

MPC
O-Plant Project
Safety Date Sheets

06/01/2018





No	Location	Product Name	Tank ID	Valume	Unit	Use	CAS	ph	Toxic	Physical State	NFPA			IBC		Note
											Health	Fire	Reactivity	Physical Hazard	Health Hazard	
1	Bldg1 - Analytical Room A	Hydrogen Peroxide (31%)	H2O2	8	gal	Use-Open	7722-84-1	3-4	No	Liquid	2	0	1	Class 2 Oxidizer		30 x 1 liter bottles for sample analysis
1	Bldg1 - Clean Room A	Hydrogen Peroxide (31%)	H2O2	8	gal	Use-Open	7722-84-1	3-4	No	Liquid	2	0	1	Class 2 Oxidizer		30 x 1 liter bottles for sample analysis
3	Bldg1 - Cylinder Room	Helium	He	136,001	gal	Use-Closed	7440-59-7		No	Gas	0	0	3	Inert Compressed Gas		4 x 13 gal Inert Gas, Not Limited
1	Bldg1 - Purification Room	Hydrogen Peroxide (31%)	H2O2	450	gal	Use-Closed	7722-84-1	3-4	No	Liquid	2	0	1	Class 2 Oxidizer		
	Bldg1 - Purification Room	Propylene Glycol	CH3CHOH CH2OH	70	gal	Use-Closed	57-55-6		No	Liquid	0	1	0	Class IIIB combustible liquid		
1	Bldg1 - Sample Drop-Off	Hydrogen Peroxide (31%)	H2O2	8	gal	Storage	7722-84-1	3-4	No	Liquid	2	0	1	Class 2 Oxidizer		30 x 1 liter bottles for sample analysis
	Bldg1 - Utility Area	Propylene Glycol	CH3CHOH CH2OH	110	gal	Use-Closed	57-55-6		No	Liquid	0	1	0	Class IIIB combustible liquid		
1	Bldg2 - Filter Room	Hydrogen Peroxide (31%)	H2O2	110	gal	Use-Closed	7722-84-1	3-4	No	Liquid	2	0	1	Class 2 Oxidizer		
1	Bldg2 - ISO Container Filling	Hydrogen Peroxide (31%)	H2O2	8400	gal	Use-Open	7722-84-1	3-4	No	Liquid	2	0	1	Class 2 Oxidizer		2 x 4,200 gal
1	Bldg2 - ISO Container Maint.	Hydrogen Peroxide (31%)	H2O2	Residue		Use-Open	7722-84-1	3-4	No	Liquid	2	0	1	Class 2 Oxidizer		
1	ORD-Lab	Hydrogen Peroxide (31%)	H2O2	5	gal	Use-Closed	7722-84-1	3-4	No	Liquid	2	0	1	Class 2 Oxidizer		
6	ORD-Lab	Acetic Acid		5	gal	Use-Closed	64-19-7			Liquid	3	2	1	Cl. 1 Water Reactive		
7	ORD-Lab	Acetonitrile		5	gal	Use-Closed	75-05-8		Yes	liquid				Class IB flammable liquid	Toxic	
8	ORD-Lab	1-amino-2-propanol		5	gal	Use-Closed	78-96-6			liquid	3	2	0	Class IB flammable liquid	Corrosive	

9	ORD-Lab	Ammonium Fluoride			5	gal	Use-Closed	12125-01-8		Yes	liquid	3	0	0	Class IB flammable liquid	Toxic	Inorganic
10	ORD-Lab	Ammonium Hydroxide (29%)			5	gal	Use-Closed	1336-21-6		Yes	liquid	3	1	0	Class IA flammable liquid	Toxic	
12	ORD-Lab	Barium Hydroxide			11	lb	Use-Closed	17194-00-2		Yes	solid					Toxic	
13	ORD-Lab	Barium Nitrate			11	lb	Use-Closed	10022-31-8		Yes	solid				Class 2 Oxidizer	Toxic	
14	ORD-Lab	Borane Dimethylamine complex			44	lb	Use-Closed	74-94-2		Yes	solid				Flammable Solid	Toxic	Organic
15	ORD-Lab	Boric Acid			11	lb	Use-Closed	10043-35-3			solid	1	0	1			
16	ORD-Lab	Citric Acid (50% aq)			55	gal	Use-Closed	77-92-9		Yes	liquid	2	0	0	Class IIIB combustible liquid	Toxic, Corrosive	Organic
17	ORD-Lab	Cobalt Sulfate Heptahydrate			44	lb	Use-Closed	10026-24			solid						
18	ORD-Lab	Copper Sulfate Pentahydrate			44	lb	Use-Closed	7758-99-8		Yes	solid					Toxic	
19	ORD-Lab	Diethyl glycol monobutyl ether			55	gal	Use-Closed	112-34-5			liquid				Class IIIB combustible liquid		
20	ORD-Lab	Diethyl glycol monomethyl ether			55	gal	Use-Closed	111-77-3			liquid	2	2	1	Class IIIB combustible liquid		
21	ORD-Lab	Diethylene triamine pernt(methylene phosphonic acid) Solution			1	gal	Use-Closed	15827-60-8			liquid					Corrosive	non-combustible and non-flammable
22	ORD-Lab	1-dodecyl-3-methylimidazolium chloride			1	gal	Use-Closed	114569-84-5			solid						Not fully tested, no information on MSDS
23	ORD-Lab	1-dodecylamine			1	gal	Use-Closed	124-22-1		No	liquid	3	1	1	Class IIIB combustible liquid	Corrosive	
24	ORD-Lab	ethanolamine			5	gal	Use-Closed	141-43-5		Yes	liquid				Class IIIA combustible liquid	Highly Toxic	
25	ORD-Lab	ethylenediaminetetraacetic Acid			44	lb	Use-Closed	60-00-04		Yes	solid					Highly Toxic	
26	ORD-Lab	Glycerol			55	gal	Use-Closed	56-81-5			liquid	1	1	0	Class IIIB combustible liquid		
27	ORD-Lab	Glyoxylic Acid			55	gal	Use-Closed	298-12-4		Yes	liquid					Highly Toxic, Corrosive	Organic, no FP or BP data
28	ORD-Lab	1-Hexadecyl-4-methylpyridinium Chloride Hydrate			11	lb	Use-Closed	13106-53-1			solid						no FP data, no BP data, or toxicity data listed
29	ORD-Lab	1,1,1,5,5,5-Hexafluoro-2,4-pentanedione			1	gal	Use-Closed	1522-22-1		Yes	liquid	4	3	0	Class IC flammable liquid, Water Reactive	Toxic, Corrosive	
30	ORD-Lab	1,1,1,3,3,3-Hexafluoro-2-propanol			1	gal	Use-Closed	920-66-1		Yes	liquid	3	0	0	Class IB flammable liquid	Toxic	
31	ORD-Lab	Hexafluorophosphoric acid solution			1	gal	Use-Closed	16940-81-1		Yes	liquid	4	0	0		Highly Toxic, Corrosive	no FP or BP data

32	ORD-Lab	Hexafluorosilicic acid (35% ww Aq. soln.)		5	gal	Use-Closed	16961-83-4			liquid	3	0	1		Corrosive	no FP listed, only BP
33	ORD-Lab	Hydrazine monohydrate		1	gal	Use-Closed	7803-57-8	Yes		liquid				Class IIIA combustible liquid	Toxic, Corrosive	
34	ORD-Lab	Hydrazine Monohydrochloride		11	lb	Use-Closed	2644-70-4	Yes		solid					Toxic, Corrosive	
35	ORD-Lab	Hydrochloric acid		1	gal	Use-Closed	7647-01-0	No		liquid	3	0	0		Corrosive	non-flammable, non-combustible
36	ORD-Lab	Hydrofluoric Acid		5	gal	Use-Closed	7664-39-3	Yes*		liquid	4	0	1		Toxic, Corrosive	non-flammable, non-combustible, lacking applicable toxicity data, but listed as fatal if ingested
37	ORD-Lab	1-Hydroxyethane-1,1-diphosphonic Acid		1	gal	Use-Closed	2809-21-4			liquid	2	0	0		Corrosive	no FP data
38	ORD-Lab	Hydroxylamine (50% aq.)		5	gal	Use-Closed	7803-49-8			liquid					Corrosive	no FP data
39	ORD-Lab	Isopropanol		55	gal	Use-Closed	67-63-0	No		liquid				Class IB flammable liquid		
40	ORD-Lab	Magnesium nitrate hydrate		11	lb	Use-Closed	10377-60-3			Solid	1	0	2	Class 2 Oxidizer		no toxicity data
41	ORD-Lab	5-methyl-1H-benzotriazole		44	lb	Use-Closed	136-85-6	No		Solid						
42	ORD-Lab	2-methylaminoethanol		5	gal	Use-Closed	109-83-1	No		liquid				Class IIIA combustible liquid		
43	ORD-Lab	N,N,N',N'-Ethylenediaminetetrakis(methylenephosphonic Acid)		1	gal	Use-Closed	1429-50-1			Solid	2	0	0			no toxicity data
44	ORD-Lab	N,N-Diethylhydroxylamine		1	gal	Use-Closed	3710-84-7	No		liquid				Class II combustible liquid		
45	ORD-Lab	N,N-Dimethylacetamide		55	gal	Use-Closed	127-19-5	No		liquid				Class IIIA combustible liquid		
46	ORD-Lab	Nitric Acid		1	gal	Use-Closed	7697-37-2			liquid				Class 2 Oxidizer		no toxicity data, no FP
47	ORD-Lab	Phosphonic Acid		5	gal	Use-Closed	7664-38-2	No		Solid						
48	ORD-Lab	Polyethylene Glycol		5	gal	Use-Closed	25388-68-3	No		solid						
49	ORD-Lab	Polyethyleneimine		1	gal	Use-Closed	9002-98-6	No		liquid	2	1	1			no FP data
50	ORD-Lab	Polypropylene glycol		1	gal	Use-Closed	25322-68-3	No		liquid	0	1	0			no FP data
51	ORD-Lab	Polyvinyl Alcohol		5	gal	Use-Closed	9002-89-5	No		solid	0	2	0			
52	ORD-Lab	Polyvinylpyrrolidone		11	lb	Use-Closed	9003-39-8	Yes		solid					Toxic	
53	ORD-Lab	Potassium Chloride		11	lb	Use-Closed	7447-40-7	No		solid						
54	ORD-Lab	Potassium hydroxide (48% aq.)		5	gal	Use-Closed	1310-58-3	Yes		liquid					Highly Toxic, Corrosive	non-combustible
55	ORD-Lab	Potassium permanganate		11	gal	Use-Closed	7722-64-7	No		solid	3	0	2	Class 2 oxidizer		
56	ORD-Lab	Potassium permanganate solution		55	gal	Use-Closed	7722-64-7			liquid						no toxicity data, no FP data, no BP data
57	ORD-Lab	Potassium phosphate monobasic		11	lb	Use-Closed	7778-77-20	No		solid						
58	ORD-Lab	Pyrazole		50	lb	Use-Closed	288-13-1	No		solid						
59	ORD-Lab	Sodium Hydroxide		11	lb	Use-Closed	1310-73-2			liquid					Corrosive	non-combustible

84	ORD-Lab	FTERGENT251			1	gal	Use-Closed	Trade Secret		Yes	liquid				Class III B combustible liquid	Toxic	
85	ORD-Lab	FTERGENT-300			1	gal	Use-Closed	Trade Secret		No	solid						
86	ORD-Lab	MEGAFACE F-510			5	gal	Use-Closed	Trade Secret			liquid	0	1	0	Class III B combustible liquid		no toxicity data
87	ORD-Lab	PAA-01			1	gal	Use-Closed	30551-89-4		No	liquid						non-flammable
88	ORD-Lab	PAA-1112			1	gal	Use-Closed	177606-24-5		No	liquid						non-flammable
89	ORD-Lab	PAS-21			1	gal	Use-Closed	62238-80-6		No	liquid						non-flammable
90	ORD-Lab	PAS-880			1	gal	Use-Closed	75665-34-8		No	liquid						non-flammable
91	ORD-Lab	PAS-92			1	gal	Use-Closed	26678-66-0		No	liquid						non-flammable
92	ORD-Lab	PAS-H-1L			1	gal	Use-Closed	26062-79-3		No	liquid						non-flammable
93	ORD-Lab	PAS-M-1L			1	gal	Use-Closed	29566-78-7		No	liquid						non-flammable
94	ORD-Lab	POLYMARON 385			1	gal	Use-Closed	Trade Secret		Yes*	liquid				Class III B combustible liquid	Toxic*	*toxic only when stored in ammonium water
95	ORD-Lab	SURFLON S-211			5	gal	Use-Closed	Trade Secret		Yes*	liquid				Class IC flammable liquid	Toxic*	*toxic only when stored in 28% ammonia
96	ORD-Lab	SURFLON S-221			5	gal	Use-Closed	Trade Secret		No	liquid				Class IA/Class IB flammable liquid		no BP data
97	ORD-Lab	SURFLON S-231			5	gal	Use-Closed	Trade Secret		No	liquid				Class IA/Class IB flammable liquid		no BP data
98	ORD-Lab	SURFLON S-232			5	gal	Use-Closed	Trade Secret		No	liquid				Class IA/Class IB flammable liquid		no BP data
99	ORD-Lab	SURFLON S-233			5	gal	Use-Closed	Trade Secret		No	liquid				Class IA/Class IB flammable liquid		no BP data
100	ORD-Lab	SURFLON S-241			5	gal	Use-Closed	Trade Secret		No	liquid				Class IA/Class IB flammable liquid		no BP data
101	ORD-Lab	SURFLON S-242			5	gal	Use-Closed	Trade Secret			liquid				Class III B combustible liquid		no toxicity data
102	ORD-Lab	SURFLON S-243			5	gal	Use-Closed	Trade Secret		No	liquid				Class III B combustible liquid		
103	ORD-Lab	SURFLON S-420			5	gal	Use-Closed	Trade Secret			liquid				Class III B combustible liquid		no toxicity data



Hydrogen Peroxide (31%)

Date: February 18, 2015

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SECTION 1 - IDENTIFICATION OF SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

SDS REVISION #: 003

1.1 PRODUCT IDENTIFIER

Trade Name: Hydrogen Peroxide (31%)
Substance name: Hydrogen peroxide
Other names: Hydrogen dioxide; Hydroperoxide; Hydrogen peroxide, solution
REACH Registration: 01-2119485845-22-0027
CAS#: 7722-84-1
EC Number: 231-765-0
EU Index Number: 008-003-00-9
Chemical Formula: H₂O₂

1.2 RELEVANT IDENTIFIED USES

Relevant use: Industrial use - electronics manufacturing, bleaching agent, water treatment, odor treatment, oxidizing agent
Use advised against: Unknown

1.3 MANUFACTURER: MGC Pure Chemicals America, Inc.
6560 South Mountain Road
Mesa, AZ 85212-9716

1.4 PHONE NUMBERS: Inquiries (480) 987-9100 (US)
81-3-3283-4755 (Japan)
Transportation emergencies - Chemtrec
(800) 424-9300 (in the US)
011-703-527-3887

1.5 EMAIL ADDRESS: contact@mgcpure.com

SECTION 2 - HAZARDS IDENTIFICATION

2.1 CLASSIFICATION OF THE SUBSTANCE (EC 1272/2008):

Human health
 Serious eye damage (Category 1) – H318
 Acute toxicity, oral (Category 4) – H302
Physical & Chemical Hazards
 Oxidizing Liquid (Category 2) – H272
Environment
 Not classified

Classification (67/548/EEC): Xn;R22. Xi;R41. O;R8
The Full Text for all R-Phrases and Hazard Statements are Displayed in Section 16.

Section 2 continued on next page



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SECTION 2 - HAZARDS IDENTIFICATION (continued)

2.2 LABEL ELEMENTS:

EC Number: 231-765-0

Pictograms:



Signal Word: Danger!

Hazard Statements: Causes serious eye damage (H318). Harmful if swallowed (H302). May intensify a fire; oxidizer (H272)

Precautionary Statements:

Prevention

Wear protective gloves/protective clothing/eye protection/face protection (P280). Wash contaminated skin thoroughly after handling (P264). Take any precaution to avoid mixing with combustibles (P221). Keep away from heat/sparks/open flames/hot surfaces. - No smoking (P210). Keep away from combustible materials (P220). Do not eat, drink or smoke when using this product (P270).

Response

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing (P305+351+338). Immediately call a POISON CENTER or doctor/physician (P310). IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell (P301+312). Rinse mouth (P330). In case of fire: Use foam, carbon dioxide, dry powder or water fog for extinction. (P370+378)

Storage

Not applicable

Disposal

Dispose of contents/container in accordance with local regulations (P501).

2.3 HAZARDS NOT OTHERWISE CLASSIFIED:

Not Classified as PBT/vPvB by current EU criteria.



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SECTION 3 - COMPOSITION / INFORMATION ON INGREDIENTS

<u>Substance</u>	<u>%</u>	<u>CAS#</u>	<u>EC#</u>	<u>Index#</u>	<u>Reach Reg.#</u>
Hydrogen peroxide	31	7722-84-1	231-765-0	008-003-00-9	01-2119485845-22-0027
Water	69	7732-18-5			

SECTION 4 - FIRST AID MEASURES

4.1 DESCRIPTION OF FIRST AID MEASURES

In Case Of Eye Contact: Immediately flush with large amounts of water for at least 15 minutes, lifting upper and lower lids occasionally. Get immediate medical attention. Do **not** use chemical antidote.

In Case Of Skin Contact: Flush with large amounts of water. If irritation persists, or open sores develop, contact a physician. Remove contaminated clothing and launder before re-use.

If Swallowed: Immediately drink two large glasses of water. Do **not** induce vomiting. Never give anything by mouth to an unconscious person. Contact a physician.

If Inhaled: If affected, move to fresh air. If breathing has stopped, give artificial respiration and call a physician.

4.2 MOST IMPORTANT SYMPTOMS AND EFFECTS:

This material causes serious eye damage and may cause skin irritation. If inhaled, it may cause irritation to the respiratory tract. Contact may result in the bleaching of skin and hair. Harmful if swallowed.

4.3 NOTES TO PHYSICIAN:

Hydrogen peroxide, at this concentration, is a strong oxidant. Direct contact with the eye is likely to cause corneal damage especially if not washed immediately. Careful ophthalmologic evaluation is recommended and the possibility of local corticosteroid therapy should be considered. Because of the likelihood of corrosive effects on the gastrointestinal tract after ingestion, and the unlikelihood of systemic effects, attempts at evacuating the stomach via emesis induction or gastric lavage should be avoided. There is a remote possibility, however, that a nasogastric or orogastric tube may be required for the reduction of severe distension due to gas formation.

Pulmonary edema may be delayed for 24-72 hours after inhalation of excessive amounts.



SECTION 5 - FIRE FIGHTING MEASURES

5.1 FLAMMABLE PROPERTIES:

This material is an oxidizer. Although this product will not burn, it releases large quantities of oxygen, which can intensify a fire. Contact between this product and organic liquids or vapors may result in fire or explosion.



5.2 EXTINGUISHING MEDIA:

Use media appropriate for other materials involved in the fire. Dilute with large amounts of water, if safe to do so, to reduce the potential for re-ignition. Do not use organic materials which may react with the product.

5.3 SPECIAL HAZARDS ARISING FROM THE SUBSTANCE

This material is a strong oxidizer. Although this product will not burn, it releases large quantities of oxygen, which can intensify a fire. Contact between this product and organic liquids or vapors may result in fire or explosion.

5.4 ADVICE FOR FIREFIGHTERS:

Keep personnel removed from and upwind. Wear full protective clothing and self-contained breathing apparatus with full face-piece. Flood area with lots of water. Cool containers with water.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

6.1 PRECAUTIONS, PROTECTIVE EQUIPMENT & EMERGENCY PROCEDURES:

Persons not wearing protective equipment should be excluded from the area of the spill until cleanup has been completed.

6.2 ENVIRONMENTAL PRECAUTIONS:

Avoid discharge to the aquatic environment.

6.3 CONTAINMENT & CLEAN-UP:

Dike area of spill with sand or dirt to prevent spreading and prevent contact with organic materials. Pump liquid to a salvage tank for treatment and disposal. Dilute remaining liquid to 5-10% hydrogen peroxide and neutralize with sodium metabisulfite or sodium sulfite. Remaining liquid may be absorbed on vermiculite or other non-combustible material and shoveled into containers.

Caution: material absorbed on absorbent may continue liberating oxygen. Do not seal containers. Do not store containers near combustible materials.

6.4 REFERNECE TO OTHER SECTIONS:

See Section 8 for appropriate protective equipment



SECTION 7 - HANDLING AND STORAGE

7.1 PRECAUTIONS FOR SAFE HANDLING:

Use caution when handling this material; product may react explosively with organic liquids or vapors. Avoid contact with flammable or combustible materials. Avoid contamination from any source including metals, dust and organic materials. Do not return used or unused peroxide to original container; dispose of in accordance with Section 13 - Disposal Considerations. This product is an oxidizer, which may liberate oxygen and promote combustion of flammable materials. Avoid concentrating hydrogen peroxide by removal of water. Drying of product on combustible material may cause fire or explosion.

Avoid contact with skin, eyes and clothing. Avoid inhalation of vapors. Wash thoroughly after handling.

7.2 CONDITIONS FOR SAFE STORAGE:

Store only in vented containers. Store in a cool, dry, well-ventilated area, away from flammable or combustible materials. Have a source of water available near the storage area. Check storage area periodically for bulging containers. For shelf-life limitations and recommendations – contact supplier.

SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 CONTROL PARAMETERS:

Hydrogen peroxide
(CAS# 7722-84-1)

OSHA PEL - 1 ppm (1.4 mg/M³)
ACGIH TLV - 1 ppm (1.4 mg/M³)
NIOSH REL - 1 ppm (1.4 mg/M³)
OEL (8-hr.) - 1 ppm (1.4 mg/M³)
OEL (15 min.) – 2 ppm (4.8 mg/M³)

OEL = Occupational Exposure Limit

8.2 EXPOSURE CONTROLS:

Engineering Controls: Provide sufficient ventilation to maintain exposure below established exposure limits.

Eye / Face Protection: Chemical splash goggles in compliance with OSHA regulations and full face-shield made of polycarbonate, acetate, polycarbonate/acetate, PETG or thermoplastic, are advised.



SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION (continued)

Skin Protection: Wear impervious clothing such as a protective suit made of rubber, Gore-Tex, or a specialized HAZMAT suit (Level A, B, or C). For foot protection, wear approved boots made of rubber, PVC, or neoprene. DO NOT wear any form of boot made of nylon or nylon blends. For hand protection, wear approved gloves made of nitrile, PVC, or neoprene. DO NOT use cotton, wool or leather, as these materials react RAPIDLY with higher concentrations of hydrogen peroxide.

Completely submerge contaminated clothing or other materials in water prior to drying. Residual hydrogen peroxide, if allowed to dry on materials such as paper, fabrics, cotton, leather, wood or other combustibles can cause the material to ignite and result in a fire.

Respiratory Protection: A NIOSH/MSHA approved respirator is recommended if there is insufficient ventilation to maintain exposures below established exposure limits. Do not use an air-purifying respirator.

Environmental Exposure Controls: None known

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Clear, colorless liquid @ 77° F (25° C)

Odor: Slightly pungent, irritating

Odor Threshold: Unavailable

pH: 3-4

Freezing Point: -15° F (-26° C)

Initial Boiling Point: 223° F (106° C) @ 760 mm Hg

Flash Point: None - Closed Cup

Evaporation Rate: Slower

(Ethyl Ether = 1)

Upper Explosion Limit: Unavailable

Lower Explosion Limit: Unavailable

Vapor Pressure (mm Hg): 22 @ 86° F (30° C)

Vapor Density (Air = 1): Unavailable

Relative Density (H₂O=1): ~1.11 @ 68° F (20° C)

Solubility in Water: Complete

Partition Coefficient: Unavailable

(n-octanol/water)

Autoignition Temperature: Not combustible

Decomposition Temperature: Unavailable

Viscosity: Unavailable

SECTION 10 - STABILITY AND REACTIVITY

10.1 REACTIVITY:

Contact with organic substances may cause fire or explosion. Contact with metals, metallic ions, alkalis, reducing agents and organic matter (such as alcohols or terpenes) may produce self-accelerated thermal decomposition.

Section 10 continued on next page



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SECTION 10 - STABILITY AND REACTIVITY (continued)

- 10.2 CHEMICAL STABILITY:
Stable under normal conditions; however, heat or contamination may result in decomposition, which may be violent.
- 10.3 POSSIBILITY OF HAZARDOUS REACTIONS:
Reacts with combustible materials or organic materials, releasing heat and oxygen. Contact with metals, metallic ions, alkalis, reducing agents and organic matter (such as alcohols or terpenes) may produce self-accelerated thermal decomposition.
- 10.4 CONDITIONS TO AVOID:
Heat or contamination may result in decomposition, which may be violent.
- 10.5 INCOMPATIBLE MATERIALS:
Avoid contact with combustible materials, copper alloys, galvanized iron, strong reducing agents heavy metals, iron, copper alloys. Contact with metals, metallic ions, alkalis, reducing agents and organic matter (such as alcohols or terpenes) may produce self-accelerated thermal decomposition.
- 10.6 HAZARDOUS DECOMPOSITION PRODUCTS:
Decomposition releases large quantities of oxygen and steam, which may cause containers to rupture and intensify a fire.

SECTION 11 - TOXICOLOGICAL INFORMATION

- 11.1 LIKELY ROUTES OF EXPOSURE:
Skin and eye contact and inhalation
- 11.2 SYMPTOMS:
Skin contact: Redness
Eye contact: Pain, redness, tearing and irritation
Inhalation: Coughing and irritation of the nose and throat
- 11.3 EFFECTS FROM EXPOSURE:
Immediate: Causes serious eye damage and skin irritation. May cause irritation to the nose and respiratory tract. Can cause bleaching of skin and hair.
Delayed: Damage to lungs
Chronic: Unavailable

Section 11 continued on next page



SECTION 11 - TOXICOLOGICAL INFORMATION (continued)

11.4 TOXICITY DATA (hydrogen peroxide):

Acute toxicity

- Oral LD₅₀ (male rats) - 1,518 mg/kg (9.6% H₂O₂)
- Oral LD₅₀ (male rats) - 1193 mg/kg (35% H₂O₂)
- Dermal LD₅₀ (rabbits) - >2,000 mg/kg (35% H₂O₂)
- Inhalation LC₅₀ (rats) - >2,000 ppm (90% H₂O₂)

Eye irritation

- Irritating at concentrations of 5% or less
- Severely irritating to corrosive at concentrations of 5% or more

Skin irritation

- Corrosive at concentrations of 50% or more

Sensitization

- Not a skin sensitizer

Subacute toxicity

Male rats were administered 60 mg/kg/day (0.6% H₂O₂). Suppression in growth rate observed after day 20.

Male rats were administered 56.2 mg/kg/day (5% H₂O₂) for twelve weeks. No adverse effects noted.

Carcinogenicity

Mice were administered water containing 0.1 and 0.4% H₂O₂ for a period of 740 days. Some mice have developed duodenal cancer. FDA and other organizations have reviewed this study and concluded that there is insufficient evidence that hydrogen peroxide is carcinogenic.

Rats were administered water containing 0.3 and 0.6% H₂O₂ for a period of 78 weeks. No carcinogenic effects were noted.

Mutagenicity

Weak mutagenicity-inducing property to *salmonella* and *typhimurium* bacteria

Reproductive toxicity

Female rats treated with 10% H₂O₂ produced offspring of lower body weight and some structural abnormalities. These changes were attributed to maternal toxicity.

Other limited animal studies demonstrate no reproductive toxicity.



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SECTION 11 - TOXICOLOGICAL INFORMATION (continued)

11.5 CARCINOGENICITY

The International Agency for Research on Cancer (IARC) has concluded that there is inadequate evidence for carcinogenicity of hydrogen peroxide in humans, but limited evidence in experimental animals (Group 3 - not classifiable as to its carcinogenicity to humans). The American Conference of Governmental Industrial Hygienists (ACGIH) has concluded that hydrogen peroxide is a 'Confirmed Animal Carcinogen with unknown Relevance to Humans' (A3). Hydrogen peroxide is not regulated by OSHA as a carcinogen, nor is it listed in NTP.

SECTION 12 - ECOLOGICAL INFORMATION

12.1 ECOTOXICITY (hydrogen peroxide):

Hydrogen peroxide is naturally produced by sunlight (between 0.1 and 4 ppb in air and 0.001 to 0.1 mg/L in water). Not expected to have significant environmental effects.

Aquatic toxicity (saltwater)

24-hr. LC₅₀ (Rabbit fish) - 224 mg/L

24-hr. LC₅₀ (Striped triple-tooth goby) - 155 mg/L

24-hr. LC₅₀ (Yellowfin horse mackerel) - 89 mg/L

Aquatic toxicity (fresh water)

48-hr. LC₅₀ (Carp) - 41 mg/L

96-hr. LC₅₀ (Catfish) - 37.4 mg/L

Algal toxicity

72-96 hr. EC₅₀ (various species) - 3.7-160 mg/L (fresh water)

72-96 hr. EC₅₀ (*Nitzschia closterium*) - 0.87 mg/L (salt water)

11.2 PERSISTENCE AND BIODEGRADABILITY

Hydrogen peroxide in the aquatic environment is subject to various reduction or oxidation processes and decomposes into water and oxygen. Hydrogen peroxide half-life in freshwater ranged from 8 hours to 20 days, in air from 10 - 20 hours, and in soils from minutes to hours depending upon microbiological activity and metal contamination.

11.3 BIOACCUMULATIVE POTENTIAL:

Not bioaccumulative

11.4 MOBILITY IN SOIL:

Will likely be mobile in the environment due to its water solubility

11.5 PBT and vPvT ASSESSMENT:

Not Classified as PBT/vPvB by current EU criteria.

11.6 OTHER ADVERSE EFFECTS:

Decomposes into oxygen and water. No adverse effects expected.



SECTION 13 - DISPOSAL CONSIDERATIONS

Dispose of in accordance with all applicable local, state and federal regulations. Material should be sent to a registered hazardous waste treatment facility for disposal. Hydrogen peroxide should be treated by diluting to a concentration of 5-10%, then reacting with a reducing agent such as sodium sulfite or sodium metabisulfite.

This product, if disposed of, is considered an ignitable waste (D001) under current RCRA regulations.

SECTION 14 - TRANSPORT INFORMATION

14.1 U.S. DOT, TDG (CANADIAN), ICAO (AIR), IMO (WATER) ADR/RID/ADN (European) TRANSPORT REGULATIONS:

UN Number:	UN 2014
Shipping Name:	Hydrogen peroxide, aqueous solutions (30-34%)
Hazard Class:	5.1
Subsidiary Risk:	(8)
Packing Group:	II
Reportable quantity (US):	None
Marine Pollutant:	No

Labeling:



14.2 ENVIRONMENTAL HAZARDS

Reportable quantity (US):	None
Marine Pollutant:	No
Environmentally Hazardous Substance:	No

14.3 SPECIAL PRECAUTIONS FOR USER

EMS:	F-H, S-Q
Emergency Access Code:	2P
Hazard Number:	58
Tunnel Restriction Code:	(E)

14.4 TRANSPORT IN BULK ACCORDING TO ANNEX II OF MARPOL73/78 & IBC CODE
Not applicable



SECTION 15 - REGULATORY INFORMATION

15.1. EU SAFETY, HEALTH & ENVIRONMENTAL REGULATIONS/LEGISLATION SPECIFIC FOR THE SUBSTANCE OR MIXTURE

Dangerous Substance Directive 67/548/EEC
Dangerous Preparations Directive 1999/45/EC
(EC) No 1907/2006 (REACH).
(EC) No 1272/2008 (CLP)
(EU) No 453/2010

15.2. CHEMICAL SAFETY ASSESSMENT

A chemical safety assessment has been carried out.

15.3. CHEMICAL INVENTORIES

TSCA (US): All components in this product are in compliance with the TSCA Inventory requirements.

EINECS (Europe): All components in this product are listed on the European Inventory of Existing Chemical Substance (231-765-0).

CEPA (Canada): All components in this product are listed on the Canadian Domestic Substances List (DSL).

15.4. US ENVIRONMENTAL REGULATIONS:

SARA

CERCLA/SARA 302: Hydrogen peroxide (CAS# 7722-84-1) TPQ – 1000#

CERCLA/SARA 311/312: Acute, fire

CERCLA/SARA 313: Not applicable

CALIFORNIA PROPOSITION 65:

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.



Hydrogen Peroxide (31%)

Date: February 18, 2015

Safety Data Sheet

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SECTION 16 - OTHER INFORMATION

HMIS HAZARD RATING: Health – 3, Fire – 0, Physical hazard - 1

RISK PHRASES IN FULL

NC Not classified. R22 Harmful if swallowed. R41 Risk of serious damage to eyes. R8 Contact with combustible material may cause fire.

HAZARD STATEMENTS IN FULL

H272 May intensify fire; oxidizer. H302 Harmful if swallowed. H318 Causes serious eye damage.

PREPARATION DATE: February 18, 2015

SUPERCEDES: Revision 2, dated August 1, 2013

REASON FOR REVISION: Updated to comply with EU requirements

The product information contained herein is believed to be accurate as of the date of the Safety Data Sheet, and is provided without warranty, expressed or implied, as to the results of use of this information or the product to which it relates. Recipient assumes all responsibility for the use of this information and the use (alone or in combination with any other product), storage or disposal of the product, including any resultant personal injury or property damage.

****END OF REPORT****

SAFETY DATA SHEET
HYPROX(TM) 600-720 HYDROGEN PEROXIDE



Material no.		Version	5.0 / US
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1. Identification

1.1. Product identifier

Trade name HYPROX(TM) 600-720 HYDROGEN PEROXIDE
CAS-No. 7722-84-1

1.2. Recommended use of the chemical and restrictions on use

Relevant applications identified For industrial use
Function For oxidation

1.3. Details of the supplier of the safety data sheet

Company Evonik Corporation USA
299 Jefferson Road
Parsippany, NJ 07054-0677
USA

Telephone 973-929-8000

Telefax 973-929-8040

Email address Product-Regulatory-Services@Evonik.com

1.4. 24 HOUR EMERGENCY TELEPHONE NUMBERS:

CHEMTREC - US & CANADA: 800-424-9300

CHEMTREC MEXICO: 01-800-681-9531

CHEMTREC INTERNATIONAL: +1 703-527-3887 (collect calls accepted)

Product Regulatory Services : 973-929-8060

2. Hazards identification

2.1. Classification of the substance or mixture

Globally Harmonized System of Classification and Labelling of Chemicals (GHS)

Oxidizing liquids	Category 1	H271
Acute toxicity (Oral)	Category 4	H302
Skin corrosion	Category 1A	H314
Serious eye damage	Category 1	H318
Specific target organ toxicity - single exposure (Respiratory system)	Category 3	H335
Acute aquatic toxicity	Category 2	H401
Chronic aquatic toxicity	Category 2	H411

2.2. Label elements

Statutory basis Globally Harmonized System of Classification and Labelling of Chemicals (GHS)

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hazard-defining component(s) (GHS)

|| • hydrogen peroxide solution
Symbol(s)



Signal word

Danger

Hazard statement

H271 - May cause fire or explosion; strong oxidiser.
H302 - Harmful if swallowed.
H314 - Causes severe skin burns and eye damage.
H318 - Causes serious eye damage.
H335 - May cause respiratory irritation.
H411 - Toxic to aquatic life with long lasting effects.

Precautionary statement:
Prevention

P210 - Keep away from heat.
P220 - Keep/Store away from clothing/ combustible materials.
P221 - Take any precaution to avoid mixing with combustibles.
P261 - Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264 - Wash skin thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P271 - Use only outdoors or in a well-ventilated area.
P280 - Wear protective gloves/ protective clothing/ eye protection/ face protection.
P283 - Wear fire/ flame resistant/ retardant clothing.
P273 - Avoid release to the environment.

Precautionary statement:
Reaction

P310 - Immediately call a POISON CENTER or doctor/ physician.
P301 + P330 + P331 - IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P306 + P360 - IF ON CLOTHING: rinse immediately contaminated clothing and skin with plenty of water before removing clothes.
P363 - Wash contaminated clothing before reuse.
P370 + P378 - In case of fire: Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide to extinguish.
P371 + P380 + P375 - In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion.
P391 - Collect spillage.

Precautionary statement:
Storage

P403 + P233 - Store in a well-ventilated place. Keep container tightly closed.
P405 - Store locked up.

Precautionary statement:
Disposal

P501 - Dispose of contents/ container to an approved waste disposal plant.

Supplemental hazard information / Label elements

2.3. Other hazards

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Product is a strong oxidizing agent.
Danger of decomposition under influence of heat.
Risk of decomposition in contact with incompatible substances, impurities, metals, alkalis, reducing agents.
Risk of explosion with organic solvents.
see also section 10.

3. Composition/information on ingredients**Chemical nature**

aqueous solution, clear

• hydrogen peroxide solution	>= 60% - <= 72%	
CAS-No.	7722-84-1	
Oxidizing liquids		Category 1
Acute toxicity (Oral)		Category 4
Skin corrosion		Category 1A
Serious eye damage		Category 1
Specific target organ toxicity - single exposure (Respiratory system)		Category 3
Acute aquatic toxicity		Category 2
Chronic aquatic toxicity		Category 3

Other information

This material is classified as hazardous under OSHA regulations.
See Section 8 for Exposure Guidelines

4. First aid measures**4.1. Description of first aid measures****General advice**

Pay attention to self-protection.
Remove victims from hazardous area. Immediately remove soiled or soaked clothing and remove it to a safe distance. Keep victim warm, in a stabilized position and covered.
Do not leave victims unattended.
If the casualty is unconscious: Place the victim in the recovery position.

Inhalation

Potential for exposure by inhalation if aerosols or mists are generated.
Move victims into fresh air.
With labored breathing: Provide with oxygen. Consult a doctor.
If the casualty is not breathing: Perform mouth-to-mouth resuscitation, notify emergency physician immediately.

Skin contact

Wash off affected area immediately with plenty of water for at least 15 minutes.
If symptoms persist, consult a physician for treatment.

Eye contact

With eye held open, thoroughly rinse immediately with plenty of water for at least 10 minutes.
Consult an ophthalmologist immediately if the symptoms persist.
When dealing with caustic substances, notify emergency physician immediately (key words: burns in eye).

Ingestion

Rinse mouth.
Immediately give large quantities of water to drink.

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Obtain medical attention.

When dealing with caustic substances, notify emergency physician immediately.

4.2. Most important symptoms and effects, both acute and delayed**Symptoms**

Irritation of skin and mucous membranes

Causes burns.

daze,

Headache, vertigo, somnolence (sleepiness), nausea.

Health injuries may be delayed.

Hazards

Strongly irritating to corrosive.

Harmful in contact with skin and if swallowed.

Vapours may cause drowsiness and dizziness.

4.3. Indication of any immediate medical attention and special treatment needed

The initial focus is only on the local action, characterized by quickly progressing deep tissue damage.

In the eye, caustic/ irritating and harmful liquids cause, depending on the intensity of exposure, various levels of irritation, destruction, and ablation of the epithelium of the conjunctiva and cornea, corneal clouding, edema and ulcerations.

Danger! Possible loss of eyesight!

Superficial irritations and damage up to ulcerations and scarring develop on the skin.

After accidental absorption in the body, the pathology and clinical findings are dependent on the kinetics of the substance (quantity of absorbed substance, the absorption time, and the effectiveness of early elimination measures (first aid)/ excretion - metabolism).

A specific action of the substance is unknown.

In case of substances with high water solubility, irritations up to formation of necrosis in the upper respiratory tract may result after inhalation of caustic/ irritating aerosols and mists.

The initial focus is on the local action: signs of irritation of the respiratory tract such as coughing, burning behind the sternum, tears, burning in the eyes or nose.

There is a risk of pulmonary edema!

5. Fire-fighting measures**5.1. Extinguishing media**

Suitable extinguishing media water spray, Adapt fire-extinguishing measures to surroundings, Foam, dry powder, Carbon dioxide (CO₂)

Unsuitable extinguishing media organic compounds

5.2. Special hazards arising from the substance or mixture

Product is fire-stimulating.

Contact with the following substances may cause inflammation: flammable substances.

The product itself does not burn. Involved in fire, it may decompose yielding oxygen.

Risk of overpressure and burst due to decomposition in confined spaces and pipes.

Release of oxygen may support combustion.

5.3. Advice for firefighters

Evacuate personnel to safe areas.

Keep out unprotected persons.

Keep unauthorized persons away.

With large-scale fire, violent decomposition or even explosion is possible.

In the case of fire, cool the containers that are at risk with water or dilute with water (flooding).

or

In case of fire, remove the endangered containers and bring to a safe place, if this can be done safely.

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Evacuate area and fight fire from a safe distance.

Stay upwind; keep out of low areas.

Containers can build up pressure if exposed to heat (fire). Cool with water spray. As in any fire, wear self-contained, pressure-demand breathing apparatus (MSHA-NIOSH approved or equivalent) and full protective gear.

Use water spray or fog to knock down irritating vapor.

In the case of fire, wear respiratory protective equipment independent of surrounding air and chemical protective suit.

6. Accidental release measures**6.1. Personal precautions, protective equipment and emergency procedures**

Product causes chemical burns. Evacuate personnel to safe areas. Keep out unprotected persons. Keep unauthorized persons away.

6.2. Environmental precautions

Observe regulations on prevention of water pollution (check, dam up, cover up)., Dam with sand or earth, Do not use: textiles, saw dust, combustible substances., Do not permit to enter into surface water, stretches of water, soil undiluted. Obey relevant local, state, provincial and federal laws and regulations. Do not contaminate any lakes, streams, ponds, groundwater or soil.

6.3. Methods and material for containment and cleaning up

In case of larger quantities: Collect product in suitable containers (e. g. made of plastic) using appropriate equipment (e. g. liquid pump). Keep away from flammable substances. Keep away from incompatible substances. Rinse away any residue with plenty of water. Dispose of absorbed material in accordance with the regulations. With small amounts: Dilute product with lots of water and rinse away. or Absorb with liquid-binding material, e. g.: diatomaceous earth or universal binder. Pick up mechanically. Collect in suitable containers. Clean contaminated surface thoroughly. Pack and label wastes like the pure substance. Do not detach label from the delivery containers prior to disposal.

Additional advice

Make safe or remove all sources of ignition.

Shut off leak, if possible and safe to do.

Isolate defective containers immediately, if possible and safe to do.

Place defective containers in waste receptacle (waste packaging receptacle) made of plastic (not metal).

Do not seal defective containers or waste receptacles airtight (danger of bursting due to product decomposition).

Never return spilled product into its original container for re-use. (Risk of decomposition.).

Never return spilled product into its original container. Never put spilled material into another container for disposal. Dilute with large amounts of water to a concentration of about 5% Hydrogen Peroxide; hold in diked area or pond until peroxide is completely decomposed or dispose of according to all relevant local, provincial, state, and federal laws and regulations. Ventilate area. Use personal protective equipment as described in section 8. If necessary, contact supplier for recommendations to decompose dilute peroxide (5%).

SPONTANEOUS COMBUSTION HAZARD: Combustible materials exposed to hydrogen peroxide should be immediately submerged in or rinsed with large amounts of water to ensure that all hydrogen peroxide is removed. Residual hydrogen peroxide that is allowed to dry (upon evaporation hydrogen peroxide can concentrate) on organic materials such as paper, fabrics, cotton, leather, wood, or other combustibles, can cause the material to ignite and result in a fire.

7. Handling and storage**7.1. Precautions for safe handling**

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Handle in accordance with good industrial hygiene and safety practice. Avoid impurities and heat effect. Ensure there is good room ventilation. Avoid contact with skin, eyes and clothing. Do not inhale vapour, aerosols, mist. Wear personal protective equipment. Immediately change moistened and saturated work clothes. Immediately rinse contaminated or saturated clothing with water. Provide for installation of emergency shower and eye bath. Set up safety and operation procedures. Never return spilled product into its original container for re-use. (Risk of decomposition.)

7.2. Conditions for safe storage, including any incompatibilities**Advice on protection against fire and explosion**

Avoid sun rays, heat, heat effect.
Keep away from sources of ignition - No smoking.
Keep away from flammable substances.
Keep away from incompatible substances.

Storage

cool, dry, clean.
well ventilated
Jointless smooth concrete floor.
Recommendation: Acid-proof floor.
Only use containers which are specially permitted for: hydrogen peroxide and/or
For transport, storage and tank installations only use suitable materials.
Use adequate venting devices on all packages, containers and tanks and check correct operation periodically.
Do not confine product in unvented vessels or between closed valves.
Risk of overpressure and burst due to decomposition in confined spaces and pipes.
Packages, containers and tanks should regularly be checked by visual observation for any sign of abnormality, e.g. corrosion, exert pressure (bulging), temperature increase etc.
Transport and store container in upright position only.
Always close container tightly after removal of product.
Do not keep the container sealed.
Ensure tightness at all times. Avoid leakage.
Avoid residues of the product on the containers.

Suitable materials	stainless steel 304L or 316L passivated
Suitable materials	aluminium 5254 or 1060: min. 99.5 % passivated
Suitable materials	aluminium magnesium alloys, passivated
Suitable materials	polyethylene, polypropylene, polyvinyl chloride (PVC),
Suitable materials	polytetrafluoroethylene
Suitable materials	glass, ceramics.

Unsuitable materials Iron, Mild steel, Copper, Bronze, brass, Zinc, tin

Keep away from heat. Store in a cool, dry place. Keep container closed when not in use.
Consult NFPA 400 for storage area guidance. Storage and handling designs should be arranged in consultation with a person experienced in these types of assessments.
Do not store together with: combustible material

Further information

Measures for storing in tank installations. These should include at least:
Compatible materials, adequate separation, adequate venting area, venting devices, temperature measurement, earthing (grounding), bund in case of leakage.
Prior to the first filling and operation of a tank installation all parts of the facility including all pipes must be thoroughly cleaned and flushed through.
Metal elements of the installation must first be pickled and passivated sufficiently.

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For detailed information on design specifications for the construction of tank- and dosing installations ask the producer for advice.

Regularly verify the availability of water to deal with emergencies (for cooling, tank flooding, fire fighting) and check correct operation periodically.

Advice on common storage

Do not store together with: alkalis, reductants, metallic salts (risk of decomposition).

Do not store together with: inflammable substances (risk of fire).

Do not store together with: organic solvents (risk of explosion).

8. Exposure controls/personal protection**8.1. Control parameters**

• Hydrogen Peroxide		
CAS-No.	7722-84-1	
Control parameters	1 ppm	Time Weighted Average (TWA):(ACGIH)
Control parameters	1 ppm 1.4 mg/m ³	Permissible exposure limit:(OSHA Z1)
Control parameters	1 ppm 1.4 mg/m ³	Time Weighted Average (TWA) Permissible Exposure Limit (PEL):(US CA OEL)

Other information

Suitable measuring processes are:

OSHA method ID 006

OSHA method VI-6

DNEL/DMEL values

End Use	Worker
Routes of exposure	Inhalation
Possible health damage	Acute - local effects
Value	3 mg/m ³
End Use	Worker
Routes of exposure	Inhalation
Possible health damage	Long-term - local effects
Value	1.4 mg/m ³
End Use	Consumers
Routes of exposure	Inhalation
Possible health damage	Acute - local effects
Value	1.93 mg/m ³
End Use	Consumers
Routes of exposure	Inhalation
Possible health damage	Long-term - local effects
Value	0.21 mg/m ³

PNEC values

Value	Freshwater 0.0126 mg/l
	marine water

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Value	0.0126 mg/l
	water - intermittent releases
Value	0.0138 mg/l
	sewage treatment plant
Value	4.66 mg/l
	Fresh water sediment
Value	0.47 mg/kg (dry weight)
	marine water sediment
Value	0.47 mg/kg (dry weight)
	soil
Value	0.0023 mg/kg (dry weight)

8.2. Exposure controls**Engineering measures**

Ensure suitable suction/aeration at the work place and with operational machinery.
Provide for installation of emergency shower and eye bath.

Personal protective equipment**Respiratory protection**

A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 or applicable federal/provincial requirements must be followed whenever workplace conditions warrant respirator use. NIOSH's "Respirator Decision Logic" may be useful in determining the suitability of various types of respirators.

If workplace exposure limit is exceeded apply Respiratory protective equipment.

If open handling is unavoidable:

Wear respiratory protection.

If necessary: Provide with fresh air.

If necessary: Local ventilation.

When handling for a short time:

3M recommends the 3M 6003 Organic Vapor/Acid Gas Cartridge, the 3M 6006 Multi-Gas/Vapor Cartridge, and equivalent cartridges or combination versions of these be used for H₂O₂ for concentrations up to ~ 90ppm.

in the event of prolonged exposure during handling:

wear a self contained respiratory apparatus

Note time limit for wearing respiratory protective equipment.

Hand protection

Glove material butyl-rubber, for example: Butoject 898, Kächele-Cama Latex GmbH (KCL), Germany

Material thickness 0.7 mm

Break through time > 480 min

Method DIN EN 374

Glove material Natural rubber (NR), for example: Combi-Latex 395, Kächele-Cama Latex GmbH (KCL), Germany

Material thickness 1 mm

Break through time < 120 min

Method DIN EN 374

The above mentioned hand protection is based on knowledge of the chemistry and anticipated uses of this product but it may not be appropriate for all workplaces. A hazard assessment should be conducted prior to use to ensure suitability of gloves for specific work environments and processes prior to use.

Use impermeable gloves.

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Eye protection

Use chemical splash goggles and face shield.

Skin and body protection

Wear protective clothing, acid-proof.

Suitable materials are:

PVC, neoprene, nitrile rubber (NBR), rubber.

Rubber or plastic boots

Where splashing is possible, full chemically resistant protective clothing (e.g. acid suit) and boots are required.

A safety shower and eye wash fountain should be readily available.

To identify additional Personal Protective Equipment (PPE) requirements, it is recommended that a hazard assessment in accordance with the OSHA PPE Standard (29CFR1910.132) be conducted before using this product.

Hygiene measures

Do not inhale vapour, aerosols, mist.

Avoid contact with skin, eyes and clothing.

Ensure there is good room ventilation.

The work-place related airborne concentrations have to be kept below of the indicated exposure limits. If the limits at the workplace are exceeded and/or larger amounts are released (leakage, spilling, etc.) the indicated respiratory protection should be used.

No eating, drinking, smoking, or snuffing tobacco at work.

Wash face and/or hands before break and end of work.

Preventive skin protection

Avoid contaminating clothes with product.

Immediately change moistened and saturated work clothes.

Immediately rinse contaminated or saturated clothing with water.

Any contaminated protective equipment is to be cleaned after use.

Protective measures

Handle in accordance with good industrial hygiene and safety practice.

Wear suitable protective clothing, gloves and eye/face protection.

Avoid protective gloves, clothes and shoes made from the following materials:

Leather

Completely submerge hydrogen peroxide contaminated clothing or other materials in water prior to drying.

Residual hydrogen peroxide, if allowed to dry on materials such as paper, fabrics, cotton, leather, wood or other combustibles can cause the material to ignite and result in a fire.

9. Physical and chemical properties

9.1. Information on basic physical and chemical properties

physical state	liquid
Colour	colourless, clear
Form	liquid
Odour	stinging
Odour Threshold	No data available
pH	< 3 (20 °C)
Melting point/range	-40.3 °C
Boiling point/range	ca. 125 °C
Flash point	Not combustible.

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Evaporation rate	No data available
Flammability (solid, gas)	not flammable
Lower explosion limit	No data available
Upper explosion limit	No data available
Vapour pressure	2.99 hPa (25 °C) tested substance: hydrogen peroxide 100 %
Vapour density	No data available
Relative density	1.2839 (25 °C)
Density	1.289 g/cm ³ (20 °C)
Water solubility	miscible
Partition coefficient: n-octanol/water	log Pow: -1.57 Method: (calculated) tested substance: hydrogen peroxide 100 %
Autoignition temperature	No data available
Thermal decomposition	No data available
Viscosity, dynamic	1.90 mPa.s (0 °C)

9.2. Other information

Explosiveness	not explosive
Oxidizing properties	The substance or mixture is classified as oxidizing with the category 1.
Surface tension	ca. 77.36 mN/m (20 °C)
Metal corrosion	No data available
Molecular Weight	34.02 g/Mol
Other information	strong oxidizing agent oxidizing

10. Stability and reactivity**10.1. Reactivity**

No further information available

10.2. Chemical stability

No further information available

10.3. Possibility of hazardous reactions

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Stability
Possibility of hazardous
reactions

Stable under recommended storage conditions.
Product is a strong oxidizing agent.
product is very reactive.
Commercial products are stabilised to reduce risk of decomposition due to contamination.
Danger of decomposition if exposed to heat

When coming in contact with the product, impurities, decomposition catalysts, incompatible substances, combustible substances, may lead to self-accelerated, exothermic decomposition and the formation of oxygen.

Risk of overpressure and burst due to decomposition in confined spaces and pipes.
Release of oxygen may support combustion.

Mixtures with organic materials (e.g. solvents) can display explosive properties.

A severe detonation hazard may exist when mixed with organic liquids, e.g. kerosene or gasoline.

SPONTANEOUS COMBUSTION HAZARD: Combustible materials exposed to hydrogen peroxide should be immediately submerged in or rinsed with large amounts of water to ensure that all hydrogen peroxide is removed. Residual hydrogen peroxide that is allowed to dry (upon evaporation hydrogen peroxide can concentrate) on organic materials such as paper, fabrics, cotton, leather, wood, or other combustibles, can cause the material to ignite and result in a fire.

10.4. Conditions to avoid

sun rays, heat, heat effect
Upon contact with combustible organic solvents self-ignition may occur.

10.5. Incompatible materials

impurities, decomposition catalysts, metals, metallic salts, alkalis, hydrochloric acid, reducing agents., (Risk of decomposition.).
flammable substances (Danger of fire).
organic solvents (danger of explosion)

10.6. Hazardous decomposition products

decomposition products Under conditions of thermal decomposition:
Steam, Oxygen

Under NFPA 400 - Hazardous Materials Code - 2013 Edition, Hydrogen Peroxide solutions are categorized in Appendix G as follows:

Solutions greater than 27.5% up to 52% are Class 2 Oxidizers.

Solutions greater than 52% up to 91% are Class 3 Oxidizers.

No further information available

11. Toxicological information**11.1. Information on toxicological effects**

Acute oral toxicity

LD50 Rat(female): 694 mg/kg

Method: OECD Test Guideline 401

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	Test substance:	Hydrogen peroxide 70 %
	LD50 rat(male):	1026 mg/kg
	Method:	OECD Test Guideline 401
	Test substance:	Hydrogen peroxide 70 %
Acute inhalation toxicity	LC50 Rat(male/female):	> 0.17 mg/l / 4 h
	Method:	US-EPA-method
	Test substance:	hydrogen peroxide, 50 %
	Assessment:	The substance or mixture has no acute inhalation toxicity the maximum dose attainable under experimental conditions no fatalities
Acute dermal toxicity	LD50 Rabbit:	> 6500 mg/kg
	Method:	literature
	Test substance:	Hydrogen peroxide 70 %
	LD50 Rabbit(male/female):	> 2000 mg/kg
	Method:	US-EPA-method
	Test substance:	hydrogen peroxide, 35 %
Skin irritation	Rabbit / 3 min	strongly corrosive
	Method:	literature
	Test substance:	Hydrogen peroxide 70 %
	Rabbit / 4 h	irritating
	Test substance:	hydrogen peroxide, 35 %
Eye irritation	Rabbit	Risk of serious damage to eyes.
	Method:	literature
	Test substance:	hydrogen peroxide, 35 %
	Rabbit	irritating
	Method:	OECD Test Guideline 405
	Test substance:	hydrogen peroxide 10 %
	literature	
Sensitization	Sensitization test guinea pig:	not sensitizing
	Method:	(Magnusson-Kligman test)
	literature	
Repeated dose toxicity	Oral Mouse(female) / 90-day	
	Subsequent observation period:	6 weeks
	NOEL	37 mg/kg
	target organ/effect	Changes of parameters of the blood, body weight development negative, Irritative effect:, Gastrointestinal tract
	Method:	OECD TG 408
	Test substance:	hydrogen peroxide, 35 %
	drinking water analysis	

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Oral Mouse(male) / 90-day
Subsequent observation period: 6 weeks
NOEL: 26 mg/kg
target organ/effect: Changes of parameters of the blood, body weight development negative, Irritative effect:, Gastrointestinal tract
Method: OECD TG 408
Test substance: hydrogen peroxide, 35 %
drinking water analysis

Assessment of STOT single exposure: No data available
Assessment of STOT repeat exposure: No data available
Risk of aspiration toxicity: No data available

Gentoxicity in vitro: Bacterial reverse mutation assay *S. typhimurium* / *E. coli* positive and negative
Metabolic activation: with or without literature

chromosomal aberration mammalian cells positive
Metabolic activation: without
Method: OECD TG 473
literature

Genetic mutation in mammal cells positive
Metabolic activation: without
Method: OECD TG 476
literature

Gentoxicity in vivo: Micronucleus test Mouse intraperitoneal (i.p.) negative
Method: OECD TG 474
Test substance: hydrogen peroxide, 35 %
literature

Carcinogenicity: No data available

carcinogenicity assessment: Clues to possible carcinogenic effects in animal experiments:
Up to date there is no evidence of increased tumour risk.

Hydrogen peroxide is not a carcinogenic substance according to MAK, IARC, NTP, OSHA, ACGIH.

Toxicity to reproduction: No data available

Human experience: Effect on the skin:
Causes caustic burns. With increasing contact length, local erythema or extreme irritation (whitening) up to blistering (caustic burn) can occur.
Effect on the eyes:

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Extreme irritation up to cauterisation. Can cause severe conjunctivitis, cornea damage or irreversible eye damage. Symptoms may occur with delay.

Effect when swallowed:

Swallowing can lead to bleeding of the mucosa in the mouth, oesophagus and stomach.

The rapid releasing of oxygen can cause distension and bleeding of the mucosa in the stomach and lead to severe damage of the internal organs, especially in the event of greater intake of the product.

Effect when inhaled:

Inhalation of vapour/aerosols can lead to irritation of the respiratory tract and cause inflammation of the respiratory tract and pulmonary oedema. Symptoms may occur with delay.

Toxicology Assessment**Acute effects**

Causes severe skin burns and eye damage.

Harmful if swallowed.

Harmful if inhaled.

May cause respiratory irritation.

Sensitization

Due to the data available, the classification criteria for all further toxicological end points are not fulfilled

Repeated dose toxicity

Due to the data available, the classification criteria for all further toxicological end points are not fulfilled

CMR assessment**Mutagenicity**

The classification criteria are not met based on the available data.

12. Ecological information**12.1. Toxicity****Toxicity to fish**

LC50 semi-static test *Pimephales promelas*: 16.4 mg/l / 96 h

Test substance: hydrogen peroxide 100 %

Toxicity in aquatic invertebrates

EC50 semi-static test *Daphnia pulex*: 2.4 mg/l / 48 h

Test substance: hydrogen peroxide 100 %

Toxicity to algae

NOEC static test *Skeletonema costatum*: 0.63 mg/l / 72 h

End point: growth rate

Test substance: hydrogen peroxide 100 %

Toxicity to bacteria

EC50 static test Activated sludge: 466 mg/l / 30 min

Test substance: hydrogen peroxide 100 %

Method: OECD TG 209

EC50 static test Activated sludge: > 1000 mg/l / 3 h

Test substance: hydrogen peroxide 100 %

Method: OECD TG 209

chronic toxicity in daphnia

NOEC flow-through test *Daphnia magna*: 0.63 mg/l / 21 d

Test substance: hydrogen peroxide 100 %

literature

12.2. Persistence and degradability**photo-decomposition**

50 % degradation within approx. 20 hours; medium: air

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Biodegradability	Result: Readily biodegradable Test substance: hydrogen peroxide 100 % Semiquantitative measurement of concentration over time.
Physico-chemical removability	The product can be degraded by abiotic (e.g. chemical or photolytic) processes.
AOX	The product does not contain any organically bonded halogen.
Further Information	Under ambient conditions quick hydrolysis, Reduction or decomposition occurs. The following substances are formed: oxygen and water.

12.3. Bioaccumulative potential

Bioaccumulation	None. Hydrogen peroxide quickly decomposes to oxygen and water.
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12.4. Mobility in soil

Mobility	No data available
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12.5. Other adverse effects**Ecotoxicology Assessment**

Acute aquatic toxicity	The classification criteria are not met based on the available data.
Chronic aquatic toxicity	Based on the data on file, the substance must be considered aquatoxic (chronic).

13. Disposal considerations**13.1. Waste treatment methods****Product**

The appropriate regulatory agencies should be contacted prior to disposal.

A possible method of disposal is to dilute with large amounts of water to a concentration of about 5% hydrogen peroxide; hold in diked area or pond until peroxide is completely decomposed or dispose of according to all relevant local, provincial, state, and federal laws and regulations. Use personal protective equipment as described in section 8. Do not contaminate any lakes, streams, ponds, groundwater or soil. If necessary, contact supplier for recommendations to decompose dilute peroxide (5%)

Uncleaned packaging

Rinse empty containers before disposal; recommended cleaning agent: water.

Offer rinsed packaging material to local recycling facilities.

Do not reuse empty containers and dispose of in accordance with the regulations issued by the appropriate local authorities. Dispose of containers that have not been emptied completely and/or cleaned like of substance.

Packaging material should be recycled or disposed of in accordance with federal, state and local regulations.

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14. Transport information**D.O.T. Road/Rail**

- 14.1. UN number: UN 2015
14.2. UN proper shipping name: HYDROGEN PEROXIDE, AQUEOUS SOLUTION, STABILIZED
14.3. Transport hazard class(es): 5.1 (8)
14.4. Packing group: I
14.5. Environmental hazards (Marine pollutant): -
14.6. Special precautions for user: Yes
RAIL: DOT-SP 14532 allows visual examination without removal of the rupture disc. This special (CFR) approval applies on tank car shipments only

Air transport ICAO-TI/IATA-DGR

- 14.1. UN number: UN 2015
14.2. UN proper shipping name: Hydrogen peroxide, aqueous solution, stabilized
14.3. Transport hazard class(es): 5.1
14.4. Packing group: -
14.5. Environmental hazards: -
14.6. Special precautions for user: Yes
IATA-C: Transport prohibited.
IATA-P: Transport prohibited.

Sea transport IMDG-Code/GGVSee (Germany)

- 14.1. UN number: UN 2015
14.2. UN proper shipping name: HYDROGEN PEROXIDE, AQUEOUS SOLUTION, STABILIZED
14.3. Transport hazard class(es): 5.1 (8)
14.4. Packing group: I
14.5. Environmental hazards (Marine pollutant): -
14.6. Special precautions for user: Yes
EmS: F-H,S-Q
Protect from heat. On deck only. Product-specific regulations on storing substances separately.
"Separated from" permanganates and class 4.1.
14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: for transport approval see regulatory information

15. Regulatory information**US Federal Regulations****OSHA**

If listed below, chemical specific standards apply to the product or components:

- None listed

Clean Air Act Section (112)

If listed below, components present at or above the de minimus level are hazardous air pollutants:

- None listed

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CERCLA Reportable Quantities

If listed below, a reportable quantity (RQ) applies to the product based on the percent of the named component:

- None listed

SARA Title III Section 311/312 Hazard Categories

The product meets the criteria only for the listed hazard classes:

- Acute Health Hazard
- Reactivity Hazard

SARA Title III Section 313 Reportable Substances

If listed below, components are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

- None listed

Toxic Substances Control Act (TSCA)

If listed below, non-proprietary substances are subject to export notification under Section 12 (b) of TSCA:

- None listed

State Regulations

California Proposition 65

A warning under the California Drinking Water Act is required only if listed below:

- None listed

International Chemical Inventory Status

Unless otherwise noted, this product is in compliance with the inventory listing of the countries shown below. For information on listing for countries not shown, contact the Product Regulatory Services Department.

Europe (EINECS/ELINCS)	listed/registered
USA (TSCA)	listed/registered
Canada (DSL)	listed/registered
Australia (AICS)	listed/registered
Japan (MITI)	listed/registered
Korea (TCCL)	listed/registered
Philippines (PICCS)	listed/registered
China	listed/registered
New Zealand	listed/registered

An employer using HMIS/NFPA labeling must through training ensure that its employees are fully aware of the hazards of the chemicals used.

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HMIS Ratings

Health :	3
Flammability :	0
Physical Hazard :	3

NFPA Ratings

Health :	3
Flammability :	0
Reactivity :	3

16. Other information**Further information**

Further information Data for the production of the safety data sheet from the studies available and from the literature.

Further information about the characteristics of the product can be found in the product code of practice or in the Product-Brochure .

Revision date 09/14/2015

Changes since the last version are highlighted in the margin. This version replaces all previous versions.

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Legend

ACC	American Chemistry Council
ACGIH	American Conference of Governmental Industrial Hygienists
ACS	Advisory Committee on Sustainability
ADI	Acceptable Daily Intake
ASTM	American Society for Testing and Materials
ATP	Adaptation to Technical Progress
BCF	Bioconcentration factor
BOD	Biochemical oxygen demand
c.c.	closed cup
CAO	Cargo Aircraft Only
Carc	Carcinogen
CAS	Chemical Abstract Services
CDN	Canada
CEPA	Canadian Environmental Protection Act
CERCLA	Comprehensive Environmental Response – Compensation and Liability Act

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CFR	Code of Federal Regulations
CMR	carcinogenic-mutagenic-toxic for reproduction
COD	Chemical oxygen demand
DIN	German Institute for Standardization
DMEL	Derived minimum effect level
DNEL	Derived no effect level
DOT	Department of Transportation
EC50	half maximal effective concentration
EPA	Environmental Protection Agency
ErC50	Reduction of Growth Rate
ERG	Emergency Response Guide Book
FDA	Food and Drug Administration
GHS	Globally Harmonized System of Classification and Labelling of Chemicals (GHS)
GLP	Good Laboratory Practice
GMO	Genetic Modified Organism
HCS	Hazard Communication Standard
HMIS	Hazardous Materials Identification System
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
IBC	Intermediate Bulk Container
ICAO-TI	International Civil Aviation Organization- Technical Instructions
ICCA	International Council of Chemical Association
ID	Identification number
IMDG	International Maritime Dangerous Goods
IUPAC	International Union of Pure and Applied Chemistry
ISO	International Organization For Standardization
LC50	50 % Lethal Concentration
LD50	50 % Lethal Dose
L(E)C50	LC50 or EC50
LOAEL	Lowest observed adverse effect level
LOEL	Lowest observed effect level
MARPOL	International Convention for the Prevention of Pollution from Ships
NFPA	National Fire Protection Association
NOAEL	No observed adverse effect level
NOEC	no observed effect concentration
NOEL	no observed effect level
o. c.	open cup
OECD	Organisation for Economic Cooperation and Development
OEL	Occupational Exposure Limit
OSHA	Occupational Safety and Health Administration
PBT	Persistent, bioaccumulative, toxic
PEC	Predicted effect concentration
PNEC	Predicted no effect concentration
RQ	Reportable Quantity
SDS	Safety Data Sheet
STOT	Specific Target Organ Toxicity
UN	United Nations
vPvB	very persistent, very bioaccumulative
voc	volatile organic compounds
WHMIS	Workplace Hazardous Materials Information System
WHO	World Health Organization

SAFETY DATA SHEET

Airgas

Helium

Section 1. Identification

GHS product identifier : Helium
Chemical name : Helium
Other means of identification : helium (dot); Helium-4; He; o-Helium; UN 1046, Helium USP
Product use : Synthetic/Analytical chemistry.
Synonym : helium (dot); Helium-4; He; o-Helium; UN 1046, Helium USP
SDS # : 001025
Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

24-hour telephone : 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : GASES UNDER PRESSURE - Compressed gas

GHS label elements

Hazard pictograms :



Signal word : Warning

Hazard statements : Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

Precautionary statements

General : Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction.

Prevention : Not applicable.

Response : Not applicable.

Storage : Protect from sunlight when ambient temperature exceeds 52°C/125°F. Store in a well-ventilated place.

Disposal : Not applicable.

Hazards not otherwise classified : In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation.

Section 3. Composition/information on ingredients

Substance/mixture : Substance
 Chemical name : Helium
 Other means of identification : helium (dot); Helium-4; He; o-Helium; UN 1046, Helium USP

CAS number/other identifiers

CAS number : 7440-59-7
 Product code : 001025

Ingredient name	%	CAS number
Helium	100	7440-59-7

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.
Inhalation : No known significant effects or critical hazards.
Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.
Frostbite : Try to warm up the frozen tissues and seek medical attention.
Ingestion : As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

Eye contact : No specific data.
Inhalation : No specific data.
Skin contact : No specific data.
Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
Specific treatments : No specific treatment.

Section 4. First aid measures

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

Hazardous thermal decomposition products : No specific data.

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Immediately contact emergency personnel. Stop leak if without risk.

Large spill : Immediately contact emergency personnel. Stop leak if without risk. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid contact with eyes, skin and clothing. Avoid breathing gas. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Section 7. Handling and storage

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Keep container tightly closed and sealed until ready for use. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Helium	Oxygen Depletion [Asphyxiant]

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state	: Gas. [Compressed gas.]
Color	: Colorless.
Molecular weight	: 4 g/mole
Molecular formula	: He
Boiling/condensation point	: -268.9°C (-452°F)
Melting/freezing point	: -272.2°C (-458°F)
Critical temperature	: -267.9°C (-450.2°F)
Odor	: Odorless.
Odor threshold	: Not available.
pH	: Not available.
Flash point	: [Product does not sustain combustion.]
Burning time	: Not applicable.
Burning rate	: Not applicable.
Evaporation rate	: Not available.
Flammability (solid, gas)	: Not available.
Lower and upper explosive (flammable) limits	: Not available.
Vapor pressure	: Not available.
Vapor density	: 0.14 (Air = 1) Liquid Density@BP: 7.8 lb/ft ³ (125 kg/m ³)
Specific Volume (ft ³ /lb)	: 96.1538
Gas Density (lb/ft ³)	: 0.0104
Relative density	: Not applicable.
Solubility	: Not available.
Solubility in water	: Not available.
Partition coefficient: n-octanol/water	: 0.28
Auto-ignition temperature	: Not available.
Decomposition temperature	: Not available.
SADT	: Not available.
Viscosity	: Not applicable.

Section 10. Stability and reactivity

Reactivity	: No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	: The product is stable.
Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	: No specific data.
Incompatible materials	: No specific data.
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Hazardous polymerization	: Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 10. Stability and reactivity

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.
 Inhalation : No known significant effects or critical hazards.
 Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.
 Ingestion : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.
 Inhalation : No specific data.
 Skin contact : No specific data.
 Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.
 Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.
 Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.
 Carcinogenicity : No known significant effects or critical hazards.

Section 11. Toxicological information

- Mutagenicity** : No known significant effects or critical hazards.
Teratogenicity : No known significant effects or critical hazards.
Developmental effects : No known significant effects or critical hazards.
Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
Helium	0.28	-	low

Mobility in soil

Soil/water partition coefficient (K_{oc}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1046	UN1046	UN1046	UN1046	UN1046
UN proper shipping name	HELIUM, COMPRESSED	HELIUM, COMPRESSED	HELIUM, COMPRESSED	HELIUM, COMPRESSED	HELIUM, COMPRESSED
Transport hazard class(es)	2.2 	2.2 	2.2 	2.2 	2.2 

Section 14. Transport information

Packing group	-	-	-	-	-
Environment	No.	No.	No.	No.	No.
Additional information	<p>Limited quantity Yes.</p> <p>Packaging instruction Passenger aircraft Quantity limitation: 75 kg</p> <p>Cargo aircraft Quantity limitation: 150 kg</p>	<p>Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2).</p> <p>Explosive Limit and Limited Quantity Index 0.125</p> <p>Passenger Carrying, Road or Rail Index 75</p>	-	-	<p>Passenger and Cargo Aircraft Quantity limitation: 75 kg</p> <p>Cargo Aircraft Only Quantity limitation: 150 kg</p>

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption:** Not determined
United States inventory (TSCA 8b): This material is listed or exempted.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Sudden release of pressure

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
Helium	100	No.	Yes.	No.	No.	No.

Section 15. Regulatory information

State regulations

Massachusetts	: This material is listed.
New York	: This material is not listed.
New Jersey	: This material is listed.
Pennsylvania	: This material is listed.

International regulations

International lists

National inventory

Australia	: This material is listed or exempted.
Canada	: This material is listed or exempted.
China	: This material is listed or exempted.
Europe	: This material is listed or exempted.
Japan	: Not determined.
Malaysia	: Not determined.
New Zealand	: This material is listed or exempted.
Philippines	: This material is listed or exempted.
Republic of Korea	: This material is listed or exempted.
Taiwan	: This material is listed or exempted.

Canada

WHMIS (Canada)	: Class A: Compressed gas.
CEPA Toxic substances:	This material is not listed.
Canadian ARET:	This material is not listed.
Canadian NPRI:	This material is not listed.
Alberta Designated Substances:	This material is not listed.
Ontario Designated Substances:	This material is not listed.
Quebec Designated Substances:	This material is not listed.

Section 16. Other information

Canada Label requirements : Class A: Compressed gas.

Hazardous Material Information System (U.S.A.)

Health	0
Flammability	0
Physical hazards	3

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on SDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)



Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

Section 16. Other information

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Classification	Justification
Press. Gas Comp. Gas, H280	Expert judgment

History

Date of printing : 2/12/2016
 Date of issue/Date of revision : 2/12/2016
 Date of previous issue : No previous validation
 Version : 0.01

Key to abbreviations : ATE = Acute Toxicity Estimate
 BCF = Bioconcentration Factor
 GHS = Globally Harmonized System of Classification and Labelling of Chemicals
 IATA = International Air Transport Association
 IBC = Intermediate Bulk Container
 IMDG = International Maritime Dangerous Goods
 LogPow = logarithm of the octanol/water partition coefficient
 MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
 UN = United Nations

References : Not available.

☑ Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.



SAFETY DATA SHEET

Prepared in accordance with Annex II of the REACH regulation EC 19007/2006,
amended by Regulation 453/2010

SODIUM HYDROXIDE SOLUTION, type 33%(w/w)

Revision: 3 Last up date: November 23, 2015 Date issued: December 2, 2010 pag.1/30

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Trade name	Sodium hydroxide solution, min 32% (w/w)
IUPAC name	Sodium Hydroxide
Synonym	Soda lye, lye, caustic soda solution
EC#	215-185-5
CAS #	1310-73-2
Nr. Index	011-002-00-6
Molecular Formula	NaOH
Molecular weight	40.01
REACH Registration number	01-2119457892-27-0065
Chemical characterization	Inorganic mono constituent substance

1.2. Relevant identified uses of the substance or mixture and uses advised against

Table 1: Identified uses

Identified use / IU number	Sector of End Use (SU)	Preparation Category (PC)	Process category (PROC)	Environmental Release Category (ERC)	Article category (AC)	Exposure Scenario
1	SU 1-24 except 21, 22	Not applicable	PROC 1-4, 8-9	ERC 1	Not applicable	ES 1: Manufacturing of liquid NaOH
2	SU 1-24 except 21, 22	Not applicable	PROC 1-4, 8-9	ERC 1	Not applicable	ES 2: Manufacturing of solid NaOH
3	SU 1-24 except 21, 22	PC 0-40	PROC 1-27	ERC 1-7, 12	Not applicable	ES 3: Industrial and professional use of NaOH
4	SU 1-24 except 21, 22	PC 0-40	PROC 1-27	ERC 2, 3, 8-11	Not applicable	
5	SU 21	PC 0-40	Not applicable	ERC 8-11	Not applicable	ES 4: Consumer use of NaOH

Uses advise against: There are no uses advised against.

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The main uses of sodium hydroxide: are in chemical manufacturing (pH control, acid neutralization, off-gas scrubbing and catalyst); pulp and paper manufacturing; in petroleum and natural gas industry (removing acidic contaminants in oil and gas processing); manufacture of soap and detergents and other cleaning products; and celluloses, such as rayon, cellophane and cellulose ethers; cotton mercerizing and scouring. Other uses include water treatment, food processing, flue-gas scrubbing, mining, glass making, textile processing, refining vegetable oils, rubber reclamation, metal processing, aluminium processing, metal degreasing, adhesive preparations, paint remover, disinfectant.

Uses advise against: There are no uses advised against.

1.3. Details of the supplier of the safety data sheet

Name	S.C. OLTCHIM S.A
Address	1 Uzinei Street, 240050 Ramnicu Valcea, Romania
Phone N°	+40 250 701 200
FAX N°	+40 250 735 030
E-mail of competent person responsible for SDS in the MS or in the EU:	tehnic@oltchim.com

1.4 Telefon de urgenta

European Emergency N°:	112
Emergency telephone at the company:	+40/250/738141- available 24h/day/365days
For Romania- The institution responsible with providing information in case of a health emergency is The National Institute for Public Health, Department for the International Sanitary Regulation and Toxicological Information.	Telephone: 021.318.36.20/extension 235, Working hours: Monday - Friday from 8 a.m. to 3 p

2. HAZARDS IDENTIFICATION

2.1. Classification of the substance, according to Regulation (EC) 1272/2008

Classification

Skin corrosive; category 1A
Corrosive to metals; category 1

Hazard statement:

H314: Causes severe skin burns and eye damage
H290: May be corrosive to metals



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2.1.2 Additional information

Risk advice to man and the environment

Sodium hydroxide causes severe burns of the eyes, even blindness. In skin contact can cause severe burns. Sodium hydroxide may be fatal if swallowed. Breathing the dust can irritate the mouth, nose and throat. Exposure to high levels may irritate the lungs, causing coughing and/or shortness of breath. Still higher exposure can cause a build up of fluid in the lungs (pulmonary edema).

In contact with water generates large amounts of heat. The high water miscibility and very low vapour pressure indicate that NaOH will be found predominantly in water. Significant emissions or exposure to the terrestrial environment and to the air are not expected either. The aquatic effect is due to possible pH changes related to OH⁻ discharges, as the toxicity of the Na⁺ ion is expected to be insignificant compared to the (potential) pH effect.

2.2. Label elements according to Regulation (EC) 1272/2008

Signal word:

Warning



Hazard Pictogram Codes and Symbols:

GHS05: corrosion

Hazard statements:

H314: Causes severe skin burns and eye damage
H290: May be corrosive to metals

Specific concentration limits

Skin Corr. 1A; H314	$C \geq 5 \%$
Skin Corr. 1B; H314	$2 \% \leq C < 5 \%$
Skin Irrit. 2; H315	$0,5 \% \leq C < 2 \%$
Eye Irrit. 2; H319	$0,5 \% \leq C < 2 \%$

Precautionary statements

P260: Do not breathe dust/fume/gas/mist/vapours/spray.

P280: Wear protective gloves/protective clothing/eye protection/face protection.

P303 + P361 + P353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P310: Immediately call a POISON CENTER or doctor/physician.



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2.3. Other hazards: The substance does not meet the criteria for PBT or vPvB substance.
No other hazards identified.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical name	PBT/vPvB	CAS no/EC No/REACH No.	Classification according to Reg (EC) No. 1272/2008)	Concentration, % (w/w)
Sodium Hydroxide	No/No	1310-73-2 215-185-5 01-2119457892-27-0065	Skin corr, cat 1A; H314 Met Corr, cat 1A; H290	min.32

Impurities

No impurities relevant for classification and labelling.

4. FIRST - AID MEASURES

4.1 Description of first aid measures

General Advice: IF exposed or if you feel unwell: Call a Poison Center or doctor/physician.
Show this safety data sheet to the doctor in attendance.

If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
Apply artificial respiration if the person has stopped breathing and provide oxygen if breathing is difficult.

In case of skin contact: Remove/Take off immediately all contaminated clothing.
Rinse skin with plenty of water for at least 15 minutes until slippery feeling disappears. Seek medical attention immediately. Wash clothing before reuse.

In case of eye contact: Rinse cautiously with water for several minutes lifting lower and upper eyelids occasionally. Remove contact lenses, if present and easy to do. Continue rinsing.
Seek medical attention immediately.

In case of ingestion: Do not induce vomiting. Rinse the mouth and lips with water if the person is conscious, then transfer to hospital urgently.



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4.2. Most important symptoms and effects, both acute and delayed

Symptoms: Sodium hydroxide is severely corrosive to the eyes, mucous membranes and exposed areas of skin.

Risks:

- By ingestion: severe burns to the digestive tract, risk of perforation of the alimentary canal, state of shock.
- By skin contact: very corrosive for the skin, severe burns, severe lesions, scarring (sometimes retractile), and dermatitis possible in the case of repeated contact.
- By eye contact: corrosive for the eyes, severe lesions possibly with lasting effects if the eyes are not rinsed immediately, harm to all the eye tissues, risk of sight loss.
- By inhalation: corrosive for respiratory tract. Causes severe skin burns and eye damage.

4.3 Indication of immediate medical attention and special treatment needed

Perform endoscopy in all cases of suspected sodium hydroxide ingestion. In cases of severe esophageal corrosion, the use of therapeutic doses of steroids should be considered. General supportive measures with continual monitoring of gas exchange, acid-base balance, electrolytes and fluid intake are also required. If skin burns are present, treat as any thermal burn after decontamination.

5. FIRE - FIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media: All media. For large fire use powder, foam extinguishing agents or carbon dioxide. Avoid water use if possible. *Adding water to caustic solution generates large amounts of heat and steam!*

Unsuitable extinguishing media: none known

5.2 Special hazards arising from the substance or mixture

Specific hazards during fire fighting / Specific hazards arising from the chemical

Not considered to be a fire hazard. Sodium hydroxide can react with certain metals, such as aluminum and zinc to generate flammable hydrogen gas. Contact with moisture or water may generate sufficient heat to ignite nearby combustible materials.

5.3 Advice for firefighters

Special protective equipment for fire-fighters: Firefighters should wear proper protective equipment and self contained breathing apparatus with full face-piece operated in positive



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pressure mode. Avoid generation of dust. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment

6. ACCIDENTAL RELEASE MEASURES

6.1 . Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Keep unprotected persons away.

Avoid contact with skin, eyes, and clothing – wear suitable protective equipment (see section 8).

Avoid inhalation of mist– ensure that sufficient ventilation or suitable respiratory protective equipment is used, wear suitable protective equipment (see section 8).

For emergency responders

Ensure adequate ventilation.

Keep unprotected persons away.

Avoid contact with skin, eyes, and clothing – wear suitable protective equipment (see section 8).

Avoid inhalation of mist– ensure that sufficient ventilation or suitable respiratory protective equipment is used, wear suitable protective equipment (see section 8).

6.2. Environmental precautions

Spillages or uncontrolled discharges into watercourses must be IMMEDIATELY alerted to the Environmental Agency or other appropriate regulatory body. Collect spillage in containers, seal securely and deliver for disposal according to local regulations.

6.3 Methods and materials for containment and cleaning up

Methods for cleaning up / Methods for containment:

Contain and recover when possible. Do not flush caustic residues to sewer. Residues from spills can be diluted with water, neutralized with diluted acid such as acetic and hydrochloric. Absorb neutralized caustic residues on clay, sand, vermiculite or other absorbent material and place in a chemical waste container for disposal.

Refer to section 13 for disposal of spilled material.

6.4 Reference to other sections

Additional advice: Refer to section 8, 13.



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7. HANDLING AND STORAGE

7.1. Precautions for safe handling

Protective measures: Special attention is required when caustic soda is handled. All workers should be properly trained in the required safe handling and first aid procedure. Persons handling caustic soda must always wear protective clothing, close-fitting chemical worker's safety goggles, hard hat and rubber gloves, in order to avoid any contact with hand, skin or eyes. Do not wear contact lenses when handling this product. It is also advisable to have individual pocket eyewash.

Advice on general occupational hygiene: Avoid inhalation or ingestion and contact with skin and eyes. General occupational hygiene measures are required to ensure safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no drinking, eating and smoking at the workplace. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home.

7.2. Conditions for safe storage, including any incompatibilities

The substance should be stored under dry conditions. Any contact with air and moisture should be avoided. Sodium hydroxide wrapped in original packaging will be store in a cool, dry, well-ventilated area away from incompatible substances. Protect containers from damage.

Incompatible materials: Do not store in aluminum, zinc, tin and lead containers.

Incompatible substances: Do not store or mix with water, acids, flammable liquids, organic halogens compounds, nitro methane.

Never add water to a corrosive. Always add corrosives to water. When mixing with water, stir small amounts in slowly. Use cold water to prevent excessive heat generation.

7.3 Specific end use(s)

Please check the identified uses from Section 1.2.

For more information please see the relevant exposure scenario, available via your supplier/given in the Annex I.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters



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Occupational Exposure Limit (OEL), 8 h TWA: 2 mg/m³ of sodium hydroxide with a few exceptions (Czech Republic - 1.0 mg/m³; Poland - 0.5 mg/m³)

Short-term exposure limit (STEL), 15 min: 2 mg/m³ of sodium hydroxide

DNEL/PENEC values

DNEL long term inhalation, general population= 1,0 mg/m³

DNEL long term inhalation, workers= 1,0 mg/m³

PNEC aqua: not applicable

PNEC soil/groundwater: not applicable.

No PNEC was able to be calculated as the buffering capacity, the pH and its fluctuation are very specific to the ecosystem in question.

8.2. Exposure control

Engineering control: A system of local and / or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emission of the contaminant at its source, preventing dispersion of it into the general work area.

Personal protective equipment

Respiratory protection: If the exposure limit is exceeded (up to 50ppm) a full face-piece respirator with a chemical cartridge respirator with an adequate cartridge is recommended, approved according to EN 14 387 standard.

For emergencies or instances where exposure levels are not known, use a full face-piece positive pressure, air supplied respirator. *Air-purifying respirators do not protect workers in oxygen deficient atmospheres!*

Hand protection: Handle with gloves which were inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. The selected protective gloves have to satisfy the specifications of the standard EN 374 derived from it.

Recommended material: PVC, butyl rubber, Viton/Butyl rubber, nitril rubber

Eye / Face protection: Chemical splash goggles and/or face shield must be worn when possibility exists for eye contact due to splashing or spraying liquid, airborne particles or vapor.



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Contact lenses must not be worn. Emergency eye wash fountains should be available in the immediate vicinity of any potential exposure area.

Skin protection: Wear impervious protective clothing including boots, lab coat, apron or coveralls as appropriate, to prevent skin contact.

Monitoring Methods: Monitoring the substance concentration (mist) in workplace may be required to confirm compliance with an OEL and adequacy of exposure control.

Environmental Exposure Control:

All ventilation systems should be filtered before discharge to atmosphere.

Avoid releasing to the environment.

Contain the spillage. Any large spillage into watercourses must be alerted to the Environment Agency or other regulatory body.

For detailed explanations of the risk management measures that adequately control exposure of the environment to the substance please check the relevant exposure scenario, available via your supplier.

Other precautions: Maintain shower, eye wash fountain and quick-drench facilities in work area.

9. PHYSICAL AND CHEMICAL PROPERTIES

General information

Appearance clear and colorless liquid
Odor odorless

Important health, safety and environmental information

pH alkaline
Boiling point 119⁰C
Flash point NA
Flammability non flammable
Explosive properties non explosive
Oxidizing properties no oxidizing properties
Vapor pressure, 20 ⁰C 18 haP, at 20⁰C
Specific density (water=1) 1.37-1.39 g/cm³
Solubility in water completely miscible with water
in ethanol, glycerol soluble



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Partition coefficient (log K_{ow})	NA
Viscosity, 20°C	ca 19mPa

Other information

Melting point	7-9°C
Auto ignition temperature	NA

10. STABILITY AND REACTIVITY

10.1. Reactivity

A violent reaction occurs with mineral or organic acids and ketones. Sodium hydroxide is highly corrosive to certain metals and alloys: zinc, aluminium, tin, copper, lead, bronze, brass. Sodium hydroxide also destroys leather, strips paint and attacks certain plastics, rubbers and coatings. Contact with nitro methane and other similar nitro compounds cause formation of shock-sensitive salts.

10.2 Chemical stability

Under normal conditions of use and storage (dry conditions), sodium hydroxide is stable. Hygroscopic product sensitive to the carbon dioxide in the air (carbonation).

10.3 Possibility of hazardous reactions

Sodium hydroxide is a stable product; however certain risks exist in the presence of :
explosives such as nitrous compounds - reaction producing enough heat to detonate the explosive
vinyl chloride monomer- formation of chloroacetylene
tetrahydrofuran-explosion upon contact
sodium tetrahydroborate -gives off hydrogen with an explosion
pentachlorophenol- explosion and formation of toxic vapours
tetrachlorobenzene-explosion due to an increase in pressure
maleic anhydride - explosive decomposition

10.4 Conditions to avoid

Substances to be avoided: water, acid, zinc, aluminium, copper, alkali metals, alkaline earth metals, acetaldehyde, acroleine, acrylonitrile, allyl alcohol, halon, maleic anhydride, bromine, nitroparaffins, nitroaromatics, oleums, tetrahydrofuran.
Minimise exposure to air and moisture to avoid degradation. Avoid contact with incompatibles.

10.5 Incompatible materials



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Certain metals and alloys: zinc, aluminium, tin, copper, lead, bronze, brass. Sodium hydroxide also destroys leather, strips paint and attacks certain plastics, rubbers and coatings. Water contact may generate large amounts of heat.

10.6 Hazardous decomposition products

Dangerous products of decomposition: by corrosion of metals, formation of flammable and explosive hydrogen.

11. TOXICOLOGICAL INFORMATION

	Conclusions
Absorbtion	no bioaccumulation potential based on study results.
Acute toxicity	Sodium hydroxide is a corrosive substance and for this reason there is no need for further acute toxicity testing (EU RAR, 2007; section 4.1.2.2.3, page 65).
Irritation/Corrosion	Based on experimental results and according to the CLP Regulation No 1272/2008 Annex VI Table 3.1, sodium hydroxide is a skin corrosive category 1A at a concentration $\geq 5\%$ (H314: Causes severe skin burns and eye damage) the concentration range for eye/skin irritation is $0,5\% \leq C < 2\%$
Sensitisation	Existing data do not demonstrate that NaOH is a skin sensitizer.
Repeated dose toxicity	No reliable studies were available. However, systemic effects of NaOH after repeated exposure are not expected to occur under normal handling and use and therefore NaOH has no specific organ repeated dose toxicity.
Mutagenity	Both the in vitro and the in vivo genetic toxicity tests indicated no evidence of mutagenic activity.
Carcinogenity	NaOH is of no concern with regard to carcinogenicity.
Toxicity for reproduction	NaOH is not toxic for reproduction.

12. ECOLOGICAL INFORMATION

In formation on environmental effects

The available data indicate that NaOH concentrations of 20 to 40 mg/l may be acutely toxic to fish and invertebrates (single species tests). Data on pH increases due to the addition of these amounts of NaOH in the used test waters are lacking. In waters with a relatively low buffering



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capacity, NaOH concentrations of 20-40 mg/l may result in a pH increase with one to several pH units (EU RAR, 2007; section 3.2.1.1.3, page 30). The OECD (2002) assigned a low code of reliability ('invalid' or 'not assignable') to all available tests, as in general the tests were not conducted according to the current test guidelines (EU RAR, 2007; section 3.2.1.1.4, page 30). Furthermore, in many tests reports there were no data on pH, buffer capacity and/or test medium composition, although this is essential information for toxicity tests with NaOH. This is the most important reason why most of the tests were considered 'invalid'. Despite this lack of valid data, there is no need for additional aquatic toxicity testing with NaOH, as all available tests resulted in a rather small range of toxicity values (acute toxicity tests: 20 to 450 mg/l; chronic toxicity test: ≥ 25 mg/l) and there are sufficient data on the pH ranges that are tolerated by major taxonomic groups. Moreover, a generic PNEC cannot be derived from single-species toxicity data for NaOH, as the pH of natural waters as well as the buffer capacity of natural waters show considerable differences and aquatic organisms/ecosystems are adapted to these specific natural conditions, resulting in different pH optima and pH ranges that are tolerated (EU RAR, 2007; section 3.2.1.1.4, page 30). According to the OECD (2002), a lot of information is available about the relationship between pH and ecosystem structure and also natural variations in pH of aquatic ecosystems have been quantified and reported extensively in ecological publications and handbooks.

Aquatic Toxicity

Short-term toxicity to fish

The OECD (2002) assigned a low code of reliability ('invalid' or 'not assignable') to all available tests, as in general the tests were not conducted according to the current test guidelines (EU RAR, 2007; section 3.2.1.1.4, page 30). In many tests reports there were no data on pH, buffer capacity and/or test medium composition, although this is essential information for toxicity tests with NaOH. Despite of this, there is no need for additional aquatic toxicity testing with NaOH, as all available tests resulted in a rather small range of toxicity values (acute toxicity tests to fish: 35 to 189 mg/l) and there are sufficient data on the pH ranges that are tolerated by major taxonomic groups.

Long-term toxicity to fish

No valid long-term toxicity studies to fish are available. Despite of this, there is no need for further toxicity testing with NaOH, as all available tests resulted in a rather small range of toxicity values (chronic toxicity test: ≥ 25 mg/l) and there are sufficient data on pH ranges that are tolerated by major taxonomic groups (EU RAR, 2007; section 3.2.1.1.4, page 30).

Short-term toxicity to aquatic invertebrates

Ceriodaphnia sp. acute 48-h immobilization test according to the NSW Environment Protection Authority



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EC50 (48h, fresh water) = 40 mg/L

Long-term toxicity to aquatic invertebrates: study scientifically unjustified

Justification: In water (including soil or sediment pore water), NaOH is present as the sodium ion (Na^+) and hydroxyl ion (OH^-), as solid NaOH rapidly dissolves and subsequently dissociates in water (EU RAR, 2007; section 3.1.3, page 24). Therefore, the only possible effect would result from the pH effect. However, pH will remain within environmentally expected ranges.

Algae and aquatic plants: study scientifically unjustified

Toxicity to soil macro-organisms: The terrestrial compartment was not included in the targeted risk assessment (EU RAR, 2007, section 3.1.3.3, page 26), because it is not considered relevant for NaOH since if emitted to the soil, sorption to soil particles will be negligible.

Toxicity to terrestrial plants: There is no direct exposure of soil to NaOH based on the available uses.

Toxicity to birds: No exposure to birds is foreseen.

PNEC not applicable According to the EU RAR (2007; section 3.1.3.5, page 26)

bioaccumulation in organisms is not relevant for NaOH. Based on this, there is no need to perform risk assessment for secondary poisoning.

12.2. Persistence and degradability: NaOH will rapidly dissolve and dissociate in water. Therefore, NaOH does not fulfil the P criterion (EU RAR, 2007; section 3.3.1.2, page 34).

12.3. Bioaccumulative potential: Bioaccumulation is not relevant for NaOH, therefore, NaOH does not meet the B criterion of the PBT criteria (EU RAR, 2007; section 3.3.1.2, page 34).

12.4. Mobility in soil

High water solubility indicates that sodium hydroxide will be found predominately in aquatic environment. During movement through soil some ion exchange will occur. Also, some of the hydroxide may remain in the aqueous phase and will move downward through soil in the direction of groundwater flow. Sodium hydroxide does not cause biological oxygen deficit.

12.5. Results of PBT and vPvB assessment

NaOH, does not fulfil the criteria for persistency, bioaccumulation and toxicity. Therefore, NaOH is not considered a PBT or vPvB substance (EU RAR, 2007; section 3.3.1.2, page 34).



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13. DISPOSAL CONSIDERATIONS

This section contains generic advice and guidance.

13.1 Waste treatment methods

Waste Code (European Waste Catalogue): 06 02 04* Sodium and potassium hydroxide

Note: Also please refer to your specific industry and take into account the waste composition for establish the correct waste code.

13.1.1 Product

Methods of disposal: The generation of waste should be avoided or minimised wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spill material and runoff and contact with soil, waterways, drains and sewers.

13.1.2. Packaging

Methods of disposal: The generation of waste should be avoided or minimised wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

European legislation regarding waste:

Directive 2008/98/EC on waste (Waste framework Directive)

Directive 2008/532/EC replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste

Regulation (Ec) No 1013/2006 of the European Parliament and of the Council on shipments of waste, with subsequent modifications and additions

14. TRANSPORT INFORMATION

Solid Sodium hydroxide can be shipped according to transport regulations for dangerous goods, hazard class 8-Corrosive substance.



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15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Relevant information regarding the European legislation

EU Regulation (EC) No. 1907/2006 (REACH) Regulation (EC) no.1907/2006 of the European Parliament and of the Council regarding the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) Regulation

Regulation (EC) no.1272/2008 of the European Parliament and of the Council on the Classification, Labeling and Packaging of substances and mixtures.

Directive 2012/18/EU (SEVESO III) of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC

Regulation (EC) No 1005/2009 of the European Parliament and of the Council on substances that deplete the ozone layer

European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)

Regulation referring to the International Carriage of Dangerous Goods by Rail (RID)

International Maritime Dangerous Goods (IMDG)

EU Regulation (EC) No. 1907/2006 (REACH)

Annex XIV - List of substances subject to authorization- Substances of very high concern (CMR). Sodium hydroxide is not subject to authorization.

Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles

Restrictions on use: no restriction

Other EU regulations: Sodium hydroxide is not a SEVESO substance, not ozone depleting substance.

WGK (Germany): WGK 1 slightly water endangering

15.2 Chemical safety Assessment

A chemical safety assessment has been carried out for this substance and a cSR was issued.



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16. OTHER INFORMATION

Data are based on our latest knowledge but do not constitute a guarantee for any specific product features and do not establish a legally valid contractual relationsh.

16.1. Full text of H-Statements referred to under sections 2 and 3

H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.
H315 Causes skin irritation
H319 Causes serious eye irritation

16.2. Full text of P-Statements referred to under sections 2

P260: Do not breathe dust/fume/gas/mist/vapours/spray.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P303 + P361 + P353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310: Immediately call a POISON CENTER or doctor/physician.

16.3. Explanations for possible abbreviations mentioned in above section

CSA - Chemical Safety Assessment
CSR - Chemical Safety Report
PBT: Persistent, bioaccumulative and toxic.
vPvB: Very persistent and very bioaccumulative.
ES: Exposure Scenario
STEL: Short term exposure limit based
TWA: Time Weighted Average (TWA)
WGK: Wassergefährdungsklasse -Water hazard class, in Germany
DNEL: Derived No Effect Level
PNEC: Predicted No-Effect Concentration
NOAEL - No observed adverse effect level
NOAEC - No Observed Adverse Effects Concentration
LOAEC- Lowest Observable Adverse Effect Concentration
EC50 - concentration of toxic material for which 50% of the tested organisms survive
LD50 - lethal dose for 50% of the tested population



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LC50 - lethal concentration for 50% of the tested population

UN - United Nations

ADR: European Agreement concerning the International Carriage of **Dangerous Goods by Road**

RID: **International Carriage of Dangerous Goods by Road**

IMDG Code: International Maritime Dangerous Goods Code

ICAO/IATA: International Civil Aviation Organization/ International Air Transport Association

16.4. Revision: Revision 3 replace revision dated May 25, 2015 and the TUV logo header was removed in accordance with accreditation body request.

Disclaimer:

Oltchim provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. Furthermore, this safety data sheet is made up based on the legal requirements as set by EC 1907/2006 (REACH) and 453/2010. Further information received following the time scale as foreseen by REACH and the guidance policies as described in the REACH Implementation Programs will be added when it becomes available.

Annex I to SDS – Exposure Scenario

ANNEX I– EXPOSURE SCENARIO

Exposure Scenario 1: Manufacturing of liquid NaOH

List of all use descriptors

Sector of use (SU):	SU 3, 8 Manufacture of bulk, large-scale substances
Product category (PC):	not applicable
Process category (PROC):	PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure



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PROC3 Use in closed batch process (synthesis or formulation)
PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8a/b Transfer of chemicals from/to vessels/large containers at (non)dedicated facilities
PROC9 Transfer of chemicals into small containers (dedicated filling line)
Article category (AC): not applicable
Environmental Release
Category (ERC): ERC1 Manufacture of substances
<i>EU Risk Assessment</i> An EU risk assessment has been performed based on the Existing Substances Regulation (Council Regulation 793/93). A comprehensive risk assessment report has been finalised in 2007 and is available via internet: http://ecb.jrc.ec.europa.eu/DOCUMENTS/Existing-Chemicals/RISK_ASSESSMENT/REPORT/sodiumhydroxidereport416.pdf
Contributing exposure scenario controlling environmental exposure
Product characteristics
Liquid NaOH, all concentrations
Frequency and duration of use
Continuous
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
Risk management measures related to the environment aim to avoid discharging NaOH solutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes. Regular control of the pH value during introduction into open waters is required. In general discharges should be carried out such that pH changes in receiving surface waters are minimised. In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms.
Conditions and measures related to external treatment or recovery of waste for disposal
Liquid NaOH waste should be reused or discharged to the industrial wastewater and further neutralized if needed.
Contributing exposure scenario controlling worker exposure
Product characteristic
Liquid NaOH, all concentrations



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Frequency and duration of use/exposure

8 hours/day, 200 days/year

Technical conditions and measures at process level (source) to prevent release

Replacing, where appropriated, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes:

- Use closed systems or covering of open containers (e.g. screens)
- Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.)
- Use of pliers, grip arms with long handles with manual use "to avoid direct contact and exposure by splashes (no working over one's head)"

Technical conditions and measures to control dispersion from source towards the worker

Local exhaust ventilation and/or general ventilation is good practice

Organisational measures to prevent /limit releases, dispersion and exposure

- Workers in the risky process/areas identified should be trained a) to avoid to work without respiratory protection and b) to understand the corrosive properties and, especially, the respiratory inhalation effects of sodium hydroxide and c) to follow the safer procedures instructed by the employer.
- The employer has also to ascertain that the required PPE is available and used according to instructions

Conditions and measures related to personal protection, hygiene and health evaluation

- Respiratory protection: In case of dust or aerosol formation (e.g. spraying): use respiratory protection with approved filter (P2)
- Hand protection: impervious chemical resistant protective gloves
 - material: butyl-rubber, PVC, polychloroprene with natural latex liner, material thickness: 0.5 mm, breakthrough time: > 480 min
 - material: nitrile-rubber, fluorinated rubber, material thickness: 0.35-0.4 mm, breakthrough time: > 480 min
- Eye protection: chemical resistant goggles must be worn. If splashes are likely to occur, wear tightly fitting safety goggles, face -shield
- Wear suitable protective clothing, aprons, shield and suits, if splashes are likely to occur, wear: rubber or plastic boots, rubber or plastic boots

Exposure estimation and reference to its source

Worker exposure:

NaOH is a corrosive substance. For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be



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neglected. Therefore, dermal exposure to NaOH was not quantified.

NaOH is not expected to be systemically available in the body under normal handling and use conditions and therefore systemic effects of NaOH after dermal or inhalation exposure are not expected to occur.

Based on NaOH measurements and following the proposed risk management measures controlling worker exposure, the reasonable worst-case inhalation exposure of 0.33 mg/m^3 (typical value is 0.14 mg/m^3) is below the DNEL of 1 mg/m^3 .

Environmental exposure:

The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH^- discharges, as the toxicity of the Na^+ ion is expected to be insignificant compared to the (potential) pH effect. The high water solubility and very low vapour pressure indicate that NaOH will be found predominantly in water. When the risk management measures related to the environment are implemented, there is no exposure to the activated sludge of a sewage treatment plant and there is not exposure of the receiving surface water.

The sediment compartment is not considered, because it is not considered relevant for NaOH. If emitted to the aquatic compartment, sorption to sediment particles will be negligible.

Significant emissions to air are not expected due to the very low vapour pressure of NaOH. If emitted to air as an aerosol in water, NaOH will be rapidly neutralised as a result of its reaction with CO_2 (or other acids).

Significant emissions to the terrestrial environment are not expected either. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of NaOH to particulate matter will occur in STPs/WWTPs. If emitted to soil, sorption to soil particles will be negligible. Depending on the buffer capacity of the soil, OH^- will be neutralised in the soil pore water or the pH may increase.

Bioaccumulation will not occur.

Exposure Scenario 2: Manufacturing of solid NaOH

List of all use descriptors

Sector of use (SU):	SU 3, 8 Manufacture of bulk, large-scale substances
Product category (PC):	not applicable
Process category (PROC):	PROC1 Use in closed process, no likelihood of exposure
	PROC2 Use in closed, continuous process with occasional controlled exposure
	PROC3 Use in closed batch process (synthesis or formulation)
exposure arises	PROC4 Use in batch and other process (synthesis) where opportunity for
	PROC8a/b Transfer of chemicals from/to vessels/large containers at
(non)dedicated facilities	PROC9 Transfer of chemicals into small containers (dedicated filling line)



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Article category (AC):	not applicable
Environmental Release	
Category (ERC):	ERC1 Manufacture of substances
<i>EU Risk Assessment</i>	
An EU risk assessment has been performed based on the Existing Substances Regulation (Council Regulation 793/93). A comprehensive risk assessment report has been finalised in 2007 and is available via internet: http://ecb.jrc.ec.europa.eu/DOCUMENTS/Existing-Chemicals/RISK_ASSESSMENT/REPORT/sodiumhydroxidereport416.pdf	
Contributing exposure scenario controlling environmental exposure	
Product characteristics	
Solid NaOH	
Frequency and duration of use	
Continuous	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk management measures related to the environment aim to avoid discharging NaOH solutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes. Regular control of the pH value during introduction into open waters is required. In general discharges should be carried out such that pH changes in receiving surface waters are minimised. In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms.	
Conditions and measures related to external treatment or recovery of waste for disposal	
There is no solid waste of NaOH. Liquid NaOH waste should be reused or discharged to the industrial wastewater and further neutralized if needed.	
Contributing exposure scenario controlling worker exposure	
Product characteristic	
Solid NaOH, all concentrations	
Frequency and duration of use/exposure	
8 hours/day, 200 days/year	
Technical conditions and measures at process level (source) to prevent release	
Replacing, where appropriated, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes:	



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- Use closed systems or covering of open containers (e.g. screens)
- Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.)
- Use of pliers, grip arms with long handles with manual use "to avoid direct contact and exposure by splashes (no working over one's head)"

Technical conditions and measures to control dispersion from source towards the worker

Local exhaust ventilation and/or general ventilation is good practice

Organisational measures to prevent /limit releases, dispersion and exposure

- Workers in the risky process/areas identified should be trained a) to avoid to work without respiratory protection and b) to understand the corrosive properties and, especially, the respiratory inhalation effects of sodium hydroxide and c) to follow the safer procedures instructed by the employer.
- The employer has also to ascertain that the required PPE is available and used according to instructions

Conditions and measures related to personal protection, hygiene and health evaluation

- Respiratory protection: In case of dust or aerosol formation (e.g. spraying): use respiratory protection with approved filter (P2)
- Hand protection: impervious chemical resistant protective gloves
 - material: butyl-rubber, PVC, polychloroprene with natural latex liner, material thickness: 0.5 mm, breakthrough time: > 480 min
 - material: nitrile-rubber, fluorinated rubber, material thickness: 0.35-0.4 mm, breakthrough time: > 480 min
- Eye protection: chemical resistant goggles must be worn. If splashes are likely to occur, wear tightly fitting safety goggles, face –shield
- Wear suitable protective clothing, aprons, shield and suits, if splashes are likely to occur, wear: rubber or plastic boots, rubber or plastic boots

Exposure estimation and reference to its source

Worker exposure:

NaOH is a corrosive substance. For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be neglected. Therefore, dermal exposure to NaOH was not quantified.

NaOH is not expected to be systemically available in the body under normal handling and use conditions and therefore systemic effects of NaOH after dermal or inhalation exposure are not expected to occur.

Based on NaOH measurements and following the proposed risk management measures controlling worker exposure, the reasonable worst-case inhalation exposure of 0.26 mg/m³ (measured at the drumming/bagging place) is below the DNEL of 1 mg/m³.



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Environmental exposure:

The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH⁻ discharges, as the toxicity of the Na⁺ ion is expected to be insignificant compared to the (potential) pH effect. The high water solubility and very low vapour pressure indicate that NaOH will be found predominantly in water. When the risk management measures related to the environment are implemented, there is no exposure to the activated sludge of a sewage treatment plant and there is not exposure of the receiving surface water.

The sediment compartment is not considered, because it is not considered relevant for NaOH. If emitted to the aquatic compartment, sorption to sediment particles will be negligible.

Significant emissions to air are not expected due to the very low vapour pressure of NaOH. If emitted to air as an aerosol in water, NaOH will be rapidly neutralised as a result of its reaction with CO₂ (or other acids).

Significant emissions to the terrestrial environment are not expected either. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of NaOH to particulate matter will occur in STPs/WWTPs. If emitted to soil, sorption to soil particles will be negligible. Depending on the buffer capacity of the soil, OH⁻ will be neutralised in the soil pore water or the pH may increase.

Bioaccumulation will not occur.

Exposure Scenario 3: Industrial and Professional Use of NaOH

List of all use descriptors



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SODIUM HYDROXIDE SOLUTION, type 33% (w/w)

Revision: 3 Last up date: November 23, 2015 Date issued: December 2, 2010 pag.1/30

Sector of use (SU): SU 1-24

Because sodium hydroxide has so many uses and is used so widely it can potentially be used in all sectors of end use (SU) described by the use descriptor system (SU 1-24). NaOH is used for different purposes in a variety of industrial sectors.

Product category (PC): PC 0-40

Sodium hydroxide can be used in many different chemical product categories (PC). It can be used for example as an adsorbent (PC2), metal surface treatment product (PC14), non-metal-surface treatment product (PC15), intermediate (PC19), pH regulator (PC20), laboratory chemical (PC21), cleaning product (PC35), water softener (PC36), water treatment chemical (PC37) or extraction agent. However, it could potentially also be used in other chemical product categories (PC 0 – 40).

Process category (PROC): PROC1 Use in closed process, no likelihood of exposure

PROC2 Use in closed, continuous process with occasional controlled exposure

PROC3 Use in closed batch process (synthesis or formulation)

PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises

PROC5 Mixing or blending in batch processes (multistage and/or significant contact)

PROC8a/b Transfer of chemicals from/to vessels/large containers at (non)dedicated facilities

PROC9 Transfer of chemicals into small containers (dedicated filling line)

PROC10 Roller application or brushing

PROC11 Non industrial spraying

PROC13 Treatment of articles by dipping and pouring

PROC15 Use of laboratory reagents in small scale laboratories

The process categories mentioned above are assumed to be the most important ones but other process categories could also be possible (PROC 1 – 27).

Article category (AC): not applicable

Although sodium hydroxide can be used during the manufacturing process of articles, the substance is not expected to be present in the article. The article categories (AC) do not seem applicable for sodium hydroxide.



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Code: FDS 011

SAFETY DATA SHEET

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Revision: 3 Last up date: November 23, 2015 Date issued: December 2, 2010 pag.1/30

Environmental Release

Category (ERC): ERC1 Manufacture of substances
 ERC2 Formulation of preparations
becoming part of articles ERC4 Industrial use of processing aids in processes and products, not
intermediates) ERC6A Industrial use resulting in manufacture of another substance (use of
 ERC6B Industrial use of reactive processing aids
 ERC7 Industrial use of substances in closed systems
 ERC8A Wide dispersive indoor use of processing aids in open systems
 ERC8B Wide dispersive indoor use of reactive substances in open systems
 ERC8D Wide dispersive outdoor use of processing aids in open systems
 ERC9A Wide dispersive indoor use of substances in closed systems

The environmental release categories mentioned above are assumed to be the most important ones but other industrial environmental release categories could also be possible (ERC 1 – 12).

Further explanations

Typical uses include: production of organic and inorganic chemicals, formulation of chemicals, production and whitening of paper pulp, production of aluminium and other metals, food industry, water treatment, production of textiles, professional end use of formulated products and other industrial uses.

EU Risk Assessment

An EU risk assessment has been performed based on the Existing Substances Regulation (Council Regulation 793/93). A comprehensive risk assessment report has been finalised in 2007 and is available via internet:

http://ecb.jrc.ec.europa.eu/DOCUMENTS/Existing-Chemicals/RISK_ASSESSMENT/REPORT/sodiumhydroxidereport416.pdf

Contributing exposure scenario controlling environmental exposure

Product characteristics

Solid or liquid NaOH, all concentrations (0-100%), if solid: low dustiness class

Frequency and duration of use

Continuous

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Risk management measures related to the environment aim to avoid discharging NaOH solutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH



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changes. Regular control of the pH value during introduction into open waters is required. In general discharges should be carried out such that pH changes in receiving surface waters are minimised. In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms.

Conditions and measures related to external treatment or recovery of waste for disposal

There is no solid waste of NaOH. Liquid NaOH waste should be reused or discharged to the industrial wastewater and further neutralized if needed.

Contributing exposure scenario controlling worker exposure

Product characteristic

Solid or liquid NaOH, all concentrations (0-100%), if solid: low dustiness class

Frequency and duration of use/exposure

8 hours/day, 200 days/year

Technical conditions and measures at process level (source) to prevent release

For worker, both solid and liquid NaOH containing products at concentration > 2%:

Replacing, where appropriated, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes:

- Use closed systems or covering of open containers (e.g. screens)
- Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.)
- Use of pliers, grip arms with long handles with manual use "to avoid direct contact and exposure by splashes (no working over one's head)"

Technical conditions and measures to control dispersion from source towards the worker

For worker, both solid and liquid NaOH containing products at concentration > 2%:

Local exhaust ventilation and/or general ventilation is good practice

Organisational measures to prevent /limit releases, dispersion and exposure

For worker, both solid and liquid NaOH containing products at concentration > 2%:

- Workers in the risky process/areas identified should be trained a) to avoid to work without respiratory protection and b) to understand the corrosive properties and, especially, the respiratory inhalation effects of sodium hydroxide and c) to follow the safer procedures instructed by the employer.
- The employer has also to ascertain that the required PPE is available and used according to instructions
- Where possible for professional use, use of specific dispensers and pumps specifically designed to prevent splashes/spills/exposure to occur.

Conditions and measures related to personal protection, hygiene and health evaluation



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For worker and professional, both solid and liquid NaOH containing products at concentration > 2%:

- Respiratory protection: In case of dust or aerosol formation (e.g. spraying): use respiratory protection with approved filter (P2)
- Hand protection: impervious chemical resistant protective gloves
 - material: butyl-rubber, PVC, polychloroprene with natural latex liner, material thickness: 0.5 mm, breakthrough time: > 480 min
 - material: nitrile-rubber, fluorinated rubber, material thickness: 0.35-0.4 mm, breakthrough time: > 480 min
- If splashes are likely to occur, wear tightly fitting chemical resistant safety goggles, face –shield
- If splashes are likely to occur, wear suitable protective clothing, aprons, shield and suits, rubber or plastic boots, rubber or plastic boots

Exposure estimation and reference to its source

Exposure Scenario 4: Consumer Use of NaOH

List of all use descriptors

Sector of use (SU): SU 21 Private households

Product category (PC): PC 0-40

Sodium hydroxide can be used in many different chemical product categories (PC): PC 20, 35, 39 (neutralisation agents, cleaning products, cosmetics, personal care products). The other PCs are not explicitly considered in this exposure scenario. However, NaOH can also be used in other PCs in low concentrations e.g. PC3 (up to 0.01%), PC8 (up to 0.1%), PC28 and PC31 (up to 0.002%) but it can be used also in the remaining product categories (PC 0-40).

Process category (PROC): not applicable

Article category (AC): not applicable

Environmental Release

Category (ERC): ERC8A Wide dispersive indoor use of processing aids in open systems
ERC8B Wide dispersive indoor use of reactive substances in open systems



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ERC8D Wide dispersive outdoor use of processing aids in open systems

ERC9A Wide dispersive indoor use of substances in closed systems

The environmental release categories mentioned above are assumed to be the most important ones but other wide dispersive environmental release categories could also be possible (ERC 8 – 11b).

Further explanations

NaOH (up to 100%) is also used by consumers. It is used at home for drain and pipe cleaning, wood treatment and it also used to make soap at home. NaOH is also used in batteries and in oven-cleaner pads.

EU Risk Assessment

An EU risk assessment has been performed based on the Existing Substances Regulation (Council Regulation 793/93). A comprehensive risk assessment report has been finalised in 2007 and is available via internet:

http://ecb.jrc.ec.europa.eu/DOCUMENTS/Existing-Chemicals/RISK_ASSESSMENT/REPORT/sodiumhydroxidereport416.pdf

Contributing exposure scenario controlling environmental exposure

Product characteristics

Solid or liquid NaOH, all concentrations (0-100%), if solid: low dustiness class

Conditions and measures related to external treatment or recovery of waste for disposal

This material and its container must be disposed of in a safe way (e.g. by returning to a public recycling facility). If container is empty, trash as regular municipal waste.

Batteries should be recycled as much as possible (e.g. by returning to a public recycling facility). Recovery of NaOH from alkaline batteries includes emptying the electrolyte, collection and neutralization with sulphuric acid and carbon dioxide.

Contributing exposure scenario controlling worker exposure

Product characteristic

Solid or liquid NaOH, all concentrations (0-100%), if solid: low dustiness class

Typical concentrations: floor strippers (<10%), hair straighteners (<2%), oven cleaners (<5%), drain openers (liquid: 30%, solid: <100%), cleaning products (<1.1%)

Conditions and measures related to the design of the product

- It is required to use resistant labelling-package to avoid its auto-damage and loss of the label integrity, under normal use and storage of the product. The lack of quality of the package provokes the physical loss of information on hazards and use instructions.
- It is required that household chemicals, containing sodium hydroxide for more than 2%, which may be accessible to children should be provided with a child-resistant fastening (currently applied) and a tactile warning of danger (Adaptation to Technical Progress of the Directive 1999/45/EC, annex IV, Part A and



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Article 15(2) of Directive 67/548 in the case of, respectively, dangerous preparations and substances intended for domestic use). This would prevent accidents by children and other sensitive groups of society.

- It is advisable to deliver only in very viscous preparations
- It is advisable to delivery only in small amounts
- For use in batteries, it is required to use completely sealed articles with a long service life maintenance.

Conditions and measures related to information and behavioural advice to consumers

It is required that improved use instructions, and product information should always be provided to the consumers. This clearly can efficiently reduce the risk of misuse. For reducing the number of accidents in which (young) children or elderly people are involved, it should be advisable to use these products in the absence of children or other potential sensitive groups. To prevent improper use of sodium hydroxide, instructions for use should contain a warning against dangerous mixtures.

Instructions addressed to consumers:

- Keep out of reach of children.
- Do not apply product into ventilator openings or slots.

Conditions and measures related to personal protection and hygiene

For consumer, both solid and liquid NaOH containing products at concentration > 2%:

- Respiratory protection: In case of dust or aerosol formation (e.g. spraying): use respiratory protection with approved filter (P2)
- Hand protection: impervious chemical resistant protective gloves
- If splashes are likely to occur, wear tightly fitting chemical resistant safety goggles, face-shield

Exposure estimation and reference to its source

Consumer exposure:

Acute/short term exposure was assessed only for the most critical use: use of NaOH in a spray oven cleaner. Consexpo and SprayExpo were used to estimate exposure. The calculated short-term exposure of 0.3 – 1.6 mg/m³ is slightly higher than the long term DNEL for inhalation of 1 mg/m³ but smaller than the short term occupational exposure limit of 2 mg/m³. Furthermore, NaOH will be rapidly neutralised as a result of its reaction with CO₂ (or other acids).

Environmental exposure:

Consumer uses relates to already diluted products which will further be neutralized quickly in the sewer, well before reaching a WWTP or surface water.



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Code: FDS 011



Univar USA Inc Material Safety Data Sheet

MGC PURE CHEMICALS
6560 SOUTH MOUNTAIN RD

MESA
AZ 85212

MSDS No:
Version No:
Order No:

Univar USA Inc., 17425 NE Union Hill Rd., Redmond WA 98052
(425) 889 3400

Emergency Assistance

For emergency assistance involving chemicals call
Chemtrec - (800) 424-9300



Univar
3075 Highland Pkwy STE 200
Downers Grove, IL 60515
425-889-3400

SAFETY DATA SHEET

1. Identification

Product Identifier: - SULFURIC ACID 1-51%

Other means of identification

SDS number: 000100000005

Recommended use and restriction on use

Recommended use: Not available.

Restrictions on use: Not known.

Emergency telephone number: For emergency assistance involving chemicals

call CHEMTREC day or night at: 1-800-424-9300. CHEMTREC INTERNATIONAL Tel# 703-527-3887

2. Hazard(s) Identification

Hazard classification

Health hazards

Skin corrosion/irritation Category 1A

Serious eye damage/eye irritation Category 1

Carcinogenicity Category 1A

Environmental hazards Acute hazards to the aquatic environment Category 3

Label elements

Hazard symbol



Version: 1.8
Revision date: 05/08/2015



Signal word	Danger
Hazard statement	Corrosive. Harmful or fatal if swallowed. Causes severe skin burns and eye damage. May be corrosive to metals. May cause cancer. Harmful to aquatic life.
Precautionary statement	
Prevention	Wash thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required.
Response	IF INHALED: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If swallowed: Rinse mouth. Do NOT induce vomiting. Immediately call a POISON CENTER/doctor. Specific treatment (see this label). Wash contaminated clothing before reuse.
Storage	Store in a closed container. Store in a well-ventilated place. Store in a dry place. Store locked up.
Disposal	Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

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result in GHS classification None.**3. Composition/information on ingredients****Substances**

Chemical identity	Common name and synonyms	CAS number	Content in percent (%)*
Water		7732-18-5	>=49 - <=99%
Sulfuric Acid		7664-93-9	>=1 - <=51%

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

Ingestion: Call a physician or poison control center immediately. DO NOT induce vomiting. Get medical attention immediately. Never give liquid to an unconscious person.

Inhalation: Move to fresh air. If breathing is difficult, give oxygen. Perform artificial respiration if breathing has stopped.

Skin contact: Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

Eye contact: If in eyes, hold eyes open, flood with water for at least 15 minutes and see a doctor.

Most important symptoms/effects, acute and delayed
Symptoms: No data available.

Indication of immediate medical attention and special treatment needed

Treatment: No data available.

5. Fire-fighting measures

General fire hazards: Material reacts with water.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: Do not use water as an extinguisher. Use: Carbon dioxide or dry powder.

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Unsuitable extinguishing media:	No data available.
Specific hazards arising from the chemical:	Material reacts with water.
Special protective equipment and precautions for firefighters	
Special fire fighting procedures:	No unusual fire or explosion hazards noted.
Special protective equipment for fire-fighters:	Use standard firefighting procedures and consider the hazards of other involved materials.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures:	Use personal protective equipment.
Methods and material for containment and cleaning up:	Absorb spillage with non-combustible, absorbent material. Dike for later disposal.

7. Handling and storage

Precautions for safe handling:	Use personal protective equipment as required. Keep away from any possible contact with water, because of violent reaction and possible flash fire. Store away from incompatible materials. Use only with adequate ventilation. Material can accumulate static charges which may cause an electrical spark (ignition source). Use proper bonding and/or grounding procedures.
Conditions for safe storage, including any incompatibilities:	Keep container tightly closed. Store in a well-ventilated place.

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8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Chemical identity	Type	Exposure Limit values	Source
Sulfuric Acid - Thoracic fraction.	TWA	0.2 mg/m ³	US. ACGIH Threshold Limit Values (03 2013)
Sulfuric Acid	REL	1 mg/m ³	US. NIOSH: Pocket Guide to Chemical Hazards (2010)
	PEL	1 mg/m ³	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)
	TWA	1 mg/m ³	US. OSHA Table Z-1-A (29 CFR 1910.1000) (1989)
	TWA	1 mg/m ³	US. Tennessee. OELs. Occupational Exposure Limits, Table Z1A (06 2008)
	TWA PEL	0.1 mg/m ³	US. California Code of Regulations, Title 8, Section 5155. Airborne Contaminants (02 2012)
	STEL	3 mg/m ³	US. California Code of Regulations, Title 8, Section 5155. Airborne Contaminants (02 2012)

Appropriate engineering controls

Adequate ventilation should be provided so that exposure limits are not exceeded. Provide eyewash station and safety shower.

Individual protection measures, such as personal protective equipment

General information:

Use personal protective equipment as required. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned. Practice good housekeeping. Provide eyewash station and safety shower.

Eye/face protection:

Use safety goggles and face shield in case of splash risk. Wear approved safety goggles.

Skin protection

Hand protection:

Wear chemical-resistant gloves. Contact glove manufacturer for specific information. Wear necessary protective equipment.

Other:

No data available.

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Revision date: 05/08/2015

Respiratory protection: Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits.

Hygiene measures: Do not eat, drink or smoke when using the product. Observe good industrial hygiene practices.

9. Physical and chemical properties

Physical state:	Liquid
Form:	No data available.
Color:	No data available.
Odor:	No data available.
Odor threshold:	No data available.
pH:	1
Melting point/freezing point:	-32 °C
Initial boiling point and boiling range:	276 °C
Flash Point:	No data available.
Evaporation rate:	No data available.
Flammability (solid, gas):	No data available.
Upper/lower limit on flammability or explosive limits	
Flammability limit - upper (%):	No data available.
Flammability limit - lower (%):	No data available.
Explosive limit - upper (%):	No data available.
Explosive limit - lower (%):	No data available.
Vapor pressure:	No data available.
Vapor density:	No data available.
Relative density:	No data available.
Solubility(ies)	
Solubility in water:	No data available.
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	No data available.
Auto-ignition temperature:	No data available.
Decomposition temperature:	No data available.
Viscosity:	No data available.

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10. Stability and reactivity

Reactivity:	No data available.
Chemical stability:	No data available.
Possibility of hazardous reactions:	Material is stable under normal conditions.
Conditions to avoid:	No data available.
Incompatible materials:	Water. Strong reducing agents. Strong bases. Metals.
Hazardous decomposition products:	No data available.

11. Toxicological information

Symptoms related to the physical, chemical and toxicological characteristics

Ingestion:	No data available.
Inhalation:	No data available.
Skin contact:	No data available.
Eye contact:	No data available.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral	
Product:	ATEmix (): 2,140 mg/kg

Dermal	
Product:	No data available.

Inhalation	
Product:	No data available.

Specified substance(s):	
Sulfuric Acid	LC 50 (Rat,): 375 mg/m ³ (, No) 2 (reliable with restrictions)

Repeated dose toxicity	
Product:	No data available.

Skin corrosion/Irritation	
Product:	No data available.

Serious eye damage/eye irritation	
Product:	No data available.

Respiratory or skin sensitization	
Product:	No data available.

Carcinogenicity	
Product:	No data available.

Version: 1.8
Revision date: 05/08/2015**IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:**

Sulfuric Acid Overall evaluation: 1. Carcinogenic to humans.

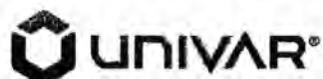
US. National Toxicology Program (NTP) Report on Carcinogens:

Sulfuric Acid Known To Be Human Carcinogen.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050):

No carcinogenic components identified

Germ cell mutagenicity**In vitro****Product:** No data available.**In vivo****Product:** No data available.**Reproductive toxicity****Product:** No data available.**Specific target organ toxicity - single exposure****Product:** No data available.**Specific target organ toxicity - repeated exposure****Product:** No data available.**Aspiration hazard****Product:** No data available.**Other effects:** No data available.**12. Ecological information****Ecotoxicity:****Acute hazards to the aquatic environment:****Fish****Product:** No data available.**Specified substance(s):**Sulfuric Acid LC 50 (Western mosquitofish (*Gambusia affinis*), 96 h): 42 mg/l Mortality**Aquatic invertebrates****Product:** No data available.**Chronic hazards to the aquatic environment:****Fish****Product:** No data available.**Aquatic invertebrates****Product:** No data available.**Toxicity to Aquatic Plants**

Version: 1.8
Revision date: 05/08/2015

Product:	No data available.
Persistence and degradability	
Biodegradation	
Product:	No data available.
BOD/COD ratio	
Product:	No data available.
Bioaccumulative potential	
Bioconcentration factor (BCF)	
Product:	No data available.
Partition coefficient n-octanol / water (log Kow)	
Product:	No data available.
Mobility in soil:	No data available.
Known or predicted distribution to environmental compartments	
Water	No data available.
Sulphuric acid	No data available.
Known or predicted distribution to environmental compartments	
Sulphuric acid	No data available.

13. Disposal considerations

Disposal instructions: All waste must be handled in accordance with Waste Act (No. 185/2001 Coll.), as amended, and related regulations, as amended.

Contaminated packaging: No data available.

14. Transport information

DOT

UN number:	UN 2796
UN proper shipping name:	Sulfuric acid
Transport hazard class(es)	
Class:	8
Label(s):	8
Packing group:	II
Marine Pollutant:	Not regulated.
Special precautions for user:	-

15. Regulatory information

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US federal regulations US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

None present or none present in regulated quantities.

CERCLA Hazardous Substance List (40 CFR 302.4):

Sulfuric Acid Reportable quantity: 1000 lbs.

Superfund amendments and reauthorization act of 1986 (SARA)

Hazard categories

Not listed.

SARA 302 Extremely hazardous substance

Chemical Identity	RQ	Threshold Planning Quantity
Sulfuric Acid	1000 lbs.	1000 lbs.

SARA 304 Emergency release notification

Chemical Identity	RQ
Sulfuric Acid	1000 lbs.

SARA 311/312 Hazardous chemical

Chemical Identity	Threshold Planning Quantity
Sulfuric Acid	500lbs

SARA 313 (TRI reporting)

Chemical Identity	Reporting threshold for other users	Reporting threshold for manufacturing and processing
Sulfuric Acid	10000 lbs	25000 lbs.

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)

Sulfuric Acid Reportable quantity: 1000 lbs.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):

Sulfuric Acid Threshold quantity: 10000 lbs

US state regulations

US. California Proposition 65

Sulfuric Acid Carcinogenic.
 Sulfuric Acid Carcinogenic.

US. New Jersey Worker and Community Right-to-Know Act

Sulfuric Acid Listed

US. Massachusetts RTK - Substance List

Sulfuric Acid Listed

US. Pennsylvania RTK - Hazardous Substances

Sulfuric Acid Listed

US. Rhode Island RTK

Sulfuric Acid Listed

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Inventory Status: Australia AICS:	Not in compliance with the inventory.
Canada DSL Inventory List:	Not in compliance with the inventory.
EU EINECS List:	Not in compliance with the inventory.
EU ELINCS List:	Not in compliance with the inventory.
Japan (ENCS) List:	Not in compliance with the inventory.
EU No Longer Polymers List:	Not in compliance with the inventory.
China Inv. Existing Chemical Substances:	Not in compliance with the inventory.
Korea Existing Chemicals Inv. (KECI):	Not in compliance with the inventory.
Canada NDSL Inventory:	Not in compliance with the inventory.
Philippines PICCS:	Not in compliance with the inventory.
New Zealand Inventory of Chemicals:	Not in compliance with the inventory.
Japan ISHL Listing:	Not in compliance with the inventory.
Japan Pharmacopoeia Listing:	Not in compliance with the inventory.
US TSCA Inventory:	On or in compliance with the inventory

16. Other information, including date of preparation or last revision

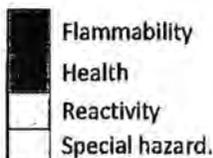
HMIS Hazard ID

Health	*	3
Flammability		0
Physical Hazards		2
PERSONAL PROTECTION		K

K - Hood, Gloves, Protective Suit & Boots

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; *Chronic health effect

NFPA Hazard ID



Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe
W: Water-reactive

Issue date: 05/08/2015
Revision date: No data available.
Version #: 1.8
Further Information: No data available.

ORDER NO:PX080393

MATERIAL SAFETY DATA SHEET
CUST:MGC PURE CHEMICALS

MSDS NO:10000005
VERSION:002 05/08/15

Version: 1.8
Revision date: 05/08/2015



Univar USA Inc Material Safety Data Sheet

For Additional Information contact MSDS Coordinator during business hours, Pacific time: (425) 889-3400

Notice

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This information relates only to the product designated herein, and does not relate to its use in combination with any other material or in any other process

1 Identification

Product identifier

Product name: **Acetic acid, glacial**

Stock number: 36289

CAS Number:
64-19-7

EC number:
200-580-7

Index number:
607-002-00-6

Relevant identified uses of the substance or mixture and uses advised against. No further relevant information available.

Identified use: SU24 Scientific research and development

Details of the supplier of the safety data sheet

Manufacturer/Supplier:

Alfa Aesar
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757
Email: tech@alfa.com
www.alfa.com

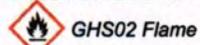
Information Department: Health, Safety and Environmental Department

Emergency telephone number:

During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660. After normal business hours, call Carechem 24 at (866) 928-0789.

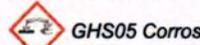
2 Hazard(s) identification

Classification of the substance or mixture in accordance with 29 CFR 1910 (OSHA HCS)



GHS02 Flame

Flam. Liq. 3 H226 Flammable liquid and vapour.



GHS05 Corrosion

Skin Corr. 1A H314 Causes severe skin burns and eye damage.

Hazards not otherwise classified No information known.

Label elements

GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)

Hazard pictograms



GHS02 GHS05

Signal word Danger

Hazard statements

H226 Flammable liquid and vapour.

H314 Causes severe skin burns and eye damage.

Precautionary statements

P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P405 Store locked up.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

WHMIS classification

B3 - Combustible liquid

D2B - Toxic material causing other toxic effects

E - Corrosive material



Classification system

HMIS ratings (scale 0-4)

(Hazardous Materials Identification System)

HEALTH 3 Health (acute effects) = 3

FLAMM 2 Flammability = 2

REACTIVITY 1 Physical Hazard = 1

Other hazards

Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

3 Composition/information on ingredients

Chemical characterization: Substances

CAS# Description:

64-19-7 Acetic acid

Identification number(s):

EC number: 200-580-7

Index number: 607-002-00-6

Product name: Acetic acid, glacial

(Contd. of page 1)

4 First-aid measures

Description of first aid measures

General information Immediately remove any clothing soiled by the product.

After inhalation

Supply fresh air. If required, provide artificial respiration. Keep patient warm.

Seek immediate medical advice.

After skin contact

Immediately wash with water and soap and rinse thoroughly.

Seek immediate medical advice.

After eye contact Rinse opened eye for several minutes under running water. Then consult a doctor.

After swallowing Seek medical treatment.

Information for doctor

Most important symptoms and effects, both acute and delayed Causes severe skin burns.

Indication of any immediate medical attention and special treatment needed No further relevant information available.

5 Fire-fighting measures

Extinguishing media

Suitable extinguishing agents Carbon dioxide, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

Special hazards arising from the substance or mixture

If this product is involved in a fire, the following can be released:

Carbon monoxide and carbon dioxide

Advice for firefighters

Protective equipment:

Wear self-contained respirator.

Wear fully protective impervious suit.

6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

Wear protective equipment. Keep unprotected persons away.

Ensure adequate ventilation

Keep away from ignition sources

Environmental precautions: Do not allow material to be released to the environment without proper governmental permits.

Methods and material for containment and cleaning up:

Keep away from ignition sources.

Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

Use neutralizing agent.

Dispose of contaminated material as waste according to section 13.

Ensure adequate ventilation.

Prevention of secondary hazards: Keep away from ignition sources.

Reference to other sections

See Section 7 for information on safe handling

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

7 Handling and storage

Handling

Precautions for safe handling

Keep container tightly sealed.

Store in cool, dry place in tightly closed containers.

Ensure good ventilation at the workplace.

Prevent formation of aerosols.

Information about protection against explosions and fires:

Protect against electrostatic charges.

Fumes can combine with air to form an explosive mixture.

Keep ignition sources away.

Conditions for safe storage, including any incompatibilities

Storage

Requirements to be met by storerooms and receptacles: No special requirements.

Information about storage in one common storage facility:

Store away from oxidizing agents.

Store away from strong bases.

Store away from amines.

Further information about storage conditions:

Keep container tightly sealed.

Store in cool, dry conditions in well sealed containers.

Specific end use(s) No further relevant information available.

8 Exposure controls/personal protection

Additional information about design of technical systems:

Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Control parameters

Components with limit values that require monitoring at the workplace:

64-19-7 Acetic acid (100.0%)

PEL (USA) Long-term value: 25 mg/m³, 10 ppm

REL (USA) Short-term value: 37 mg/m³, 15 ppm

Long-term value: 25 mg/m³, 10 ppm

TLV (USA) Short-term value: 37 mg/m³, 15 ppm

Long-term value: 25 mg/m³, 10 ppm

EL (Canada) Short-term value: 15 ppm

Long-term value: 10 ppm

EV (Canada) Short-term value: 37 mg/m³, 15 ppm

Long-term value: 25 mg/m³, 10 ppm

Additional information: No data

Exposure controls

Personal protective equipment

General protective and hygienic measures

The usual precautionary measures for handling chemicals should be followed.

(Contd. on page 3)
USA

Product name: **Acetic acid, glacial**

(Contd. of page 2)

Keep away from foodstuffs, beverages and feed.
Remove all soiled and contaminated clothing immediately.
Wash hands before breaks and at the end of work.
Avoid contact with the eyes and skin.
Maintain an ergonomically appropriate working environment.
Breathing equipment: Use suitable respirator when high concentrations are present.
Recommended filter device for short term use:
Use a respirator with multi-purpose combination (US) or type ABEK (EN 14387) as a backup to engineering controls. Risk assessment should be performed to determine if air-purifying respirators are appropriate. Only use equipment tested and approved under appropriate government standards such as NIOSH (USA) or CEN (EU).
Protection of hands:
Impervious gloves
Check protective gloves prior to each use for their proper condition.
The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.
Material of gloves: Butyl rubber, BR
Penetration time of glove material (in minutes): 480
Glove thickness: 0.3 mm
Eye protection:
Tightly sealed goggles
Full face protection
Body protection: Protective work clothing.

9 Physical and chemical properties

Information on basic physical and chemical properties

General Information

Appearance:

Form:	Liquid
Odor:	Pungent
Odor threshold:	Not determined.

pH-value (10 g/l) at 20 °C (68 °F): 2.5

Change in condition

Melting point/Melting range:	16.6 °C (62 °F)
Boiling point/Boiling range:	118.1 °C (245 °F)
Sublimation temperature / start:	Not determined

Flash point:	40 °C (104 °F)
Flammability (solid, gaseous):	Not applicable.
Ignition temperature:	485 °C (905 °F)
Decomposition temperature:	Not determined
Auto igniting:	Not determined.

Danger of explosion: Product is not explosive. However, formation of explosive air/vapor mixtures is possible.

Explosion limits:

Lower:	4 Vol %
Upper:	17 Vol %
Vapor pressure at 20 °C (68 °F):	16 hPa (12 mm Hg)
Density at 20 °C (68 °F):	1.049 g/cm ³ (8.754 lbs/gal)
Relative density:	Not determined.
Vapor density:	Not determined.
Evaporation rate:	Not determined.

Solubility in / Miscibility with

Water:	Fully miscible
Partition coefficient (n-octanol/water):	Not determined.

Viscosity:

dynamic at 25 °C (77 °F):	1.53 mPas
kinematic:	Not determined.

Other information No further relevant information available.

10 Stability and reactivity

Reactivity: No information known.

Chemical stability: Stable under recommended storage conditions.

Thermal decomposition / conditions to be avoided: Decomposition will not occur if used and stored according to specifications.

Possibility of hazardous reactions: No dangerous reactions known

Conditions to avoid: No further relevant information available.

Incompatible materials:

Oxidizing agents

Bases

Amines

Hazardous decomposition products: Carbon monoxide and carbon dioxide

11 Toxicological information

Information on toxicological effects

Acute toxicity:

Swallowing will lead to a strong corrosive effect on mouth and throat and to the danger of perforation of esophagus and stomach.

The Registry of Toxic Effects of Chemical Substances (RTECS) contains acute toxicity data for this substance.

LD/LC50 values that are relevant for classification:

Oral	LD50	3310 mg/kg (rat)
Dermal	LD50	1060 mg/kg (rabbit)
Inhalative	LC50/1H	5620 ppm/1H (mouse)

Skin irritation or corrosion: Causes severe skin burns.

Eye irritation or corrosion: Causes serious eye damage.

Sensitization: No sensitizing effects known.

Germ cell mutagenicity: The Registry of Toxic Effects of Chemical Substances (RTECS) contains mutation data for this substance.

Carcinogenicity:

The Registry of Toxic Effects of Chemical Substances (RTECS) contains tumorigenic and/or carcinogenic and/or neoplastic data for this substance.

No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.

Reproductive toxicity: The Registry of Toxic Effects of Chemical Substances (RTECS) contains reproductive data for this substance.

Specific target organ system toxicity - repeated exposure: No effects known.

Specific target organ system toxicity - single exposure: No effects known.

(Contd. on page 4)
USA

Product name: **Acetic acid, glacial**

(Contd. of page 3)

Aspiration hazard: No effects known.
Subacute to chronic toxicity: The Registry of Toxic Effects of Chemical Substances (RTECS) contains multiple dose toxicity data for this substance.
Additional toxicological information: To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
Carcinogenic categories
OSHA-Ca (Occupational Safety & Health Administration) Substance is not listed.

12 Ecological information

Toxicity
Aquatic toxicity: No further relevant information available.
Persistence and degradability No further relevant information available.
Bioaccumulative potential No further relevant information available.
Mobility in soil No further relevant information available.
Additional ecological information:
General notes:
Do not allow material to be released to the environment without proper governmental permits.
Do not allow undiluted product or large quantities to reach ground water, water course or sewage system.
Avoid transfer into the environment.
Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.
Other adverse effects No further relevant information available.

13 Disposal considerations

Waste treatment methods
Recommendation Consult state, local or national regulations to ensure proper disposal.
Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.
Recommended cleansing agent: Water, if necessary with cleansing agents.

14 Transport information

UN-Number DOT, IMDG, IATA	UN2789
UN proper shipping name DOT IMDG, IATA	Acetic acid, glacial ACETIC ACID, GLACIAL
Transport hazard class(es) DOT	
	
Class Label Class Label IMDG, IATA	8 Corrosive substances. 8+3 8 (CF1) Corrosive substances 8+3
	
Class Label	8 Corrosive substances. 8+3
Packing group DOT, IMDG, IATA	II
Environmental hazards:	Not applicable.
Special precautions for user EMS Number: Segregation groups	Warning: Corrosive substances F-E, S-C Acids
Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	Not applicable.
Transport/Additional information: DOT Marine Pollutant (DOT): Item:	No
UN "Model Regulation":	UN2789, Acetic acid, glacial, 8 (3), II

15 Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture
GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)
Hazard pictograms



GHS02 GHS05

Signal word Danger

Hazard statements

H226 Flammable liquid and vapour.

H314 Causes severe skin burns and eye damage.

Precautionary statements

P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

(Contd. on page 5)
USA

Product name: **Acetic acid, glacial**

(Contd. of page 4)

P405 Store locked up.
7501 Dispose of contents/container in accordance with local/regional/national/international regulations.

National regulations

All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.
All components of this product are listed on the Canadian Domestic Substances List (DSL).

SARA Section 313 (specific toxic chemical listings)

64-19-7 Acetic acid

California Proposition 65

Prop 65 - Chemicals known to cause cancer Substance is not listed.

Prop 65 - Developmental toxicity Substance is not listed.

Prop 65 - Developmental toxicity, female Substance is not listed.

Prop 65 - Developmental toxicity, male Substance is not listed.

Information about limitation of use: For use only by technically qualified individuals.

Other regulations, limitations and prohibitive regulations

Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006. Substance is not listed.

The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing on the market and use must be observed.

Substance is not listed.

Annex XIV of the REACH Regulations (requiring Authorisation for use) Substance is not listed.

Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing SDS: Global Marketing Department

Date of preparation / last revision 05/10/2016 / -

Abbreviations and acronyms:

RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)

ICAO: International Civil Aviation Organization

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

EINECS: European Inventory of Existing Commercial Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

HMIS: Hazardous Materials Identification System (USA)

WHMIS: Workplace Hazardous Materials Information System (Canada)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

vPvB: very Persistent and very Bioaccumulative

ACGIH: American Conference of Governmental Industrial Hygienists (USA)

OSHA: Occupational Safety and Health Administration (USA)

NTP: National Toxicology Program (USA)

IARC: International Agency for Research on Cancer

EPA: Environmental Protection Agency (USA)

Flam. Liq. 3: Flammable liquids, Hazard Category 3

Skin Corr. 1A: Skin corrosion/irritation, Hazard Category 1A



SAFETY DATA SHEET

1. IDENTIFICATION

Product name: Acetonitrile
Product code: A0060
Company: TOKYO CHEMICAL INDUSTRY CO., LTD.
Address: 4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Responsible department: Global Business Department
Telephone: +81-3-5640-8872
Fax: +81-3-5640-8902
e-mail: globalbusiness@TCIchemicals.com
Revision number: 12

2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

PHYSICAL HAZARDS

Flammable liquids

Category 2

HEALTH HAZARDS

Acute toxicity (Oral)

Category 5

Acute toxicity (Dermal)

Category 3

Acute toxicity (Inhalation)

Category 4

Serious eye damage/eye irritation

Category 2A

Germ cell mutagenicity

Category 2

Specific target organ toxicity

Respiratory system, Central nervous system

- Single exposure [Category 1]

Specific target organ toxicity

Liver, Blood system, Respiratory system, Kidney, Central nervous system

- Repeated exposure [Category 2]

Not classified

ENVIRONMENTAL HAZARDS

Label elements

Pictograms or hazard symbols



Signal word

Danger

Hazard statements

Highly flammable liquid and vapour

May be harmful if swallowed

Toxic in contact with skin

Harmful if inhaled

Causes serious eye irritation

Suspected of causing genetic defects

Causes damage to organs : Respiratory system Central nervous system

May cause damage to organs through prolonged or

repeated exposure : Liver Blood system Respiratory system

Kidney Central nervous system

Precautionary statements:

2. HAZARDS IDENTIFICATION**[Prevention]**

Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Keep container tightly closed.
Use explosion-proof electrical/ventilating/lighting equipment. Take precautionary measures against ignition by the static discharge and the spark.
Do not breathe dust/fume/gas/mist/vapours/spray.
Use only outdoors or in a well-ventilated area.
Do not eat, drink or smoke when using this product.
Wash hands thoroughly after handling.

[Response]

Wear protective gloves and eye/face protection.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists: Get medical advice/attention.
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
Remove/Take off immediately all contaminated clothing.
Wash contaminated clothing before reuse.
IF exposed or concerned: Get medical advice/attention.

[Storage]

Store in a well-ventilated place. Keep cool.
Store locked up.

[Disposal]

Dispose of contents/container through a waste management company authorized by the local government.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/mixture:	Substance
Components:	Acetonitrile
Percent:	>99.5%(GC)
CAS Number:	75-05-8
Synonyms:	Methyl Cyanide , ACN
Chemical Formula:	C ₂ H ₃ N
Notice Through Official Gazettes Reference Number	
ENCS:	(2)-1508
ISHL:	Official announcement chemistry substance.

4. FIRST-AID MEASURES

Inhalation:	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical advice/attention.
Skin contact:	Remove/Take off immediately all contaminated clothing. Gently wash with plenty of soap and water. Call a POISON CENTER or doctor/physician.
Eye contact:	Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Get medical advice/attention.
Ingestion:	Get medical advice/attention. Rinse mouth.
Most important symptoms/effects, acute and delayed:	Sore throat, Weakness, Dizziness, Headache, Abdominal pain, Laboured breathing, Convulsions, Unconsciousness, Vomiting, Redness, Pain
Protection of first-aiders:	A rescuer should wear personal protective equipment, such as rubber gloves and air-tight goggles.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media:	Dry chemical, foam, water in large amounts, carbon dioxide.
Specific hazards arising from the chemical:	Take care as it may decompose upon combustion or in high temperatures to generate poisonous fume.

5. FIRE-FIGHTING MEASURES

Precautions for firefighters: Fire-extinguishing work is done from the windward and the suitable fire-extinguishing method according to the surrounding situation is used. Uninvolved persons should evacuate to a safe place. In case of fire in the surroundings: Keep containers cool by spraying with water. Eliminate all ignition sources if safe to do so.

Special protective equipment for firefighters: When extinguishing fire, be sure to wear personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Use extra personal protective equipment (self-contained breathing apparatus). Keep people away from and upwind of spill/leak. Ensure adequate ventilation. Entry to non-involved personnel should be controlled around the leakage area by roping off, etc.

Environmental precautions: Prevent product from entering drains.

Methods and materials for containment and cleaning up: Absorb spilled material in dry sand or inert absorbent before recovering it into an airtight container. In case of large amount of spillage, contain a spill by bunding. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

Prevention of secondary hazards: Remove all sources of ignition. Fire-extinguishing devices should be prepared in case of a fire. Use spark-proof tools and explosion-proof equipment.

7. HANDLING AND STORAGE

Precautions for safe handling

Technical measures: Handling is performed in a well ventilated place. Wear suitable protective equipment. Prevent generation of vapour or mist. Keep away from heat/sparks/open flame/hot surfaces. -No smoking. Take measures to prevent the build up of electrostatic charge. Use explosion-proof equipment. Wash hands and face thoroughly after handling.

Use a closed system if possible. Use a ventilation, local exhaust if vapour or aerosol will be generated.

Advice on safe handling: Avoid all contact!

Conditions for safe storage, including any incompatibilities

Storage conditions: Keep container tightly closed. Store in a cool, dark and well-ventilated place. Store under inert gas. Protect from moisture. Store locked up. Store away from incompatible materials such as oxidizing agents. Hygroscopic

Packaging material: Comply with laws.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls: Install a closed system or local exhaust. Also install safety shower and eye bath.

Control parameters: Not set up

Exposure limits:

ACGIH TLV(TWA): 20 ppm (skin)

OSHA PEL(TWA): 40 ppm

Personal protective equipment

Respiratory protection: Half or full facepiece respirator, self-contained breathing apparatus(SCBA), supplied air respirator, etc. Use respirators approved under appropriate government standards and follow local and national regulations.

Hand protection: Impervious gloves.

Eye protection: Safety goggles. A face-shield, if the situation requires.

Skin and body protection: Impervious protective clothing. Protective boots, if the situation requires.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state (20°C): Liquid

Form: Clear

Colour: Colorless

Odour: Ether-like

Odour threshold: 170 ppm

9. PHYSICAL AND CHEMICAL PROPERTIES

pH:	No data available
Melting point/freezing point:	-46°C
Boiling point/range:	82°C
Flash point:	10°C
Evaporation rate(Butyl Acetate=1):	5.79
Flammability or explosive limits:	
Lower:	3%
Upper:	16%
Vapour pressure:	9.7kPa/20°C
Vapour density:	1.42
Relative density:	0.78
Solubility(ies):	
[Water]	Miscible
[Other solvents]	
Miscible:	Ether, Alcohols
Log Pow:	-0.34
Autoignition temperature:	524°C

10. STABILITY AND REACTIVITY

Chemical stability:	Stable under proper conditions.
Possibility of hazardous reactions:	No special reactivity has been reported.
Conditions to avoid:	Spark, Open flame, Static discharge
Incompatible materials:	Oxidizing agents, Acids, Bases, Reducing agents, Alkali metals
Hazardous decomposition products:	Carbon monoxide, Carbon dioxide, Nitrogen oxides (NOx), Cyanide

11. TOXICOLOGICAL INFORMATION

Acute Toxicity:	ihl-rat LC50:7551 ppm/8H ori-mus LD50:269 mg/kg ori-rat LD50:2460 mg/kg skn-rbt LD50:980 mg/kg
Skin corrosion/irritation:	skn-rbt 500 mg open MLD
Serious eye damage/irritation:	eye-rbt 20 mg open SEV
Germ cell mutagenicity:	sce-ham-ovr 5 g/L sln-dmg-ihl 131 ppm sln-smc 47600 ppm
Carcinogenicity:	ihl-rat TCLo:400 ppm/6H/2Y-I
IARC =	No data available
NTP =	No data available
Reproductive toxicity:	No data available
RTECS Number:	AL7700000

12. ECOLOGICAL INFORMATION

Ecotoxicity:	
Fish:	96h LC50:>100 mg/L (Oryzias latipes)
Crustacea:	48h EC50:>1000 mg/L (Daphnia magna)
Algae:	72h EC50:>700 mg/L (Selenastrum capricornutum)
Persistence / degradability:	65 % (NH ₃) (by BOD), 84 % (by TOC), 88 % (by GC) *The substance was determined as "Ready biodegradability" under the Chemical Substances Control Law.
Bioaccumulative potential(BCF):	3
Mobility in soil	
Log Pow:	-0.34
Soil adsorption (Koc):	120

12. ECOLOGICAL INFORMATION

Henry's Law constant(PaM³/mol): 3.49

13. DISPOSAL CONSIDERATIONS

Recycle to process, if possible. Consult your local regional authorities. You may be able to burn in a chemical incinerator equipped with an afterburner and scrubber system but exert extra care in igniting as this material is highly flammable. Observe all federal, state and local regulations when disposing of the substance

14. TRANSPORT INFORMATION

Hazards Class: 3: Flammable liquid.
UN-No: 1648
Proper shipping name: Acetonitrile
Packing group: II

15. JAPANESE REGULATORY INFORMATION

Fire Defense Law: Class-4 No.1 petroleum Dangerous grade 2 Water-soluble fluid
Poisonous and Deleterious Substances Control Law: on Deleterious Substances List.
ISHL(Article 57): Dangerous or Harmful Substances Subject to Be Indicated their Names, etc.
ISHL(Article 57-2): Dangerous or Harmful Substances Subject to Be Notified their Names, etc.

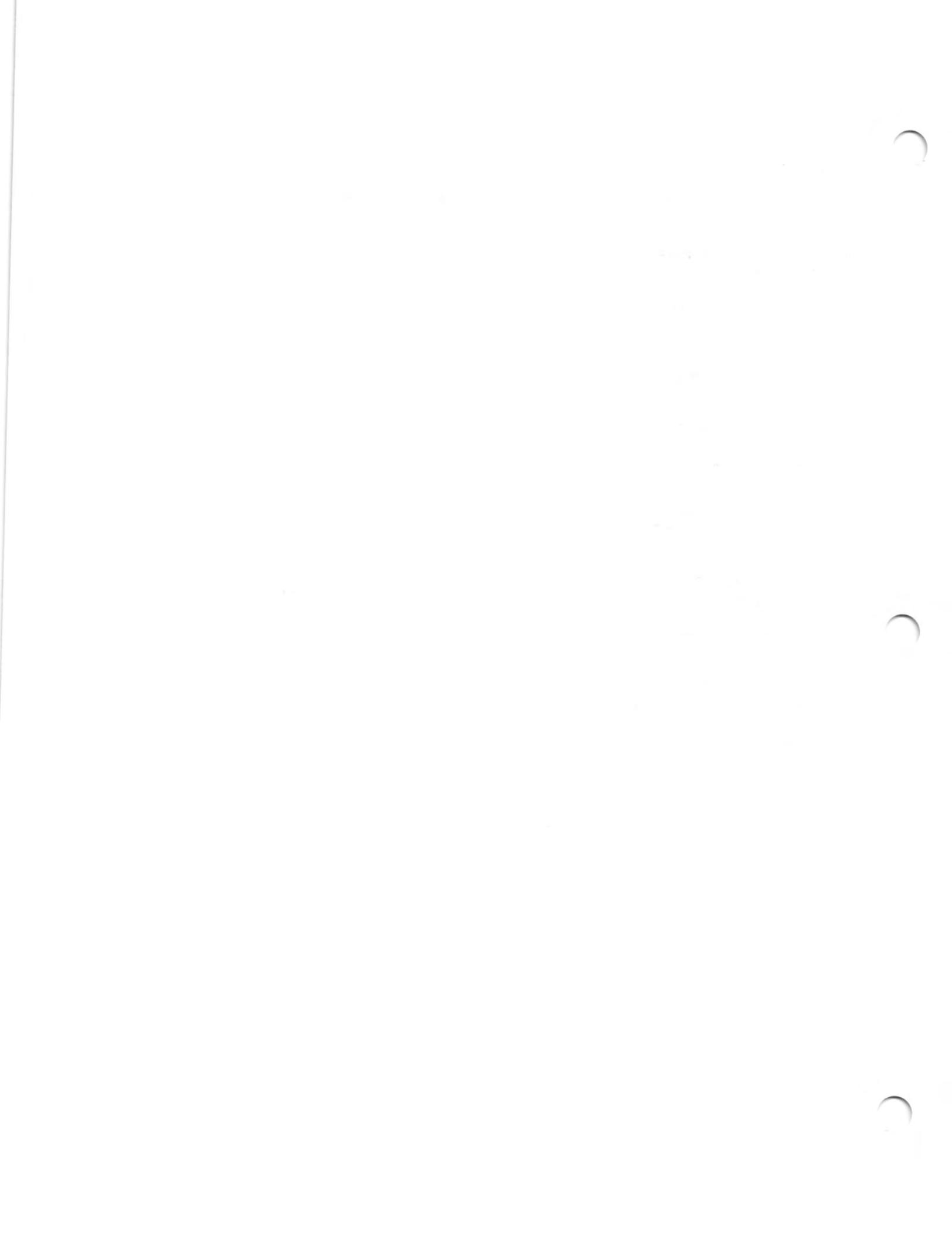
ISHL(Enforcement Order of the Industrial Safety and Health Act Appended Table

1):
ENCS: Priority Assessment Chemical Substance
Law for safety of vessels: Hazardous materials notification, Schedule form No.1 Flammable liquid
Pollutant Release and Transfer Register Law: on Designated Chemical Substances, Class I List(No.13)
Water Pollution Control Law: Harmful substances

16. OTHER INFORMATION**The reference company name of written contents**

Company: TOKYO CHEMICAL INDUSTRY CO., LTD.
Address: 4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Department: Global Business Department
Telephone: +81-3-5640-8872
Fax: +81-3-5640-8902

This SDS was prepared sincerely on the basis of the information we could obtained, however, any warranty shall not be given regarding the data contained and the assessment of hazards and toxicity. Prior to use, please investigate not only the hazards and toxicity information but also the laws and regulations of the organization, area and country where the products are to be used, which shall be given the first priority. The products are supposed to be used promptly after purchase in consideration of safety. Some new information or amendments may be added afterwards. If the products are to be used far behind the expected time of use or you have any questions, please feel free to contact us. The stated cautions are for normal handling only. In case of special handling, sufficient care should be taken, in addition to the safety measures suitable for the situation. All chemical products should be treated with the recognition of "having unknown hazards and toxicity", which differ greatly depending on the conditions and handling when in use and/or the conditions and duration of storage. The products must be handled only by those who are familiar with specialized knowledge and have experience or under the guidance of those specialists throughout use from opening to storage and disposal. Safe usage conditions shall be set up on each user's own responsibility.





TCI AMERICA

SAFETY DATA SHEET

Revision number: 2
Revision date: 10/06/2014

1. IDENTIFICATION

Product name: DL-1-Amino-2-propanol
Product code: A1229

Product use: For laboratory research purposes.
Restrictions on use: Not for drug or household use.

Company:
TCI America
9211 N. Harborsgate Street
Portland, OR 97203 U.S.A.
Telephone:
+1-800-423-8616 / +1-503-283-1681
Fax:
+1-888-520-1075 / +1-503-283-1987
e-mail:
sales-US@TCIchemicals.com
www.TCIchemicals.com

Emergency telephone number:
Chemical Emergencies:
TCI America (8:00am - 5:00pm) PST
+1-503-286-7624
Transportation Emergencies:
Chemtrec 24-Hour
+1-800-424-9300 (U.S.A.)
+1-703-527-3887 (International)
Responsible department:
TCI America
Environmental Health Safety and Security
+1- 503-286-7624

2. HAZARD(S) IDENTIFICATION

OSHA Haz Com: CFR 1910.1200:
Acute Toxicity - Oral [Category 4]
Acute Toxicity - Dermal [Category 4]
Eye Damage/Irritation [Category 1]
Flammable Liquids [Category 4]
Aquatic Hazard (Acute) [Category 3]
Aquatic Hazard (Long-Term) [Category 3]
Skin Corrosion/Irritation [Category 1B]

Signal word: Danger!

Hazard Statement(s):
Causes serious eye damage
Causes severe skin burns and eye damage
Combustible liquid
Harmful if swallowed
Harmful in contact with skin
Harmful to aquatic life
Harmful to aquatic life with long lasting effects

Pictogram(s) or Symbol(s):



Precautionary Statement(s):
[Prevention]

[Response]

[Storage]

Do not eat, drink or smoke when using this product. Wash hands and face thoroughly after handling. Wear protective gloves and protective clothing. Do not breathe dusts or mists. Use only outdoors or in a well-ventilated area. Wear protective gloves, protective clothing, eye protection and face protection. Wear eye protection. Wear face protection (full length face shield). Keep away from heat, sparks, open flames or other hot surfaces. - No smoking. Wear protective gloves, eye protection and face protection.
If swallowed: Immediately call a poison center or doctor. Rinse mouth. If on skin: Wash with plenty of water. Call a poison center or doctor if you feel unwell. Take off contaminated clothing and wash it before reuse. If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. Wash contaminated clothing before reuse. If inhaled: Remove person to fresh air and keep comfortable for breathing. Immediately call a poison center or doctor. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. In case of fire: Use dry chemical, CO2, water spray or alcohol-resistant foam to extinguish.
Store locked up. Store in well-ventilated place. Keep cool.

2. HAZARD(S) IDENTIFICATION

[Disposal]

Dispose of contents and container in accordance with US EPA guidelines for the classification and determination of hazardous waste listed in 40 CFR 261.3. (See Section 13)

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/Mixture:	Substance
Components:	DL-1-Amino-2-propanol
Percent:	>98.0%(GC)(T)
CAS Number:	78-96-6
Molecular Weight:	75.11
Chemical Formula:	C ₃ H ₉ NO
Synonyms:	DL-Isopropanolamine

4. FIRST-AID MEASURES

Inhalation:	Immediately call a poison center or doctor. Effects of exposure (inhalation) to substance may be delayed. Move victim to fresh air. Give artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult. Keep victim warm and quiet. Treat symptomatically and supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
Skin contact:	For severe burns, immediate medical attention is required. Immediately call a poison center or doctor. Remove and wash contaminated clothing before re-use. Remove and isolate contaminated clothing and shoes. In case of contact with substance, immediately flush skin with running water for at least 20 minutes. Treat symptomatically and supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
Eye contact:	IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. Eye contact with vapors or substance may cause severe injury, burns, or death. Call emergency medical service. Move victim to fresh air. Check for and remove any contact lenses. Keep victim warm and quiet. Treat symptomatically and supportively. Effects of exposure to substance may be delayed. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
Ingestion:	Harmful if swallowed. Do not induce vomiting with out medical advice. Call a physician or Poison Control Center immediately. Do not use mouth-to-mouth method if victim ingested the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Loosen tight clothing such as a collar, tie, belt or waistband. If a person vomits place them in the recovery position so that vomit will not reenter the mouth and throat. Rinse mouth. Keep victim warm and quiet. Treat symptomatically and supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
Symptoms/effects:	
Acute:	Pain. Redness.
Delayed:	No data available
Immediate medical attention:	WARNING: It might be hazardous to the person providing aid to give mouth-to-mouth respiration, because the inhaled material is harmful. WARNING: It might be hazardous to the person providing aid to give mouth-to-mouth respiration, because the inhaled material is corrosive. For severe burns, immediate medical attention is required. If breathing has stopped, perform artificial respiration. Use first aid treatment according to the nature of the injury. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: Dry chemical, CO₂ or water spray. Consult with local fire authorities before attempting large scale fire fighting operations.

Specific hazards arising from the chemical

Hazardous combustion products: These products include: Carbon oxides Nitrogen oxides

Other specific hazards: Closed containers may explode from heat of a fire.

Special precautions for fire-fighters:

Use water spray or fog; do not use straight streams. Dike fire-control water for later disposal; do not scatter the material. CAUTION: All these products have a very low flash point: Use of water spray when fighting fire may be inefficient. Do not use straight streams. Runoff to sewer may create fire or explosion hazard. Containers may explode when heated. Move containers from fire area if you can do it without risk.

5. FIRE-FIGHTING MEASURES**Special protective equipment for fire-fighters:**

Wear positive pressure self-contained breathing apparatus (SCBA). Structural fire fighters' protective clothing provides limited protection in fire situations ONLY; it may not be effective in spill situations. Wear chemical protective clothing which is specifically recommended by the manufacturer. It may provide little or no thermal protection.

6. ACCIDENTAL RELEASE MEASURES**Personal precautions:**

Avoid contact with skin, eyes, and clothing. Keep people away from and upwind of spill/leak. Use spark-proof tools and explosion-proof equipment. Remove all sources of ignition. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing (Section 8). Warn unnecessary personnel to move away. Stop leak if you can do it without risk. Ensure adequate ventilation. Isolate the hazard area and deny entry to unnecessary and unprotected personnel.

Personal protective equipment:

Wear eye protection (splash goggles) and face protection (full length face shield). Lab coat. Vapor respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent. Wear protective gloves (nitrile).

Emergency procedures:

Isolate area until gas has dispersed. In case of a spill and/or a leak, always shut off any sources of ignition, ventilate the area, and exercise caution. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Warn personnel to move away. Prevent entry into sewers, basements or confined areas; dike if needed.

Methods and materials for containment and cleaning up:

ELIMINATE all ignition sources (no smoking, flares, sparks, or flames in immediate area). All equipment used when handling the product must be grounded. Stop leak if without risk. Ventilate the area. Absorb with an inert material and put the spilled material in an appropriate waste disposal container. Use clean non-sparking tools to collect absorbed material. Dike far ahead of spill; use dry sand to contain the flow of material.

Environmental precautions:

Keep away from living quarters. Environmental hazard. Do not let product enter drains. Prevent further leakage or spillage if safe to do so. Water runoff can cause environmental damage. Prevent entry into sewers, basements or confined areas; dike if needed.

7. HANDLING AND STORAGE**Precautions for safe handling:**

Do NOT breath gas, fumes, vapor, or spray. Manipulate under an adequate fume hood. Do not ingest. Avoid contact with skin and eyes. Avoid contact with skin. Keep away from heat and sources of ignition. Use explosion-proof equipment. Use only non-sparking hand tool when handling this product. Ground all equipment containing material. Take measures to prevent build up of electrostatic charge. Good general ventilation should be sufficient to control airborne levels. Keep container dry. Handle and open container with care. Wear suitable protective clothing, gloves and eye/face protection. When using do not eat, drink, or smoke. Keep away from sources of ignition.

Conditions for safe storage:

Keep away from sources of ignition. Store and use away from heat, sparks, open flame, or any other ignition source. Store locked up. Keep containers tightly closed in a cool, well-ventilated place. Keep away from incompatibles. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Avoid prolonged storage periods. Store under inert gas (e.g. Argon). Hygroscopic material, store in a tightly sealed container.

Storage incompatibilities:

Bases, Combustible substances, Store away from oxidizing agents

8. EXPOSURE CONTROLS / PERSONAL PROTECTION**Exposure limits:**

No data available

Appropriate engineering controls:

Good general ventilation should be sufficient to control airborne levels. Ventilation is normally required when handling or using this product. Eyewash fountains should be provided in areas where there is any possibility that workers could be exposed to the substance. Follow safe industrial engineering/laboratory practices when handling any chemical.

Personal protective equipment**Respiratory protection:**

Vapor respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent.

Hand protection:

Wear protective gloves.

Eye protection:

Splash goggles.

Skin and body protection:

Lab coat.

9. PHYSICAL AND CHEMICAL PROPERTIES**Physical state (20°C):**

Liquid

Form:

Clear

Color:

Colorless - Slightly pale yellow

Odor:

Slight Ammoniacal

Odor threshold:

No data available

9. PHYSICAL AND CHEMICAL PROPERTIES

Melting point/freezing point:	-2°C (28°F)	pH:	No data available
Boiling point/range:	160°C (320°F)	Vapor pressure:	63Pa/25°C
Decomposition temperature:	No data available	Vapor density:	2.6
Relative density:	0.96	Dynamic Viscosity:	No data available
Kinematic Viscosity:	No data available		
Partition coefficient: n-octanol/water (log P_{ow})	-1.0	Evaporation rate: (Butyl Acetate = 1)	No data available
Flash point:	78°C (172°F)	Autoignition temperature:	374°C (705°F)
Flammability (solid, gas):	No data available	Flammability or explosive limits:	
		Lower:	2.2%
		Upper:	12%

Solubility(ies):

Water: Miscible

Miscible: Ether, Alcohols, Benzene, Acetone, Carbon tetrachloride

10. STABILITY AND REACTIVITY

Reactivity:	Not Available.
Chemical Stability:	Air sensitive.
Possibility of Hazardous Reactions:	In use, may form flammable/explosive vapor-air mixture.
Conditions to avoid:	Air sensitive. Exposure to air.
Incompatible materials:	Oxidizing agents
Hazardous Decomposition Products:	No data available

11. TOXICOLOGICAL INFORMATION

RTECS Number: UA5775000

Acute Toxicity:

ori-rat LD50:1715 mg/kg

ipr-mus LDLo:250 mg/kg

skn-rbt LD50:1640 uL/kg

Skin corrosion/irritation:

skn-rbt 485 mg open MOD

Serious eye damage/irritation:

eye-rbt 250 ug/24H SEV

Respiratory or skin sensitization:

No data available

Germ cell mutagenicity:

No data available

Carcinogenicity:

No data available

IARC: No data available

NTP: No data available

OSHA: No data available

Reproductive toxicity:

No data available

Routes of Exposure:

Inhalation, Eye contact, Ingestion, Skin contact.

Symptoms related to exposure:

Overexposure may result in serious illness or death. Skin contact may produce burns. Skin contact may result in inflammation; characterized by itching, scaling, reddening, or occasionally blistering. Eye contact can result in corneal damage or blindness.

Potential Health Effects:

No specific information available; skin and eye contact may result in irritation. May be harmful if inhaled or ingested.

Target organ(s):

No data available

12. ECOLOGICAL INFORMATION**Ecotoxicity**

Fish:	No data available
Crustacea:	No data available
Algae:	No data available

Persistence and degradability:	No data available
Bioaccumulative potential (BCF):	0.11
Mobility in soil:	No data available
Partition coefficient: n-octanol/water (log P_{ow})	-1.0
Soil adsorption (K_{oc}):	7.1
Henry's Law: constant (PaM³/mol)	2.37 x 10 ⁻⁵

13. DISPOSAL CONSIDERATIONS

Disposal of product:	Recycle to process if possible. It is the generator's responsibility to comply with Federal, State and Local rules and regulations. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. This section is intended to provide assistance but does not replace these laws, nor does compliance in accordance with this section ensure regulatory compliance according to the law. US EPA guidelines for Identification and Listing of Hazardous Waste are listed in 40 CFR Parts 261. The product should not be allowed to enter the environment, drains, water ways, or the soil.
Disposal of container:	Dispose of as unused product. Do not re-use empty containers.
Other considerations:	Observe all federal, state and local regulations when disposing of the substance.

14. TRANSPORT INFORMATION**DOT (US)**

UN number:	Proper Shipping Name:	Class or Division:	Packing Group:
UN2735	Amines, liquid, corrosive, n.o.s.	8 Corrosive material	III

IATA

UN number:	Proper Shipping Name:	Class or Division:	Packing Group:
UN2735	Amines, liquid, corrosive, n.o.s.	8 Corrosive material	III

IMDG

UN number:	Proper Shipping Name:	Class or Division:	Packing Group:
UN2735	Amines, liquid, corrosive, n.o.s.	8 Corrosive material	III

EmS number: F-A, S-B

15. REGULATORY INFORMATION**Toxic Substance Control Act (TSCA 8b.):**

This product is ON the EPA Toxic Substances Control Act (TSCA) inventory.

US Federal Regulations**CERCLA Hazardous substance and Reportable Quantity:**

SARA 313:	Not Listed
SARA 302:	Not Listed

State Regulations**State Right-to-Know**

Massachusetts	Not Listed
New Jersey	Listed
Pennsylvania	Not Listed
California Proposition 65:	Not Listed

Other Information

15. REGULATORY INFORMATION**NFPA Rating:**

Health: 3
Flammability: 2
Instability: 0

HMIS Classification:

Health: 3
Flammability: 2
Physical: 0

International Inventories**WHMIS hazard class:**

E: Corrosive material.
B3: Combustible Liquid.
D2A: Materials causing other toxic effects. (Very Toxic)
201-162-7

EC-No:**16. OTHER INFORMATION**

Revision date: 10/06/2014

Revision number: 2

TCI chemicals are for research purposes only and are NOT intended for use as drugs, food additives, households, or pesticides. The information herein is believed to be correct, but does not claim to be all inclusive and should be used only as a guide. Neither the above named supplier nor any of its affiliates or subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All chemical reagents must be handled with the recognition that their chemical, physiological, toxicological, and hazardous properties have not been fully investigated or determined. All chemical reagents should be handled only by individuals who are familiar with their potential hazards and who have been fully trained in proper safety, laboratory, and chemical handling procedures. Although certain hazards are described herein, we can not guarantee that these are the only hazards which exist. Our SDS are based only on data available at the time of shipping and are subject to change without notice as new information is obtained. Avoid long storage periods since the product is subject to degradation with age and may become more dangerous or hazardous. It is the responsibility of the user to request updated SDS for products that are stored for extended periods. Disposal of unused product must be undertaken by qualified personnel who are knowledgeable in all applicable regulations and follow all pertinent safety precautions including the use of appropriate protective equipment (e.g. protective goggles, protective clothing, breathing equipment, face mask, fume hood). For proper handling and disposal, always comply with federal, state and local regulations.

SAFETY DATA SHEET

1. Identification

Product identifier: AMMONIUM FLUORIDE 40% SOLUTION

Other means of identification

Product No.: 5874, 5864, 0712, 0702, 37816

Recommended use and restriction on use

Recommended use: Not available.

Restrictions on use: Not known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Company Name: Avantor Performance Materials, Inc.
Address: 3477 Corporate Parkway, Suite 200
Center Valley, PA 18034

Telephone: Customer Service: 855-282-6867

Fax:
Contact Person: Environmental Health & Safety
e-mail: info@avantormaterials.com

Emergency telephone number:

24 Hour Emergency: 908-859-2151

Chemtrec: 800-424-9300

2. Hazard(s) identification

Hazard classification

Health hazards

Acute toxicity (Oral)	Category 3
Acute toxicity (Dermal)	Category 3
Acute toxicity (Inhalation - gas)	Category 3

Label elements

Hazard symbol:



Signal word: Danger

Hazard statement: Toxic if swallowed.
Toxic in contact with skin.
Toxic if inhaled.

Precautionary statement

Prevention: Wash hands thoroughly after handling. Do not eat, drink or smoke when using this product. Wear eye protection/face protection. Avoid breathing dust/fume/gas/mist/vapors/spray. Use only outdoors or in a well-ventilated

area.

- Response:** Specific treatment (see this label). IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Rinse mouth. IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or doctor/physician if you feel unwell. Take off immediately all contaminated clothing and wash it before reuse. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician.
- Storage:** Store in a well-ventilated place. Keep container tightly closed. Store locked up.
- Disposal:** Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Other hazards which do not result in GHS classification: None.

3. Composition/information on ingredients

Mixtures

Chemical identity	Common name and synonyms	CAS number	Content in percent (%)*
AMMONIUM FLUORIDE		12125-01-8	40%

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

- General information:** Get medical advice/attention if you feel unwell. Show this safety data sheet to the doctor in attendance.
- Ingestion:** Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting without advice from poison control center.
- Inhalation:** Move to fresh air. Call a physician or poison control center immediately. If breathing stops, provide artificial respiration.
- Skin contact:** Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician or poison control center immediately. Wash contaminated clothing before reuse. Destroy or thoroughly clean contaminated shoes.
- Eye contact:** Flush thoroughly with water. If irritation occurs, get medical assistance.

Most important symptoms/effects, acute and delayed

Symptoms: Toxic if swallowed. Toxic in contact with skin. Toxic if inhaled. May cause irritation to skin, eyes, and respiratory tract.

Indication of immediate medical attention and special treatment needed

Treatment: Treat symptomatically. Symptoms may be delayed.

5. Fire-fighting measures

General fire hazards: In case of fire and/or explosion do not breathe fumes.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: Use fire-extinguishing media appropriate for surrounding materials.

Unsuitable extinguishing media: None known.

Specific hazards arising from the chemical: Contact with metals may evolve flammable hydrogen gas. Fire may produce irritating, corrosive and/or toxic gases.

Special protective equipment and precautions for firefighters

Special fire fighting procedures: Move containers from fire area if you can do so without risk. Use water spray to keep fire-exposed containers cool. Cool containers exposed to flames with water until well after the fire is out.

Special protective equipment for fire-fighters: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures: Keep unauthorized personnel away. Use personal protective equipment. See Section 8 of the MSDS for Personal Protective Equipment. Ventilate closed spaces before entering them. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

Methods and material for containment and cleaning up: Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. Dike far ahead of larger spill for later recovery and disposal.

Notification Procedures: Dike for later disposal. Prevent entry into waterways, sewer, basements or confined areas. Stop the flow of material, if this is without risk. Inform authorities if large amounts are involved.

Environmental precautions: Do not contaminate water sources or sewer. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling: Use personal protective equipment as required. Avoid contact with eyes, skin, and clothing. Do not breathe mist or vapor. Do not taste or swallow. Do not eat, drink or smoke when using the product. Use only with adequate ventilation. Wash hands thoroughly after handling. See Section 8 of the MSDS for Personal Protective Equipment.

Conditions for safe storage, including any incompatibilities: Do not store in metal containers. Will attack glass and most ceramics. Keep in a cool, well-ventilated place. Store in a dry place.

8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Chemical identity	Type	Exposure Limit values	Source
AMMONIUM FLUORIDE - as F	TWA	2.5 mg/m ³	US. ACGIH Threshold Limit Values (2011)
	REL	2.5 mg/m ³	US. NIOSH: Pocket Guide to Chemical Hazards (2010)
	PEL	2.5 mg/m ³	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)
AMMONIUM FLUORIDE - Dust.	TWA	2.5 mg/m ³	US. OSHA Table Z-1-A (29 CFR 1910.1000) (1989)
	TWA	2.5 mg/m ³	US. OSHA Table Z-2 (29 CFR 1910.1000) (02 2006)

Biological limit values

Chemical identity	Exposure Limit values	Source
AMMONIUM FLUORIDE (fluorides: Sampling time: Prior to shift.)	2 mg/l (Urine)	ACGIH BEL (02 2012)
AMMONIUM FLUORIDE (fluorides: Sampling time: End of shift.)	3 mg/l (Urine)	ACGIH BEL (02 2012)

Appropriate engineering controls

No data available.

Individual protection measures, such as personal protective equipment

General information: Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. An eye wash and safety shower must be available in the immediate work area.

Eye/face protection: Wear safety glasses with side shields (or goggles) and a face shield.

Skin protection

Hand protection: Chemical resistant gloves

Other: Wear suitable protective clothing.

Respiratory protection: In case of inadequate ventilation use suitable respirator.

Hygiene measures: Provide eyewash station and safety shower. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned.

9. Physical and chemical properties

Appearance

Physical state: Liquid
Form: Liquid
Color: Colorless

Odor: Slight
Odor threshold: No data available.
pH: No data available.

Melting point/freezing point:	-30 °C
Initial boiling point and boiling range:	109 °C
Flash Point:	Not applicable
Evaporation rate:	No data available.
Flammability (solid, gas):	No data available.
Upper/lower limit on flammability or explosive limits	
Flammability limit - upper (%):	No data available.
Flammability limit - lower (%):	No data available.
Explosive limit - upper (%):	No data available.
Explosive limit - lower (%):	No data available.
Vapor pressure:	As water
Vapor density:	No data available.
Relative density:	1.1 (20 °C)
Solubility(ies)	
Solubility in water:	Completely Soluble
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	No data available.
Auto-ignition temperature:	No data available.
Decomposition temperature:	No data available.
Viscosity:	No data available.

10. Stability and reactivity

Reactivity:	No dangerous reaction known under conditions of normal use.
Chemical stability:	Material is stable under normal conditions.
Possibility of hazardous reactions:	Hazardous polymerization does not occur.
Conditions to avoid:	Excessive heat. Contact with incompatible materials.
Incompatible materials:	Strong oxidizing agents. Strong acids. Strong bases. Glass. Metals.
Hazardous decomposition products:	Hydrogen fluoride. Nitrogen Oxides ammonia

11. Toxicological information

Information on likely routes of exposure

Ingestion:	Toxic if swallowed.
Inhalation:	Toxic by inhalation.
Skin contact:	Toxic in contact with skin.
Eye contact:	May irritate eyes.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral Product:	No data available.
Dermal Product:	No data available.

Inhalation	
Product:	No data available.
Repeated dose toxicity	
Product:	No data available.
Skin corrosion/irritation	
Product:	May cause skin irritation.
Serious eye damage/eye irritation	
Product:	May irritate eyes.
Respiratory or skin sensitization	
Product:	Not a skin sensitizer.
Carcinogenicity	
Product:	This substance has no evidence of carcinogenic properties.
IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:	
No carcinogenic components identified	
US. National Toxicology Program (NTP) Report on Carcinogens:	
No carcinogenic components identified	
US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050):	
No carcinogenic components identified	
Germ cell mutagenicity	
In vitro	
Product:	No mutagenic components identified
In vivo	
Product:	No mutagenic components identified
Reproductive toxicity	
Product:	No components toxic to reproduction
Specific target organ toxicity - single exposure	
Product:	Not known.
Specific target organ toxicity - repeated exposure	
Product:	None known.
Aspiration hazard	
Product:	Not classified
Other effects:	None known.

12. Ecological information

Ecotoxicity:

Acute hazards to the aquatic environment:

Fish

Product: No data available.

Aquatic invertebrates

Product: No data available.

Chronic hazards to the aquatic environment:

Fish
Product: No data available.

Aquatic invertebrates
Product: No data available.

Toxicity to Aquatic Plants
Product: No data available.

Persistence and degradability

Biodegradation
Product: Expected to be readily biodegradable.

BOD/COD ratio
Product: No data available.

Bioaccumulative potential

Bioconcentration factor (BCF)
Product: No data available on bioaccumulation.

Partition coefficient n-octanol / water (log Kow)
Product: No data available.

Mobility in soil: The product is water soluble and may spread in water systems.

Other adverse effects: The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

13. Disposal considerations

Disposal instructions: Discharge, treatment, or disposal may be subject to national, state, or local laws.

Contaminated packaging: Since emptied containers retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

UN number:	UN 2505
UN proper shipping name:	Ammonium fluoride solution
Transport hazard class(es)	
Class(es):	6.1
Label(s):	6.1
Packing group:	III
Marine Pollutant:	No

IMDG

UN number: UN 3287
 UN proper shipping name: TOXIC LIQUID, INORGANIC, N.O.S.(AMMONIUM FLUORIDE SOLUTION)
 Transport hazard class(es)
 Class(es): 6.1
 Label(s): 6.1
 EmS No.: F-A, S-A
 Packing group: III
 Marine Pollutant: No

IATA

UN number: UN 3287
 Proper Shipping Name: Toxic liquid, inorganic, n.o.s.(AMMONIUM FLUORIDE SOLUTION)
 Transport hazard class(es):
 Class(es): 6.1
 Label(s): 6.1
 Marine Pollutant: No
 Packing group: III

15. Regulatory information

US federal regulations

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)
US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)
 None present or none present in regulated quantities.

CERCLA Hazardous Substance List (40 CFR 302.4):
 AMMONIUM FLUORIDE Reportable quantity: 100 lbs.

Superfund amendments and reauthorization act of 1986 (SARA)

Hazard categories

Acute (Immediate) Chronic (Delayed) Fire Reactive Pressure Generating

SARA 302 Extremely hazardous substance
 None present or none present in regulated quantities.

SARA 304 Emergency release notification

<u>Chemical identity</u>	<u>RQ</u>
AMMONIUM FLUORIDE	100 lbs.

SARA 311/312 Hazardous chemical

<u>Chemical identity</u>	<u>Threshold Planning Quantity</u>
AMMONIUM FLUORIDE	500 lbs

SARA 313 (TRI reporting)

<u>Chemical identity</u>	<u>Reporting threshold for other users</u>	<u>Reporting threshold for manufacturing and processing</u>
AMMONIUM FLUORIDE	10000 lbs	25000 lbs.

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)
 AMMONIUM FLUORIDE Reportable quantity: 100 lbs.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):
 None present or none present in regulated quantities.

US state regulations

US. California Proposition 65

No ingredient regulated by CA Prop 65 present.

US. New Jersey Worker and Community Right-to-Know Act

AMMONIUM FLUORIDE Listed

US. Massachusetts RTK - Substance List

AMMONIUM FLUORIDE Listed

US. Pennsylvania RTK - Hazardous Substances

AMMONIUM FLUORIDE Listed

US. Rhode Island RTK

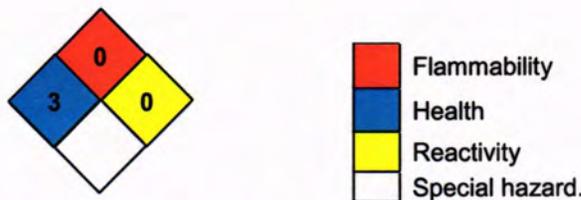
AMMONIUM FLUORIDE Listed

Inventory Status:

Australia AICS:	On or in compliance with the inventory
Canada DSL Inventory List:	On or in compliance with the inventory
EINECS, ELINCS or NLP:	On or in compliance with the inventory
Japan (ENCS) List:	On or in compliance with the inventory
China Inv. Existing Chemical Substances:	Not in compliance with the inventory.
Korea Existing Chemicals Inv. (KECI):	On or in compliance with the inventory
Canada NDSL Inventory:	Not in compliance with the inventory.
Philippines PICCS:	On or in compliance with the inventory
US TSCA Inventory:	On or in compliance with the inventory
New Zealand Inventory of Chemicals:	On or in compliance with the inventory
Japan ISHL Listing:	Not in compliance with the inventory.
Japan Pharmacopoeia Listing:	Not in compliance with the inventory.

16. Other information, including date of preparation or last revision

NFPA Hazard ID



Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe

Issue date: 07-15-2014
Revision date: No data available.
Version #: 2.0
Further information: No data available.

Disclaimer:

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SAFETY DATA SHEET

1. Identification

Product identifier: AMMONIUM HYDROXIDE

Other means of identification

Product No.: 9380, 5800, 0889, 9718, 4807, 3261, 3258, 3256, V222, V188, 6665, H893, 5980, 5820, 5817, 9741, 9733, 9731, 9721, 5604, 5358, 37826

Recommended use and restriction on use

Recommended use: Not available.
Restrictions on use: Not known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Company Name: Avantor Performance Materials, Inc.
Address: 3477 Corporate Parkway, Suite 200
Center Valley, PA 18034
Telephone: Customer Service: 855-282-6867
Fax:
Contact Person: Environmental Health & Safety
e-mail: info@avantormaterials.com

Emergency telephone number:

24 Hour Emergency: 908-859-2151

Chemtrec: 800-424-9300

2. Hazard(s) identification

Hazard classification

Physical hazards

Corrosive to metals Category 1

Health hazards

Acute toxicity (Oral) Category 4
Skin corrosion/irritation Category 1
Serious eye damage/eye irritation Category 1
Specific target organ toxicity - single exposure Category 3

Environmental hazards

Acute hazards to the aquatic environment Category 1

Label elements

Hazard symbol:



Signal word: Danger

Hazard statement: May be corrosive to metals.
Harmful if swallowed.
Causes severe skin burns and eye damage.
May cause respiratory irritation.
Very toxic to aquatic life.

Precautionary statement

Prevention: Do not breathe dust/fume/gas/mist/vapors/spray. Do not eat, drink or smoke when using this product. Wear protective gloves/protective clothing/eye protection/face protection. Wash hands thoroughly after handling. Avoid release to the environment.

Response: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. Call a POISON CENTER/doctor if you feel unwell. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Specific treatment (see this label). Collect spillage.

Storage: Store locked up. Store in a well-ventilated place. Keep container tightly closed. Store in corrosive resistant container with a resistant inner liner.

Disposal: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Other hazards which do not result in GHS classification: None.

3. Composition/information on ingredients

Mixtures

Chemical identity	Common name and synonyms	CAS number	Content in percent (%)*
AMMONIUM HYDROXIDE		1336-21-6	18 - 72%

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

General information: Get medical advice/attention if you feel unwell. If medical advice is needed, have product container or label at hand.

Ingestion: Call a physician or poison control center immediately. Do not induce vomiting. If vomiting occurs, the head should be kept low so that stomach vomit doesn't enter the lungs.

Inhalation: Move to fresh air. Call a physician or poison control center immediately. Apply artificial respiration if victim is not breathing. If breathing is difficult, give oxygen.

Skin contact: Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician or poison control center immediately. Wash contaminated clothing before reuse. Destroy or thoroughly clean contaminated shoes.

Eye contact: Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Call a physician or poison control center immediately.

Most important symptoms/effects, acute and delayed

Symptoms: Corrosive to skin and eyes.

Indication of immediate medical attention and special treatment needed

Treatment: Treat symptomatically. Symptoms may be delayed.

5. Fire-fighting measures

General fire hazards: In case of fire and/or explosion do not breathe fumes.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: Water spray, fog, CO2, dry chemical, or regular foam.

Unsuitable extinguishing media: None known.

Specific hazards arising from the chemical: Fire may produce irritating, corrosive and/or toxic gases.

Special protective equipment and precautions for firefighters

Special fire fighting procedures: Move containers from fire area if you can do so without risk. Use water spray to keep fire-exposed containers cool. Cool containers exposed to flames with water until well after the fire is out.

Special protective equipment for fire-fighters: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures: Keep unauthorized personnel away. Keep upwind. Ventilate closed spaces before entering them. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. See Section 8 of the MSDS for Personal Protective Equipment.

Methods and material for containment and cleaning up: Neutralize with lime or soda ash. Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. Dike far ahead of larger spill for later recovery and disposal.

Notification Procedures: Inform authorities if large amounts are involved.

Environmental precautions: Prevent further leakage or spillage if safe to do so. Do not contaminate water sources or sewer. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling: Do not breathe mist or vapor. Do not get in eyes, on skin, on clothing. Do not taste or swallow. Use only with adequate ventilation. Wash hands thoroughly after handling. See Section 8 of the MSDS for Personal Protective Equipment.

Conditions for safe storage, including any incompatibilities: Keep container tightly closed. Store in a well-ventilated place. Do not store in metal containers.

8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Chemical identity	Type	Exposure Limit values	Source
AMMONIUM HYDROXIDE	STEL	35 ppm	US. ACGIH Threshold Limit Values (2011)
	TWA	25 ppm	US. ACGIH Threshold Limit Values (2011)
	STEL	35 ppm 27 mg/m ³	US. NIOSH: Pocket Guide to Chemical Hazards (2010)
	REL	25 ppm 18 mg/m ³	US. NIOSH: Pocket Guide to Chemical Hazards (2010)
	PEL	50 ppm 35 mg/m ³	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)
	STEL	35 ppm 27 mg/m ³	US. OSHA Table Z-1-A (29 CFR 1910.1000) (1989)

Appropriate engineering controls No data available.

Individual protection measures, such as personal protective equipment

General information: Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. An eye wash and safety shower must be available in the immediate work area.

Eye/face protection: Wear safety glasses with side shields (or goggles) and a face shield.

Skin protection

Hand protection: Chemical resistant gloves

Other: Wear suitable protective clothing.

Respiratory protection: In case of inadequate ventilation use suitable respirator.

Hygiene measures: Provide eyewash station and safety shower. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned.

9. Physical and chemical properties

Appearance

Physical state: Liquid
Form: Liquid
Color: Colorless

Odor:	Odorless
Odor threshold:	No data available.
pH:	13.8
Melting point/freezing point:	-74.4 °C
Initial boiling point and boiling range:	27 °C
Flash Point:	Not applicable
Evaporation rate:	No data available.
Flammability (solid, gas):	No data available.
Upper/lower limit on flammability or explosive limits	
Flammability limit - upper (%):	No data available.
Flammability limit - lower (%):	No data available.
Explosive limit - upper (%):	No data available.
Explosive limit - lower (%):	No data available.
Vapor pressure:	288 kPa
Vapor density:	No data available.
Relative density:	0.90 (20 °C)
Solubility(ies)	
Solubility in water:	Soluble
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	No data available.
Auto-ignition temperature:	No data available.
Decomposition temperature:	No data available.
Viscosity:	No data available.

10. Stability and reactivity

Reactivity:	No dangerous reaction known under conditions of normal use.
Chemical stability:	Material is stable under normal conditions.
Possibility of hazardous reactions:	Hazardous polymerization does not occur.
Conditions to avoid:	Excessive heat.
Incompatible materials:	Strong oxidizing agents. Acids. Metals. Halogens. Water. Nitromethane.
Hazardous decomposition products:	Nitrogen Oxides ammonia

11. Toxicological information

Information on likely routes of exposure

Ingestion:	Harmful if swallowed. May cause burns of the gastrointestinal tract if swallowed.
Inhalation:	Severely irritating to respiratory system.
Skin contact:	Causes severe skin burns.
Eye contact:	Causes serious eye damage.

Information on toxicological effects**Acute toxicity (list all possible routes of exposure)****Oral****Product:** LD 50 (Rat): 350 mg/kg**Dermal****Product:** No data available.**Inhalation****Product:** No data available.**Repeated dose toxicity****Product:** No data available.**Skin corrosion/irritation****Product:** Causes severe skin burns.**Serious eye damage/eye irritation****Product:** Causes serious eye damage.**Respiratory or skin sensitization****Product:** Not a skin sensitizer.**Carcinogenicity****Product:** This substance has no evidence of carcinogenic properties.**IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:**

No carcinogenic components identified

US. National Toxicology Program (NTP) Report on Carcinogens:

No carcinogenic components identified

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050):

No carcinogenic components identified

Germ cell mutagenicity**In vitro****Product:** No mutagenic components identified**In vivo****Product:** No mutagenic components identified**Reproductive toxicity****Product:** No components toxic to reproduction**Specific target organ toxicity - single exposure****Product:** Respiratory tract irritation.**Specific target organ toxicity - repeated exposure****Product:** None known.**Aspiration hazard****Product:** Not classified**Other effects:**

None known.

12. Ecological information

Ecotoxicity:

Acute hazards to the aquatic environment:

Fish

Product: LC 50 (Western mosquitofish (*Gambusia affinis*), 96 h): 15 mg/l

Aquatic invertebrates

Product: LC 50 (Water flea (*Daphnia magna*), 48 h): 0.66 mg/l

Chronic hazards to the aquatic environment:

Fish

Product: No data available.

Aquatic invertebrates

Product: No data available.

Toxicity to Aquatic Plants

Product: No data available.

Persistence and degradability

Biodegradation

Product: Expected to be readily biodegradable.

BOD/COD ratio

Product: No data available.

Bioaccumulative potential

Bioconcentration factor (BCF)

Product: No data available on bioaccumulation.

Partition coefficient n-octanol / water (log Kow)

Product: No data available.

Mobility in soil: The product is water soluble and may spread in water systems.

Other adverse effects: Very toxic to aquatic life.

13. Disposal considerations

Disposal instructions: Discharge, treatment, or disposal may be subject to national, state, or local laws.

Contaminated packaging: Since emptied containers retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

UN number:	UN 2672
UN proper shipping name:	Ammonia solutions
Transport hazard class(es)	
Class(es):	8
Label(s):	8
Packing group:	III
Marine Pollutant:	No

IMDG

UN number: UN 2672
 UN proper shipping name: AMMONIA SOLUTION
 Transport hazard class(es)
 Class(es): 8
 Label(s): 8
 EmS No.: F-A, S-B
 Packing group: III
 Marine Pollutant: No

IATA

UN number: UN 2672
 Proper Shipping Name: Ammonia solution
 Transport hazard class(es):
 Class(es): 8
 Label(s): 8
 Marine Pollutant: No
 Packing group: III

15. Regulatory information

US federal regulations

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)
US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)
 None present or none present in regulated quantities.

CERCLA Hazardous Substance List (40 CFR 302.4):
 AMMONIUM HYDROXIDE Reportable quantity: 1000 lbs.

Superfund amendments and reauthorization act of 1986 (SARA)

Hazard categories

Acute (Immediate) Chronic (Delayed) Fire Reactive Pressure Generating

SARA 302 Extremely hazardous substance

Chemical identity	RQ	Threshold Planning Quantity
AMMONIUM HYDROXIDE		

SARA 304 Emergency release notification

Chemical identity	RQ
AMMONIUM HYDROXIDE	1000 lbs.

SARA 311/312 Hazardous chemical

Chemical identity	Threshold Planning Quantity
AMMONIUM HYDROXIDE	
AMMONIUM HYDROXIDE	500 lbs

SARA 313 (TRI reporting)

Chemical identity	Reporting threshold for other users	Reporting threshold for manufacturing and processing
AMMONIUM HYDROXIDE	10000 lbs	25000 lbs.

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)

AMMONIUM HYDROXIDE Reportable quantity: 1000 lbs.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):

None present or none present in regulated quantities.

US state regulations

US. California Proposition 65

No ingredient regulated by CA Prop 65 present.

US. New Jersey Worker and Community Right-to-Know Act

WATER Listed
AMMONIUM HYDROXIDE Listed

US. Massachusetts RTK - Substance List

AMMONIUM HYDROXIDE Listed

US. Pennsylvania RTK - Hazardous Substances

WATER Listed
AMMONIUM HYDROXIDE Listed

US. Rhode Island RTK

AMMONIUM HYDROXIDE Listed

Inventory Status:

Australia AICS:	On or in compliance with the inventory
Canada DSL Inventory List:	On or in compliance with the inventory
EINECS, ELINCS or NLP:	On or in compliance with the inventory
Japan (ENCS) List:	On or in compliance with the inventory
China Inv. Existing Chemical Substances:	Not in compliance with the inventory.
Korea Existing Chemicals Inv. (KECI):	On or in compliance with the inventory
Canada NDSL Inventory:	Not in compliance with the inventory.
Philippines PICCS:	On or in compliance with the inventory
US TSCA Inventory:	On or in compliance with the inventory
New Zealand Inventory of Chemicals:	On or in compliance with the inventory
Japan ISHL Listing:	Not in compliance with the inventory.
Japan Pharmacopoeia Listing:	Not in compliance with the inventory.

16. Other information, including date of preparation or last revision

NFPA Hazard ID



Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe
COR: Corrosive

Issue date:	05-20-2014
Revision date:	No data available.
Version #:	1.0
Further information:	No data available.

Disclaimer:

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SAFETY DATA SHEET

according to Regulation (EC) No. 453/2010

Version 5.2 Revision Date 25.11.2015

Print Date 22.03.2017

GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product Identifiers

Product name : Barium hydroxide

Product Number : 433373

Brand : Aldrich

Index-No. : 056-002-00-7

REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

CAS-No. : 17194-00-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Japan G.K.
Tennoz Central Tower, 2-2-24 Higashi-Shinagawa
SHINAGAWA-KU 140-0002
JAPAN

Telephone : +81 3 5796 7310

Fax : +81 3 5796 7315

1.4 Emergency telephone number

Emergency Phone # (03) 6758-3625

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

Acute toxicity, Oral (Category 4), H302

Skin corrosion (Category 1A), H314

Serious eye damage (Category 1), H318

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram



Signal word : Danger

Hazard statement(s)

H302

Harmful if swallowed.

H314

Causes severe skin burns and eye damage.

Precautionary statement(s)	
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/ physician.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	H ₂ BaO ₂
Molecular weight	:	171,34 g/mol
CAS-No.	:	17194-00-2
EC-No.	:	241-234-5
Index-No.	:	056-002-00-7

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component	Classification	Concentration
Barium hydroxide		
CAS-No.	17194-00-2	<= 100 %
EC-No.	241-234-5	
Index-No.	056-002-00-7	
	Acute Tox. 4; Skin Corr. 1A; Eye Dam. 1; H302, H314, H318	

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

- 4.2 Most important symptoms and effects, both acute and delayed**
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11
- 4.3 Indication of any immediate medical attention and special treatment needed**
No data available
-

SECTION 5: Firefighting measures

- 5.1 Extinguishing media**
Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
- 5.2 Special hazards arising from the substance or mixture**
Barium oxide
- 5.3 Advice for firefighters**
Wear self-contained breathing apparatus for firefighting if necessary.
- 5.4 Further information**
No data available
-

SECTION 6: Accidental release measures

- 6.1 Personal precautions, protective equipment and emergency procedures**
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.
- 6.2 Environmental precautions**
Do not let product enter drains.
- 6.3 Methods and materials for containment and cleaning up**
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.
- 6.4 Reference to other sections**
For disposal see section 13.
-

SECTION 7: Handling and storage

- 7.1 Precautions for safe handling**
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.
- 7.2 Conditions for safe storage, including any incompatibilities**
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.
Air sensitive.
Storage class (TRGS 510): Non-combustible, corrosive hazardous materials
- 7.3 Specific end use(s)**
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated
-

SECTION 8: Exposure controls/personal protection

- 8.1 Control parameters**
Components with workplace control parameters
- 8.2 Exposure controls**
Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0,11 mm

Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0,11 mm

Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de,

test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

- | | |
|--|--------------------------------------|
| a) Appearance | Form: powder
Colour: white |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | 12,5 at 50 g/l at 20 °C |
| e) Melting point/freezing point | Melting point/range: > 300 °C - lit. |
| f) Initial boiling point and boiling range | No data available |

g) Flash point	Not applicable
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	No data available
k) Vapour pressure	No data available
l) Vapour density	No data available
m) Relative density	2,2 g/mL at 25 °C
n) Water solubility	No data available
o) Partition coefficient: n-octanol/water	No data available
p) Auto-ignition temperature	No data available
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

Bulk density	0,90 - 1,10 g/l
--------------	-----------------

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

acids, Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 308 mg/kg

Skin corrosion/irritation

Causes skin burns.

Serious eye damage/eye irritation

Risk of serious damage to eyes.

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

Corrosive to the respiratory tract.

Additional Information

RTECS: CQ9200000

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., Cough, Shortness of breath, Headache, Nausea

SECTION 12: Ecological information**12.1 Toxicity**

No data available

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

May be harmful to aquatic organisms due to the shift of the pH.

No data available

SECTION 13: Disposal considerations**13.1 Waste treatment methods****Product**

Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

SECTION 14: Transport information**14.1 UN number**

ADR/RID: 3262

IMDG: 3262

IATA: 3262

14.2 UN proper shipping name

ADR/RID: CORROSIVE SOLID, BASIC, INORGANIC, N.O.S. (Barium hydroxide)

IMDG: CORROSIVE SOLID, BASIC, INORGANIC, N.O.S. (Barium hydroxide)

IATA: Corrosive solid, basic, inorganic, n.o.s. (Barium hydroxide)

14.3 Transport hazard class(es)

ADR/RID: 8

IMDG: 8

IATA: 8

14.4 Packaging group

ADR/RID: II

IMDG: II

IATA: II

14.5 Environmental hazards

ADR/RID: no

IMDG Marine pollutant: no

IATA: no

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 453/2010.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**15.2 Chemical Safety Assessment**

For this product a chemical safety assessment was not carried out

SECTION 16: Other information**Full text of H-Statements referred to under sections 2 and 3.**

H302 Harmful if swallowed.

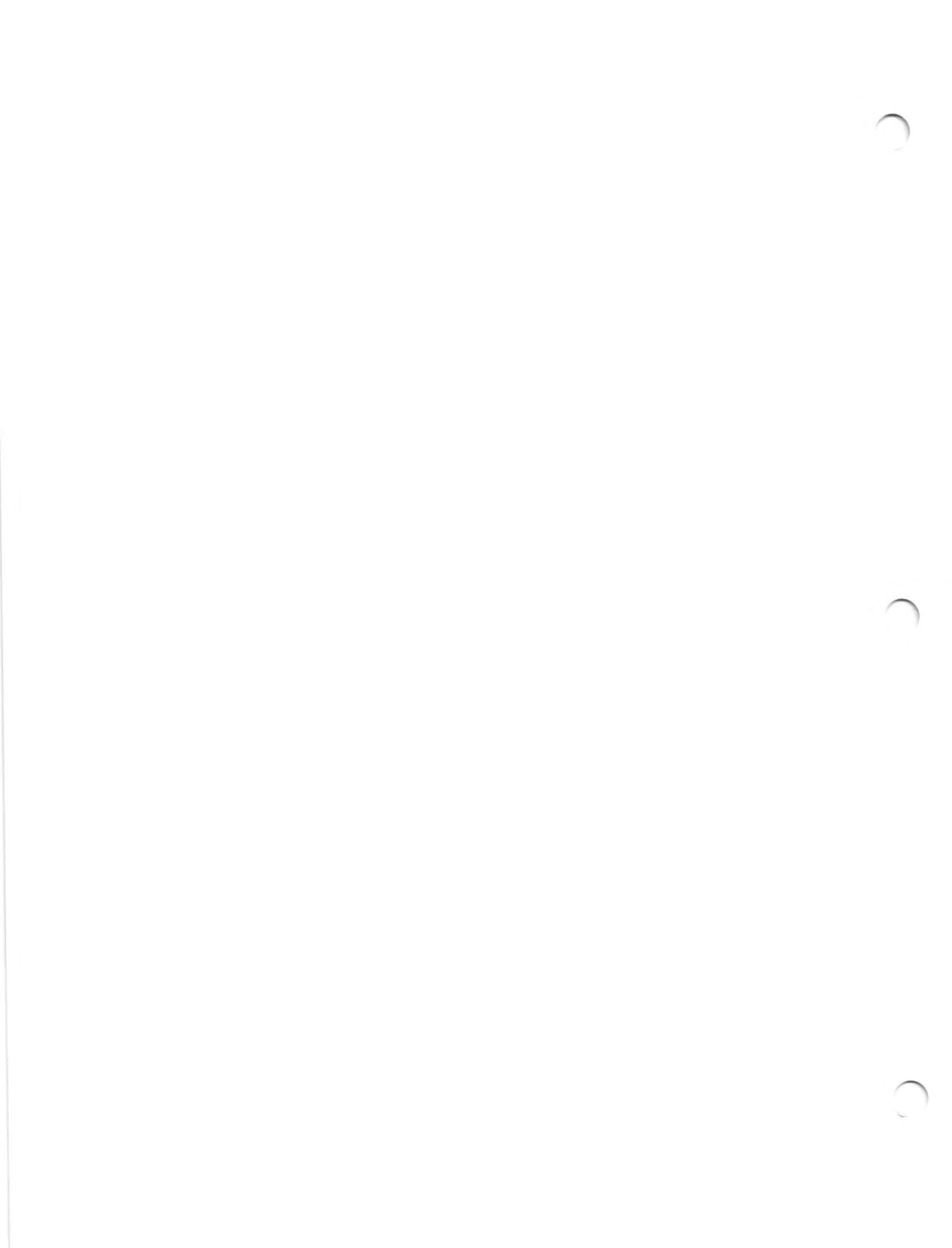
H314 Causes severe skin burns and eye damage.

H318 Causes serious eye damage.

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.



SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Version 5.2 Revision Date 27.01.2016

Print Date 22.03.2017

GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Barium nitrate

Product Number : 11420

Brand : Sigma-Aldrich

Index-No. : 056-002-00-7

REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

CAS-No. : 10022-31-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Japan G.K.
Tennoz Central Tower, 2-2-24 Higashi-Shinagawa
SHINAGAWA-KU 140-0002
JAPAN

Telephone : +81 3 5796 7310

Fax : +81 3 5796 7315

1.4 Emergency telephone number

Emergency Phone # (03) 6758-3625

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

Oxidizing solids (Category 2), H272

Acute toxicity, Oral (Category 4), H302

Acute toxicity, Inhalation (Category 4), H332

Eye irritation (Category 2), H319

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram



Signal word

Danger

Hazard statement(s)

H272

May intensify fire; oxidizer.

H302 + H332

Harmful if swallowed or if inhaled

H319	Causes serious eye irritation.
Precautionary statement(s)	
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P220	Keep/Store away from clothing/ combustible materials.
P221	Take any precaution to avoid mixing with combustibles.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P370 + P378	In case of fire: Use dry powder or dry sand to extinguish.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	BaN ₂ O ₆
Molecular weight	:	261,34 g/mol
CAS-No.	:	10022-31-8
EC-No.	:	233-020-5
Index-No.	:	056-002-00-7

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component	Classification	Concentration
Barium nitrate		
CAS-No.	10022-31-8	<= 100 %
EC-No.	233-020-5	
Index-No.	056-002-00-7	
	Ox. Sol. 2; Acute Tox. 4; Eye Irrit. 2; H272, H302, H332, H319	

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Nitrogen oxides (NOx), Barium oxide

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.

Provide appropriate exhaust ventilation at places where dust is formed. Keep away from sources of ignition

- No smoking. Keep away from heat and sources of ignition.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

Storage class (TRGS 510): Oxidizing hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0,11 mm

Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0,11 mm

Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

- | | |
|--|------------------------------------|
| a) Appearance | Form: solid
Colour: white |
| b) Odour | odourless |
| c) Odour Threshold | No data available |
| d) pH | No data available |
| e) Melting point/freezing point | Melting point/range: 592 °C - dec. |
| f) Initial boiling point and boiling range | No data available |

g) Flash point	No data available
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	No data available
k) Vapour pressure	No data available
l) Vapour density	No data available
m) Relative density	3,23 g/cm ³
n) Water solubility	No data available
o) Partition coefficient: n-octanol/water	No data available
p) Auto-ignition temperature	No data available
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	The substance or mixture is classified as oxidizing with the category 2.

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

Avoid moisture. Heat

10.5 Incompatible materials

Acid anhydrides, Acids, Bases, Reducing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 390 mg/kg

Remarks: Behavioral:Somnolence (general depressed activity).

LD50 Oral - Mammal - 390 mg/kg

Remarks: Behavioral:Muscle weakness. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea.

Skin corrosion/irritation

Skin - Rabbit

Result: Mild skin irritation

(Draize Test)

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Moderate eye irritation

(Draize Test)

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: 2A - Group 2A: Probably carcinogenic to humans (Barium nitrate)

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: CQ9625000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information**12.1 Toxicity**

No data available

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations**13.1 Waste treatment methods****Product**

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number ADR/RID: 1446	IMDG: 1446	IATA: 1446
14.2 UN proper shipping name ADR/RID: BARIUM NITRATE IMDG: BARIUM NITRATE IATA: Barium nitrate		
14.3 Transport hazard class(es) ADR/RID: 5.1 (6.1)	IMDG: 5.1 (6.1)	IATA: 5.1 (6.1)
14.4 Packaging group ADR/RID: II	IMDG: II	IATA: II
14.5 Environmental hazards ADR/RID: no	IMDG Marine pollutant: no	IATA: no
14.6 Special precautions for user No data available		

SECTION 15: Regulatory information

- 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**
This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.
- 15.2 Chemical Safety Assessment**
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

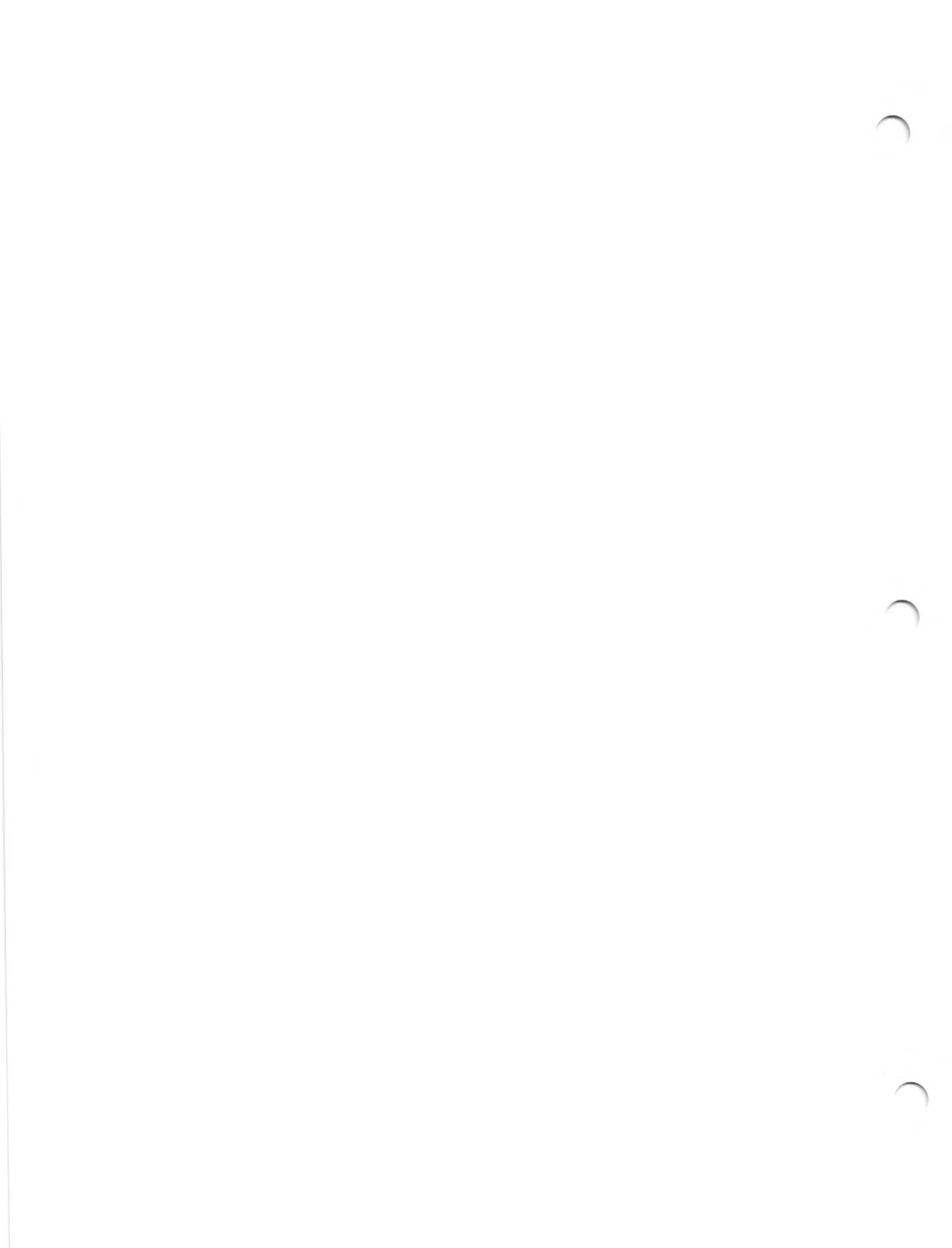
Full text of H-Statements referred to under sections 2 and 3.

H272	May intensify fire; oxidizer.
H302	Harmful if swallowed.
H302 + H332	Harmful if swallowed or if inhaled
H319	Causes serious eye irritation.
H332	Harmful if inhaled.

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.





TOKYO CHEMICAL INDUSTRY CO., LTD.

Dimethylamine Borane

Revision 15
number:

Revision date: 03/01/2017

Page 1 of 5

Revision date: 03/01/2017

SAFETY DATA SHEET

1. IDENTIFICATION

Product name: Dimethylamine Borane
Product code: D1842
Company: TOKYO CHEMICAL INDUSTRY CO., LTD.
Address: 4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Responsible department: Global Business Department
Telephone: +81-3-5640-8872
Fax: +81-3-5640-8902
e-mail: globalbusiness@TCIchemicals.com
Revision number: 15

2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

PHYSICAL HAZARDS

Flammable solids Category 1

HEALTH HAZARDS

Acute toxicity (Oral) Category 3

Acute toxicity (Dermal) Category 3

Skin corrosion/irritation Category 1B

Serious eye damage/eye irritation Category 1

ENVIRONMENTAL HAZARDS

Not classified

Label elements

Pictograms or hazard symbols



Signal word

Danger

Hazard statements

Flammable solid
Toxic if swallowed or in contact with skin
Causes severe skin burns and eye damage

Precautionary statements:

[Prevention]

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Use explosion-proof electrical/ventilating/lighting equipment.
Do not breathe dust/fume/gas/mist/vapours/spray.
Do not eat, drink or smoke when using this product.
Wash hands thoroughly after handling.

[Response]

Wear protective gloves and eye/face protection.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Rinse mouth.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
Remove/Take off immediately all contaminated clothing.
Wash contaminated clothing before reuse.
Immediately call a POISON CENTER or doctor/physician.
Store locked up.

[Storage]

2. HAZARDS IDENTIFICATION

[Disposal]

Dispose of contents/container through a waste management company authorized by the local government.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/mixture:	Substance
Components:	Dimethylamine Borane
Percent:	>95.0%(T)
CAS Number:	74-94-2
Synonyms:	Borane - Dimethylamine Complex , DMAB
Chemical Formula:	C ₂ H ₇ N·BH ₃
Notice Through Official Gazettes Reference Number	
ENCS:	(2)-2102
ISHL:	Official announcement chemistry substance.

4. FIRST-AID MEASURES

Inhalation:	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/physician.
Skin contact:	Remove/Take off immediately all contaminated clothing. Gently wash with plenty of soap and water. Immediately call a POISON CENTER or doctor/physician.
Eye contact:	Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.
Ingestion:	Immediately call a POISON CENTER or doctor/physician. Rinse mouth.
Protection of first-aiders:	A rescuer should wear personal protective equipment, such as rubber gloves and air-tight goggles.
Indication of immediate medical attention and special treatment needed, if necessary:	Medical observation is indicated.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media:	Dry chemical, foam, water spray, carbon dioxide.
Specific hazards arising from the chemical:	Take care as it may decompose upon combustion or in high temperatures to generate poisonous fume.
Precautions for firefighters:	Fire-extinguishing work is done from the windward and the suitable fire-extinguishing method according to the surrounding situation is used. Uninvolved persons should evacuate to a safe place. In case of fire in the surroundings: Remove movable containers if safe to do so.
Special protective equipment for firefighters:	When extinguishing fire, be sure to wear personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:	Use extra personal protective equipment (P3 filter respirator for toxic particles). Keep people away from and upwind of spill/leak. Entry to non-involved personnel should be controlled around the leakage area by roping off, etc.
Environmental precautions:	Prevent product from entering drains.
Methods and materials for containment and cleaning up:	Sweep dust to collect it into an airtight container, taking care not to disperse it. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.
Prevention of secondary hazards:	Remove all sources of ignition. Fire-extinguishing devices should be prepared in case of a fire. Use spark-proof tools and explosion-proof equipment.

7. HANDLING AND STORAGE

Precautions for safe handling

7. HANDLING AND STORAGE

Technical measures: Handling is performed in a well ventilated place. Wear suitable protective equipment. Prevent dispersion of dust. Keep away from heat/sparks/open flame/hot surfaces. - No smoking. Take measures to prevent the build up of electrostatic charge. Wash hands and face thoroughly after handling. Use a closed system if possible. Use a local exhaust if dust or aerosol will be generated.

Advice on safe handling: Avoid contact with skin, eyes and clothing.

Conditions for safe storage, including any incompatibilities

Storage conditions: Keep container tightly closed. Store in an explosion-proof refrigerator. Store under inert gas. Store locked up. Store away from incompatible materials such as oxidizing agents. Heat-sensitive, Air-sensitive

Packaging material: Comply with laws.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls: Install a closed system or local exhaust. Also install safety shower and eye bath.

Control parameters: Not set up

Personal protective equipment

Respiratory protection: Dust respirator, self-contained breathing apparatus(SCBA), supplied air respirator, etc. Use respirators approved under appropriate government standards and follow local and national regulations.

Hand protection: Impervious gloves.

Eye protection: Safety goggles. A face-shield, if the situation requires.

Skin and body protection: Impervious protective clothing. Protective boots, if the situation requires.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state (20°C): Solid
Form: Crystal- Powder
Colour: White
Odour: Amine-like
pH: No data available
Melting point/freezing point: 37°C
Boiling point/range: No data available
Flash point: 43°C
Flammability or explosive limits:
Lower: No data available
Upper: No data available
Relative density: No data available
Solubility(ies):
[Water] No data available
[Other solvents]
Soluble: Methanol
Autoignition temperature: 175°C

10. STABILITY AND REACTIVITY

Chemical stability: Stable under proper conditions.

Possibility of hazardous reactions: No special reactivity has been reported.

Conditions to avoid: Spark, Open flame, Static discharge

Incompatible materials: Oxidizing agents, Acids, Water, Oxygen, Heavy metal salts

Hazardous decomposition products: Carbon monoxide, Carbon dioxide, Nitrogen oxides (NOx), Boron oxides, Hydrogen gas

11. TOXICOLOGICAL INFORMATION

Acute Toxicity:	ipr-mus LD50:200 mg/kg ipr-rat LD50:39 mg/kg orl-rat LD50:59 mg/kg skn-rbt LD50:210 mg/kg
Skin corrosion/irritation:	skn-rbt 50 mg MLD
Serious eye damage/irritation:	eye-rbt 10 mg
Germ cell mutagenicity:	dni-mus-ast 100 umol/L oms-mus-ast 100 umol/L
Carcinogenicity:	
IARC =	No data available
NTP =	No data available
Reproductive toxicity:	No data available
RTECS Number:	IP9450000

12. ECOLOGICAL INFORMATION

Ecotoxicity:	
Fish:	No data available
Crustacea:	No data available
Algae:	No data available
Persistence / degradability:	No data available
Bioaccumulative potential(BCF):	No data available
Mobility in soil	
Log Pow:	No data available
Soil adsorption (Koc):	No data available
Henry's Law constant(PaM³/mol):	No data available

13. DISPOSAL CONSIDERATIONS

Recycle to process, if possible. Consult your local regional authorities. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. Observe all federal, state and local regulations when disposing of the substance.

14. TRANSPORT INFORMATION

Hazards Class:	4.1: Flammable solid.
Subsidiary risk:	6.1: Toxic substance.
UN-No:	2926
Proper shipping name:	Flammable solid, toxic, organic, n.o.s.
Packing group:	II

15. JAPANESE REGULATORY INFORMATION

Fire Defense Law:	Class-4 No.2 petroleum Dangerous grade 3 Not water-soluble fluid
ISHL(Enforcement Order of the Industrial Safety and Health Act Appended Table 1):	Inflammable Substances
Law for safety of vessels:	Hazardous materials notification, Schedule form No.1 Flammable substance
Pollutant Release and Transfer Register Law:	on Designated Chemical Substances, Class I List(No.405)
Water Pollution Control Law:	Harmful substances

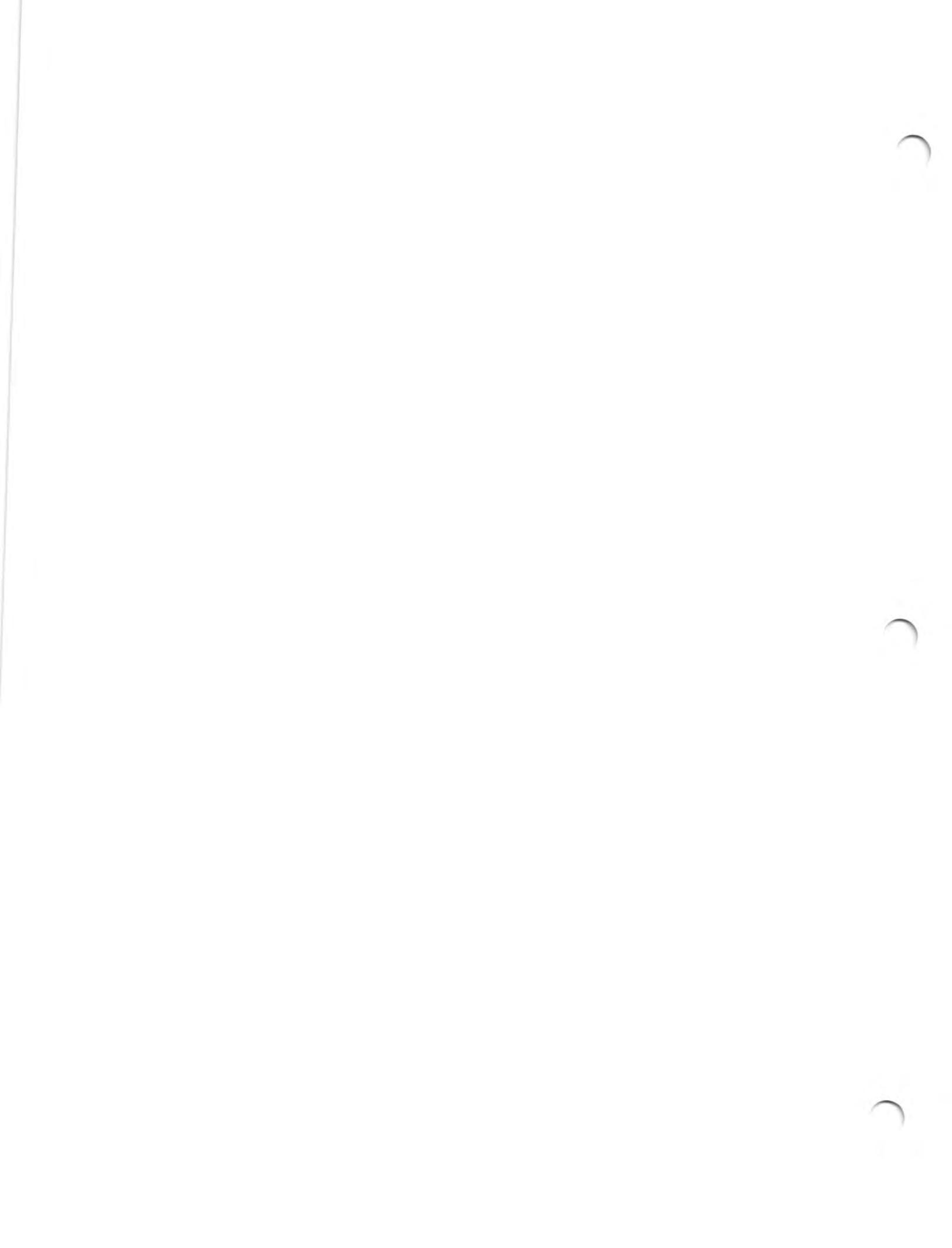
16. OTHER INFORMATION

The reference company name of written contents	
Company:	TOKYO CHEMICAL INDUSTRY CO., LTD.
Address:	4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan

16. OTHER INFORMATION

Department: Global Business Department
Telephone: +81-3-5640-8872
Fax: +81-3-5640-8902

This SDS was prepared sincerely on the basis of the information we could obtained, however, any warranty shall not be given regarding the data contained and the assessment of hazards and toxicity. Prior to use, please investigate not only the hazards and toxicity information but also the laws and regulations of the organization, area and country where the products are to be used, which shall be given the first priority. The products are supposed to be used promptly after purchase in consideration of safety. Some new information or amendments may be added afterwards. If the products are to be used far behind the expected time of use or you have any questions, please feel free to contact us. The stated cautions are for normal handling only. In case of special handling, sufficient care should be taken, in addition to the safety measures suitable for the situation. All chemical products should be treated with the recognition of "having unknown hazards and toxicity", which differ greatly depending on the conditions and handling when in use and/or the conditions and duration of storage. The products must be handled only by those who are familiar with specialized knowledge and have experience or under the guidance of those specialists throughout use from opening to storage and disposal. Safe usage conditions shall be set up on each user's own responsibility.



1: Identification

Product identifier

Product name: **Boric acid**

Stock number: 36771

CAS Number:

10043-35-3

EC number:

233-139-2

Index number:

005-007-00-2

Relevant identified uses of the substance or mixture and uses advised against. No further relevant information available.

Identified use: SU24 Scientific research and development

Details of the supplier of the safety data sheet

Manufacturer/Supplier:

Alfa Aesar, A Johnson Matthey Company

Johnson Matthey Catalog Company, Inc.

30 Bond Street

Ward Hill, MA 01835-8099

Tel: 800-343-0660

Fax: 800-322-4757

Email: tech@alfa.com

www.alfa.com

Information Department: Health, Safety and Environmental Department

Emergency telephone number:

During normal hours the Health, Safety and Environmental Department at (800) 343-0660. After normal hours call Carechem 24 at (866) 928-0789.

2: Hazard(s) identification

Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008



GHS08 Health hazard

Repr. 1B H360 May damage fertility or the unborn child.

Classification according to Directive 67/548/EEC or Directive 1999/45/EC

T; Toxic

R60-61: May impair fertility. May cause harm to the unborn child.

Information concerning particular hazards for human and environment: Not applicable

Hazards not otherwise classified No information known.

Label elements

Labelling according to Regulation (EC) No 1272/2008 The substance is classified and labeled according to the CLP regulation.

Hazard pictograms



GHS08

Signal word Danger

Hazard statements

H360 May damage fertility or the unborn child.

Precautionary statements

P201 Obtain special instructions before use.

P308+P313 IF exposed or concerned: Get medical advice/attention.

WHMIS classification

D2A - Very toxic material causing other toxic effects



Classification system

HMIS ratings (scale 0-4)

(Hazardous Materials Identification System)

HEALTH	1	Health (acute effects) = 1
FIRE	0	Flammability = 0
REACTIVITY	1	Physical Hazard = 1

Other hazards

Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

3: Composition/information on ingredients

Chemical characterization: Substances

CAS# Description:

10043-35-3 Boric acid

Identification number(s):

EC number: 233-139-2

Index number: 005-007-00-2

4: First-aid measures

Description of first aid measures

After inhalation

Supply fresh air. If required, provide artificial respiration. Keep patient warm.

Seek immediate medical advice.

Product name: **Boric acid**

(Contd. of page 1)

After skin contact

Immediately wash with water and soap and rinse thoroughly.
Seek immediate medical advice.

After eye contact Rinse opened eye for several minutes under running water. Then consult a doctor.

After swallowing Seek medical treatment.

Information for doctor

Most important symptoms and effects, both acute and delayed No further relevant information available.

Indication of any immediate medical attention and special treatment needed No further relevant information available.

5: Fire-fighting measures

Extinguishing media

Suitable extinguishing agents Product is not flammable. Use fire fighting measures that suit the surrounding fire.

Special hazards arising from the substance or mixture

If this product is involved in a fire, the following can be released:

Boron oxide

Advice for firefighters

Protective equipment:

Wear self-contained respirator.

Wear fully protective impervious suit.

6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

Wear protective equipment. Keep unprotected persons away.

Ensure adequate ventilation

Environmental precautions:

Do not allow material to be released to the environment without proper governmental permits.

Do not allow product to reach sewage system or any water course.

Do not allow to penetrate the ground/soil.

Methods and material for containment and cleaning up: Dispose contaminated material as waste according to item 13.

Prevention of secondary hazards: No special measures required.

Reference to other sections

See Section 7 for information on safe handling

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

7: Handling and storage

Handling

Precautions for safe handling

Keep container tightly sealed.

Store in cool, dry place in tightly closed containers.

Ensure good ventilation at the workplace.

Open and handle container with care.

Information about protection against explosions and fires: The product is not flammable

Conditions for safe storage, including any incompatibilities

Storage

Requirements to be met by storerooms and receptacles: No special requirements.

Information about storage in one common storage facility: Store away from oxidizing agents.

Further information about storage conditions:

Keep container tightly sealed.

Store in cool, dry conditions in well sealed containers.

Specific end use(s) No further relevant information available.

8: Exposure controls/personal protection

Additional information about design of technical systems:

Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Control parameters

Components with limit values that require monitoring at the workplace:

10043-35-3 Boric acid (100.0%)

TLV (USA) Short-term value: 6* mg/m³
Long-term value: 2* mg/m³
*as inhalable fraction

EL (Canada) Short-term value: 6 mg/m³
Long-term value: 2 mg/m³

EV (Canada) Short-term value: 6 mg/m³
Long-term value: 2 mg/m³
inorganic, inhalable

Additional information: No data

Exposure controls

Personal protective equipment

General protective and hygienic measures

The usual precautionary measures for handling chemicals should be followed.

Keep away from foodstuffs, beverages and feed.

Remove all soiled and contaminated clothing immediately.

Wash hands before breaks and at the end of work.

Store protective clothing separately.

Maintain an ergonomically appropriate working environment.

Breathing equipment: Use suitable respirator when high concentrations are present.

Recommended filter device for short term use:

Use a respirator with type P100 (USA) or P3 (EN 143) cartridges as a backup to engineering controls. Risk assessment should be performed to determine if air-purifying respirators are appropriate. Only use equipment tested and approved under appropriate government standards.

Protection of hands:

Impervious gloves

Check protective gloves prior to each use for their proper condition.

The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.

Material of gloves Nitrile rubber, NBR

Eye protection: Safety glasses

(Contd. on)

Product name: **Boric acid**

(Contd. of page 2)

Body protection: Protective work clothing.

9: Physical and chemical properties

Information on basic physical and chemical properties

General Information

Appearance:

Form: Powder or granules
Color: White
Odor: Odorless
Odor threshold: Not determined.

pH-value (33 g/l) at 20 °C (68 °F): 3.8-4.8

Change in condition

Melting point/Melting range: ≈185(dec) °C (≈365(dec) °F)
Boiling point/Boiling range: Not determined
Sublimation temperature / start: Not determined
Flammability (solid, gaseous): Not determined.
Ignition temperature: Not determined
Decomposition temperature: Not determined
Auto igniting: Not determined.

Danger of explosion:

Explosion limits:

Lower: Not determined
Upper: Not determined
Vapor pressure: Not applicable.
Density at 20 °C (68 °F): 1.435 g/cm³ (11.975 lbs/gal)
Relative density: Not determined.
Vapor density: Not applicable.
Evaporation rate: Not applicable.
Solubility in / Miscibility with
Water at 21 °C (70 °F): 50 g/l
Partition coefficient (n-octanol/water): Not determined.
Viscosity:
dynamic: Not applicable.
kinematic: Not applicable.
Other information: No further relevant information available.

10: Stability and reactivity

Reactivity: No information known.

Chemical stability: Stable under recommended storage conditions.

Thermal decomposition / conditions to be avoided: Decomposition will not occur if used and stored according to specifications.

Possibility of hazardous reactions: Reacts with strong oxidizing agents

Incompatible materials: Oxidizing agents

Hazardous decomposition products: Boron oxide

11: Toxicological information

Information on toxicological effects

Acute toxicity: No effects known.

LD/LC50 values that are relevant for classification:

Oral LD50: 2660 mg/kg (rat)

Skin irritation or corrosion: May cause irritation

Eye irritation or corrosion: May cause irritation

Sensitization: No sensitizing effects known.

Germ cell mutagenicity: The Registry of Toxic Effects of Chemical Substances (RTECS) contains mutation data for this substance.

Carcinogenicity:

EPA-I: Data are inadequate for an assessment of human carcinogenic potential.

ACGIH A4: Not classifiable as a human carcinogen: Inadequate data on which to classify the agent in terms of its carcinogenicity in humans and/or animals.

Reproductive toxicity:

May damage fertility or the unborn child.

The Registry of Toxic Effects of Chemical Substances (RTECS) contains reproductive data for this substance.

Specific target organ system toxicity - repeated exposure: No effects known.

Specific target organ system toxicity - single exposure: No effects known.

Aspiration hazard: No effects known.

Subacute to chronic toxicity: No effects known.

Additional toxicological information: To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

Carcinogenic categories

OSHA-Ca (Occupational Safety & Health Administration) Substance is not listed.

12: Ecological information

Toxicity

Aquatic toxicity: No further relevant information available.

Persistence and degradability: No further relevant information available.

Bioaccumulative potential: No further relevant information available.

Mobility in soil: No further relevant information available.

Additional ecological information:

General notes:

Do not allow material to be released to the environment without proper governmental permits.

Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.

Avoid transfer into the environment.

Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

Other adverse effects: No further relevant information available.

13: Disposal considerations

Waste treatment methods

Recommendation: Consult state, local or national regulations to ensure proper disposal.

(Contd. on page 4)
USA

Product name: **Boric acid**

(Contd. of page 3)

Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.

14: Transport information

UN-Number
DOT, ADN, IMDG, IATA Not applicable

UN proper shipping name
DOT, ADN, IMDG, IATA Not applicable

Transport hazard class(es)
DOT, ADR, ADN, IMDG, IATA
Class Not applicable

Packing group
DOT, IMDG, IATA Not applicable

Environmental hazards: Not applicable.

Special precautions for user Not applicable.

Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code Not applicable.

Transport/Additional information:

DOT
Marine Pollutant (DOT): No

UN "Model Regulation": -

15: Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture

National regulations

All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.

All components of this product are listed on the Canadian Domestic Substances List (DSL).

SARA Section 313 (specific toxic chemical listings) Substance is not listed.

California Proposition 65

Prop 65 - Chemicals known to cause cancer Substance is not listed.

Prop 65 - Developmental toxicity Substance is not listed.

Prop 65 - Developmental toxicity, female Substance is not listed.

Prop 65 - Developmental toxicity, male Substance is not listed.

Information about limitation of use: For use only by technically qualified individuals.

Other regulations, limitations and prohibitive regulations

Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006.

This substance is included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH).

REACH - Pre-registered substances Substance is listed.

Chemical safety assessment: A Chemical Safety Assessment has been carried out.

16: Other information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing SDS: Health, Safety and Environmental Department.

Date of preparation / last revision 07/07/2014 / -

Abbreviations and acronyms:

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

DOT: US Department of Transportation

GHS: Globally Harmonized System of Classification and Labelling of Chemicals

EINECS: European Inventory of Existing Commercial Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

HMIS: Hazardous Materials Identification System (USA)

WHMIS: Workplace Hazardous Materials Information System (Canada)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

vPvB: very Persistent and very Bioaccumulative

ACGIH: American Conference of Governmental Industrial Hygienists (USA)

OSHA: Occupational Safety and Health Administration (USA)

NTP: National Toxicology Program (USA)

IARC: International Agency for Research on Cancer

EPA: Environmental Protection Agency (USA)

Repr. 1B: Reproductive toxicity, Hazard Category 1B

Material Safety Data Sheet

Material Name: Citric Acid, 50% Solution

ID: C1-110L

*** Section 1 - Chemical Product and Company Identification ***

Part Number: Technical

Chemical Name: Citric Acid, 50% Solution

Product Use: For Manufacturing Use

Synonyms: 1,2,3-Propanetricarboxylic acid, 2-hydroxy-; 2-Hydroxy-1,2,3-propanetricarboxylic acid; Propane-1,2,3-tricarboxylic acid, 2-hydroxy-; beta-hydroxytricarballic acid.

Supplier Information

Chem One Ltd.
14140 Westfair East Drive
Houston, Texas 77041-1104

Phone: (713) 896-9966
Fax: (713) 896-7540
Emergency # 1-800-424-9300 or (703) 527-3887

General Comments: FOR MANUFACTURING USE ONLY; NOT TO BE USED AS A PESTICIDE.

NOTE: Emergency telephone numbers are to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure, or accident involving chemicals. All non-emergency questions should be directed to customer service.

*** Section 2 - Composition / Information on Ingredients ***

CAS #	Component	Percent
77-92-9	Citric Acid	50%
7732-18-5	Water	50%

Component Information/Information on Non-Hazardous Components

This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).

*** Section 3 - Hazards Identification ***

Emergency Overview

Citric Acid 50% Solution is a clear or yellow to brown liquid, with a faint sugary odor. Citric Acid is moderately to severely irritating to eyes, and moderately irritating to skin, and respiratory tract. Citric Acid Solution is not combustible. Use methods suitable for containing (diking) the solution in case of fire or spill. Firefighters should wear full protective equipment when fighting a fire involving this product.

Hazard Statements

DANGER! THIS SOLUTION CAUSES EYE, SKIN, AND RESPIRATORY TRACT IRRITATION OR BURNS. MAY CAUSE ALLERGIC SKIN SENSITIZATION REACTION. Do not breath or ingest mists, vapors, or aerosols. Do not allow contact with eyes, skin, or clothing. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling.

Potential Health Effects: Eyes

This solution may cause severe irritation to the eyes, with symptoms that include redness, tearing, and pain. Concentrated solutions may be corrosive to the eyes and cause corneal ulcerations.

Potential Health Effects: Skin

This product may cause moderate irritation of the skin. Citric Acid may cause allergic contact dermatitis with prolonged or repeated contact in sensitive individuals.

Potential Health Effects: Ingestion

Citric Acid may cause mild gastrointestinal irritation, with symptoms including nausea, diarrhea, vomiting, and abdominal pain. Concentrated solutions may cause necrotic and ulcerative lesions on oral mucous membranes. Chronic ingestion of high concentration Citric Acid can result in erosion of tooth enamel. Repeated ingestion of this solution can result in sensitization to the sun, causing sunburn.

Potential Health Effects: Inhalation

Aerosols and mists from solutions may cause mild to moderate irritation of the nose and throat. Overexposure could cause coughing, sneezing, and labored breathing.

Other Potential Health Effects

Chronic, high concentration overexposure to Citric Acid can result in a reduction of plasma calcium concentration, which can lead to cardiac arrhythmias, reduced cardiac output and, in severe cases, death.

HMIS Ratings: Health Hazard: 2* Fire Hazard: 0 Physical Hazard: 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe * = Chronic hazard

Material Safety Data Sheet

Material Name: Citric Acid, 50% Solution

ID: C1-110L

*** Section 4 - First Aid Measures ***

First Aid: Eyes

Immediately flush the contaminated eye with plenty of water for 15 minutes. Get medical attention if symptoms of pain, swelling, or tearing exist after flushing the eyes.

First Aid: Skin

For skin contact, immediately wash extremely thoroughly with soap and water. Get medical attention if irritation develops or persists.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Have victim rinse mouth with water, if conscious. Never give anything by mouth to a victim who is unconscious or having convulsions. Contact a physician or poison control center immediately.

First Aid: Inhalation

Remove source of contamination or move victim to fresh air. Apply artificial respiration if victim is not breathing. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Administer oxygen if breathing is difficult. Get immediate medical attention.

First Aid: Notes to Physician

There is no specific antidote. Care is symptomatic and supportive.

*** Section 5 - Fire Fighting Measures ***

Flash Point: Not applicable.

Method Used: Not applicable.

Upper Flammable Limit (UEL) Not applicable.

Lower Flammable Limit (LEL): Not applicable.

Auto Ignition: Not applicable.

Flammability Classification: Not applicable.

Rate of Burning: Not applicable.

General Fire Hazards

Not considered flammable although if allowed to evaporate to dryness, residue may burn in presence of strong ignition source.

Hazardous Combustion Products

Applies to residue: Carbon dioxide and carbon monoxide are normal products of combustion. Incomplete combustion may produce irritating fumes and acrid smoke.

Extinguishing Media

Water, foam, dry chemical, or carbon dioxide. Dike and collect water used to fight fire; runoff may cause damage.

Fire Fighting Equipment/Instructions

Firefighters should wear full protective clothing including self contained breathing apparatus.

NFPA Ratings: Health: 2 Fire: 0 Reactivity: 0 Other:

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

*** Section 6 - Accidental Release Measures ***

Containment Procedures

Stop the flow of material, if this can be done without risk. Contain the discharged solution; dike runoff to prevent spill from contaminating storm drains, sewers, soil or groundwater waterways.

Clean-Up Procedures

Wear appropriate protective equipment and clothing during clean-up. Addition of sodium bicarbonate or lime (soda ash) will neutralize Citric Acid and precipitate calcium citrate. Test area of spill with pH paper to assure neutralization. Thoroughly wash the area after a spill clean-up with large quantities of water, flush to drain.

Evacuation Procedures

Evacuate the area promptly and keep upwind of the spilled material. Isolate the spill area to prevent people from entering. Keep incompatible materials away from spilled solution. In case of large spills, follow all facility emergency response procedures.

Special Procedures

Remove soiled clothing and launder before reuse. Avoid all skin contact with the spilled material. Have emergency equipment readily available.

Material Safety Data Sheet

Material Name: Citric Acid, 50% Solution

ID: C1-110L

*** Section 7 - Handling and Storage ***

Handling Procedures

All employees who handle this material should be trained to handle it safely. Do not breathe vapors or mists. Avoid all contact with skin and eyes. Use this product only with adequate ventilation. Wash thoroughly after handling.

Storage Procedures

Keep container tightly closed when not in use. Keep containers upright, do not drop, roll or skid. Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Material should be stored in secondary containers or in a diked area, as appropriate. Store containers away from incompatible chemicals (see Section 10, Stability and Reactivity). Storage areas should be made of fire- and corrosion-resistant materials. Post warning and "NO SMOKING" signs in storage and use areas, as appropriate. Use corrosion-resistant structural materials, lighting, and ventilation systems in the storage area. Floors should be sealed to prevent absorption of this material. Inspect all incoming containers before storage, to ensure containers are properly labeled and not damaged. Have appropriate extinguishing equipment in the storage area (i.e., sprinkler system, portable fire extinguishers).

Empty containers may contain residual particulates; therefore, empty containers should be handled with care. Never store food, feed, or drinking water in containers which held this product. Keep this material away from food, drink and animal feed. Do not store this material in open or unlabeled containers. Limit quantity of material stored. Wipe down area of use periodically as area can become sticky.

*** Section 8 - Exposure Controls / Personal Protection ***

Exposure Guidelines

A: General Product Information

No exposure guidelines have been established.

B: Component Exposure Limits

ACGIH, OSHA, and NIOSH have not developed exposure limits for any of this product's components.

Engineering Controls

Use mechanical ventilation such as dilution and local exhaust. Use a corrosion-resistant ventilation system and exhaust directly to the outside. Supply ample air replacement.

PERSONAL PROTECTIVE EQUIPMENT

The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132). Please reference applicable regulations and standards for relevant details.

Personal Protective Equipment: Eyes/Face

Faceshields and goggles should be worn when working with solutions of Citric Acid. If necessary, refer to U.S. OSHA 29 CFR 1910.133.

Personal Protective Equipment: Skin

Use impervious gloves. Butyl rubber, natural rubber, neoprene, nitrile rubber, polyethylene, or PVC are recommended. If necessary, refer to U.S. OSHA 29 CFR 1910.138.

Personal Protective Equipment: Respiratory

None required where adequate ventilation conditions exist. If airborne concentration is high, use an appropriate respirator with acid dust/mist pre-filters. If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998).

Personal Protective Equipment: General

Have an eyewash fountain and safety shower available in the work area. Use good hygiene practices when handling this material including changing and laundering work clothing after use. Wash hands thoroughly after handling material. Do not eat, drink, or smoke in work areas.

Material Safety Data Sheet

Material Name: Citric Acid, 50% Solution

ID: C1-110L

*** Section 9 - Physical & Chemical Properties ***

Physical Properties: Additional Information

The data provided in this section are to be used for product safety handling purposes. Please refer to Product Data Sheets, Certificates of Conformity or Certificates of Analysis for chemical and physical data for determinations of quality and for formulation purposes.

Appearance: Colorless or yellow to brown	Odor: Slight sugar odor.
Physical State: Liquid	pH: Approx 2.5 or lower
Vapor Pressure: Not available.	Vapor Density: Not available.
Boiling Point: 104°C (219°F)	Melting Point: Not applicable.
Solubility (H2O): 162 g/100 ml water at 25°C	Specific Gravity: 1.24 @ 25°C (77° F)
Freezing Point: 0°C (32°F)	Particle Size: Not applicable.
Softening Point: Not applicable.	Evaporation Rate: Similar to water.
Viscosity: 7.0 centipoise at 25°C	Bulk Density: Not applicable.
Percent Volatile: Not available.	Molecular Weight: 192.13 (Citric Acid, Anhydrous)
	Chemical Formula: C6H8O7 (Citric Acid, Anhydrous)

*** Section 10 - Chemical Stability & Reactivity Information ***

Chemical Stability

Stable under normal conditions. Dilute aqueous solutions of Citric Acid may ferment if left standing for long period of time.

Chemical Stability: Conditions to Avoid

Heat, moisture and incompatible materials.

Incompatibility

Potentially explosive reaction with metal nitrates, strong bases, and oxidizers. Citric Acid is incompatible with reducing agents. Citric Acid Solution is corrosive to brass, copper, zinc, aluminum and their alloys, lead, cast iron and steel (not stainless steel).

Hazardous Decomposition

Residue: Carbon dioxide and carbon monoxide are normal products of combustion. Incomplete combustion may produce irritating fumes and acrid smoke.

Hazardous Polymerization

Hazardous polymerization will not occur.

*** Section 11 - Toxicological Information ***

Acute and Chronic Toxicity

A: General Product Information

Citric Acid has been reported to have allergenic properties, and might cause allergic contact dermatitis and sensitization to the sun. Irritation of the skin, eyes, and gastrointestinal tract may occur, but should not require extensive therapy beyond dilution/irrigation. Vapors and solution may cause severe irritation to the eyes, with symptoms that include redness, tearing, and pain. Concentrated solutions may be corrosive to the eyes and cause corneal ulcerations. This product may cause moderate irritation of the skin. Citric Acid may cause mild gastrointestinal irritation, with symptoms including nausea, diarrhea, vomiting, abdominal pain. Concentrated solutions may cause necrotic and ulcerative lesions on oral mucous membranes. Dusts and mists from solutions may cause mild to moderate irritation to the nose and throat. Higher concentrations could cause coughing, sneezing, and labored breathing.

Chronic, high concentration overexposure to Citric Acid can result in a reduction of plasma calcium concentration, which can lead to cardiac arrhythmias, reduced cardiac output and, in severe cases, death.

B: Component Analysis - LD₅₀/LC₅₀

Citric Acid (77-92-9)

LD₅₀ (Oral-Rat) 3 gm/kg; LD₅₀ (Oral-Mouse) 5040 mg/kg; Lungs, Thorax, or Respiration changes; Musculoskeletal changes; LD₅₀ (Subcutaneous-Rat) 5500 mg/kg; LD₅₀ (Subcutaneous-Mouse) 2700 mg/kg; Lungs, Thorax, or Respiration changes; Musculoskeletal changes; LD₅₀ (Intraperitoneal-Rat) 290 mg/kg; LD₅₀ (Intraperitoneal-Mouse) 903 mg/kg; LD₅₀ (Intravenous-Mouse) 42 mg/kg; Behavioral: convulsions or effect on seizure threshold; Lungs, Thorax, or Respiration: cyanosis; Gastrointestinal: changes in structure or function of salivary glands; LD₅₀ (Intravenous-Rabbit) 330 mg/kg

B: Component Analysis - TDLo/TCLo/LD/LDLo

Citric Acid (77-92-9)

LDLo (Oral-Rabbit) 7 gm/kg; Behavioral: tremor, convulsions or effect on seizure threshold, muscle contraction or spasticity

Material Safety Data Sheet

Material Name: Citric Acid, 50% Solution

ID: C1-110L

*** Section 11 - Toxicological Information (Continued) ***

Carcinogenicity

A: General Product Information

No information identified.

B: Component Carcinogenicity

None of this product's components are listed by ACGIH, IARC, OSHA, NIOSH, or NTP.

Epidemiology

No information available.

Neurotoxicity

Has not been identified.

Mutagenicity

Citric Acid would not be expected to be genotoxic at physiological concentrations because it is a normal metabolite. It was not mutagenic in *Salmonella typhimurium*, and did not induce chromosome aberrations in cultured Chinese hamster fibroblast cells.

Teratogenicity

Citric Acid did not cause reproductive effects when tested in experimental animals. The sodium salt did not cause birth defects in rats. When given to rats at 1.2% in the diet over 2 generations, it did not affect reproduction. It did not affect litter size or survival of mice with prenatal exposure to up to 5% in the diet.

Other Toxicological Information

Persons with pre-existing eye, skin, respiratory, or allergic conditions may be more sensitive.

*** Section 12 - Ecological Information ***

Ecotoxicity

A: General Product Information

Water Solubility = 59.2% (20°C); 84% (100°C). Biological Oxygen Demand (BOD): 40%, 5 days; 60%, 10-20 days. Citric Acid biodegrades quite rapidly. It is dangerous to aquatic life in high concentrations. Lowers pH in water but does not dissociate to any great extent.

Food Chain Concentration Potential: Very Low

B: Ecotoxicity

TLm (immersion-shore crab) 48 hours = 160 ppm (salt water); TLm (immersion-goldfish) 4 hr = 894 ppm (fresh water/ killed); EC₀ (*Pseudomonas putida* bacteria) 16 hours = >10,000 mg/L; EC₀ (*Microcystis aeruginosa* algae) 8 days = 80 mg/L; EC₀ (*Scenedesmus quadricauda* green algae) 7 days = 640 mg/L; EC₀ (*Entosiphon sulcatum* protozoa) 72 hours = 485 mg/L; EC₀ (*Uronema parduczi* Chatton-Lwoff protozoa) = 622 mg/L; LD₀ (*Daphnia magna*) = 80 mg/L, long-time exposure in soft water; LD₀ (goldfish) = 625 mg/L, long-time exposure in hard water; LD₁₀₀ (goldfish) = 894 mg/l, long-time exposure in hard water; LD₁₀₀ (*Daphnia magna*) 120 mg/l long-time exposure in soft water; toxic (*Daphnia*) = 100 mg/L; period of survival at pH 4.0 (goldfish) 48 hours = 894 mg/L; period of survival at pH 4.5 (goldfish) 48 hours = 625 mg/L

Environmental Fate

Citric Acid is a naturally occurring chemical and is biodegradable. Octanol/Water Partition Coefficient Log P (oct): -1.72.

*** Section 13 - Disposal Considerations ***

US EPA Waste Number & Descriptions

A: General Product Information

Concentrated solutions may be considered D002 wastes (corrosive) by RCRA. Wastes should be tested prior to disposal to determine classification.

B: Component Waste Numbers

No EPA Waste Numbers are applicable for this product's components.

Disposal Instructions

Review federal, provincial, and local government requirements prior to disposal.

Material Safety Data Sheet

Material Name: Citric Acid, 50% Solution

ID: C1-110L

*** Section 14 - Transportation Information ***

NOTE: The shipping classification information in this section (Section 14) are meant as a guide to the overall classification of the product. However, transportation classifications may be subject to change with changes in package size. Consult shipper requirements under I.M.O., I.C.A.O. (I.A.T.A.) and 49 CFR to assure regulatory compliance.

US DOT Information

UN #: 3265
Shipping Name: Corrosive liquid, acidic, organic, n.o.s. (Citric Acid)
Hazard Class: 8
Packing Group: II
Required Label(s): Class 8 (Corrosive)

International Air Transport Association (IATA)

UN Number: UN 3265
Proper Shipping Name: Corrosive liquid, acidic, organic, n.o.s. (Citric Acid)
Hazard Class: 8 (Corrosive)
Packing Group: II
Passenger & Cargo Aircraft Packing Instruction: 808
Passenger & Cargo Aircraft Maximum Net Quantity: 5 L
Limited Quantity Packing Instruction (Passenger & Cargo Aircraft): Y808
Limited Quantity Maximum Net Quantity (Passenger & Cargo Aircraft): 1 L
Special Provisions: A97
ERG Code: 8L

International Maritime Organization (I.M.O.) Classification

For shipments via marine vessel transport, the following classification information applies.
UN #: UN 3265
Proper Shipping Name: Corrosive liquid, acidic, organic, n.o.s. (Citric Acid)
Hazard Class: 8 (Corrosive)
Packing Group: II
Special Provisions: 223, 24, 944
Limited Quantities: 1L
Packing Instructions: P001, LP01
EmS: F-A, S-B
Stowage and Segregation: Category A, Clear of Living Quarters

*** Section 15 - Regulatory Information ***

US Federal Regulations

A: General Product Information

No additional information.

B: Component Analysis

None of this product's components are listed under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), or CERCLA (40 CFR 302.4).

SARA 302 (EHS TPQ) There are no specific Threshold Planning Quantities for Citric Acid. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lbs. (4,540 kg) therefore applies, per 40 CFR 370.20.

C: Sara 311/312 Tier II Hazard Ratings:

Component	CAS #	Fire Hazard	Reactivity Hazard	Pressure Hazard	Immediate Health Hazard	Chronic Health Hazard
Citric Acid	77-92-9	No	No	No	Yes	Yes

Material Safety Data Sheet

Material Name: Citric Acid, 50% Solution

ID: C1-110L

***** Section 15 - Regulatory Information (Continued) *****

State Regulations

A: General Product Information

Other state regulations may apply.

B: Component Analysis - State

California Proposition 65

Citric Acid is not on the California Proposition 65 chemical lists.

Citric Acid and Water are listed as follows: NJ4: New Jersey other (included in 5 predominant ingredients >1%); PA3: Pennsylvania (non-hazardous - present at 3% or greater)

Component	CAS #	CA	FL	MA	MN	NJ	PA
Citric Acid	77-92-9	No	No	No	No	Yes	Yes

Other Regulations

A: General Product Information

No additional information.

B: Component Analysis - Inventory

Component	CAS #	TSCA	DSL	EINECS
Citric Acid	77-92-9	Yes	Yes	Yes

C: Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Citric Acid	77-92-9	1% item 409 (80)

ANSI Labeling (Z129.1):

DANGER! CORROSIVE. CAUSES EYE, SKIN, AND RESPIRATORY TRACT IRRITATION OR BURNS. MAY CAUSE ALLERGIC SKIN SENSITIZATION REACTION. Do not taste or swallow. Do not get on skin or in eyes. Avoid breathing aerosols or mists. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Keep from contact with clothing. Wear gloves, goggles, faceshields, suitable body protection, and NIOSH/MSHA-approved respiratory protection, as appropriate. **FIRST-AID:** In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. If inhaled, remove to fresh air. If ingested, do not induce vomiting. Get medical attention. **IN CASE OF FIRE:** Use water fog, dry chemical, CO₂, or "alcohol" foam. **IN CASE OF SPILL:** Neutralize spill and wash area. Place residue in suitable container. Consult Material Safety Data Sheet for additional information.

Material Safety Data Sheet

Material Name: Citric Acid, 50% Solution

ID: C1-110L

*** Section 16 - Other Information ***

Other Information

Chem One Ltd. ("Supplier") shall not be responsible for the use of any information, product, method, or apparatus herein presented ("Information"), and you must make your own determination as to its suitability and completeness for your own use, for the protection of the environment, and for health and safety purposes. You assume the entire risk of relying on this Information. In no event shall Supplier be responsible for damages of any nature whatsoever resulting from the use of this product or products, or reliance upon this Information. By providing this Information, Supplier neither can nor intends to control the method or manner by which you use, handle, store, or transport Supplier products. If any materials are mentioned that are not Supplier products, appropriate industrial hygiene and other safety precautions recommended by their manufacturers should be observed. Supplier makes no representations or warranties, either express or implied of merchantability, fitness for a particular purpose or of any other nature regarding this information, and nothing herein waives any of Supplier's conditions of sale.

This information could include technical inaccuracies or typographical errors. Supplier may make improvements and/or changes in the product (s) and/or the program (s) described in this information at any time. If you have any questions, please contact us at Tel. 713-896-9966 or E-mail us at Safety@chemone.com.

Key/Legend

EPA = Environmental Protection Agency; TSCA = Toxic Substance Control Act; ACGIH = American Conference of Governmental Industrial Hygienists; IARC = International Agency for Research on Cancer; NIOSH = National Institute for Occupational Safety and Health; NTP = National Toxicology Program; OSHA = Occupational Safety and Health; NA = Not available or not applicable g = grams; kg = kilograms GRAS = Generally regarded as safe

Contact: Sue Palmer-Koleman, PhD

Contact Phone: (713) 896-9966

Revision log:

09/21/00 2:10 PM HDF Revision to health hazard information. Addition of 49 CFR information in Transportation Section (Section 14).

05/14/01 9:31 AM Checked exposure limits; made changes to Section 9; overall review, add SARA 311/312 Hazard Ratings.

08/12/03: 10:05 AM HDF General review and up-date of entire MSDS. Up-date of HMIS categories. Up-date of Section 8. Up-date of Section 14.

12/29/03 10:32 AM CLW Revised signal word from Warning to Danger so that it the signal word in the ANSI label is the same as the one on page 1 of this MSDS. Deleted pH value shown in Section 9, replaced with "Not Available"; In Section 14 deleted the statements in parentheses behind the hazard class for US DOT Information transport. Deleted the word "or in Bulk Packaging" in same section under Additional Info. In the International Air Transport Section deleted the default paragraph " For shipments by Air Transport..." .Corrected Contact name in Section 16 and in "Other Information" and deleted the last sentence "Revision date 05/30/01".

12/29/03 02:47 PM CLW Section 14 changed Packing group , listed as III, to Packing group II, removed "Additional Info section on Limited Quantities & Exceptions, and changed UN/NA# to UN #.

12/29/03 03:57 PM CLW Added pH value in Section 9.

06/22/05 2:04PM SEP Updated IATA Section 14.

6/07/06 10:31 AM HDF Addition of Proposition 65 statement in Section 15

09/05/06 SEP 2:38 PM Updated DOT & IMO Section 14

10/10/08 3:07 PM DLY Changed Chem One Physical Address, Section 1

This is the end of MSDS # C1-110

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Version 5.1 Revision Date 27.05.2015

Print Date 22.03.2017

GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Cobalt(II) sulfate heptahydrate

Product Number : 544167

Brand : Sigma-Aldrich

Index-No. : 027-005-00-0

REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

CAS-No. : 10026-24-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Japan G.K.
Tennoz Central Tower, 2-2-24 Higashi-Shinagawa
SHINAGAWA-KU 140-0002
JAPAN

Telephone : +81 3 5796 7310

Fax : +81 3 5796 7315

1.4 Emergency telephone number

Emergency Phone # (03) 6758-3625

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

Acute toxicity, Oral (Category 4), H302

Respiratory sensitisation (Category 1), H334

Skin sensitisation (Category 1), H317

Germ cell mutagenicity (Category 2), H341

Carcinogenicity, Inhalation (Category 1B), H350i

Reproductive toxicity (Category 1B), H360F

Acute aquatic toxicity (Category 1), H400

Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

		R49
		R60
Xn	Harmful	R22
		R42/43
N	Dangerous for the environment	R50/53
		R68

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram



Signal word	Danger
Hazard statement(s)	
H302	Harmful if swallowed.
H317	May cause an allergic skin reaction.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H341	Suspected of causing genetic defects.
H350i	May cause cancer by inhalation.
H360F	May damage fertility.
H410	Very toxic to aquatic life with long lasting effects.
Precautionary statement(s)	
P201	Obtain special instructions before use.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P284	Wear respiratory protection.
P304 + P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
Supplemental Hazard Statements	none
Restricted to professional users.	

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Cobaltous sulfateheptahydrate
Formula	:	CoO ₄ S · 7H ₂ O
Molecular weight	:	281,10 g/mol
CAS-No.	:	10026-24-1
EC-No.	:	233-334-2
Index-No.	:	027-005-00-0

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component	Classification	Concentration
Cobalt(II) sulfate heptahydrate Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)		
CAS-No. 10026-24-1 EC-No. 233-334-2 Index-No. 027-005-00-0	Acute Tox. 4; Resp. Sens. 1; Skin Sens. 1; Muta. 2; Carc. 1B; Repr. 1B; Aquatic Acute 1; Aquatic Chronic 1; H302, H317, H334, H341, H350i, H360F, H410	<= 100 %

Hazardous ingredients according to Directive 1999/45/EC

Component	Classification	Concentration
-----------	----------------	---------------

Cobalt(II) sulfate heptahydrate Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)			
CAS-No.	10026-24-1	T, N, Carc.Cat.2, Repr.Cat.2,	<= 100 %
EC-No.	233-334-2	Mut.Cat.3, R49 - R60 - R22 -	
Index-No.	027-005-00-0	R42/43 - R68 - R50/53	

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Sulphur oxides, Cobalt/cobalt oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Avoid exposure - obtain special instructions before use.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0,11 mm

Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0,11 mm

Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

- | | |
|---|----------------------------------|
| a) Appearance | Form: crystalline
Colour: red |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | 4 at 100 g/l at 20 °C |
| e) Melting point/freezing point | Melting point/range: 98 °C |
| f) Initial boiling point and boiling range | No data available |
| g) Flash point | Not applicable |
| h) Evaporation rate | No data available |
| i) Flammability (solid, gas) | No data available |
| j) Upper/lower flammability or explosive limits | No data available |
| k) Vapour pressure | No data available |
| l) Vapour density | No data available |
| m) Relative density | 2,03 g/cm ³ at 25 °C |
| n) Water solubility | No data available |
| o) Partition coefficient: n-octanol/water | No data available |
| p) Auto-ignition temperature | No data available |
| q) Decomposition temperature | No data available |
| r) Viscosity | No data available |
| s) Explosive properties | No data available |
| t) Oxidizing properties | No data available |

9.2 Other safety information

- | | |
|--------------|---------|
| Bulk density | 0,9 g/l |
|--------------|---------|

SECTION 10: Stability and reactivity**10.1 Reactivity**

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

SECTION 11: Toxicological information**11.1 Information on toxicological effects****Acute toxicity**

LD50 Oral - Rat - 582 mg/kg

Remarks: Behavioral:Somnolence (general depressed activity). Behavioral:Ataxia. Diarrhoea

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation**Germ cell mutagenicity**

Hamster

Embryo

Micronucleus test

Carcinogenicity

This is or contains a component that has been reported to be carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Possible human carcinogen

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Cobalt(II) sulfate heptahydrate)

2B - Group 2B: Possibly carcinogenic to humans (Cobalt(II) sulfate heptahydrate)

Reproductive toxicity

Presumed human reproductive toxicant

Reproductive toxicity - Mouse - Inhalation

Paternal Effects: Spermatogenesis (including genetic material, sperm morphology, motility, and count).

Paternal Effects: Testes, epididymis, sperm duct.

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: GG3200000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

No data available

12.2 Persistence and degradability

Biodegradability Biotic/Aerobic
Result: - Not readily biodegradable.

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

Very toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 3077 IMDG: 3077 IATA: 3077

14.2 UN proper shipping name

ADR/RID: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Cobalt(II) sulfate heptahydrate)
IMDG: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Cobalt(II) sulfate heptahydrate)
IATA: Environmentally hazardous substance, solid, n.o.s. (Cobalt(II) sulfate heptahydrate)

14.3 Transport hazard class(es)

ADR/RID: 9 IMDG: 9 IATA: 9

14.4 Packaging group

ADR/RID: III IMDG: III IATA: III

14.5 Environmental hazards

ADR/RID: yes IMDG Marine pollutant: yes IATA: yes

14.6 Special precautions for user

Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**Authorisations and/or restrictions on use**

Cobalt(II) sulfate heptahydrate CAS-No.: 10026-24-1
Candidate List of Substances of Very High Concern for Authorisation
Carcinogenic (article 57a)
ED/95/2010

Cobalt(II) sulfate heptahydrate CAS-No.: 10026-24-1
REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59).
Carcinogenic (article 57a)
ED/95/2010

Cobalt(II) sulfate heptahydrate CAS-No.: 10026-24-1
REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, preparations and articles (Annex XVII)
Carcinogens: category 1B
Restricted to professional users.
See Annex XVII to Regulation (EC) no 1907/2006 for Conditions of restriction

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information**Full text of H-Statements referred to under sections 2 and 3.**

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H302	Harmful if swallowed.
H317	May cause an allergic skin reaction.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H341	Suspected of causing genetic defects.
H350i	May cause cancer by inhalation.
H360F	May damage fertility.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

Full text of R-phrases referred to under sections 2 and 3

N	Dangerous for the environment
T	Toxic
R22	Harmful if swallowed.
R42/43	May cause sensitisation by inhalation and skin contact.
R49	May cause cancer by inhalation.
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R60	May impair fertility.
R68	Possible risk of irreversible effects.
Repr.Cat.2	Toxic to Reproduction Category 2

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge

and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.



SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Version 5.4 Revision Date 14.11.2014

Print Date 22.03.2017

GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Copper(II) sulfate pentahydrate

Product Number : 203165

Brand : Aldrich

Index-No. : 029-004-00-0

REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

CAS-No. : 7758-99-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Japan G.K.
Tennoz Central Tower, 2-2-24 Higashi-Shinagawa
SHINAGAWA-KU 140-0002
JAPAN

Telephone : +81 3 5796 7310

Fax : +81 3 5796 7315

1.4 Emergency telephone number

Emergency Phone # : (03) 6758-3625

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

Acute toxicity, Oral (Category 4), H302

Skin irritation (Category 2), H315

Eye irritation (Category 2), H319

Acute aquatic toxicity (Category 1), H400

Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

Classification according to EU Directives 67/548/EEC or 1999/45/EC

Xn	Harmful	R22
Xi	Irritant	R36/38
N	Dangerous for the environment	R50/53

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram



Signal word	Warning
Hazard statement(s)	
H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H410	Very toxic to aquatic life with long lasting effects.
Precautionary statement(s)	
P273	Avoid release to the environment.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P501	Dispose of contents/ container to an approved waste disposal plant.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	: $\text{CuO}_4\text{S} \cdot 5\text{H}_2\text{O}$
Molecular weight	: 249,69 g/mol
CAS-No.	: 7758-99-8
EC-No.	: 231-847-6
Index-No.	: 029-004-00-0

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component	Classification	Concentration
Copper sulphate pentahydrate		
CAS-No. 7758-99-8 EC-No. 231-847-6 Index-No. 029-004-00-0	Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2; Aquatic Acute 1; Aquatic Chronic 1; H302, H315, H319, H410, H302, H315, H319, H410	<= 100 %

Hazardous ingredients according to Directive 1999/45/EC

Component	Classification	Concentration
Copper sulphate pentahydrate		
CAS-No. 7758-99-8 EC-No. 231-847-6 Index-No. 029-004-00-0	Xn, N, R22 - R36/38 - R50/53	<= 100 %

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures**5.1 Extinguishing media****Suitable extinguishing media**

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Sulphur oxides, Copper oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

SECTION 6: Accidental release measures**6.1 Personal precautions, protective equipment and emergency procedures**

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage**7.1 Precautions for safe handling**

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

Air sensitive, hygroscopic. Handle and store under inert gas.

Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0,11 mm

Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0,11 mm

Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator. For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges.

Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

- a) Appearance Form: Crystals with lumps

	Colour: blue
b) Odour	No data available
c) Odour Threshold	No data available
d) pH	3,7 - 4,5 at 50 g/l at 25 °C
e) Melting point/freezing point	Melting point/range: 110 °C - dec.
f) Initial boiling point and boiling range	No data available
g) Flash point	No data available
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	No data available
k) Vapour pressure	9,7 hPa at 25 °C
l) Vapour density	No data available
m) Relative density	2,284 g/cm ³
n) Water solubility	No data available
o) Partition coefficient: n-octanol/water	No data available
p) Auto-ignition temperature	No data available
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

Exposure to moisture.

10.5 Incompatible materials

Powdered metals, Anhydrous copper(II) sulfate, reacts violently with:, hydroxylamine, Magnesium

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

SECTION 11: Toxicological information**11.1 Information on toxicological effects****Acute toxicity**

LD50 Oral - Rat - 482 mg/kg
(OECD Test Guideline 401)

Remarks: anhydrous

LD50 Dermal - Rat - > 2.000 mg/kg

Remarks: anhydrous

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

Prolonged or repeated exposure may cause allergic reactions in certain sensitive individuals.

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: GL8900000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information**12.1 Toxicity**

Toxicity to daphnia and other aquatic invertebrates EC50 - Daphnia magna (Water flea) - 0,024 mg/l - 48 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

Very toxic to aquatic life with long lasting effects.

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

ADR/RID: 3077

IMDG: 3077

IATA: 3077

14.2 UN proper shipping name

ADR/RID: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Copper sulphate pentahydrate)

IMDG: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Copper sulphate pentahydrate)

IATA: Environmentally hazardous substance, solid, n.o.s. (Copper sulphate pentahydrate)

14.3 Transport hazard class(es)

ADR/RID: 9

IMDG: 9

IATA: 9

14.4 Packaging group

ADR/RID: III

IMDG: III

IATA: III

14.5 Environmental hazards

ADR/RID: yes

IMDG Marine pollutant: yes

IATA: yes

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

No data available

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Eye Irrit.	Eye irritation
H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

Skin Irrit. Skin irritation

Full text of R-phrases referred to under sections 2 and 3

N	Dangerous for the environment
Xn	Harmful
R22	Harmful if swallowed.
R36/38	Irritating to eyes and skin.
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.



TOKYO CHEMICAL INDUSTRY CO., LTD.

Diethylene Glycol Monobutyl Ether

Revision 7
number:

Revision date: 11/13/2014

Page 1 of 4

Revision date: 11/13/2014

SAFETY DATA SHEET

1. IDENTIFICATION

Product name: Diethylene Glycol Monobutyl Ether
Product code: B0699
Company: TOKYO CHEMICAL INDUSTRY CO., LTD.
Address: 4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Responsible department: Global Business Department
Telephone: +81-3-5640-8872
Fax: +81-3-5640-8902
e-mail: globalbusiness@TCIchemicals.com
Revision number: 7

2. HAZARDS IDENTIFICATION

GHS classification

PHYSICAL HAZARDS

Flammable liquids Category 4

HEALTH HAZARDS

Acute toxicity (Dermal) Category 5

Serious eye damage/eye irritation Category 2A

ENVIRONMENTAL HAZARDS

Not classified

GHS label elements, including precautionary statements

Pictograms or hazard symbols



Signal word

Hazard statements

Warning

Combustible liquid

May be harmful in contact with skin

Causes serious eye irritation

Precautionary statements:

[Prevention]

Keep away from flames and hot surfaces.

Wear protective gloves and eye/face protection.

[Response]

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

If eye irritation persists: Get medical advice/attention.

Wash hands thoroughly after handling.

[Storage]

Call a POISON CENTER or doctor/physician if you feel unwell.

[Disposal]

Store in a well-ventilated place. Keep cool.

Dispose of contents/container through a waste management company authorized by the local government.

Other hazards which do not result in classification

May form explosive peroxides.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/mixture: Substance
Components: Diethylene Glycol Monobutyl Ether
Percent: >98.0%(GC)
CAS Number: 112-34-5
Synonyms: 2-(2-Butoxyethoxy)ethanol , Butyl Carbitol

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Formula: $C_8H_{18}O_3$
Notice Through Official Gazettes Reference Number
ENCs: (2)-422, (7)-97
ISHL: 2-(8)-99, 2-(8)-317

4. FIRST-AID MEASURES

Inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.

Skin contact: Remove/Take off immediately all contaminated clothing. Gently wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention.

Eye contact: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

Ingestion: Call a POISON CENTER or doctor/physician if you feel unwell. Rinse mouth.

Most important symptoms/effects, acute and delayed: Dry skin, Redness, Pain

Protection of first-aiders: A rescuer should wear personal protective equipment, such as rubber gloves and air-tight goggles.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: Dry chemical, foam, water in large amounts, carbon dioxide.

Precautions for firefighters: Fire-extinguishing work is done from the windward and the suitable fire-extinguishing method according to the surrounding situation is used. Uninvolved persons should evacuate to a safe place. In case of fire in the surroundings: Remove movable containers if safe to do so.

Special protective equipment for firefighters: When extinguishing fire, be sure to wear personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Use personal protective equipment. Keep people away from and upwind of spill/leak. Ensure adequate ventilation. Entry to non-involved personnel should be controlled around the leakage area by roping off, etc.

Environmental precautions: Prevent product from entering drains.

Methods and materials for containment and cleaning up: Absorb spilled material in a suitable absorbent (e.g. rag, dry sand, earth, saw-dust). In case of large amount of spillage, contain a spill by bunding. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

Prevention of secondary hazards: Remove all sources of ignition. Fire-extinguishing devices should be prepared in case of a fire. Use spark-proof tools and explosion-proof equipment.

7. HANDLING AND STORAGE

Precautions for safe handling

Technical measures: Handling is performed in a well ventilated place. Wear suitable protective equipment. Prevent generation of vapour or mist. Keep away from flames and hot surfaces. Take measures to prevent the build up of electrostatic charge. Use explosion-proof equipment. Wash hands and face thoroughly after handling. Use a closed system, ventilation.

Advice on safe handling: Avoid contact with skin, eyes and clothing. Confirm in advance if peroxides exist when operations involving heating such as distillation are carried out.

Conditions for safe storage, including any incompatibilities

Storage conditions: Keep container tightly closed. Store in a cool, dark and well-ventilated place. Store away from incompatible materials such as oxidizing agents.

Packaging material: Comply with laws.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls:	Install a closed system or local exhaust as possible so that workers should not be exposed directly. Also install safety shower and eye bath.
Control parameters:	Not set up
Exposure limits:	
ACGIH TLV(TWA):	10 ppm (IFV)
Personal protective equipment	
Respiratory protection:	Vapor respirator. Follow local and national regulations.
Hand protection:	Protective gloves.
Eye protection:	Safety glasses. A face-shield, if the situation requires.
Skin and body protection:	Protective clothing. Protective boots, if the situation requires.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state (20°C):	Liquid
Form:	Clear
Colour:	Colorless
Odour:	Slight Characteristic
pH:	No data available
Melting point/freezing point:	-68°C
Boiling point/range:	230°C
Flash point:	78°C
Flammability or explosive limits:	
Lower:	0.8%
Upper:	9.4%
Vapour pressure:	3Pa/20°C
Vapour density:	5.6
Relative density:	0.96
Solubility(ies):	
[Water]	Miscible
[Other solvents]	
Very soluble:	Ether, Alcohols, Acetone
Soluble:	Benzene, Many organic solvents
Log Pow:	0.56
Autoignition temperature:	223°C

10. STABILITY AND REACTIVITY

Chemical stability:	May form explosive peroxides.
Possibility of hazardous reactions:	No special reactivity has been reported.
Conditions to avoid:	Open flame, Air
Incompatible materials:	Oxidizing agents, Acids
Hazardous decomposition products:	Carbon monoxide, Carbon dioxide

11. TOXICOLOGICAL INFORMATION

Acute Toxicity:	ipr-mus LD50:850 mg/kg orl-mus LD50:2400 mg/kg orl-rat LD50:5660 mg/kg skn-rbt LD50:2700 mg/kg
Skin corrosion/irritation:	No data available
Serious eye damage/irritation:	eye-rbt 20 mg SEV
Germ cell mutagenicity:	No data available
Carcinogenicity:	
IARC =	No data available
NTP =	No data available
Reproductive toxicity:	No data available
RTECS Number:	KJ9100000

12. ECOLOGICAL INFORMATION

Ecotoxicity:

Fish:	No data available
Crustacea:	No data available
Algae:	No data available
Persistence / degradability:	92% (by BOD), 98% (by TOC), 100% (by GC)
Bioaccumulative potential(BCF):	2
Mobility in soil	
Log Pow:	0.56
Soil adsorption (Koc):	50
Henry's Law constant(PaM³/mol):	1.3 x 10 ⁻³

13. DISPOSAL CONSIDERATIONS

Recycle to process, if possible. Consult your local regional authorities. You may be able to burn in a chemical incinerator equipped with an afterburner and scrubber system. Observe all federal, state and local regulations when disposing of the substance.

14. TRANSPORT INFORMATION

Hazards Class:	Does not correspond to the classification standard of the United Nations
UN-No:	Not listed

15. JAPANESE REGULATORY INFORMATION

Fire Defense Law:	Class-4 No.3 petroleum Dangerous grade 3 Water-soluble fluid
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16. OTHER INFORMATION

The reference company name of written contents

Company:	TOKYO CHEMICAL INDUSTRY CO., LTD.
Address:	4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Department:	Global Business Department
Telephone:	+81-3-5640-8872
Fax:	+81-3-5640-8902

This SDS was prepared sincerely on the basis of the information we could obtained, however, any warranty shall not be given regarding the data contained and the assessment of hazards and toxicity. Prior to use, please investigate not only the hazards and toxicity information but also the laws and regulations of the organization, area and country where the products are to be used, which shall be given the first priority. The products are supposed to be used promptly after purchase in consideration of safety. Some new information or amendments may be added afterwards. If the products are to be used far behind the expected time of use or you have any questions, please feel free to contact us. The stated cautions are for normal handling only. In case of special handling, sufficient care should be taken, in addition to the safety measures suitable for the situation. All chemical products should be treated with the recognition of "having unknown hazards and toxicity", which differ greatly depending on the conditions and handling when in use and/or the conditions and duration of storage. The products must be handled only by those who are familiar with specialized knowledge and have experience or under the guidance of those specialists throughout use from opening to storage and disposal. Safe usage conditions shall be set up on each user's own responsibility.

SIGMA-ALDRICH

MATERIAL SAFETY DATA SHEET

Date Printed: 22.03.2017

Date Updated: 05.06.2007

Version 1.8

Section 1 - Product and Company Information

Product Name D.IETHYLENE GLYCOL MONOMETHYL ETHER, 99%
Product Number 537624
Brand ALDRICH

Company Sigma-Aldrich Japan K.K.
Address 2-2-24 Higashi-Shinagawa, Tennoz
Central Tower
Shinagawa-Ku 13 140-0002 JP
Technical Phone: 03-5796-7300
Fax: 03-5796-7315

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
DI (ETHYLENE GLYCOL) METHYL ETHER	111-77-3	Yes

Formula C5H12O3
Synonyms Diethylene glycol methyl ether * Diethylene glycol monomethyl ether * Diglycol monomethyl ether * Dowanol 16 * Dowanol DM * Ethylene diglycol monomethyl ether * MECB * Methoxydiglycol * 2-(2-Methoxyethoxy)ethanol * beta-Methoxy-beta'-hydroxydiethyl ether * Methyl carbitol * Methyl karbitol (Czech) * Poly-Solv DM
RTECS Number: KL6125000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Harmful.
Possible risk of harm to the unborn child. Possible risk of impaired fertility. Irritating to eyes.
Target organ(s): Liver. Kidneys. Combustible.

HMIS RATING

HEALTH: 2*
FLAMMABILITY: 2
REACTIVITY: 1

NFPA RATING

HEALTH: 2
FLAMMABILITY: 2
REACTIVITY: 1

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is conscious. Call a physician immediately.

INHALATION EXPOSURE

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE

In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

EYE EXPOSURE

In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLASH POINT

188,600 °F 87,000 °C Method: closed cup

EXPLOSION LIMITS

Lower: 1,380 % Upper: 22,700 %

AUTOIGNITION TEMP

221,00 °C

FLAMMABILITY

N/A

EXTINGUISHING MEDIA

Suitable: For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

FIREFIGHTING

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL

Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves. Wear disposable coveralls and discard them after use.

METHODS FOR CLEANING UP

Cover with dry-lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is complete.

Flash Point	188,600 °F 87,000 °C	Method: closed cup
Explosion Limits	Lower: 1,380 % Upper: 22,700 %	
Flammability	N/A	
Autoignition Temp	221,00 °C	
Refractive Index	1,4260	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	N/A	

N/A = not available

Section 10 - Stability and Reactivity

STABILITY

Stable: Stable.
Materials to Avoid: Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE

Skin Contact: May cause skin irritation.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: Causes eye irritation.
Inhalation: Material may be irritating to mucous membranes and upper respiratory tract. May be harmful if inhaled.
Ingestion: May be harmful if swallowed.

TARGET ORGAN(S) OR SYSTEM(S)

Testes. Kidneys. Liver.

TOXICITY DATA

Skin
Rabbit
>20 ML/KG
LD50
Oral
Rat
> 7.000, mg/kg
LD50

Oral Oral
Rat Rat
4 ML/KG 4 ML/KG
LD50 LD50

Intraperitoneal Intraperitoneal
Rat Rat
2722 MG/KG 2722 MG/KG
LD50 LD50

Remarks: Autonomic Nervous System:Other (direct)
parasympathomimetic. Behavioral:Somnolence (general depressed activity). Lungs, Thorax, or Respiration:Cyanosis. Lungs,

Thorax, or Respiration:Cyanosis. Autonomic Nervous System:Other (direct) parasympathomimetic. Behavioral:Somnolence (general depressed activity).

Oral Oral

Mouse Mouse

8222,000000 mg/kg 8222,000000 mg/kg

LD50 LD50

Remarks: Autonomic Nervous System:Other (direct) parasympathomimetic. Behavioral:Somnolence (general depressed activity). Lungs, Thorax, or Respiration:Cyanosis. Lungs, Thorax, or Respiration:Cyanosis. Autonomic Nervous System:Other (direct) parasympathomimetic. Behavioral:Somnolence (general depressed activity).

Intraperitoneal Intraperitoneal

Mouse Mouse

2611 MG/KG 2611 MG/KG

LD50 LD50

Remarks: Lungs, Thorax, or Respiration:Cyanosis. Behavioral:Somnolence (general depressed activity). Autonomic Nervous System:Other (direct) parasympathomimetic. Lungs, Thorax, or Respiration:Cyanosis. Behavioral:Somnolence (general depressed activity). Autonomic Nervous System:Other (direct) parasympathomimetic.

Oral Oral

Rabbit Rabbit

7190,000000 mg/kg 7190,000000 mg/kg

LD50 LD50

Skin Skin

Rabbit Rabbit

2500 UL/KG 2500 UL/KG

LD50 LD50

Remarks: Lungs, Thorax, or Respiration:Other changes. Gastrointestinal:Other changes. Kidney, Ureter, Bladder:Other changes. Kidney, Ureter, Bladder:Other changes. Lungs, Thorax, or Respiration:Other changes. Gastrointestinal:Other changes.

Oral Oral

Guinea pig Guinea pig

4160,000000 mg/kg 4160,000000 mg/kg

LD50 LD50

Remarks: Behavioral:General anesthetic. Gastrointestinal:Other changes. Kidney, Ureter, Bladder:Other changes. Kidney, Ureter, Bladder:Other changes. Gastrointestinal:Other changes. Behavioral:General anesthetic.

IRRITATION DATA

Eyes Eyes

Rabbit Rabbit

500,000000 mg 500,000000 mg

Remarks: Moderate irritation effect Moderate irritation effect

Eyes Eyes

Rabbit Rabbit

500,000000 mg 500,000000 mg

24H 24H

Remarks: Mild irritation effect Mild irritation effect

CHRONIC EXPOSURE - TERATOGEN

Result: Possible risk of congenital malformation in the fetus.

Species: Rat Rat

Dose: 6600 MG/KG 6600 MG/KG

Route of Application: Oral Oral

Exposure Time: (7-17D PREG) (7-17D PREG)

Result: Effects on Newborn: Physical. Specific Developmental Abnormalities: Musculoskeletal system. Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Effects on Newborn: Physical. Specific Developmental Abnormalities: Musculoskeletal system. Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Species: Rabbit Rabbit

Dose: 3250 MG/KG 3250 MG/KG

Route of Application: Skin Skin

Exposure Time: (6-18D PREG) (6-18D PREG)

Result: Specific Developmental Abnormalities: Musculoskeletal system. Specific Developmental Abnormalities: Musculoskeletal system.

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Result: Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Species: Rat Rat

Dose: 19800 MG/KG 19800 MG/KG

Route of Application: Oral Oral

Exposure Time: (7-17D PREG) (7-17D PREG)

Result: Maternal Effects: Parturition. Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Specific Developmental Abnormalities: Cardiovascular (circulatory) system. Specific Developmental Abnormalities: Cardiovascular (circulatory) system. Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Maternal Effects: Parturition.

Species: Rat Rat

Dose: 21650 MG/KG 21650 MG/KG

Route of Application: Oral Oral

Exposure Time: (7-16D PREG) (7-16D PREG)

Result: Effects on Fertility: Litter size (e.g.; # fetuses per litter; measured before birth). Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Cardiovascular (circulatory) system. Specific Developmental Abnormalities: Cardiovascular (circulatory) system. Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Effects on Fertility: Litter size (e.g.; # fetuses per litter; measured before birth).

Species: Rat Rat

Dose: 19800 MG/KG 19800 MG/KG

Route of Application: Oral Oral

Exposure Time: (7-17D PREG) (7-17D PREG)

Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Urogenital system. Specific Developmental Abnormalities: Urogenital system. Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Species: Mouse Mouse
Dose: 32 GM/KG 32 GM/KG
Route of Application: Oral Oral
Exposure Time: (7-14D PREG) (7-14D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Effects on Newborn: Live birth index (# fetuses per litter; measured after birth). Effects on Newborn: Viability index (e.g., # alive at day 4 per # born alive). Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Effects on Newborn: Live birth index (# fetuses per litter; measured after birth). Effects on Newborn: Viability index (e.g., # alive at day 4 per # born alive).

Species: Rabbit
Dose: 13 GM/KG
Route of Application: Skin
Exposure Time: (6-18D PREG)
Result: Maternal Effects: Other effects. Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Contact a licensed professional waste disposal service to dispose of this material. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT

Proper Shipping Name: Combustible liquid, n.o.s.
UN#: NA1993
Class: COMBUSTIBLE LIQUID
Packing Group: Packing Group III
Hazard Label: None
PIH: Not PIH

IATA

Non-Hazardous for Air Transport; Non-hazardous for air transport.

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION

Symbol of Danger: Xn
Indication of Danger: Harmful.
R: 63
Risk Statements: Possible risk of harm to the unborn child.
S: 36/37
Safety Statements: Wear suitable protective clothing and gloves.

US CLASSIFICATION AND LABEL TEXT

Indication of Danger: Harmful.
Risk Statements: Possible risk of harm to the unborn child.
Possible risk of impaired fertility. Irritating to eyes.
Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing.
US Statements: Target organ(s): Liver. Kidneys. Combustible.

UNITED STATES REGULATORY INFORMATION

SARA LISTED: Yes
DEMINIMIS: 1,000 %
NOTES: This product is subject to SARA section 313 reporting requirements - glycol ethers.
TSCA INVENTORY ITEM: Yes Yes

CANADA REGULATORY INFORMATION

WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: Yes
NDSL: No

Section 16 - Other Information

DISCLAIMER

For R&D use only. Not for drug, household or other uses.

WARRANTY

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2010 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006 (REACH)
and Regulation (EU) No 2015/830

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Version: 5

Language: en-GB,IE

Date of print: 4/8/2015

Diethylene triamine penta(methylene phosphonic acid) (DTPMPA) Solution

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SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Trade name: Diethylene triamine penta(methylene phosphonic acid) (DTPMPA) Solution

1.2 Relevant identified uses of the substance or mixture and uses advised against

General use: Chemical basic material.

Identified uses: Industrial:

- Industrial manufacturing
- Formulation of preparations and for the production of substances
- Anti-scalant, complexing agent, stabiliser for hydrogen peroxide in cleaning products
- Industrial use of cleaning agent
- Anti-scalant, complexing agent in industrial water treatment
- Metal surface treatment products
- Anti-scalant in oilfield water systems
- Industrial use of coatings and paints
- Anti-scalant and bleaching agent in the paper industry
- Anti-scalant and bleaching agent in the textile industry
- Anti-scalant in water desalination systems
- Manufacture of ceramics

Professional:

- Professional use of cleaning agent
- Cosmetics, personal care products
- Professional use of coatings and paints
- Agrochemical uses

Consumer:

- Consumer use of cleaning agent
- Cosmetics, personal care products
- Consumer use coatings and paints
- Agrochemical uses

1.3 Details of the supplier of the safety data sheet

Company name: NetSun EU B.V.

Street/POB-No.: Blaak 40, Fifth Floor

Postal Code, city: 3011 TA Rotterdam

Netherlands

Telephone: +31 (0)10 842 1148

Telefax: +31 (0)10 840 4118

Dept. responsible for information:

REACH Department,

Telephone: +31 (0)10 842 1148, E-mail reachcompliance@netsun.com

1.4 Emergency telephone number

GIZ-Nord, Germany, Telephone: +49 (0)551-19240

**Diethylene triamine penta(methylene
phosphonic acid) (DTPMPA) Solution**

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to EC regulation 1272/2008 (CLP)

Met. Corr. 1; H290 May be corrosive to metals.
Skin Corr. 1B; H314 Causes severe skin burns and eye damage.
STOT SE 3; H335 May cause respiratory irritation.

2.2 Label elements

Labelling (CLP)



Signal word:

Danger

Hazard statements:

H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.
H335 May cause respiratory irritation.

Precautionary statements:

P102 Keep out of reach of children.
P260 Do not breathe fume.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P301+P330+P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER/doctor.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.

Special labelling

Text for labelling: Contains Diethylentetramine penta(methylenephosphonic acid), Hydrochloric acid and Phosphonic acid.

2.3 Other hazards

Harmful effects on water organisms by modification of pH-value.

SECTION 3: Composition / information on ingredients

3.1 Substances: not applicable

3.2 Mixtures

Chemical characterisation: Aqueous solution

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Hazardous ingredients:

Ingredient	Designation	Content	Classification
REACH 01-2119510387-42-xxxx EC No. 239-931-4 CAS 15827-60-8	Diethylentetramine penta (methylenphosphonic acid)	>= 50 %	Met. Corr. 1; H290. Skin Irrit. 2; H315. Eye Dam. 1; H318.
EC No. 231-595-7	Hydrochloric acid	12 - 17 %	Met. Corr. 1; H290. Skin Corr. 1B; H314. STOT SE 3; H335.
REACH 01-2119488030-46-xxxx EC No. 237-066-7 CAS 13598-36-2	Phosphonic acid	< 5 %	Met. Corr. 1; H290. Acute Tox. 4; H302. Skin Corr. 1A; H314.

Full text of H- and EUH-statements: see section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

- General information:** First aider: Pay attention to self-protection!
- In case of inhalation:** Move victim to fresh air. Seek medical attention.
In case of breathing difficulties administer oxygen. If breathing has stopped, give artificial respiration immediately.
- Following skin contact:** After contact with skin, wash immediately with plenty of water.
Change contaminated clothing. Immediately get medical attention.
- After eye contact:** Immediately flush eyes with plenty of flowing water for 10 to 15 minutes holding eyelids apart. Remove contact lenses, if present and easy to do. Continue rinsing. Subsequently seek the immediate attention of an ophthalmologist.
- After swallowing:** Rinse mouth immediately and drink plenty of water.
Do not induce vomiting. Immediately get medical attention.
Never give anything by mouth to an unconscious person.

4.2 Most important symptoms and effects, both acute and delayed

- In case of inhalation: Burns
In case of ingestion: Burns, gastrointestinal complaints.
When swallowed and vomited immediately, aspiration into the lungs may occur resulting in chemical pneumonia or suffocation.

4.3 Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5: Firefighting measures

5.1 Extinguishing media

- Suitable extinguishing media:**
Water fog, foam, extinguishing powder, carbon dioxide.
- Extinguishing media which must not be used for safety reasons:**
High power water jet

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5.2 Special hazards arising from the substance or mixture

Fires in the immediate vicinity may cause the development of dangerous vapours.
In case of fire may be liberated: nitrogen oxides (NO_x), phosphorus oxides, phosphine, carbon monoxide and carbon dioxide.

5.3 Advice for firefighters

Special protective equipment for firefighters:

Wear self-contained breathing apparatus.

Additional information: Hazchem-Code: 2X

Do not allow water used to extinguish fire to enter drains, ground or waterways. Treat runoff as hazardous.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Avoid contact with the substance. Wear suitable protective clothing.

6.2 Environmental precautions

Do not allow to penetrate into soil, waterbodies or drains.

6.3 Methods and material for containment and cleaning up

In case of spills of large quantities: Dam spills and pump to remove.
Absorb residues with appropriate material, and dispose of according to regulations.
Use soda or another alkaline detergent for removal of residues. Wash spill area with plenty of water.

6.4 Reference to other sections

Refer additionally to section 8 and 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advices on safe handling: Avoid contact with skin, eyes, and clothing.

Provide adequate ventilation. Do not breathe vapour/aerosol.

Wash hands before breaks and immediately after handling the product.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storerooms and containers:

Keep container tightly closed in a cool, well-ventilated place.

Storage temperature: > -10 °C. Shelf life: 24 months.

Suitable material: Glass, PVC, polyethylene, polypropylene.

Unsuitable material: steel, aluminium, metals.

Storage class: 8B = Non-combustible corrosive substances

7.3 Specific end use(s)

No information available.

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SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational exposure limit values:

CAS No.	Designation	Type	Limit value
-	Hydrochloric acid	Europe: IOELV: STEL Europe: IOELV: TWA Great Britain: WEL-STEL Great Britain: WEL-TWA Ireland: 15 minutes Ireland: 8 hours	15 mg/m ³ ; 10 ppm (Hydrogen chloride) 8 mg/m ³ ; 5 ppm (Hydrogen chloride) 8 mg/m ³ ; 5 ppm (gas and aerosol mists) 2 mg/m ³ ; 1 ppm (gas and aerosol mists) 15 mg/m ³ ; 10 ppm IOELV 8 mg/m ³ ; 5 ppm IOELV

DNEL/DMEL: Information about Diethylentetramine penta(methylenphosphonic acid):

Systemic effects:

DNEL Short-term, workers, oral: 3,9 mg/kg bw/d

DNEL Long-term, workers, oral: 3,9 mg/kg bw/d

DNEL Short-term, consumers, oral: 1,9 mg/kg bw/d

DNEL Long-term, consumers, oral: 1,9 mg/kg bw/d

PNEC: Information about Diethylentetramine penta(methylenphosphonic acid):

PNEC water (freshwater): 0,52 mg/L

PNEC water (marine water): 0,052 mg/L

PNEC sediment (freshwater): 108 mg/kg dw

PNEC sediment (marine water): 10,8 mg/kg dw

PNEC soil: 174 mg/kg ww

PNEC sewage treatment plant: 20 mg/L

PNEC Secondary Poisoning, oral: >= 55 mg/kg food and feedingstuffs

8.2 Exposure controls

Make sure there is sufficient air exchange and / or that working rooms are air suctioned.

Personal protection equipment

Occupational exposure controls

Respiratory protection: Respiratory protection must be worn whenever the WEL levels have been exceeded.

Use filter type E-(P2) according to EN 14387.

Hand protection: Protective gloves according to EN 374.

Glove material: Polypropylene, polyethylene, PVC.

Breakthrough time: > 480 min

Observe glove manufacturer's instructions concerning penetrability and breakthrough time.

Eye protection: Tightly sealed goggles according to EN 166.

Body protection: Wear suitable protective clothing.

General protection and hygiene measures:

Take off immediately all contaminated clothing. Wash contaminated clothing prior to re-use.

When using do not eat or drink.

Wash hands before breaks and immediately after handling the product.

Safety shower and eye wash station should be easily accessible to the work area.

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SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance:	Form: liquid Colour: brown
Odour:	characteristic
Odour threshold:	no data available
pH value:	at 1 g/L: ≤ 2
Melting point/freezing point:	no data available
Initial boiling point and boiling range:	no data available
Flash point/flash point range:	not combustible
Evaporation rate:	no data available
Flammability:	non-flammable
Explosion limits:	no data available
Vapour pressure:	no data available
Vapour density:	no data available
Density:	at 20 °C: 1.35 - 1.45 g/mL
Water solubility:	completely miscible
Partition coefficient: n-octanol/water:	-3.4 log P(o/w) (Diethylenetetramine penta(methylenphosphonic acid)) Bio-accumulation is not to be expected (log P(o/w) <1).
Auto-ignition temperature:	no data available
Thermal decomposition:	Information about Diethylenetetramine penta(methylenphosphonic acid): > 200 °C
Viscosity, kinematic:	no data available
Explosive properties:	no data available
Oxidizing characteristics:	no data available

9.2 Other information

Additional information: no data available

SECTION 10: Stability and reactivity

10.1 Reactivity

Corrosive to metals (aluminium, steel).

10.2 Chemical stability

Material is not combustible.
Product is stable under normal storage conditions.
Shelf life: > 24 months (> -10 °C).

10.3 Possibility of hazardous reactions

No hazardous reaction when handled and stored according to provisions.

10.4 Conditions to avoid

no data available

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10.5 Incompatible materials

Strong oxidizing agents, alkalis, caustic substance(s).

10.6 Hazardous decomposition products

In case of fire may be liberated: nitrogen oxides (NO_x), phosphorus oxides, phosphine, carbon monoxide and carbon dioxide.

Thermal decomposition: Information about Diethylentetramine penta(methylenphosphonic acid):
> 200 °C

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity: LD50 Rat, oral: (Diethylentetramine penta(methylenphosphonic acid)) 4164 mg/kg
LD50 Rabbit, dermal: (Diethylentetramine penta(methylenphosphonic acid)) > 4605 mg/kg

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Toxicological effects:

Acute toxicity (oral): Based on available data, the classification criteria are not met.
(Diethylentetramine penta(methylenphosphonic acid))

Acute toxicity (dermal): Based on available data, the classification criteria are not met.
(Diethylentetramine penta(methylenphosphonic acid))

Acute toxicity (inhalative): Based on available data, the classification criteria are not met.
(Diethylentetramine penta(methylenphosphonic acid))

Skin corrosion/irritation, eye damage/irritation: Skin Corr. 1B; H314 = Causes severe skin burns and eye damage.

Information about Diethylentetramine penta(methylenphosphonic acid):
Rabbit, eye: strongly irritant (OECD 405).

Sensitisation to the respiratory tract: Based on available data, the classification criteria are not met.

Skin sensitisation: Based on available data, the classification criteria are not met.
Information about Diethylentetramine penta(methylenphosphonic acid):
Guinea pig: not sensitising.

Germ cell mutagenicity/Genotoxicity: Based on available data, the classification criteria are not met.
Information about Diethylentetramine penta(methylenphosphonic acid):
In vitro mutagenicity:
Ames test: negative.
Gene-mutations mammalian cells: negative

In vivo mutagenicity:
Chromosomal aberrations mammalian cells (Rat): negative

Carcinogenicity: Based on available data, the classification criteria are not met.

Reproductive toxicity: Based on available data, the classification criteria are not met.
Information about Diethylentetramine penta(methylenphosphonic acid):
NOAEL (P) Rat, oral: 294 - 312 mg/kg bw/d
Developmental toxicity/teratogenicity: NOAEL Rat, oral: 312 mg/kg bw/d.

Effects on or via lactation: Based on available data, the classification criteria are not met.

Specific target organ toxicity (single exposure): STOT SE 3; H335 = May cause respiratory irritation.

Specific target organ toxicity (repeated exposure): Based on available data, the classification criteria are not met.

Aspiration hazard: Lack of data.

Symptoms

In case of inhalation: Burns
In case of ingestion: Burns, gastrointestinal complaints.
When swallowed and vomited immediately, aspiration into the lungs may occur resulting in chemical pneumonia or suffocation.

Diethylene triamine penta(methylene phosphonic acid) (DTPMPA) Solution

SECTION 12: Ecological information

12.1 Toxicity

Aquatic toxicity: Harmful effects on water organisms by modification of pH-value.
Information about Diethylentetramine penta(methylenephosphonic acid):
Algae toxicity:
ErC50 Pseudokirchneriella subcapitata (green algae): > 10 mg/L/95h.
Daphnia toxicity:
EC50 Daphnia magna (Big water flea): 242 mg/L/48h.
Fish toxicity:
LC50 Oncorhynchus mykiss: 180 - 252 mg/L/96h (OECD 203).
NOEC Oncorhynchus mykiss: 25,6 mg/L/60d.

12.2. Persistence and degradability

Further details: Biodegradability: Product is not readily biodegradable.

12.3 Bioaccumulative potential

Bioconcentration factor (BCF):
No indication of bioaccumulation potential.

12.4 Mobility in soil

no data available

12.5 Results of PBT and vPvB assessment

This substance does not meet the PBT/vPvB criteria of REACH, Annex XIII.

12.6 Other adverse effects

General information: Do not allow to enter into ground-water, surface water or drains.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste key number: 20 01 29* = Detergents containing dangerous substances
* = Evidence for disposal must be provided.

Recommendation: Special waste. Dispose of waste according to applicable legislation.
Do not empty into drains.

Contaminated packaging

Waste key number: 15 01 02 = Plastic packaging

Recommendation: Dispose of waste according to applicable legislation. Handle contaminated packages in the same way as the substance itself. Non-contaminated packages may be recycled.

**Diethylene triamine penta(methylene
phosphonic acid) (DTPMPA) Solution**

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SECTION 14: Transport information

14.1 UN number

ADR/RID, IMDG, IATA-DGR:

UN 3265

14.2 UN proper shipping name

ADR/RID, IMDG, IATA-DGR:

UN 3265, CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.
(Diethylentetramine penta(methylenphosphonic acid), Hydrochloric acid and Phosphonic acid)

14.3 Transport hazard class(es)

ADR/RID: Class 8, Code: C3
IMDG: Class 8, Subrisk -
IATA-DGR: Class 8



14.4 Packing group

ADR/RID, IMDG, IATA-DGR:

II

14.5 Environmental hazards

Marine pollutant: No

14.6 Special precautions for user

Land transport (ADR/RID)

Warning board: ADR/RID: Kemmler-number 80, UN number UN 3265
Hazard label: 8
Special provisions: 274
Limited quantities: 1 L
EQ: E2
Contaminated packaging - Instructions: P001 IBC02
Special provisions for packing together: MP15
Portable tanks - Instructions: T11
Portable tanks - Special provisions: TP2 TP27
Tank coding: L4BN
Tunnel restriction code: E

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Sea transport (IMDG)

EmS: F-A, S-B
Special provisions: 274
Limited quantities: 1 L
EQ: E2
Contaminated packaging - Instructions: P001
Contaminated packaging - Provisions: -
IBC - Instructions: IBC02
IBC - Provisions: -
Tank instructions - IMO: -
Tank instructions - UN: T11
Tank instructions - Provisions: TP2, TP27
Stowage and handling: Category B. SW2
Properties and observations: Causes burns to skin, eyes and mucous membranes.
Segregation group: 1

Air transport (IATA)

Hazard: Corrosive
EQ: E2
Passenger Ltd.Qty.: Pack.Instr. Y840 - Max. Net Qty/Pkg. 0.5 L
Passenger: Pack.Instr. 851 - Max. Net Qty/Pkg. 1 L
Cargo: Pack.Instr. 855 - Max. Net Qty/Pkg. 30 L
Special Provisioning: A3 A803
ERG: 8L

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

no data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

National regulations - Great Britain

Hazchem-Code: 2X
No data available

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National regulations - EC member states

Labelling of packaging with <= 125mL content



Signal word:

Danger

Hazard statements:

H314 Causes severe skin burns and eye damage.
H335 May cause respiratory irritation.

Precautionary statements:

P102 Keep out of reach of children.
P260 Do not breathe fume.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P301+P330+P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER/doctor.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.

15.2 Chemical Safety Assessment

For the following substances of this mixture a chemical safety assessment has been carried out: Diethylentetramine penta(methylenephosphonic acid)

SECTION 16: Other information

Further information

Wording of the H-phrases under paragraph 2 and 3:

H290 = May be corrosive to metals.
H302 = Harmful if swallowed.
H314 = Causes severe skin burns and eye damage.
H315 = Causes skin irritation.
H318 = Causes serious eye damage.
H335 = May cause respiratory irritation.

Reason of change: General revision (Regulation (EU) No 2015/830)

Date of first version: 2/8/2011

Department issuing data sheet

Contact person: see section 1: Dept. responsible for information

For abbreviations and acronyms, see: ECHA Guidance on information requirements and chemical safety assessment, chapter R.20 (Table of terms and abbreviations).

The information in this data sheet has been established to our best knowledge and was up-to-date at time of revision. It does not represent a guarantee for the properties of the product described in terms of the legal warranty regulations.

Material Safety Data Sheet

1-Dodecyl-3-methylimidazolium chloride

Revision Date: 12/06/2010

Date Issued: 6/28/2011

1 IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

Product name	1-Dodecyl-3-methylimidazolium chloride
Product code	IL-0120
CAS	114569-84-5
Supplier	IoLiTec Ionic Liquids Technologies GmbH Salzstrasse 184 D – 74076 Heilbronn Germany
Telephone	+49 (0)7131-89839-0
Fax	+49 (0)7131-89839-109
Emergency telephone	+49 (0)179-5322578
Email	msds@iolitec.de

2 HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Caution! Substance not yet fully tested. Risks cannot be excluded if the product is handled inappropriately. For laboratory use only!

Classification (67/548/EEC or 1999/45/EC)

Caution! Substance not yet fully tested. Risks cannot be excluded if the product is handled inappropriately. For laboratory use only!

Material Safety Data Sheet

1-Dodecyl-3-methylimidazolium chloride

Revision Date: 12/06/2010

Date Issued: 6/28/2011

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Substance not yet fully tested.

Hazard statements

H-phrases

Substance not yet fully tested.

Precautionary statements

P phrases

P262: Do not get in eyes, on skin, or on clothing
P280: Wear protective gloves/ protective clothing/ eye protection/ face protection
P305 + P351 + P338: IF IN EYES: Rinse continuously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing.
P313: Get medical advice/attention

Labelling (67/548/EEC or 1999/45/EC)

Substance not yet fully tested.

Risk phrases

Not fully tested substance.

Safety phrases

S: 24/25 Avoid contact with skin and eyes.
S: 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S: 36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
S:28,2 After contact with skin, wash immediately with plenty of water and liquid soap.

Material Safety Data Sheet

1-Dodecyl-3-methylimidazolium chloride

Revision Date: 12/06/2010

Date Issued: 6/28/2011

3 COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient name	Contents	Health(Class)	Risk(R/No.)
1-Dodecyl-3-methylimidazolium chloride	>98%		Substance not yet fully tested!

4 FIRST AID MEASURES

General	Contaminated clothing should be removed and washed before being reused.
Inhalation	Move the exposed person to fresh air at once. If respiratory problems, provide artificial respiration/oxygen.
Ingestion	Immediately rinse mouth and provide fresh air. Do not induce vomiting. Get medical attention immediately.
Skin	Wash the skin immediately with soap and water.
Eyes	Promptly wash eyes with plenty of water while lifting the eye lids. Continue to rinse for at least 15 minutes. Get medical attention immediately. Continue to rinse.

5 FIRE FIGHTING MEASURES

Extinguishing media	Use: Water spray, fog or mist. Carbon dioxides (CO ₂). Dry chemicals, sand, dolomite etc.
Special fire fighting procedures	Avoid water in straight hose stream, will scatter and spread fire. Keep run-off water out of

Material Safety Data Sheet

1-Dodecyl-3-methylimidazolium chloride

Revision Date: 12/06/2010

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sewers and water sources. Dike for water control.

Unusual fire & explosion hazards

Fire causes formation of toxic gases.

Protective measures in fire

Wear self-contained breathing apparatus as combustion may produce hazardous fumes.

6 ACCIDENTAL RELEASE MEASURES

Personal precautions during spill

Wear protective clothing and avoid inhalation of vapor, skin or eye contact.

Precautions to protect environment

Avoid washing into water courses. Avoid contaminating public drains or water supply.

Spill cleanup methods

Avoid contact with skin or inhalation of spillage, dust or vapor, Avoid dust formation. Collect and reclaim or dispose in sealed containers in license waste. Extinguish all ignition sources. Avoid sparks, flames, heat and smoking. Ventilate.

7 HANDLING AND STORAGE

Usage precautions

Keep away from heat, sparks and open flame. Do not use in confined spaces without adequate ventilation and/or respirator.

Storage precautions

Store at moderate temperatures in dry, well ventilated area.

Storage criteria

Chemical storage.

Material Safety Data Sheet

1-Dodecyl-3-methylimidazolium chloride

Revision Date: 12/06/2010

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8 EXPOSURE CONTROLS AND PERSONAL PROTECTION

Protective equipment	Safety goggles. Chemical resistant gloves. Protective clothing.
Process control measures	Provide eyewash station and safety shower. Use engineering controls to reduce air contamination to permissible exposure levels.
Ventilation	Provide adequate general and local exhaust ventilation.
Respirators	Use high efficiency particulate respirator with appropriate filter.
Other protection	Wear overalls and industrial shoes.

9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Solid.
Color	Colorless to orange.
Odor/taste	No characteristic odor.

10 STABILITY AND REACTIVITY

Stability	No particular stability concerns.
Conditions to avoid	Avoid contact to strong oxidizers and bases.
Hazardous Decomposition Products	High temperatures generate: Corrosive gases/vapor/fumes of: Carbon dioxide (CO ₂). Carbon monoxide (CO). Nitrous gases (NO _x). Hydrogen fluoride (HF).

Material Safety Data Sheet

1-Dodecyl-3-methylimidazolium chloride

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11 TOXICOLOGICAL INFORMATION

Ingestion not available.

Skin not available.

Eyes not available

Data on the toxicity of this product are not available. Hazardous properties cannot be excluded.

12 ECOLOGICAL INFORMATION

Environmental hazards Avoid washing into water courses. Avoid contaminating public drains or water supply.

13 DISPOSAL CONSIDERATIONS

Disposal method Contact specialist disposal companies. Dispose of in accordance with Local Authority requirements. Recover and reclaim or recycle, if practical.

14 TRANSPORT INFORMATION

General Not classified as dangerous for transport purposes.

UN No. 0

Road transport notes Not classified as dangerous for road transport.

Rail transport notes Not classified as dangerous for rail transport.

Sea transport notes Not classified as dangerous for sea transport.

Air transport notes Not classified as dangerous for air transport.

Material Safety Data Sheet

1-Dodecyl-3-methylimidazolium chloride

Revision Date: 12/06/2010

Date Issued: 6/28/2011

15 REGULATORY INFORMATION

Label for supply

Substance not yet fully tested.

P phrases

P262:

Do not get in eyes, on skin, or on clothing

P280:

Wear protective gloves/ protective clothing/ eye protection/ face protection

P305 + P351 + P338:

IF IN EYES: Rinse continuously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing.

P313:

Get medical advice/attention

Safety phrases

S: 24/25

Avoid contact with skin and eyes.

S: 26

In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S: 36/37/39

Wear suitable protective clothing, gloves and eye/face protection.

S:28,2

After contact with skin, wash immediately with plenty of water and liquid soap.

Country specific information

Germany

WGK: 3 (Self-Classification)

Material Safety Data Sheet

1-Dodecyl-3-methylimidazolium chloride

Revision Date: 12/06/2010

Date Issued: 6/28/2011

16 OTHER INFORMATION

DISCLAIMER

THE ABOVE INFORMATION IS BELIEVED TO BE CORRECT BUT DOES NOT PURPOSED TO BE ALL INCLUSIVE AND SHALL BE USED ONLY AS A GUIDE. IOLITEC SHALL NOT BE HELD LIABLE FOR ANY DAMAGE RESULTING FROM HANDLING OR FROM CONTACT WITH THE ABOVE PRODUCT. THIS INFORMATION RELATES ONLY TO THE SPECIFIC MATERIAL DESIGNATED AND MAY NOT BE VALID FOR SUCH MATERIAL USED IN COMBINATION WITH ANY OTHER MATERIALS OR ANY PROCESS. IT IS THE USERE'S RESPONISIBILITY TO SATISFY HIMSELF AS TO THE SUITABILITY OF SUCH INFORMATION FOR HIS OWN PARTICULAR USE.

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1 Identification

Product Identifier

Product name: n-Dodecylamine

Stock number: A15515, L04242

CAS Number:

124-22-1

EC number:

204-690-6

Relevant identified uses of the substance or mixture and uses advised against.

Identified use: SU24 Scientific research and development

Details of the supplier of the safety data sheet

Manufacturer/Supplier:

Alfa Aesar

Thermo Fisher Scientific Chemicals, Inc.

30 Bond Street

Ward Hill, MA 01835-8099

Tel: 800-343-0660

Fax: 800-322-4757

Email: tech@alfa.com

www.alfa.com

Information Department: Health, Safety and Environmental Department

Emergency telephone number:

During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660. After normal business hours, call Carechem 24 at (866) 928-0789.

2 Hazard(s) identification

Classification of the substance or mixture in accordance with 29 CFR 1910 (OSHA HCS)

 **GHS05 Corrosion**

Skin Corr. 1B H314 Causes severe skin burns and eye damage.

Eye Dam. 1 H318 Causes serious eye damage.

 **GHS07**

Acute Tox. 4 H302 Harmful if swallowed.

Hazards not otherwise classified No information known.

Label elements

GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)

Hazard pictograms

GHS05 GHS07

Signal word Danger

Hazard statements

H302 Harmful if swallowed.

H314 Causes severe skin burns and eye damage.

Precautionary statements

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P301+P330+P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.

P405 Store locked up.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

WHMIS classification

D2B - Toxic material causing other toxic effects

E - Corrosive material

Classification system

HMIS ratings (scale 0-4)

(Hazardous Materials Identification System)

HEALTH 3 Health (acute effects) = 3

FLAMM. 1 Flammability = 1

REACTIVITY 1 Physical Hazard = 1

Other hazards

Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

3 Composition/information on ingredients

Chemical characterization: Substances

CAS# Description:

124-22-1 n-Dodecylamine

Identification number(s):

EC number: 204-690-6

First-aid measures

Description of first aid measures

General information Immediately remove any clothing soiled by the product.

Product name: n-Dodecylamine

(Contd. of page 1)

After inhalation

Supply fresh air. If required, provide artificial respiration. Keep patient warm.
Seek immediate medical advice.

After skin contact

Immediately wash with water and soap and rinse thoroughly.
Seek immediate medical advice.

After eye contact Rinse opened eye for several minutes under running water. Then consult a doctor.

After swallowing Seek medical treatment.

Information for doctor

Most important symptoms and effects, both acute and delayed

Causes severe skin burns.

Causes serious eye damage.

Indication of any immediate medical attention and special treatment needed No further relevant information available.

5 Fire-fighting measures

Extinguishing media

Suitable extinguishing agents Carbon dioxide, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

Special hazards arising from the substance or mixture

If this product is involved in a fire, the following can be released:

Carbon monoxide and carbon dioxide

Nitrogen oxides (NOx)

Advice for firefighters

Protective equipment:

Wear self-contained respirator.

Wear fully protective impervious suit.

6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

Wear protective equipment. Keep unprotected persons away.

Ensure adequate ventilation

Environmental precautions: Do not allow material to be released to the environment without proper governmental permits.

Methods and material for containment and cleaning up:

Use neutralizing agent.

Dispose of contaminated material as waste according to section 13.

Ensure adequate ventilation.

Prevention of secondary hazards: No special measures required.

Reference to other sections

See Section 7 for information on safe handling

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

7 Handling and storage

Handling

Precautions for safe handling

Keep container tightly sealed.

Store in cool, dry place in tightly closed containers.

Ensure good ventilation at the workplace.

Information about protection against explosions and fires: No information known.

Conditions for safe storage, including any incompatibilities

Storage

Requirements to be met by storerooms and receptacles: No special requirements.

Information about storage in one common storage facility: Store away from oxidizing agents.

Further information about storage conditions:

Keep container tightly sealed.

Store in cool, dry conditions in well sealed containers.

Specific end use(s) No further relevant information available.

8 Exposure controls/personal protection

Additional information about design of technical systems:

Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Control parameters

Components with limit values that require monitoring at the workplace: Not required.

Additional information: No data

Exposure controls

Personal protective equipment

General protective and hygienic measures

The usual precautionary measures for handling chemicals should be followed.

Keep away from foodstuffs, beverages and feed.

Remove all soiled and contaminated clothing immediately.

Wash hands before breaks and at the end of work.

Avoid contact with the eyes and skin.

Maintain an ergonomically appropriate working environment.

Breathing equipment: Use suitable respirator when high concentrations are present.

Protection of hands:

Impervious gloves

Check protective gloves prior to each use for their proper condition.

The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.

Penetration time of glove material (in minutes) Not determined

Eye protection:

Tightly sealed goggles

Full face protection

Body protection: Protective work clothing.

9 Physical and chemical properties

Information on basic physical and chemical properties

General Information

Appearance:

Form: Low melting solid

(Contd. on page 3)
USA

Product name: *n*-Dodecylamine

(Contd. of page 2)

Color:	White
Odor:	Not determined
Odor threshold:	Not determined.
pH-value:	Not applicable.
Change in condition	
Melting point/Melting range:	28-30 °C (82-86 °F)
Boiling point/Boiling range:	247-249 °C (477-480 °F)
Sublimation temperature / start:	Not determined
Flash point:	> 110 °C (> 230 °F)
Flammability (solid, gaseous)	Not determined.
Ignition temperature:	Not determined
Decomposition temperature:	Not determined
Auto igniting:	Not determined.
Danger of explosion:	Product does not present an explosion hazard.
Explosion limits:	
Lower:	Not determined
Upper:	Not determined
Vapor pressure:	Not applicable.
Density at 20 °C (68 °F):	0.8015 g/cm ³ (6.689 lbs/gal)
Relative density	Not determined.
Vapor density	Not applicable.
Evaporation rate	Not applicable.
Solubility in / Miscibility with	
Water:	Not determined
Partition coefficient (n-octanol/water):	Not determined.
Viscosity:	
dynamic:	Not applicable.
kinematic:	Not applicable.
Other information	No further relevant information available.

10 Stability and reactivity

Reactivity No information known.
Chemical stability Stable under recommended storage conditions.
Thermal decomposition / conditions to be avoided: Decomposition will not occur if used and stored according to specifications.
Possibility of hazardous reactions No dangerous reactions known
Conditions to avoid No further relevant information available.
Incompatible materials: Oxidizing agents
Hazardous decomposition products:
 Carbon monoxide and carbon dioxide
 Nitrogen oxides

Toxicological information

Information on toxicological effects

Acute toxicity:
 Harmful if swallowed.
 Swallowing will lead to a strong corrosive effect on mouth and throat and to the danger of perforation of esophagus and stomach.

LD/LC50 values that are relevant for classification:

Oral | LD50 | 1020 mg/kg (rat)

Skin irritation or corrosion: Causes severe skin burns.
Eye irritation or corrosion: Causes serious eye damage.
Sensitization: No sensitizing effects known.
Germ cell mutagenicity: No effects known.
Carcinogenicity: No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.
Reproductive toxicity: No effects known.
Specific target organ system toxicity - repeated exposure: No effects known.
Specific target organ system toxicity - single exposure: No effects known.
Aspiration hazard: No effects known.
Subacute to chronic toxicity:
 The Registry of Toxic Effects of Chemical Substances (RTECS) reports the following effects in laboratory animals:
 Gastrointestinal - other changes.
Additional toxicological information: To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

12 Ecological information

Toxicity
Aquatic toxicity: No further relevant information available.
Persistence and degradability No further relevant information available.
Bioaccumulative potential No further relevant information available.
Mobility in soil No further relevant information available.
Ecotoxicological effects:
Remark: Very toxic for aquatic organisms
Additional ecological information:
General notes:
 Do not allow product to reach ground water, water course or sewage system.
 Do not allow material to be released to the environment without proper governmental permits.
 Danger to drinking water if even small quantities leak into the ground.
 Also poisonous for fish and plankton in water bodies.
 Avoid transfer into the environment.
 Very toxic for aquatic organisms
Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.
Other adverse effects No further relevant information available.

13 Disposal considerations

Waste treatment methods
Recommendation Consult state, local or national regulations to ensure proper disposal.

(Contd. on page 4)
USA

Product name: **n-Dodecylamine**

(Contd. of page 3)

Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.

14 Transport information

UN-Number DOT, IMDG, IATA	UN3259
UN proper shipping name DOT IMDG, IATA	Amines, solid, corrosive, n.o.s. (n-Dodecylamine) AMINES, SOLID, CORROSIVE, N.O.S. (n-Dodecylamine)
Transport hazard class(es) DOT	
 	
Class Label Class Label IMDG, IATA	8 Corrosive substances. 8 8 (C8) Corrosive substances 8
	
Class Label	8 Corrosive substances. 8
Packing group DOT, IMDG, IATA	II
Environmental hazards: Marine pollutant (IMDG):	Environmentally hazardous substance, solid Yes (P)
Special precautions for user Segregation groups	Warning: Corrosive substances Alkalis
Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	Not applicable.
Transport/Additional information: DOT Marine Pollutant (DOT): Remarks:	Yes (P) Special marking with the symbol (fish and tree).
UN "Model Regulation":	UN3259, Amines, solid, corrosive, n.o.s. (n-Dodecylamine), 8, II

15 Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture
GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)
Hazard pictograms



GHS05 GHS07

Signal word Danger

Hazard statements

H302 Harmful if swallowed.

H314 Causes severe skin burns and eye damage.

Precautionary statements

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P301+P330+P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.

P405 Store locked up.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

National regulations

All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.

All components of this product are listed on the Canadian Domestic Substances List (DSL).

SARA Section 313 (specific toxic chemical listings) Substance is not listed.

California Proposition 65

Prop 65 - Chemicals known to cause cancer Substance is not listed.

Prop 65 - Developmental toxicity Substance is not listed.

Prop 65 - Developmental toxicity, female Substance is not listed.

Prop 65 - Developmental toxicity, male Substance is not listed.

Information about limitation of use: For use only by technically qualified individuals.

Other regulations, limitations and prohibitive regulations

Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006. Substance is not listed.

The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing on the market and use must be observed.

Substance is not listed.

Annex XIV of the REACH Regulations (requiring Authorisation for use) Substance is not listed.

Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing SDS: Global Marketing Department

Date of preparation / last revision 11/23/2015 / -

Abbreviations and acronyms:

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

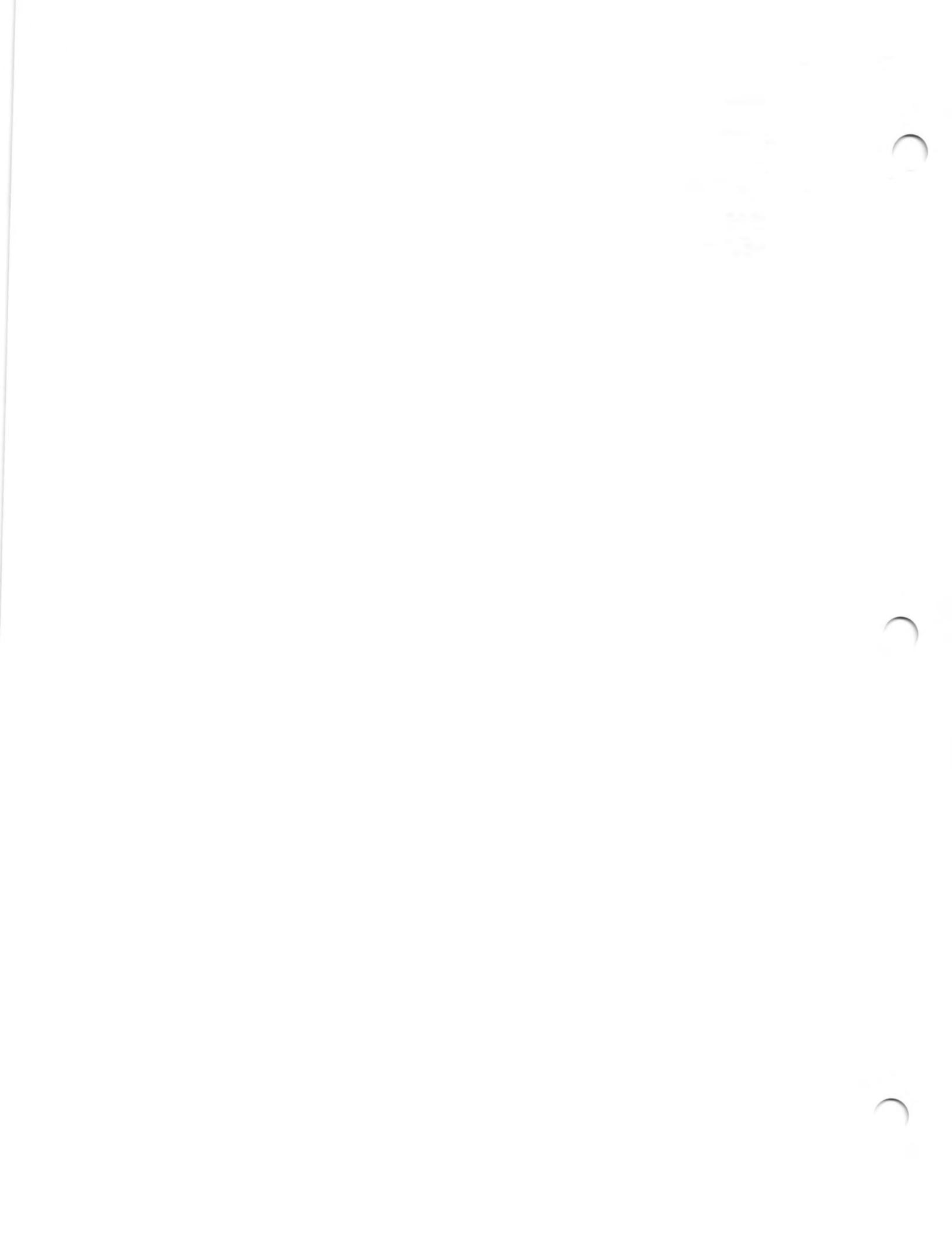
(Contd. on page 5)
USA

Product name: n-Dodecylamine

(Contd. of page 4)

IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
ATA: International Air Transport Association
P: Marine Pollutant
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
HMIS: Hazardous Materials Identification System (USA)
WHMIS: Workplace Hazardous Materials Information System (Canada)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
vPvB: very Persistent and very Bioaccumulative
ACGIH: American Conference of Governmental Industrial Hygienists (USA)
OSHA: Occupational Safety and Health Administration (USA)
NTP: National Toxicology Program (USA)
IARC: International Agency for Research on Cancer
EPA: Environmental Protection Agency (USA)

USA



SAFETY DATA SHEET

according to Regulation (EC) No. 453/2010

Version 6.0 Revision Date 16.07.2015

Print Date 18.03.2017

GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Ethanolamine

Product Number : E9508

Brand : Sigma-Aldrich

Index-No. : 603-030-00-8

REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

CAS-No. : 141-43-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Japan G.K.
Tennoz Central Tower, 2-2-24 Higashi-Shinagawa
SHINAGAWA-KU 140-0002
JAPAN

Telephone : +81 3 5796 7310

Fax : +81 3 5796 7315

1.4 Emergency telephone number

Emergency Phone # (03) 6758-3625

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

Acute toxicity, Oral (Category 4), H302

Acute toxicity, Inhalation (Category 4), H332

Acute toxicity, Dermal (Category 4), H312

Skin corrosion (Category 1B), H314

Chronic aquatic toxicity (Category 3), H412

Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram



Signal word

Danger

Hazard statement(s)	
H302 + H312 + H332 H314 H335 H412	Harmful if swallowed, in contact with skin or if inhaled Causes severe skin burns and eye damage. May cause respiratory irritation. Harmful to aquatic life with long lasting effects.
Precautionary statement(s)	
P261 P273 P301 + P312 + P330 P303 + P361 + P353 P304 + P340 + P310 P305 + P351 + P338	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray. Avoid release to the environment. IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Monoethanolamine 2-Aminoethyl alcohol 2-Aminoethanol
Formula	:	C ₂ H ₇ NO
Molecular weight	:	61,08 g/mol
CAS-No.	:	141-43-5
EC-No.	:	205-483-3
Index-No.	:	603-030-00-8

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component	Classification	Concentration
Ethanolamine		
CAS-No. 141-43-5 EC-No. 205-483-3 Index-No. 603-030-00-8	Acute Tox. 4; Skin Corr. 1B; STOT SE 3; Aquatic Chronic 3; H302, H332, H312, H314, H335, H412 Concentration limits: >= 5%: STOT SE 3, H335;	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures**5.1 Extinguishing media****Suitable extinguishing media**

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Nitrogen oxides (NO_x)

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

SECTION 6: Accidental release measures**6.1 Personal precautions, protective equipment and emergency procedures**

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas. For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage**7.1 Precautions for safe handling**

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

hygroscopic

Storage class (TRGS 510): Combustible, corrosive hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact

Material: Nature latex/chloroprene

Minimum layer thickness: 0,6 mm

Break through time: 480 min

Material tested:Lapren® (KCL 706 / Aldrich Z677558, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0,2 mm

Break through time: 30 min

Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance	Form: liquid, clear Colour: colourless
b) Odour	amine-like
c) Odour Threshold	No data available
d) pH	12,1 at 100 g/l at 20 °C
e) Melting point/freezing point	Melting point/range: 10 - 11 °C - lit.
f) Initial boiling point and boiling range	170 °C - lit. 69 - 70 °C at 13 hPa
g) Flash point	91 °C - closed cup
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	Upper explosion limit: 17 %(V) Lower explosion limit: 2,5 %(V)
k) Vapour pressure	0,3 hPa at 20 °C
l) Vapour density	2,11 - (Air = 1.0)
m) Relative density	1,012 g/cm ³ at 25 °C
n) Water solubility	1.000 g/l at 20 °C - completely miscible
o) Partition coefficient: n-octanol/water	log Pow: -2,299 at 25 °C
p) Auto-ignition temperature	424 °C
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	No data available

9.2 Other safety information

Relative vapour density 2,11 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

Absorbs carbon dioxide (CO₂) from air.
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

Exposure to moisture
Heat, flames and sparks.

10.5 Incompatible materials

Strong acids and oxidizing agents, Iron, Copper, Brass, Rubber

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - male and female - 1.089 mg/kg

(OECD Test Guideline 401)

Inhalation: Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.

LD50 Dermal - Rabbit - 1.015 mg/kg

Skin corrosion/irritation

Skin - Rabbit

Result: Causes burns.

(OECD Test Guideline 404)

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Corrosive

(OECD Test Guideline 405)

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

Ames test

Salmonella typhimurium

Result: negative

OECD Test Guideline 474

Mouse - male and female

Result: negative

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: KJ5775000

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Liver - Irregularities - Based on Human Evidence

SECTION 12: Ecological information**12.1 Toxicity**

Toxicity to fish	semi-static test LC50 - Cyprinus carpio (Carp) - 150 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 65 mg/l - 48 h
Toxicity to algae	static test EC50 - Selenastrum capricornutum (green algae) - 2,8 mg/l - 72 h (OECD Test Guideline 201)
Toxicity to bacteria	EC50 - Pseudomonas putida - 110 mg/l - 17 h (DIN 38 412 Part 8)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: > 70 % - Readily biodegradable (OECD Test Guideline 301F)
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12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

Toxic to aquatic life.

SECTION 13: Disposal considerations**13.1 Waste treatment methods****Product**

This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

SECTION 14: Transport information**14.1 UN number**

ADR/RID: 2491	IMDG: 2491	IATA: 2491
---------------	------------	------------

14.2 UN proper shipping name

ADR/RID: ETHANOLAMINE
IMDG: ETHANOLAMINE
IATA: Ethanolamine

14.3 Transport hazard class(es)

ADR/RID: 8	IMDG: 8	IATA: 8
------------	---------	---------

14.4 Packaging group

ADR/RID: III	IMDG: III	IATA: III
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14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no
-------------	---------------------------	----------

14.6 Special precautions for user

No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 453/2010.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**15.2 Chemical Safety Assessment**

For this product a chemical safety assessment was not carried out

SECTION 16: Other information**Full text of H-Statements referred to under sections 2 and 3.**

H302	Harmful if swallowed.
H302 + H312 + H332	Harmful if swallowed, in contact with skin or if inhaled
H312	Harmful in contact with skin.
H314	Causes severe skin burns and eye damage.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H412	Harmful to aquatic life with long lasting effects.

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.



SAFETY DATA SHEET

1. IDENTIFICATION

Product name: Ethylenediaminetetraacetic Acid
Product code: E0084
Company: TOKYO CHEMICAL INDUSTRY CO., LTD.
Address: 4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Responsible department: Global Business Department
Telephone: +81-3-5640-8872
Fax: +81-3-5640-8902
e-mail: globalbusiness@TCIchemicals.com
Revision number: 6

2. HAZARDS IDENTIFICATION

GHS classification

PHYSICAL HAZARDS

Not classified

HEALTH HAZARDS

Acute toxicity (Oral) Category 5
Serious eye damage/eye irritation Category 2B
Reproductive toxicity Category 2
Specific target organ toxicity Kidney
- Repeated exposure [Category 1]

ENVIRONMENTAL HAZARDS

Acute aquatic hazard Category 2
Long-term aquatic hazard Category 2

GHS label elements, including precautionary statements

Pictograms or hazard symbols



Signal word

Danger

Hazard statements

May be harmful if swallowed
Causes eye irritation
Suspected of damaging fertility or the unborn child
Causes damage to organs through prolonged or repeated exposure : Kidney
Toxic to aquatic life
Toxic to aquatic life with long lasting effects

Precautionary statements:

[Prevention]

Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Do not breathe dust/fume/gas/mist/vapours/spray.
Avoid release to the environment.
Do not eat, drink or smoke when using this product.
Wash hands thoroughly after handling.

[Response]

Use personal protective equipment as required.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists: Get medical advice/attention.
If exposed or concerned: Get medical advice/attention.
Collect spillage.

2. HAZARDS IDENTIFICATION

[Storage]	Store locked up.
[Disposal]	Dispose of contents/container through a waste management company authorized by the local government.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/mixture:	Substance
Components:	Ethylenediaminetetraacetic Acid
Percent:	>98.0%(T)
CAS Number:	60-00-4
Synonyms:	(Ethylenedinitrilo)tetraacetic Acid , EDTA
Chemical Formula:	C ₁₀ H ₁₆ N ₂ O ₈
Notice Through Official Gazettes Reference Number	
ENCS:	(2)-1263, (2)-1296
ISHL:	Official announcement chemistry substance.

4. FIRST-AID MEASURES

Inhalation:	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical advice/attention.
Skin contact:	Remove/Take off immediately all contaminated clothing. Gently wash with plenty of soap and water. Get medical advice/attention.
Eye contact:	Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Get medical advice/attention.
Ingestion:	Get medical advice/attention. Rinse mouth.
Most important symptoms/effects, acute and delayed:	Cough, Sore throat, Abdominal pain, Burning sensation, Diarrhoea, Redness, Pain
Protection of first-aiders:	A rescuer should wear personal protective equipment, such as rubber gloves and air-tight goggles.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media:	Dry chemical, foam, water spray, carbon dioxide.
Specific hazards arising from the chemical:	Take care as it may decompose upon combustion or in high temperatures to generate poisonous fume.
Precautions for firefighters:	Fire-extinguishing work is done from the windward and the suitable fire-extinguishing method according to the surrounding situation is used. Uninvolved persons should evacuate to a safe place. In case of fire in the surroundings: Remove movable containers if safe to do so.
Special protective equipment for firefighters:	When extinguishing fire, be sure to wear personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:	Use extra personal protective equipment (P3 filter respirator for toxic particles). Keep people away from and upwind of spill/leak. Entry to non-involved personnel should be controlled around the leakage area by roping off, etc.
Environmental precautions:	Be careful not to let it flow into rivers, etc., since adverse effects on the environment are concerned.
Methods and materials for containment and cleaning up:	Sweep dust to collect it into an airtight container, taking care not to disperse it. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

7. HANDLING AND STORAGE

Precautions for safe handling

Technical measures:	Handling is performed in a well ventilated place. Wear suitable protective equipment. Prevent dispersion of dust. Wash hands and face thoroughly after handling. Use a closed system if possible. Use a local exhaust if dust or aerosol will be generated.
Advice on safe handling:	Avoid all contact!

7. HANDLING AND STORAGE

Conditions for safe storage, including any incompatibilities

Storage conditions:	Keep container tightly closed. Store in a cool and dark place. Store locked up. Store away from incompatible materials such as oxidizing agents.
Packaging material:	Comply with laws.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls:	Install a closed system or local exhaust. Also install safety shower and eye bath.
Control parameters:	Not set up
Personal protective equipment	
Respiratory protection:	Dust respirator, self-contained breathing apparatus(SCBA), supplied air respirator, etc. Use respirators approved under appropriate government standards and follow local and national regulations.
Hand protection:	Impervious gloves.
Eye protection:	Safety goggles. A face-shield, if the situation requires.
Skin and body protection:	Impervious protective clothing. Protective boots, if the situation requires.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state (20°C):	Solid
Form:	Crystal- Powder
Colour:	White - Almost white
Odour:	No data available
pH:	No data available
Melting point/freezing point:	240°C
Boiling point/range:	No data available
Flash point:	No data available
Flammability or explosive limits:	
Lower:	No data available
Upper:	No data available
Relative density:	No data available
Solubility(ies):	
[Water]	Insoluble (0.05g/100mL)
[Other solvents]	
Soluble:	Sodium hydroxide solution
Insoluble:	Many organic solvents
Log Pow:	-1.97
Decomposition temperature:	150°C (Starts to decarboxylate)

10. STABILITY AND REACTIVITY

Chemical stability:	Stable under proper conditions.
Possibility of hazardous reactions:	No special reactivity has been reported.
Incompatible materials:	Oxidizing agents, Strong bases, Copper, Nickel, Copper alloys
Hazardous decomposition products:	Carbon monoxide, Carbon dioxide, Nitrogen oxides (NOx)

11. TOXICOLOGICAL INFORMATION

Acute Toxicity:	ipr-mus LD50:250 mg/kg ipr-rat LD50:397 mg/kg ivn-mus LD50:28500 ug/kg orl-mus LD50:30 mg/kg
Skin corrosion/irritation:	No data available
Serious eye damage/irritation:	No data available

11. TOXICOLOGICAL INFORMATION

Germ cell mutagenicity: cyt-mus-ipr 50 mmol/L
dnd-mus-lym 40500 umol/L
dni-rat-oth 600 umol/L
dni-rbt-kdy 250 umol/L

Carcinogenicity:

IARC = No data available

NTP = No data available

Reproductive toxicity: No data available

RTECS Number: AH4025000

12. ECOLOGICAL INFORMATION**Ecotoxicity:**

Fish: 48h LC50:163 mg/L (*Oryzias latipes*)

Crustacea: No data available

Algae: No data available

Persistence / degradability: 0% (by BOD), 0% (by TOC), 0% (by UV-VIS)

*The substance was determined as "Non-biodegradability" under the Chemical Substances Control Law.

Bioaccumulative potential(BCF): 2.7 - 12 (conc.2 mg/L), 27 - 123 (conc.0.2 mg/L)

*The substance was determined as "Low bioconcentration " under the Chemical Substances Control Law.

Mobility in soil

Log Pow: -1.97

Soil adsorption (Koc): No data available

Henry's Law

constant(PaM³/mol): No data available

13. DISPOSAL CONSIDERATIONS

Recycle to process, if possible. Consult your local regional authorities. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. Observe all federal, state and local regulations when disposing of the substance.

14. TRANSPORT INFORMATION

Hazards Class: 9: Miscellaneous dangerous goods.

UN-No: 3077

Proper shipping name: Environmentally hazardous substance, solid, n.o.s.

Packing group: III

Marine pollutant Y

15. JAPANESE REGULATORY INFORMATION

ENCS: Priority Assessment Chemical Substance

Law for safety of vessels: Hazardous materials notification, Schedule form No.1 Harmful substances

Pollutant Release and on Designated Chemical Substances, Class I List(No.60)

Transfer Register Law:

16. OTHER INFORMATION**The reference company name of written contents**

Company: TOKYO CHEMICAL INDUSTRY CO., LTD.

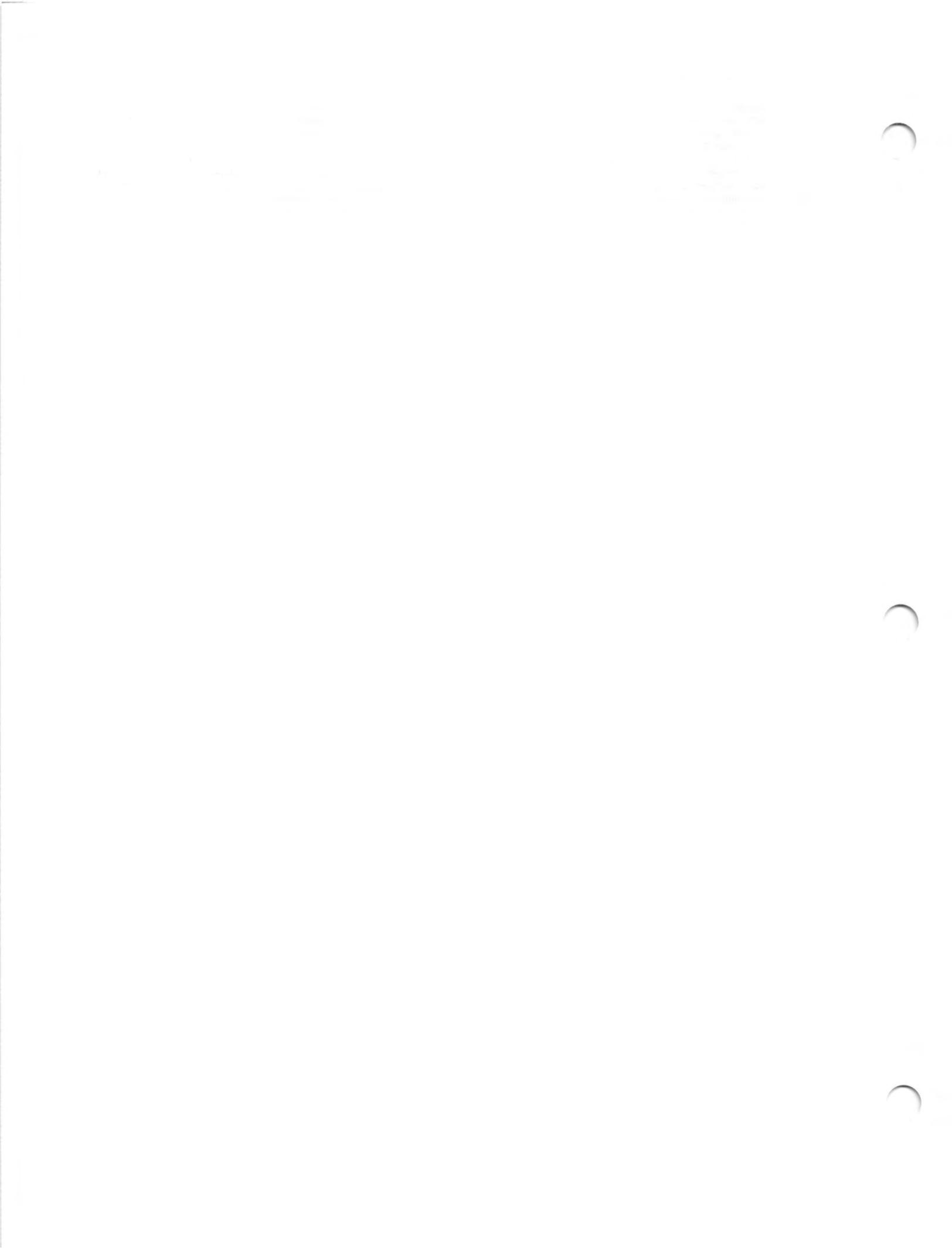
Address: 4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan

Department: Global Business Department

Telephone: +81-3-5640-8872

Fax: +81-3-5640-8902

This SDS was prepared sincerely on the basis of the information we could obtain, however, any warranty shall not be given regarding the data contained and the assessment of hazards and toxicity. Prior to use, please investigate not only the hazards and toxicity information but also the laws and regulations of the organization, area and country where the products are to be used, which shall be given the first priority. The products are supposed to be used promptly after purchase in consideration of safety. Some new information or amendments may be added afterwards. If the products are to be used far behind the expected time of use or you have any questions, please feel free to contact us. The stated cautions are for normal handling only. In case of special handling, sufficient care should be taken, in addition to the safety measures suitable for the situation. All chemical products should be treated with the recognition of "having unknown hazards and toxicity", which differ greatly depending on the conditions and handling when in use and/or the conditions and duration of storage. The products must be handled only by those who are familiar with specialized knowledge and have experience or under the guidance of those specialists throughout use from opening to storage and disposal. Safe usage conditions shall be set up on each user's own responsibility.



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Glycerol

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Print Date 05/08/2015

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Glycerol

MSDS Number : 000000011695

Product Use Description : Solvent

Manufactured for : VWR International LLC
Radnor Corporate Center
Building One
Suite 200
100 Matsonford Road
Radnor PA 19087

For more information call : (Monday-Friday, 8.00am-5:00pm)
1-800-932-5000

In case of emergency call : (24 hours/day, 7 days/week)
1-800-424-9300 (USA Only)
For Transportation Emergencies:
1-800-424-9300 (CHEMTREC - Domestic)
1-613-996-6666 (CANUTEC - Canada)

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Form : liquid, clear

Color : colourless

Odor : odourless

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Classification of the substance or mixture

Not a hazardous substance or mixture.

Precautionary statements : **Prevention:**
Use personal protective equipment as required.

Hazards not otherwise classified : May cause eye and skin irritation.

Carcinogenicity

No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP, IARC, or OSHA.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : C₃H₈O₃

Chemical nature : Substance

Chemical Name	CAS-No.	Concentration
Glycerol	56-81-5	100.00 %

SECTION 4. FIRST AID MEASURES

Inhalation : Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Use oxygen as required, provided a qualified operator is present. Call a physician.

Skin contact : Wash off immediately with plenty of water for at least 15 minutes. Take off contaminated clothing and shoes immediately. Wash contaminated clothing before re-use. Call a physician if irritation develops or persists.

Eye contact : Rinse immediately with plenty of water, also under the eyelids,

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for at least 15 minutes. Call a physician if irritation develops or persists.

Ingestion : Do not induce vomiting without medical advice. Call a physician.

Notes to physician

Treatment : Treat symptomatically.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media : Alcohol-resistant foam
Carbon dioxide (CO₂)
Dry chemical
Cool closed containers exposed to fire with water spray.

: Water spray
Foam
Carbon dioxide (CO₂)
Dry powder

Unsuitable extinguishing media : Do not use a solid water stream as it may scatter and spread fire.

: High volume water jet

Specific hazards during firefighting : In case of fire hazardous decomposition products may be produced such as:
Acrolein
Carbon monoxide
Carbon dioxide (CO₂)

Special protective equipment for firefighters : Wear self-contained breathing apparatus and protective suit.

SECTION 6. ACCIDENTAL RELEASE MEASURES

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- Personal precautions** : Wear personal protective equipment.
Immediately evacuate personnel to safe areas.
Keep people away from and upwind of spill/leak.
Ensure adequate ventilation.
Remove all sources of ignition.
Do not swallow.
Avoid breathing vapours, mist or gas.
Avoid contact with skin, eyes and clothing.
- Environmental precautions** : Prevent further leakage or spillage if safe to do so.
Discharge into the environment must be avoided.
Do not flush into surface water or sanitary sewer system.
Prevent product from entering drains.
Collect contaminated fire extinguishing water separately. This must not be discharged into drains.
- Methods for cleaning up** : Ventilate the area.
Contain and collect spillage with non-combustible absorbent materials, e.g. sand, earth, vermiculite, diatomaceous earth and place in container for disposal according to local regulations (see section 13).

SECTION 7. HANDLING AND STORAGE

Handling

- Handling** : Wear personal protective equipment.
Use only in well-ventilated areas.
Keep container tightly closed.
Do not smoke.
Do not swallow.
Avoid breathing vapours, mist or gas.
Avoid contact with skin, eyes and clothing.

Advice on protection against fire and explosion : Normal measures for preventive fire protection.

Storage

- Requirements for storage areas and containers** : Keep containers tightly closed in a dry, cool and well-ventilated place.

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Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Keep away from heat and sources of ignition.
Keep away from direct sunlight.
Protect from physical damage.
Store away from incompatible substances.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

- | | | |
|--------------------------|---|---|
| Protective measures | : | Ensure that eyewash stations and safety showers are close to the workstation location. |
| Engineering measures | : | Use with local exhaust ventilation.
Prevent vapour buildup by providing adequate ventilation during and after use. |
| Eye protection | : | Wear as appropriate:
Safety glasses with side-shields
Safety goggles |
| Hand protection | : | Protective gloves
Gloves must be inspected prior to use.
Replace when worn. |
| Skin and body protection | : | Wear as appropriate:
Solvent-resistant apron
If splashes are likely to occur, wear:
Protective suit |
| Respiratory protection | : | In case of insufficient ventilation wear suitable respiratory equipment.
Use NIOSH approved respiratory protection. |
| Hygiene measures | : | When using, do not eat, drink or smoke.
Wash hands before breaks and immediately after handling the product.
Keep working clothes separately.
Remove and wash contaminated clothing before re-use.
Do not swallow.
Avoid breathing vapours, mist or gas. |

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Avoid contact with skin, eyes and clothing.

Exposure Guidelines

Components	CAS-No.	Value	Control parameters	Update	Basis
Glycerol	56-81-5	PEL : Permissible exposure limit	15 mg/m3	02 2006	OSHA_TRANS:US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)
Further information	:	Form of exposure : Total dust.			

Glycerol	56-81-5	PEL : Permissible exposure limit	5 mg/m3	02 2006	OSHA_TRANS:US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)
Further information	:	Form of exposure : Respirable fraction.			

Glycerol	56-81-5	TWA : time weighted average	10 mg/m3	1989	Z1A:US. OSHA Table Z-1-A (29 CFR 1910.1000)
Further information	:	Form of exposure : Total dust.			

Glycerol	56-81-5	TWA : time weighted average	5 mg/m3	1989	Z1A:US. OSHA Table Z-1-A (29 CFR 1910.1000)
Further information	:	Form of exposure : Respirable fraction.			

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

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VWR ANALYTICAL

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Physical state	: liquid, clear
Color	: colourless
Odor	: odourless
pH	: 6.5 - 8.5 at 50 Weight percent Note: (as aqueous solution)
Melting point/freezing point	: 17.8 °C
Boiling point/boiling range	: 290 °C
Flash point	: 390 °F (199 °C) Method: closed cup
Lower explosion limit	: 2 %(V)
Upper explosion limit	: 11.3 %(V) Note: no data available
Vapor pressure	: 1.33 hPa at 20 °C(68 °F)
Vapor density	: 3.1 at 20 °C Note: (Air = 1.0)
Density	: 1.261 g/cm ³
Water solubility	: Note: soluble

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Ignition temperature : 369.9 °C

Molecular weight : 92.11 g/mol

SECTION 10. STABILITY AND REACTIVITY

Chemical stability : Stable under normal conditions.

Possibility of hazardous reactions : Hazardous polymerisation does not occur.

Conditions to avoid : Heat, flames and sparks.
Keep away from direct sunlight.
Protect from moisture.

Incompatible materials to avoid : Strong oxidizing agents
Acetic anhydride
Calcium oxychloride
Chromium oxides
Alkali metal hydrides

Hazardous decomposition products : In case of fire hazardous decomposition products may be produced such as:
Acrolein
Carbon monoxide
Carbon dioxide (CO₂)

SECTION 11. TOXICOLOGICAL INFORMATION

Acute oral toxicity : LD₅₀: 17,000 - 27,200 mg/kg
Species: Rat

Acute dermal toxicity : LD₅₀: > 10,000 mg/kg
Species: Rabbit

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Genotoxicity in vitro : Note: In vitro tests did not show mutagenic effects

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity effects

Toxicity to fish : static test
LC50: 44,000 mg/l
Exposure time: 96 h
Species: Pimephales promelas (fathead minnow)

Toxicity to daphnia and other aquatic invertebrates : LC50: > 10,000 mg/l
Exposure time: 24 h
Species: Daphnia magna (Water flea)

Toxicity to bacteria : Respiration inhibition
EC50: > 1,000 mg/l
Exposure time: 3 h
Species: activated sludge
Method: OECD 209

Elimination information (persistence and degradability)

Bioaccumulation : Bioconcentration factor (BCF): 3.16
Note: Accumulation in aquatic organisms is unlikely.

Biodegradability : Value: 63 %
Method: OECD 301 C
Note: Readily biodegradable, according to appropriate OECD test.

Further information on ecology

SAFETY DATA SHEET



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SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods : Dispose of contents/ container in accordance with local, state, and federal regulations.

SECTION 14. TRANSPORT INFORMATION

DOT Not dangerous goods

TDG Not dangerous goods

IATA Not dangerous goods

IMDG Not dangerous goods

SECTION 15. REGULATORY INFORMATION

Inventories

US. Toxic Substances Control Act : On TSCA Inventory

Australia. Industrial Chemical (Notification and Assessment) Act : On the inventory, or in compliance with the inventory

Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL) : All components of this product are on the Canadian DSL.

Japan. Kashin-Hou Law List : On the inventory, or in compliance with the inventory

Korea. Toxic Chemical Control Law (TCCL) List : On the inventory, or in compliance with the inventory

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Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act : On the inventory, or in compliance with the inventory

China. Inventory of Existing Chemical Substances : On the inventory, or in compliance with the inventory

New Zealand. Inventory of Chemicals (NZIoC), as published by ERMA New Zealand : On the inventory, or in compliance with the inventory

National regulatory information

SARA 302 Components : No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards : Acute Health Hazard

California Prop. 65 : This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

Massachusetts RTK : Glycerol 56-81-5

WHMIS Classification : Not Rated
This product has been classified according to the hazard criteria

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of the CPR and the MSDS contains all of the information required by the CPR.

SECTION 16. OTHER INFORMATION

	HMIS III	NFPA
Health hazard	: 1	1
Flammability	: 1	1
Physical Hazard	: 0	
Instability	:	0

Hazard rating and rating systems (e.g. HMIS® III, NFPA): This information is intended solely for the use of individuals trained in the particular system.

Further information

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. Final determination of suitability of any material is the sole responsibility of the user. This information should not constitute a guarantee for any specific product properties.

Changes since the last version are highlighted in the margin. This version replaces all previous versions.

Previous Issue Date: 06/20/2012

Prepared by Honeywell Performance Materials and Technologies Product Stewardship Group



SAFETY DATA SHEET

1. IDENTIFICATION

Product name: Glyoxylic Acid (ca. 50% in Water, ca. 9mol/L)
Product code: G0366
Company: TOKYO CHEMICAL INDUSTRY CO., LTD.
Address: 4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Responsible department: Global Business Department
Telephone: +81-3-5640-8872
Fax: +81-3-5640-8902
e-mail: globalbusiness@TCIchemicals.com
Revision number: 6

2. HAZARDS IDENTIFICATION

GHS classification

PHYSICAL HAZARDS

Corrosive to metals Category 1

HEALTH HAZARDS

Skin corrosion/irritation Category 1C

Serious eye damage/eye irritation Category 1

Skin sensitization Category 1

ENVIRONMENTAL HAZARDS

Acute aquatic hazard Category 3

GHS label elements, including precautionary statements

Pictograms or hazard symbols



Signal word

Danger

Hazard statements

May be corrosive to metals
Causes severe skin burns and eye damage
May cause an allergic skin reaction
Harmful to aquatic life

Precautionary statements:

[Prevention]

Keep only in original container.
Do not breathe dust/fume/gas/mist/vapours/spray.
Avoid release to the environment.
Contaminated work clothing should not be allowed out of the workplace.
Wash hands thoroughly after handling.

[Response]

Wear protective gloves/eye protection/face protection.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
If skin irritation or rash occurs: Get medical advice/attention.
Wash contaminated clothing before reuse.
Immediately call a POISON CENTER or doctor/physician.
Absorb spillage to prevent material damage.

2. HAZARDS IDENTIFICATION

[Storage]	Store locked up.
[Disposal]	Dispose of contents/container through a waste management company authorized by the local government.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/mixture:	Mixture
Components:	Glyoxylic Acid (ca. 50% in Water, ca. 9mol/L)
Percent:
CAS Number:	298-12-4
Chemical Formula:	C ₂ H ₂ O ₃
Notice Through Official Gazettes Reference Number	
ENCS:	(2)-1471
ISHL:	Official announcement chemistry substance.

4. FIRST-AID MEASURES

Inhalation:	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/physician.
Skin contact:	Remove/Take off immediately all contaminated clothing. Gently wash with plenty of soap and water. Immediately call a POISON CENTER or doctor/physician.
Eye contact:	Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.
Ingestion:	Immediately call a POISON CENTER or doctor/physician. Rinse mouth. Do NOT induce vomiting.
Protection of first-aiders:	A rescuer should wear personal protective equipment, such as rubber gloves and air-tight goggles.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media:	Dry chemical, foam, water spray, carbon dioxide.
Precautions for firefighters:	Fire-extinguishing work is done from the windward and the suitable fire-extinguishing method according to the surrounding situation is used. Uninvolved persons should evacuate to a safe place. In case of fire in the surroundings: Remove movable containers if safe to do so.
Special protective equipment for firefighters:	When extinguishing fire, be sure to wear personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:	Use extra personal protective equipment (self-contained breathing apparatus). Keep people away from and upwind of spill/leak. Ensure adequate ventilation. Entry to non-involved personnel should be controlled around the leakage area by roping off, etc.
Environmental precautions:	Prevent product from entering drains.
Methods and materials for containment and cleaning up:	Absorb spilled material in a suitable absorbent (e.g. rag, dry sand, earth, saw-dust). In case of large amount of spillage, contain a spill by bunding. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

7. HANDLING AND STORAGE

Precautions for safe handling

Technical measures:	Handling is performed in a well ventilated place. Wear suitable protective equipment. Prevent generation of vapour or mist. Wash hands and face thoroughly after handling. Use a closed system if possible. Use a ventilation, local exhaust if vapour or aerosol will be generated.
Advice on safe handling:	Avoid contact with skin, eyes and clothing. Use corrosive resistant equipment.

Conditions for safe storage, including any incompatibilities

7. HANDLING AND STORAGE

Storage conditions: Keep container tightly closed. Store in a cool and dark place.
Store locked up.
Store away from incompatible materials such as oxidizing agents.

Packaging material: Comply with laws. Keep only in original container.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls: Install a closed system or local exhaust. Also install safety shower and eye bath.

Control parameters: Not set up

Personal protective equipment

Respiratory protection: Half or full facepiece respirator, self-contained breathing apparatus(SCBA), supplied air respirator, etc. Use respirators approved under appropriate government standards and follow local and national regulations.

Hand protection: Impervious gloves.

Eye protection: Safety goggles. A face-shield, if the situation requires.

Skin and body protection: Impervious protective clothing. Protective boots, if the situation requires.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state (20°C): Liquid

Form: Clear

Colour: Colorless - Yellow

Odour: No data available

pH: No data available

Melting point/freezing point: No data available

Boiling point/range: No data available

Flash point: No data available

Flammability or explosive limits:

Lower: No data available

Upper: No data available

Relative density: No data available

Solubility(ies):

[Water] No data available

[Other solvents] No data available

Log Pow: -0.07

10. STABILITY AND REACTIVITY

Chemical stability: Stable under proper conditions.

Possibility of hazardous reactions: No special reactivity has been reported.

Incompatible materials: Oxidizing agents, Bases

Hazardous decomposition products: Carbon monoxide, Carbon dioxide

11. TOXICOLOGICAL INFORMATION

Acute Toxicity: ori-rat LDLo:3 g/kg
ims-rat LDLo:250 mg/kg

Skin corrosion/irritation: No data available

Serious eye damage/irritation: No data available

Germ cell mutagenicity: mmo-sat 200 ug/plate (+S9)
mmo-sat 1500 ug/plate (-S9)

Carcinogenicity:

IARC = No data available

NTP = No data available

Reproductive toxicity: No data available

RTECS Number: MD4550000

12. ECOLOGICAL INFORMATION

Ecotoxicity:

Fish: 96h LC50:41 mg/L (Oryzias latipes)
Crustacea: 48h LC50:51 mg/L (Daphnia magna)
Algae: 72h EC50:33 mg/L (Selenastrum capricornutum)

Persistence / degradability: 96 % (by BOD), 100 % (by TOC), 100 % (by HPLC)

*The substance was determined as "Ready biodegradability" under the Chemical Substances Control Law.

Bioaccumulative potential(BCF):

3

Mobility in soil

Log Pow: -0.07
Soil adsorption (Koc): 1
Henry's Law constant(PaM³/mol): 3 x 10⁻⁴

13. DISPOSAL CONSIDERATIONS

Recycle to process, if possible. Consult your local regional authorities. Observe all federal, state and local regulations when disposing of the substance.

14. TRANSPORT INFORMATION

Hazards Class: 8: Corrosive.
UN-No: 3265
Proper shipping name: Corrosive liquid, acidic, organic, n.o.s.
Packing group: III

15. JAPANESE REGULATORY INFORMATION

Law for safety of vessels: Hazardous materials notification, Schedule form No.1 Corrosive substance

16. OTHER INFORMATION

The reference company name of written contents

Company: TOKYO CHEMICAL INDUSTRY CO., LTD.
Address: 4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Department: Global Business Department
Telephone: +81-3-5640-8872
Fax: +81-3-5640-8902

This SDS was prepared sincerely on the basis of the information we could obtained, however, any warranty shall not be given regarding the data contained and the assessment of hazards and toxicity. Prior to use, please investigate not only the hazards and toxicity information but also the laws and regulations of the organization, area and country where the products are to be used, which shall be given the first priority.

The products are supposed to be used promptly after purchase in consideration of safety. Some new information or amendments may be added afterwards. If the products are to be used far behind the expected time of use or you have any questions, please feel free to contact us. The stated cautions are for normal handling only. In case of special handling, sufficient care should be taken, in addition to the safety measures suitable for the situation. All chemical products should be treated with the recognition of "having unknown hazards and toxicity", which differ greatly depending on the conditions and handling when in use and/or the conditions and duration of storage. The products must be handled only by those who are familiar with specialized knowledge and have experience or under the guidance of those specialists throughout use from opening to storage and disposal. Safe usage conditions shall be set up on each user's own responsibility.



SAFETY DATA SHEET

1. IDENTIFICATION

Product name: 1-Hexadecyl-4-methylpyridinium Chloride Hydrate
Product code: H0967
Company: TOKYO CHEMICAL INDUSTRY CO., LTD.
Address: 4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Responsible department: Global Business Department
Telephone: +81-3-5640-8872
Fax: +81-3-5640-8902
e-mail: globalbusiness@TCIchemicals.com
Revision number: 6

2. HAZARDS IDENTIFICATION

GHS classification

PHYSICAL HAZARDS Not classified
HEALTH HAZARDS Not classified
ENVIRONMENTAL HAZARDS Not classified

GHS label elements, including precautionary statements

Pictograms or hazard symbols None
Signal word No signal word
Hazard statements None
Precautionary statements: None

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/mixture: Substance
Components: 1-Hexadecyl-4-methylpyridinium Chloride Hydrate
Percent:
CAS Number: 13106-53-1
Chemical Formula: C₂₂H₄₀ClN·xH₂O
Notice Through Official Gazettes Reference Number
ENCS: Not Listed

4. FIRST-AID MEASURES

Inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical advice/attention if you feel unwell.
Skin contact: Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. If skin irritation or rash occurs: Get medical advice/attention.
Eye contact: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
Ingestion: Get medical advice/attention if you feel unwell. Rinse mouth.
Protection of first-aiders: A rescuer should wear personal protective equipment, such as rubber gloves and air-tight goggles.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: Dry chemical, foam, water spray, carbon dioxide.
Specific hazards arising from the chemical: Take care as it may decompose upon combustion or in high temperatures to generate poisonous fume.

5. FIRE-FIGHTING MEASURES

Precautions for firefighters: Fire-extinguishing work is done from the windward and the suitable fire-extinguishing method according to the surrounding situation is used. Uninvolved persons should evacuate to a safe place. In case of fire in the surroundings: Remove movable containers if safe to do so.

Special protective equipment for firefighters: When extinguishing fire, be sure to wear personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Use personal protective equipment. Keep people away from and upwind of spill/leak. Entry to non-involved personnel should be controlled around the leakage area by roping off, etc.

Environmental precautions: Prevent product from entering drains.

Methods and materials for containment and cleaning up: Sweep dust to collect it into an airtight container, taking care not to disperse it. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

7. HANDLING AND STORAGE

Precautions for safe handling

Technical measures: Handling is performed in a well ventilated place. Wear suitable protective equipment. Prevent dispersion of dust. Wash hands and face thoroughly after handling. Use a local exhaust if dust or aerosol will be generated.

Advice on safe handling: Avoid contact with skin, eyes and clothing.

Conditions for safe storage, including any incompatibilities

Storage conditions: Keep container tightly closed. Store in a cool and dark place. Store away from incompatible materials such as oxidizing agents.

Packaging material: Comply with laws.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls: Install a closed system or local exhaust as possible so that workers should not be exposed directly. Also install safety shower and eye bath.

Control parameters: Not set up

Personal protective equipment

Respiratory protection: Dust respirator. Follow local and national regulations.

Hand protection: Protective gloves.

Eye protection: Safety glasses. A face-shield, if the situation requires.

Skin and body protection: Protective clothing. Protective boots, if the situation requires.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state (20°C): Solid

Form: Crystal- Powder

Colour: White - Very pale yellow

Odour: No data available

pH: No data available

Melting point/freezing point: No data available

Boiling point/range: No data available

Flash point: No data available

Flammability or explosive limits:

Lower: No data available

Upper: No data available

Relative density: No data available

Solubility(ies):

[Water] No data available

[Other solvents] No data available

10. STABILITY AND REACTIVITY

Chemical stability: Stable under proper conditions.

10. STABILITY AND REACTIVITY

Possibility of hazardous reactions: No special reactivity has been reported.

Incompatible materials: Oxidizing agents

Hazardous decomposition products: Carbon monoxide, Carbon dioxide, Nitrogen oxides (NOx), Hydrogen chloride

11. TOXICOLOGICAL INFORMATION

Acute Toxicity: No data available

Skin corrosion/irritation: No data available

Serious eye damage/irritation: No data available

Germ cell mutagenicity: No data available

Carcinogenicity:

IARC = No data available

NTP = No data available

Reproductive toxicity: No data available

12. ECOLOGICAL INFORMATION

Ecotoxicity:

Fish: No data available

Crustacea: No data available

Algae: No data available

Persistence / degradability: No data available

Bioaccumulative potential(BCF): No data available

Mobility in soil

Log Pow: No data available

Soil adsorption (Koc): No data available

Henry's Law constant(PaM³/mol): No data available

13. DISPOSAL CONSIDERATIONS

Recycle to process, if possible. Consult your local regional authorities. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. Observe all federal, state and local regulations when disposing of the substance.

14. TRANSPORT INFORMATION

Hazards Class: Does not correspond to the classification standard of the United Nations

UN-No: Not listed

15. JAPANESE REGULATORY INFORMATION

- Not applicable

16. OTHER INFORMATION**The reference company name of written contents**

Company: TOKYO CHEMICAL INDUSTRY CO., LTD.

Address: 4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan

Department: Global Business Department

Telephone: +81-3-5640-8872

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This SDS was prepared sincerely on the basis of the information we could obtain, however, any warranty shall not be given regarding the data contained and the assessment of hazards and toxicity. Prior to use, please investigate not only the hazards and toxicity information but also the laws and regulations of the organization, area and country where the products are to be used, which shall be given the first priority. The products are supposed to be used promptly after purchase in consideration of safety. Some new information or amendments may be added afterwards. If the products are to be used far behind the expected time of use or you have any questions, please feel free to contact us. The stated cautions are for normal handling only. In case of special handling, sufficient care should be taken, in addition to the safety measures suitable for the situation. All chemical products should be treated with the recognition of "having unknown hazards and toxicity", which differ greatly depending on the conditions and handling when in use and/or the conditions and duration of storage. The products must be handled only by those who are familiar with specialized knowledge and have experience or under the guidance of those specialists throughout use from opening to storage and disposal. Safe usage conditions shall be set up on each user's own responsibility.

Safety Data Sheet

acc. to OSHA Hazard Communication Standard (29 CFR 1910.1200)

Printing date 03/05/2015

Reviewed on 11/30/2014

1 Identification

- **Product identifier**
- **Trade name:** 1,1,1,5,5,5-Hexafluoro-2,4-pentanedione
- **Article number:** 140795
- **CAS Number:**
1522-22-1
- **EC number:**
216-191-0
- **Application of the substance / the mixture** Laboratory chemicals for research and development
- **Details of the supplier of the safety data sheet**
- **Manufacturer/Supplier:**
BeanTown Chemical
9 Sagamore Park Road
Hudson, NH 03051
USA

- Phone: (603) 402-2234
Fax: (603) 402-9713
Email: technical@beantownchem.com
www.beantownchem.com
- **Information department:** Technical Support Department
- **Emergency telephone number:**
During normal operating hours, please call (603) 402-2234
After hours, please call Chemtrec at (800) 424-9300

2 Hazard(s) identification

- **Classification of the substance or mixture**



GHS02 Flame

Flam. Liq. 3 H226 Flammable liquid and vapour.



GHS06 Skull and crossbones

Acute Tox. 3 H301 Toxic if swallowed.



GHS05 Corrosion

Skin Corr. 1A H314 Causes severe skin burns and eye damage.

Eye Dam. 1 H318 Causes serious eye damage.



GHS07

STOT SE 3 H335 May cause respiratory irritation.

- **Label elements**

- **GHS label elements** The substance is classified and labeled according to the Globally Harmonized System (GHS).
(Contd. on page 2)

Safety Data Sheet

acc. to OSHA Hazard Communication Standard (29 CFR 1910.1200)

Printing date 03/05/2015

Reviewed on 11/30/2014

Trade name: 1,1,1,5,5,5-Hexafluoro-2,4-pentanedione

(Contd. of page 1)

· Hazard pictograms

GHS02

GHS05

GHS06

· Signal word Danger**· Hazard-determining components of labeling:**

1,1,1,5,5,5-Hexafluoro-2,4-pentanedione

· Hazard statements

Flammable liquid and vapour.

Toxic if swallowed.

Causes severe skin burns and eye damage.

May cause respiratory irritation.

· Precautionary statements

If medical advice is needed, have product container or label at hand.

Keep out of reach of children.

Read label before use.

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

If swallowed: Immediately call a poison center/doctor.

IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.

Continue rinsing.

Store locked up.

Dispose of contents/container in accordance with local/regional/national/international regulations.

· Other hazards**· Results of PBT and vPvB assessment****· PBT:** Not applicable.**· vPvB:** Not applicable.**3 Composition/information on ingredients****· Chemical characterization: Substances****· CAS No. Description**

1522-22-1 1,1,1,5,5,5-Hexafluoro-2,4-pentanedione

· Identification number(s)**· EC number:** 216-191-0**4 First-aid measures****· Description of first aid measures****· General information:**

Immediately remove any clothing soiled by the product.

In case of irregular breathing or respiratory arrest provide artificial respiration.

· After inhalation: In case of unconsciousness place patient stably in side position for transportation.**· After skin contact:** Immediately wash with water and soap and rinse thoroughly.**· After eye contact:** Rinse opened eye for several minutes under running water. Then consult a doctor.**· After swallowing:**

Do not induce vomiting; immediately call for medical help.

Drink copious amounts of water and provide fresh air. Immediately call a doctor.

(Contd. on page 3)

USA

Safety Data Sheet

acc. to OSHA Hazard Communication Standard (29 CFR 1910.1200)

Printing date 03/05/2015

Reviewed on 11/30/2014

Trade name: 1,1,1,5,5,5-Hexafluoro-2,4-pentanedione

(Contd. of page 2)

- **Information for doctor:**
- **Most important symptoms and effects, both acute and delayed** No further relevant information available.
- **Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

5 Fire-fighting measures

- **Extinguishing media**
- **Suitable extinguishing agents:** CO₂, sand, extinguishing powder. Do not use water.
- **For safety reasons unsuitable extinguishing agents:** Water with full jet
- **Special hazards arising from the substance or mixture** No further relevant information available.
- **Advice for firefighters**
- **Protective equipment:** No special measures required.

6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures**
Wear protective equipment. Keep unprotected persons away.
- **Environmental precautions:**
Do not allow product to reach sewage system or any water course.
Inform respective authorities in case of seepage into water course or sewage system.
- **Methods and material for containment and cleaning up:**
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Use neutralizing agent.
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.
Do not flush with water or aqueous cleansing agents
- **Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

- **Handling:**
- **Precautions for safe handling**
Ensure good ventilation/exhaustion at the workplace.
Prevent formation of aerosols.
- **Information about protection against explosions and fires:**
Keep ignition sources away - Do not smoke.
Protect against electrostatic charges.
- **Conditions for safe storage, including any incompatibilities**
- **Storage:**
- **Requirements to be met by storerooms and receptacles:** No special requirements.
- **Information about storage in one common storage facility:** Not required.
- **Further information about storage conditions:** Keep receptacle tightly sealed.
- **Specific end use(s)** No further relevant information available.

USA

(Contd. on page 4)

Safety Data Sheet

acc. to OSHA Hazard Communication Standard (29 CFR 1910.1200)

Printing date 03/05/2015

Reviewed on 11/30/2014

Trade name: 1,1,1,5,5,5-Hexafluoro-2,4-pentanedione

(Contd. of page 3)

8 Exposure controls/personal protection

- **Additional information about design of technical systems:**
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute
- **Control parameters**
- **Components with limit values that require monitoring at the workplace:** Not required.
- **Additional information:** The lists that were valid during the creation were used as basis.
- **Exposure controls**
- **Personal protective equipment:**
- **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Avoid contact with the eyes.
Avoid contact with the eyes and skin.
- **Breathing equipment:**
In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use respiratory protective device that is independent of circulating air.
- **Protection of hands:**
Protective gloves
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
- **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.
- **Penetration time of glove material**
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
- **Eye protection:** Tightly sealed goggles

9 Physical and chemical properties

- **Information on basic physical and chemical properties**
- **General Information**
- **Appearance:**

Form:	Liquid
Color:	Not determined.
Odor:	Characteristic
Odour threshold:	Not determined.
- **pH-value:** Not determined.
- **Change in condition**

Melting point/Melting range:	Undetermined
Boiling point/Boiling range:	70-71 °C (158-160 °F)
- **Flash point:** 32 °C (90 °F)
- **Flammability (solid, gaseous):** Not applicable.

(Contd. on page 5)

USA

Safety Data Sheet

acc. to OSHA Hazard Communication Standard (29 CFR 1910.1200)

Printing date 03/05/2015

Reviewed on 11/30/2014

Trade name: 1,1,1,5,5,5-Hexafluoro-2,4-pentanedione

(Contd. of page 4)

· Ignition temperature:	
Decomposition temperature:	Not determined.
· Auto igniting: Not determined.	
· Danger of explosion: Product is not explosive. However, formation of explosive air/vapor mixtures are possible.	
· Explosion limits:	
Lower:	Not determined.
Upper:	Not determined.
· Vapor pressure: Not determined.	
· Density at 20 °C (68 °F): 1.47 g/cm ³ (12.267 lbs/gal)	
· Relative density: Not determined.	
· Vapour density: Not determined.	
· Evaporation rate: Not determined.	
· Solubility in / Miscibility with Water: Not miscible or difficult to mix.	
· Partition coefficient (n-octanol/water): Not determined.	
· Viscosity:	
Dynamic:	Not determined.
Kinematic:	Not determined.
Organic solvents:	0.0 %
· Other information: No further relevant information available.	

10 Stability and reactivity

- **Reactivity**
- **Chemical stability**
- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Possibility of hazardous reactions:** No dangerous reactions known.
- **Conditions to avoid:** No further relevant information available.
- **Incompatible materials:** No further relevant information available.
- **Hazardous decomposition products:** No dangerous decomposition products known.

11 Toxicological information

- **Information on toxicological effects**
- **Acute toxicity:**
- **Primary irritant effect:**
- **on the skin:** Strong caustic effect on skin and mucous membranes.
- **on the eye:**
Strong caustic effect.
Strong irritant with the danger of severe eye injury.
- **Sensitization:** No sensitizing effects known.
- **Additional toxicological information:**
Swallowing will lead to a strong caustic effect on mouth and throat and to the danger of perforation of esophagus and stomach.

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USA

Safety Data Sheet

acc. to OSHA Hazard Communication Standard (29 CFR 1910.1200)

Printing date 03/05/2015

Reviewed on 11/30/2014

Trade name: 1,1,1,5,5,5-Hexafluoro-2,4-pentanedione

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· **Carcinogenic categories**· **IARC (International Agency for Research on Cancer)**

Substance is not listed.

· **NTP (National Toxicology Program)**

Substance is not listed.

· **OSHA-Ca (Occupational Safety & Health Administration)**

Substance is not listed.

12 Ecological information· **Toxicity**· **Aquatic toxicity:** No further relevant information available.· **Persistence and degradability** No further relevant information available.· **Behavior in environmental systems:**· **Bioaccumulative potential** No further relevant information available.· **Mobility in soil** No further relevant information available.· **Additional ecological information:**· **General notes:** Must not reach bodies of water or drainage ditch undiluted or unneutralized.· **Results of PBT and vPvB assessment**· **PBT:** Not applicable.· **vPvB:** Not applicable.· **Other adverse effects** No further relevant information available.**13 Disposal considerations**· **Waste treatment methods**· **Recommendation:**

Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

· **Uncleaned packagings:**· **Recommendation:** Disposal must be made according to official regulations.**14 Transport information**· **UN-Number**· **DOT, IMDG, IATA** UN2920· **UN proper shipping name**· **DOT** Corrosive liquids, flammable, n.o.s.· **IMDG, IATA** CORROSIVE LIQUID, FLAMMABLE, N.O.S.· **Transport hazard class(es)**· **DOT, IMDG, IATA**· **Class** 8 Corrosive substances· **Packing group**· **DOT, IMDG, IATA** II· **Environmental hazards:**· **Marine pollutant:** No

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Trade name: 1,1,1,5,5,5-Hexafluoro-2,4-pentanedione

(Contd. of page 6)

- | | |
|---|---|
| · Special precautions for user | Warning: Corrosive substances |
| · Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code | Not applicable. |
| · UN "Model Regulation": | UN2920, Corrosive liquids, flammable, n.o.s., 8, II |

15 Regulatory information

- Safety, health and environmental regulations/legislation specific for the substance or mixture
- Sara

- **Section 355 (extremely hazardous substances):**

Substance is not listed.

- **Section 313 (Specific toxic chemical listings):**

Substance is not listed.

- **TSCA (Toxic Substances Control Act):**

Substance is listed.

- **Proposition 65**

- **Chemicals known to cause cancer:**

Substance is not listed.

- **Chemicals known to cause reproductive toxicity for females:**

Substance is not listed.

- **Chemicals known to cause reproductive toxicity for males:**

Substance is not listed.

- **Chemicals known to cause developmental toxicity:**

Substance is not listed.

- **Carcinogenic categories**

- **EPA (Environmental Protection Agency)**

Substance is not listed.

- **TLV (Threshold Limit Value established by ACGIH)**

Substance is not listed.

- **NIOSH-Ca (National Institute for Occupational Safety and Health)**

Substance is not listed.

- **RTECS**

Substance is not listed.

- **Chemical safety assessment: A Chemical Safety Assessment has not been carried out.**

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- **NFPA ratings (scale 0-4)**

Health = 4

Fire = 3

Reactivity = 0

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Safety Data Sheet

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Printing date 03/05/2015

Reviewed on 11/30/2014

Trade name: 1,1,1,5,5,5-Hexafluoro-2,4-pentanedione

(Contd. of page 7)

· HMIS ratings (scale 0-4)

Health = 4

Fire = 3

Reactivity = 0

· Department issuing SDS: Technical Support Department**· Contact: Technical Support Department****· Date of preparation / last revision 03/05/2015 / -****· Abbreviations and acronyms:***ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)**IMDG: International Maritime Code for Dangerous Goods**DOT: US Department of Transportation**IATA: International Air Transport Association**ACGIH: American Conference of Governmental Industrial Hygienists**EINECS: European Inventory of Existing Commercial Chemical Substances**CAS: Chemical Abstracts Service (division of the American Chemical Society)**Flam. Liq. 3: Flammable liquids, Hazard Category 3**Acute Tox. 3: Acute toxicity, Hazard Category 3**Skin Corr. 1A: Skin corrosion/irritation, Hazard Category 1A**Eye Dam. 1: Serious eye damage/eye irritation, Hazard Category 1**STOT SE 3: Specific target organ toxicity - Single exposure, Hazard Category 3*

USA



TCI AMERICA

SAFETY DATA SHEET

Revision number: 3.1
Revision date: 05/15/2015

1. IDENTIFICATION

Product name: 1,1,1,3,3,3-Hexafluoro-2-propanol
Product code: H0424

Product use: For laboratory research purposes.
Restrictions on use: Not for drug or household use.

Company:
TCI America
9211 N. Harborsgate Street
Portland, OR 97203 U.S.A.
Telephone:
+1-800-423-8616 / +1-503-283-1681
Fax:
+1-888-520-1075 / +1-503-283-1987
e-mail:
sales-US@TCIchemicals.com
www.TCIchemicals.com

Emergency telephone number:
Chemical Emergencies:
TCI America (8:00am - 5:00pm) PST
+1-503-286-7624
Transportation Emergencies:
Chemtrec 24-Hour
+1-800-424-9300 (U.S.A.)
+1-703-527-3887 (International)
Responsible department:
TCI America
Environmental Health Safety and Security
+1- 503-286-7624

2. HAZARD(S) IDENTIFICATION

OSHA Haz Com: CFR 1910.1200: Acute Toxicity - Oral [Category 4]
Acute Toxicity - Inhalation [Category 4]
Eye Damage/Irritation [Category 1]
Skin Corrosion/Irritation [Category 1C]

Signal word: Danger!

Hazard Statement(s): Causes serious eye damage
Causes severe skin burns and eye damage
Harmful if swallowed
Harmful if inhaled

Pictogram(s) or Symbol(s):



Precautionary Statement(s):

[Prevention]

Do not eat, drink or smoke when using this product. Wash hands and face thoroughly after handling. Avoid breathing fume, mist, vapors or spray. Use only outdoors or in a well-ventilated area. Do not breathe dusts or mists. Wear protective gloves, protective clothing, eye protection and face protection. Wear eye protection. Wear face protection (full length face shield).

[Response]

If swallowed: Immediately call a poison center or doctor. Rinse mouth. If inhaled: Remove person to fresh air and keep comfortable for breathing. Call a poison center or doctor if you feel unwell. If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. Wash contaminated clothing before reuse. Immediately call a poison center or doctor. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

[Storage]

Store locked up.

[Disposal]

Dispose of contents and container in accordance with US EPA guidelines for the classification and determination of hazardous waste listed in 40 CFR 261.3. (See Section 13)

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/Mixture: Substance

3. COMPOSITION/INFORMATION ON INGREDIENTS

Components:	1,1,1,3,3,3-Hexafluoro-2-propanol
Percent:	>99.0%(GC)
CAS Number:	920-66-1
Molecular Weight:	168.04
Chemical Formula:	C ₃ H ₂ F ₆ O
Synonyms:	Hexafluoroisopropyl Alcohol , HFIP , HFP

4. FIRST-AID MEASURES

Inhalation:	Immediately call a poison center or doctor. Effects of exposure (inhalation) to substance may be delayed. Move victim to fresh air. Give artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult. Keep victim warm and quiet. Treat symptomatically and supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
Skin contact:	For severe burns, immediate medical attention is required. Immediately call a poison center or doctor. Remove and wash contaminated clothing before re-use. Remove and isolate contaminated clothing and shoes. In case of contact with substance, immediately flush skin with running water for at least 20 minutes. Treat symptomatically and supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
Eye contact:	IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. Eye contact with vapors or substance may cause severe injury, burns, or death. Call emergency medical service. Move victim to fresh air. Check for and remove any contact lenses. Keep victim warm and quiet. Treat symptomatically and supportively. Effects of exposure to substance may be delayed. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
Ingestion:	Harmful if swallowed. Do not induce vomiting without medical advice. Call a physician or Poison Control Center immediately. Do not use mouth-to-mouth method if victim ingested the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Loosen tight clothing such as a collar, tie, belt or waistband. If a person vomits place them in the recovery position so that vomit will not reenter the mouth and throat. Rinse mouth. Keep victim warm and quiet. Treat symptomatically and supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Symptoms/effects:

Acute:	Pain. Redness.
Delayed:	No data available

Immediate medical attention:

WARNING: It might be hazardous to the person providing aid to give mouth-to-mouth respiration, because the inhaled material is harmful. WARNING: It might be hazardous to the person providing aid to give mouth-to-mouth respiration, because the inhaled material is corrosive. For severe burns, immediate medical attention is required. If breathing has stopped, perform artificial respiration. Use first aid treatment according to the nature of the injury. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: Dry chemical, CO₂ or water spray. Consult with local fire authorities before attempting large scale fire fighting operations.

Specific hazards arising from the chemical

Hazardous combustion products: These products include: Carbon oxides Halogenated compounds
Other specific hazards: WARNING: Highly toxic HF gas is produced during combustion.

Special precautions for fire-fighters:

Use water spray or fog; do not use straight streams. Dike fire-control water for later disposal; do not scatter the material. Containers may explode when heated. Move containers from fire area if you can do it without risk.

Special protective equipment for fire-fighters:

Wear positive pressure self-contained breathing apparatus (SCBA). Structural fire fighters' protective clothing provides limited protection in fire situations ONLY; it may not be effective in spill situations. Wear chemical protective clothing which is specifically recommended by the manufacturer. It may provide little or no thermal protection.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Avoid contact with skin, eyes, and clothing. Keep people away from and upwind of spill/leak. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing (Section 8). Warn unnecessary personnel to move away. Stop leak if you can do it without risk. Ensure adequate ventilation. Isolate the hazard area and deny entry to unnecessary and unprotected personnel.
Personal protective equipment:	Wear eye protection (splash goggles) and face protection (full length face shield). Lab coat. Vapor respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent. Wear protective gloves (nitrile).

6. ACCIDENTAL RELEASE MEASURES

Emergency procedures: In case of a spill and/or a leak, always shut off any sources of ignition, ventilate the area, and exercise caution. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Warn personnel to move away. Prevent entry into sewers, basements or confined areas; dike if needed.

Methods and materials for containment and cleaning up:

ELIMINATE all ignition sources (no smoking, flares, sparks, or flames in immediate area). Stop leak if without risk. Ventilate the area. Absorb with an inert material and put the spilled material in an appropriate waste disposal container. Use clean non-sparking tools to collect absorbed material.

Environmental precautions:

Keep away from living quarters. Prevent further leakage or spillage if safe to do so. Water runoff can cause environmental damage. Prevent entry into sewers, basements or confined areas; dike if needed.

7. HANDLING AND STORAGE

Precautions for safe handling: Do NOT breath gas, fumes, vapor, or spray. Manipulate under an adequate fume hood. Do not ingest. Avoid contact with skin and eyes. Good general ventilation should be sufficient to control airborne levels. Keep container dry. Handle and open container with care. Wear suitable protective clothing, gloves and eye/face protection. When using do not eat, drink, or smoke. Keep away from sources of ignition.

Conditions for safe storage: Store locked up. Keep containers tightly closed in a cool, well-ventilated place. Keep away from incompatibles. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Avoid prolonged storage periods.

Storage incompatibilities: Bases, Store away from oxidizing agents

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure limits: No data available

Appropriate engineering controls:

Good general ventilation should be sufficient to control airborne levels. Ventilation is normally required when handling or using this product. Eyewash fountains should be provided in areas where there is any possibility that workers could be exposed to the substance. Follow safe industrial engineering/laboratory practices when handling any chemical.

Personal protective equipment

Respiratory protection: Vapor respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent.
Hand protection: Wear protective gloves.
Eye protection: Splash goggles.
Skin and body protection: Lab coat.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state (20°C):	Liquid		
Form:	Clear		
Color:	Colorless - Almost colorless		
Odor:	Pungent		
Odor threshold:	No data available		
Melting point/freezing point:	-4°C (25°F)	pH:	No data available
Boiling point/range:	58°C (136°F)	Vapor pressure:	No data available
Decomposition temperature:	No data available	Vapor density:	No data available
Relative density:	1.62	Dynamic Viscosity:	158mPa·s (25°C)
Kinematic Viscosity:	No data available	Evaporation rate:	No data available
Partition coefficient:	1.66	(Butyl Acetate = 1)	
n-octanol/water (log P_{ow})		Autoignition temperature:	No data available
Flash point:	No data available	Flammability or explosive limits:	
Flammability (solid, gas):	No data available	Lower:	No data available
		Upper:	No data available
Solubility(ies):			
Water:	Soluble		
Soluble:	Ether, Acetone		

10. STABILITY AND REACTIVITY

Reactivity: Not Available.

Chemical Stability: Stable under recommended storage conditions. (See Section 7)

Possibility of Hazardous Reactions: No hazardous reactivity has been reported.

Conditions to avoid: Avoid excessive heat and light.

Incompatible materials: Oxidizing agents

10. STABILITY AND REACTIVITY

Hazardous Decomposition Products: No data available

11. TOXICOLOGICAL INFORMATION

RTECS Number: UB6450000

Acute Toxicity:

ori-rat LD50:1500 mg/kg

ihl-rat LC50:1974 ppm/4H

ivn-mus LD50:180 mg/kg

ipr-mus LD50:300 mg/kg

Skin corrosion/irritation:

No data available

Serious eye damage/irritation:

No data available

Respiratory or skin sensitization:

No data available

Germ cell mutagenicity:

No data available

Carcinogenicity:

No data available

IARC: No data available

NTP: No data available

OSHA: No data available

Reproductive toxicity:

No data available

Routes of Exposure:

Inhalation, Eye contact, Ingestion, Skin contact.

Symptoms related to exposure:

Overexposure may result in serious illness or death. Skin contact may produce burns. Skin contact may result in inflammation; characterized by itching, scaling, reddening, or occasionally blistering. Eye contact can result in corneal damage or blindness.

Potential Health Effects:

No specific information available; skin and eye contact may result in irritation. May be harmful if inhaled or ingested.

Target organ(s):

No data available

12. ECOLOGICAL INFORMATION**Ecotoxicity****Fish:**48h LC50:270 mg/L (*Oryzias latipes*)96h LC50:244 mg/L (*Pimephales promelas*)**Crustacea:**

No data available

Algae:

No data available

Persistence and degradability:

0 % (by TOC), 3 % (by GC)

Bioaccumulative potential (BCF):

1.1 - 1.4 (conc. 1 mg/L), 1.3 - 2.7 (conc. 0.1 mg/L)

Mobility in soil:

No data available

Partition coefficient:

1.66

n-octanol/water (log P_{ow})**Soil adsorption (Koc):**

No data available

Henry's Law:

4.3

constant (PaM³/mol)**13. DISPOSAL CONSIDERATIONS****Disposal of product:**

Recycle to process if possible. It is the generator's responsibility to comply with Federal, State and Local rules and regulations. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. This section is intended to provide assistance but does not replace these laws, nor does compliance in accordance with this section ensure regulatory compliance according to the law. US EPA guidelines for Identification and Listing of Hazardous Waste are listed in 40 CFR Parts 261. The product should not be allowed to enter the environment, drains, water ways, or the soil.

Disposal of container:

Dispose of as unused product. Do not re-use empty containers.

Other considerations:

Observe all federal, state and local regulations when disposing of the substance.

14. TRANSPORT INFORMATION**DOT (US)**

UN number: UN1760	Proper Shipping Name: Corrosive liquids, n.o.s.	Class or Division: 8 Corrosive material	Packing Group: III
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IATA

UN number: UN1760	Proper Shipping Name: Corrosive liquid, n.o.s.	Class or Division: 8 Corrosive material	Packing Group: III
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IMDG

UN number: UN1760	Proper Shipping Name: Corrosive liquid, n.o.s.	Class or Division: 8 Corrosive material	Packing Group: III
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EmS number: F-A, S-B

15. REGULATORY INFORMATION**Toxic Substance Control Act (TSCA 8b.):**

This product is ON the EPA Toxic Substances Control Act (TSCA) inventory.

US Federal Regulations**CERCLA Hazardous substance and Reportable Quantity:**

SARA 313:	Not Listed
SARA 302:	Not Listed

State Regulations**State Right-to-Know**

Massachusetts	Not Listed
New Jersey	Not Listed
Pennsylvania	Not Listed

California Proposition 65: Not Listed

Other Information**NFPA Rating:**

Health:	3
Flammability:	0
Instability:	0

HMIS Classification:

Health:	3
Flammability:	0
Physical:	0

International Inventories

WHMIS hazard class: E: Corrosive material.
D2A: Materials causing other toxic effects. (Very Toxic)

EC-No: 213-059-4

16. OTHER INFORMATION

Revision date: 05/15/2015

Revision number: 3.1

TCI chemicals are for research purposes only and are NOT intended for use as drugs, food additives, households, or pesticides. The information herein is believed to be correct, but does not claim to be all inclusive and should be used only as a guide. Neither the above named supplier nor any of its affiliates or subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All chemical reagents must be handled with the recognition that their chemical, physiological, toxicological, and hazardous properties have not been fully investigated or determined. All chemical reagents should be handled only by individuals who are familiar with their potential hazards and who have been fully trained in proper safety, laboratory, and chemical handling procedures. Although certain hazards are described herein, we can not guarantee that these are the only hazards which exist. Our SDS are based only on data available at the time of shipping and are subject to change without notice as new information is obtained. Avoid long storage periods since the product is subject to degradation with age and may become more dangerous or hazardous. It is the responsibility of the user to request updated SDS for products that are stored for extended periods. Disposal of unused product must be undertaken by qualified personnel who are knowledgeable in all applicable regulations and follow all pertinent safety precautions including the use of appropriate protective equipment (e.g. protective goggles, protective clothing, breathing equipment, face mask, fume hood). For proper handling and disposal, always comply with federal, state and local regulations.

Safety Data Sheet

acc. to OSHA Hazard Communication Standard (29 CFR 1910.1200)

Printing date 03/08/2015

Reviewed on 01/12/2015

1 Identification

- **Product identifier**
- **Trade name:** Hexafluorophosphoric acid solution
- **Article number:** 220290
- **CAS Number:** 16940-81-1
- **EINECS Number:** 241-006-5
- **Application of the substance / the mixture** Laboratory chemicals for research and development
- **Details of the supplier of the safety data sheet**
- **Manufacturer/Supplier:**
 BeanTown Chemical
 9 Sagamore Park Road
 Hudson, NH 03051
 USA
- **Phone:** (603) 402-2234
- **Fax:** (603) 402-9713
- **Email:** technical@beantownchem.com
- **www.beantownchem.com**
- **Information department:** Technical Support Department
- **Emergency telephone number:**
 During normal operating hours, please call (603) 402-2234
 After hours, please call Chemtrec at (800) 424-9300

2 Hazard(s) identification

- **Classification of the substance or mixture**



GHS06 Skull and crossbones

- Acute Tox. 2 H300 Fatal if swallowed.
- Acute Tox. 2 H310 Fatal in contact with skin.
- Acute Tox. 2 H330 Fatal if inhaled.



GHS05 Corrosion

- Skin Corr. 1B H314 Causes severe skin burns and eye damage.
- Eye Dam. 1 H318 Causes serious eye damage.

- **Classification according to Directive 67/548/EEC or Directive 1999/45/EC**



Toxic

Danger of very serious irreversible effects.



Corrosive

Causes severe burns.

- **Information concerning particular hazards for human and environment:**
 The product has to be labeled due to the calculation procedure of international guidelines.
- **Classification system:**
 The classification was made according to the latest editions of international substances lists, and expanded upon from company and literature data.

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Safety Data Sheet

acc. to OSHA Hazard Communication Standard (29 CFR 1910.1200)

Printing date 03/08/2015

Reviewed on 01/12/2015

Trade name: Hexafluorophosphoric acid solution

(Contd. of page 1)

· **Label elements**· **Labelling according to EU guidelines:***The product has been classified and marked in accordance with directives on hazardous materials.*· **Code letter and hazard designation of product:**

Toxic

· **Hazard-determining components of labeling:***hexafluorophosphoric acid*· **Risk phrases:***Causes severe burns.**Danger of very serious irreversible effects.*· **Safety phrases:***Keep locked up and out of the reach of children.**In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.**Do not empty into drains, dispose of this material and its container at hazardous or special waste collection point.**Wear suitable protective clothing, gloves and eye/face protection.**In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).*· **Other hazards**· **Results of PBT and vPvB assessment**· **PBT:** Not applicable.· **vPvB:** Not applicable.**3 Composition/information on ingredients**· **Chemical characterization: Mixtures**· **Description:** Mixture of the substances listed below with nonhazardous additions.· **Dangerous components:**

16940-81-1	hexafluorophosphoric acid	60.0%
------------	---------------------------	-------

4 First-aid measures· **Description of first aid measures**· **General information:** Immediately remove any clothing soiled by the product.· **After inhalation:** In case of unconsciousness place patient stably in side position for transportation.· **After skin contact:** Immediately wash with water and soap and rinse thoroughly.· **After eye contact:** Rinse opened eye for several minutes under running water. Then consult a doctor.· **After swallowing:** Drink copious amounts of water and provide fresh air. Immediately call a doctor.· **Information for doctor:**· **Most important symptoms and effects, both acute and delayed** No further relevant information available.· **Indication of any immediate medical attention and special treatment needed***No further relevant information available.*

USA

(Contd. on page 3)

Safety Data Sheet
acc. to OSHA Hazard Communication Standard (29 CFR 1910.1200)

Printing date 03/08/2015

Reviewed on 01/12/2015

Trade name: Hexafluorophosphoric acid solution

(Contd. of page 2)

5 Fire-fighting measures

- **Extinguishing media**
- **Suitable extinguishing agents:**
CO₂, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
- **Special hazards arising from the substance or mixture** No further relevant information available.
- **Advice for firefighters**
- **Protective equipment:** No special measures required.

6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures**
Wear protective equipment. Keep unprotected persons away.
- **Environmental precautions:**
Do not allow product to reach sewage system or any water course.
Inform respective authorities in case of seepage into water course or sewage system.
Dilute with plenty of water.
Do not allow to enter sewers/ surface or ground water.
- **Methods and material for containment and cleaning up:**
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Use neutralizing agent.
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.
- **Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

- **Handling:**
- **Precautions for safe handling**
Ensure good ventilation/exhaustion at the workplace.
Prevent formation of aerosols.
- **Information about protection against explosions and fires:** No special measures required.
- **Conditions for safe storage, including any incompatibilities**
- **Storage:**
- **Requirements to be met by storerooms and receptacles:** No special requirements.
- **Information about storage in one common storage facility:** Not required.
- **Further information about storage conditions:** Keep receptacle tightly sealed.
- **Specific end use(s)** No further relevant information available.

8 Exposure controls/personal protection

- **Additional information about design of technical systems:**
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute

(Contd. on page 4)

USA

Safety Data Sheet

acc. to OSHA Hazard Communication Standard (29 CFR 1910.1200)

Printing date 03/08/2015

Reviewed on 01/12/2015

Trade name: Hexafluorophosphoric acid solution

(Contd. of page 3)

- **Control parameters**
- **Components with limit values that require monitoring at the workplace:**
The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.
- **Additional information:** The lists that were valid during the creation were used as basis.
- **Exposure controls**
- **Personal protective equipment:**
- **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Avoid contact with the eyes and skin.
- **Breathing equipment:**
In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use respiratory protective device that is independent of circulating air.
- **Protection of hands:**
Protective gloves
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
- **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
- **Penetration time of glove material**
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
- **Eye protection:** Tightly sealed goggles

9 Physical and chemical properties

- **Information on basic physical and chemical properties**
- **General Information**
- **Appearance:**

Form:	Liquid
Color:	According to product specification
- **Odor:** Characteristic
- **Odour threshold:** Not determined.
- **pH-value:** Not determined.
- **Change in condition**

Melting point/Melting range:	Undetermined
Boiling point/Boiling range:	Undetermined
- **Flash point:** Not applicable.
- **Flammability (solid, gaseous):** Not applicable.
- **Ignition temperature:**

Decomposition temperature:	Not determined.
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(Contd. on page 5)

USA

Safety Data Sheet

acc. to OSHA Hazard Communication Standard (29 CFR 1910.1200)

Printing date 03/08/2015

Reviewed on 01/12/2015

Trade name: Hexafluorophosphoric acid solution

(Contd. of page 4)

· Auto igniting:	Product is not selfigniting.
· Danger of explosion:	Product does not present an explosion hazard.
· Explosion limits:	
Lower:	Not determined.
Upper:	Not determined.
· Vapor pressure at 20 °C (68 °F):	23 hPa (17 mm Hg)
· Density at 20 °C (68 °F):	1.651 g/cm ³ (13.778 lbs/gal)
· Relative density	Not determined.
· Vapour density	Not determined.
· Evaporation rate	Not determined.
· Solubility in / Miscibility with Water:	Fully miscible.
· Partition coefficient (n-octanol/water):	Not determined.
· Viscosity:	
Dynamic:	Not determined.
Kinematic:	Not determined.
· Solvent content:	
Organic solvents:	0.0 %
Water:	40.0 %
Solids content:	60.0 %
· Other information	No further relevant information available.

10 Stability and reactivity

- **Reactivity**
- **Chemical stability**
- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Possibility of hazardous reactions** No dangerous reactions known.
- **Conditions to avoid** No further relevant information available.
- **Incompatible materials:** No further relevant information available.
- **Hazardous decomposition products:** No dangerous decomposition products known.

11 Toxicological information

- **Information on toxicological effects**
- **Acute toxicity:**
- **Primary irritant effect:**
- **on the skin:** Strong caustic effect on skin and mucous membranes.
- **on the eye:** Strong caustic effect.
- **Sensitization:** No sensitizing effects known.
- **Additional toxicological information:**
The product shows the following dangers according to internally approved calculation methods for preparations:
Corrosive
Swallowing will lead to a strong caustic effect on mouth and throat and to the danger of perforation of esophagus and stomach.

(Contd. on page 6)

USA

Safety Data Sheet

acc. to OSHA Hazard Communication Standard (29 CFR 1910.1200)

Printing date 03/08/2015

Reviewed on 01/12/2015

Trade name: Hexafluorophosphoric acid solution

(Contd. of page 5)

· **Carcinogenic categories**· **IARC (International Agency for Research on Cancer)**

None of the ingredients is listed.

· **NTP (National Toxicology Program)**

None of the ingredients is listed.

· **OSHA-Ca (Occupational Safety & Health Administration)**

None of the ingredients is listed.

12 Ecological information· **Toxicity**· **Aquatic toxicity:** No further relevant information available.· **Persistence and degradability** No further relevant information available.· **Behavior in environmental systems:**· **Bioaccumulative potential** No further relevant information available.· **Mobility in soil** No further relevant information available.· **Additional ecological information:**· **General notes:**

Water hazard class 1 (Self-assessment): slightly hazardous for water

Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.

Must not reach bodies of water or drainage ditch undiluted or unneutralized.

· **Results of PBT and vPvB assessment**· **PBT:** Not applicable.· **vPvB:** Not applicable.· **Other adverse effects** No further relevant information available.**13 Disposal considerations**· **Waste treatment methods**· **Recommendation:**

Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

· **Uncleaned packagings:**· **Recommendation:** Disposal must be made according to official regulations.· **Recommended cleansing agent:** Water, if necessary with cleansing agents.**14 Transport information**· **UN-Number**· **DOT, IMDG, IATA**

UN1782

· **UN proper shipping name**· **DOT**

Hexafluorophosphoric acid, solution

· **IMDG, IATA**

HEXAFLUOROPHOSPHORIC ACID, solution

· **Transport hazard class(es)**· **DOT, IMDG, IATA**· **Class**

8 Corrosive substances

· **Label**

8

(Contd. on page 7)

USA

Safety Data Sheet

acc. to OSHA Hazard Communication Standard (29 CFR 1910.1200)

Printing date 03/08/2015

Reviewed on 01/12/2015

Trade name: Hexafluorophosphoric acid solution

(Contd. of page 6)

· Packing group	
· DOT, IMDG, IATA	II
· Environmental hazards:	
· Marine pollutant:	No
· Special precautions for user	Warning: Corrosive substances
· Danger code (Kemler):	80
· EMS Number:	F-A,S-B
· Segregation groups	Acids
· Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	Not applicable.
· Transport/Additional information:	
· DOT	
· Quantity limitations	On passenger aircraft/rail: 1 L On cargo aircraft only: 30 L
· IMDG	
· Limited quantities (LQ)	1L
· Excepted quantities (EQ)	Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
· UN "Model Regulation":	UN1782, Hexafluorophosphoric acid, solution, 8, II

15 Regulatory information

- **Safety, health and environmental regulations/legislation specific for the substance or mixture**
- **Sara**

· **Section 355 (extremely hazardous substances):**

None of the ingredients is listed.

· **Section 313 (Specific toxic chemical listings):**

None of the ingredients is listed.

· **TSCA (Toxic Substances Control Act):**

All ingredients are listed.

· **Proposition 65**· **Chemicals known to cause cancer:**

None of the ingredients is listed.

· **Chemicals known to cause reproductive toxicity for females:**

None of the ingredients is listed.

· **Chemicals known to cause reproductive toxicity for males:**

None of the ingredients is listed.

· **Chemicals known to cause developmental toxicity:**

None of the ingredients is listed.

· **Carcinogenic categories**· **EPA (Environmental Protection Agency)**

None of the ingredients is listed.

(Contd. on page 8)

USA

Safety Data Sheet

acc. to OSHA Hazard Communication Standard (29 CFR 1910.1200)

Printing date 03/08/2015

Reviewed on 01/12/2015

Trade name: Hexafluorophosphoric acid solution

(Contd. of page 7)

· TLV (Threshold Limit Value established by ACGIH)

None of the ingredients is listed.

· NIOSH-Ca (National Institute for Occupational Safety and Health)

None of the ingredients is listed.

· RTECS

None of the ingredients is listed.

· Product related hazard informations:

The product has been classified and marked in accordance with directives on hazardous materials.

· Hazard symbols:

Toxic

· Hazard-determining components of labeling:
hexafluorophosphoric acid**· Risk phrases:**

Causes severe burns.

Danger of very serious irreversible effects.

· Safety phrases:

Keep locked up and out of the reach of children.

In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Do not empty into drains, dispose of this material and its container at hazardous or special waste collection point.

Wear suitable protective clothing, gloves and eye/face protection.

In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

· Chemical safety assessment: A Chemical Safety Assessment has not been carried out.**16 Other information**

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· NFPA ratings (scale 0-4)

Health = 4

Fire = 0

Reactivity = 0

· HMIS ratings (scale 0-4)

Health = *4

Fire = 0

Reactivity = 0

· Department issuing SDS: Technical Support Department**· Contact:** Technical Support Department**· Date of preparation / last revision** 03/08/2015 / -**· Abbreviations and acronyms:**

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

ACGIH: American Conference of Governmental Industrial Hygienists

EINECS: European Inventory of Existing Commercial Chemical Substances

ELINCS: European List of Notified Chemical Substances

(Contd. on page 9)

Safety Data Sheet
acc. to OSHA Hazard Communication Standard (29 CFR 1910.1200)

Printing date 03/08/2015

Reviewed on 01/12/2015

Trade name: Hexafluorophosphoric acid solution

(Contd. of page 8)

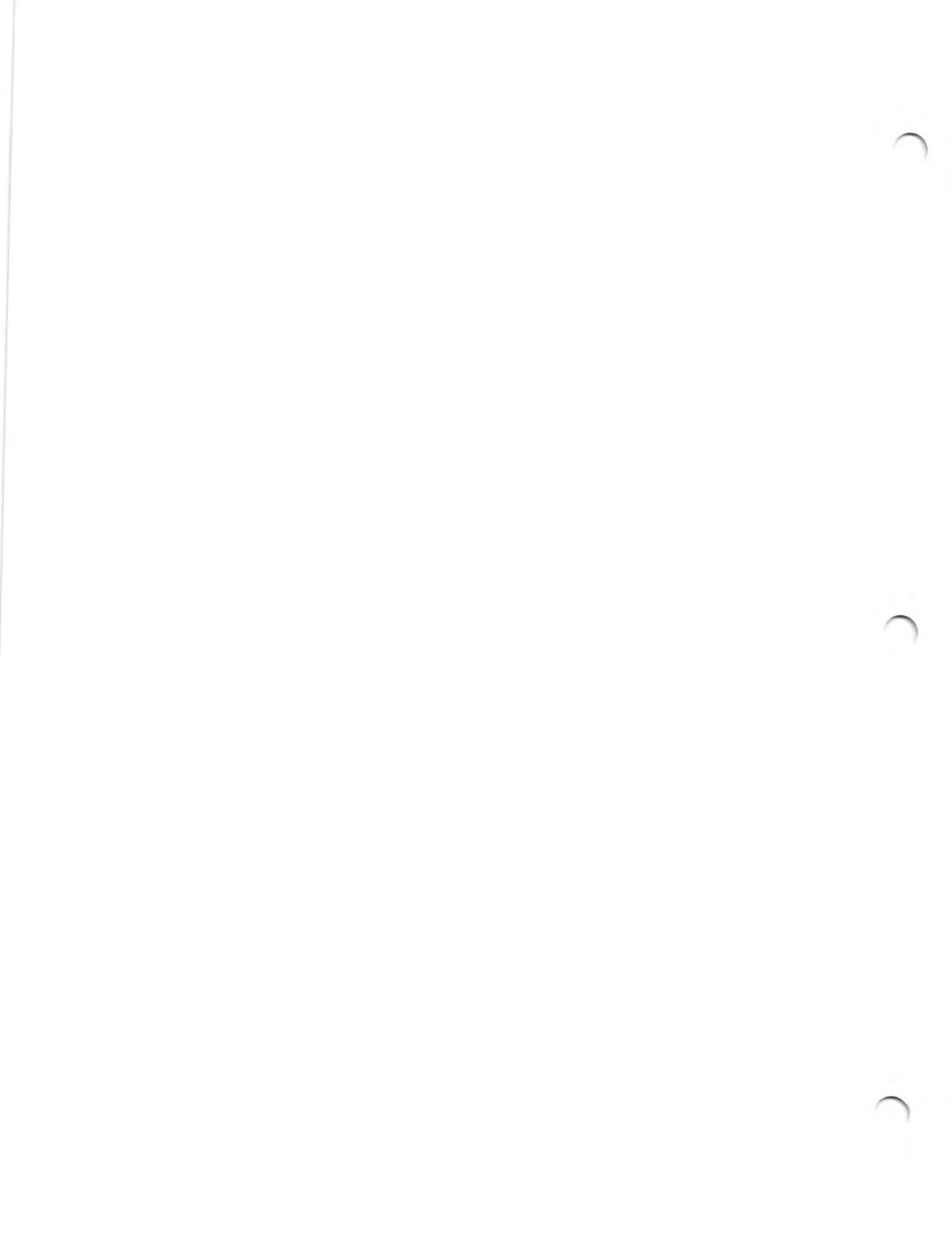
CAS: Chemical Abstracts Service (division of the American Chemical Society)

Acute Tox. 2: Acute toxicity, Hazard Category 2

Skin Corr. 1B: Skin corrosion/irritation, Hazard Category 1B

Eye Dam. 1: Serious eye damage/eye irritation, Hazard Category 1

USA



1 Identification

Product identifier

Product name: **Hexafluorosilicic acid, 35% w/w aqueous solution**

Stock number: L14829

Relevant identified uses of the substance or mixture and uses advised against.

Identified use: SU24 Scientific research and development

Details of the supplier of the safety data sheet

Manufacturer/Supplier:

Alfa Aesar
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757
Email: tech@alfa.com
www.alfa.com

Information Department: Health, Safety and Environmental Department

Emergency telephone number:

During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660. After normal business hours, call Carechem 24 at (866) 928-0789.

2 Hazard(s) identification

Classification of the substance or mixture in accordance with 29 CFR 1910 (OSHA HCS)

 **GHS05 Corrosion**

Skin Corr. 1B H314 Causes severe skin burns and eye damage.

Hazards not otherwise classified No information known.

Label elements

GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)

Hazard pictograms



GHS05

Signal word

Danger

Hazard-determining components of labeling:

Hexafluorosilicic acid

Hazard statements

H314 Causes severe skin burns and eye damage.

Precautionary statements

P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P301+P330+P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

WHMIS classification

D2B - Toxic material causing other toxic effects
E - Corrosive material



Classification system

HMIS ratings (scale 0-4)
(Hazardous Materials Identification System)

HEALTH	3	Health (acute effects) = 3
FIRE	0	Flammability = 0
REACTIVITY	1	Physical Hazard = 1

Other hazards

Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

3 Composition/information on ingredients

Chemical characterization: Mixtures

Dangerous components:

16961-83-4 Hexafluorosilicic acid		Skin Corr. 1B, H314	35.0%
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Additional information None known.

Non-Hazardous Ingredients

7732-18-5 Water			65.0%
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4 First-aid measures

Description of first aid measures

General information Immediately remove any clothing soiled by the product.

After inhalation

Supply fresh air. If required, provide artificial respiration. Keep patient warm.

Seek immediate medical advice.

After skin contact

Immediately wash with water and soap and rinse thoroughly.

Seek immediate medical advice.

Product name: Hexafluorosilicic acid, 35% w/w aqueous solution

(Contd. of page 1)

After eye contact Rinse opened eye for several minutes under running water. Then consult a doctor.

After swallowing Seek medical treatment.

Information for doctor

Most important symptoms and effects, both acute and delayed

Causes severe skin burns.

Causes serious eye damage.

Indication of any immediate medical attention and special treatment needed No further relevant information available.

5 Fire-fighting measures

Extinguishing media

Suitable extinguishing agents Product is not flammable. Use fire-fighting measures that suit the surrounding fire.

Special hazards arising from the substance or mixture If this product is involved in a fire, the following can be released:

Advice for firefighters

Protective equipment:

Wear self-contained respirator.

Wear fully protective impervious suit.

6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

Wear protective equipment. Keep unprotected persons away.

Ensure adequate ventilation

Environmental precautions: Do not allow product to reach sewage system or any water course.

Methods and material for containment and cleaning up:

Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

Use neutralizing agent.

Dispose of contaminated material as waste according to section 13.

Ensure adequate ventilation.

Prevention of secondary hazards: No special measures required.

Reference to other sections

See Section 7 for information on safe handling

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

7 Handling and storage

Handling

Precautions for safe handling

Keep container tightly sealed.

Store in cool, dry place in tightly closed containers.

Ensure good ventilation at the workplace.

Information about protection against explosions and fires: The product is not flammable

Conditions for safe storage, including any incompatibilities

Storage

Requirements to be met by storerooms and receptacles: Unsuitable material for container: ceramic, glass

Information about storage in one common storage facility:

Store away from strong bases.

Water reacts with many metals to give hydrogen, often violently. Water is also incompatible with many reactive organic and inorganic chemicals.

Further information about storage conditions:

Keep container tightly sealed.

Store in cool, dry conditions in well sealed containers.

Specific end use(s) No further relevant information available.

8 Exposure controls/personal protection

Additional information about design of technical systems:

Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Control parameters

Components with limit values that require monitoring at the workplace:

The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.

Additional information: No data

Exposure controls

Personal protective equipment

General protective and hygienic measures

The usual precautionary measures for handling chemicals should be followed.

Keep away from foodstuffs, beverages and feed.

Remove all soiled and contaminated clothing immediately.

Wash hands before breaks and at the end of work.

Do not inhale dust / smoke / mist.

Avoid contact with the eyes and skin.

Maintain an ergonomically appropriate working environment.

Breathing equipment: Use suitable respirator when high concentrations are present.

Protection of hands:

Impervious gloves

Check protective gloves prior to each use for their proper condition.

The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.

Penetration time of glove material (in minutes) Not determined

Eye protection:

Tightly sealed goggles

Full face protection

Body protection: Protective work clothing.

9 Physical and chemical properties

Information on basic physical and chemical properties

General Information

Appearance:

Form:

Liquid

Color:

Colorless

Odor:

Not determined

Odor threshold:

Not determined.

(Contd. on page 3)
USA

Product name: **Hexafluorosilicic acid, 35% w/w aqueous solution**

(Contd. of page 2)

H-value:	Not determined.
Change in condition	
Melting point/Melting range:	Not determined
Boiling point/Boiling range:	108-109 °C
Sublimation temperature / start:	Not determined
Flammability (solid, gaseous)	Not determined.
Ignition temperature:	Not determined
Decomposition temperature:	Not determined
Auto igniting:	Product is not selfigniting.
Danger of explosion:	Not determined.
Explosion limits:	
Lower:	Not determined
Upper:	Not determined
Vapor pressure at 20 °C (68 °F):	23 hPa (17 mm Hg)
Density at 20 °C (68 °F):	1.32 g/cm ³ (11.015 lbs/gal)
Relative density	Not determined.
Vapor density	Not determined.
Evaporation rate	Not determined.
Solubility in / Miscibility with	
Water:	Not miscible or difficult to mix
Partition coefficient (n-octanol/water):	Not determined.
Viscosity:	
dynamic:	Not determined.
kinematic:	Not determined.
Solvent content:	
Organic solvents:	0.0 %
Other information	No further relevant information available.

10 Stability and reactivity

Reactivity No information known.
Chemical stability Stable under recommended storage conditions.
Thermal decomposition / conditions to be avoided: Decomposition will not occur if used and stored according to specifications.
Possibility of hazardous reactions
 Water reacts with many metals to give hydrogen, often violently. Water is also incompatible with many reactive organic and inorganic chemicals.
 Water reacts violently with alkali metals.
 Reacts with alkaline earth metals.
Conditions to avoid No further relevant information available.
Incompatible materials: Bases

11 Toxicological information

Information on toxicological effects
Acute toxicity:
 Swallowing will lead to a strong corrosive effect on mouth and throat and to the danger of perforation of esophagus and stomach.
 The Registry of Toxic Effects of Chemical Substances (RTECS) contains acute toxicity data for components in this product.
LD/LC50 values that are relevant for classification:
16961-83-4 Hexafluorosilicic acid
 Oral LD50 430 mg/kg (rat)
Skin irritation or corrosion: Causes severe skin burns.
Eye irritation or corrosion: Causes serious eye damage.
Sensitization: No sensitizing effects known.
Germ cell mutagenicity: No effects known.
Carcinogenicity:
 ACGIH A4: Not classifiable as a human carcinogen: Inadequate data on which to classify the agent in terms of its carcinogenicity in humans and/or animals.
Reproductive toxicity: No effects known.
Specific target organ system toxicity - repeated exposure: No effects known.
Specific target organ system toxicity - single exposure: No effects known.
Aspiration hazard: No effects known.
Subacute to chronic toxicity: No effects known.
Additional toxicological information:
 To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
 The product shows the following dangers according to internally approved calculation methods for preparations:
 Corrosive

12 Ecological information

Toxicity
Aquatic toxicity: No further relevant information available.
Persistence and degradability No further relevant information available.
Bioaccumulative potential No further relevant information available.
Mobility in soil No further relevant information available.
Additional ecological information:
General notes:
 Do not allow product to reach ground water, water course or sewage system.
 Danger to drinking water if even small quantities leak into the ground.
 Avoid transfer into the environment.
Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.
Other adverse effects No further relevant information available.

13 Disposal considerations

Waste treatment methods
Recommendation Consult state, local or national regulations to ensure proper disposal.
Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.

Product name: Hexafluorosilicic acid, 35% w/w aqueous solution

(Contd. of page 3)

14 Transport information

UN-Number DOT, IMDG, IATA	UN1778
UN proper shipping name DOT IMDG, IATA	Fluorosilicic acid FLUROSILICIC ACID
Transport hazard class(es) DOT	
	
Class Label Class Label IMDG, IATA	8 Corrosive substances. 8 8 (C1) Corrosive substances 8
	
Class Label	8 Corrosive substances. 8
Packing group DOT, IMDG, IATA	II
Environmental hazards: Marine pollutant (IMDG):	No
Special precautions for user EMS Number: Segregation groups	Warning: Corrosive substances F-A, S-B Acids
Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	Not applicable.
Transport/Additional information: DOT	
Marine Pollutant (DOT):	No
UN "Model Regulation":	UN1778, Fluorosilicic acid, 8, II

15 Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture
GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)
Hazard pictograms



GHS05

Signal word Danger

Hazard-determining components of labeling:

Hexafluorosilicic acid

Hazard statements

H314 Causes severe skin burns and eye damage.

Precautionary statements

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P301+P330+P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.

P405 Store locked up.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

National regulations

All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.

All components of this product are listed on the Canadian Domestic Substances List (DSL).

SARA Section 313 (specific toxic chemical listings)

None of the ingredients are listed.

California Proposition 65

Prop 65 - Chemicals known to cause cancer

None of the ingredients are listed.

Prop 65 - Developmental toxicity

None of the ingredients are listed.

Prop 65 - Developmental toxicity, female

None of the ingredients are listed.

Prop 65 - Developmental toxicity, male

None of the ingredients are listed.

Information about limitation of use: For use only by technically qualified individuals.

Other regulations, limitations and prohibitive regulations

Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006.

None of the ingredients are listed.

The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing on the market and use must be observed.

None of the ingredients is listed.

Annex XIV of the REACH Regulations (requiring Authorisation for use)

None of the ingredients is listed.

(Contd. on page 5)
USA

Product name: **Hexafluorosilicic acid, 35% w/w aqueous solution**

(Contd. of page 4)

Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

Other information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing SDS: Global Marketing Department

Date of preparation / last revision 11/24/2015 / -

Abbreviations and acronyms:

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

EINECS: European Inventory of Existing Commercial Chemical Substances

ELINCS: European List of Notified Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

HMIS: Hazardous Materials Identification System (USA)

WHMIS: Workplace Hazardous Materials Information System (Canada)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

vPvB: very Persistent and very Bioaccumulative

ACGIH: American Conference of Governmental Industrial Hygienists (USA)

OSHA: Occupational Safety and Health Administration (USA)

NTP: National Toxicology Program (USA)

IARC: International Agency for Research on Cancer

EPA: Environmental Protection Agency (USA)

USA



SAFETY DATA SHEET

1. IDENTIFICATION

Product name: Hydrazine Monohydrate
Product code: H0172
Company: TOKYO CHEMICAL INDUSTRY CO., LTD.
Address: 4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Responsible department: Global Business Department
Telephone: +81-3-5640-8872
Fax: +81-3-5640-8902
e-mail: globalbusiness@TCIchemicals.com
Revision number: 12

2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

PHYSICAL HAZARDS

Flammable liquids

Category 4

HEALTH HAZARDS

Acute toxicity (Oral)

Category 3

Skin corrosion/irritation

Category 1B

Serious eye damage/eye irritation

Category 1

Skin sensitization

Category 1

Germ cell mutagenicity

Category 2

Carcinogenicity

Category 2

Specific target organ toxicity

Liver, Kidney, Central nervous system

- Single exposure [Category 1]

Specific target organ toxicity

Liver, Digestive tract, Nervous system, Kidney

- Repeated exposure [Category 1]

ENVIRONMENTAL HAZARDS

Acute aquatic hazard

Category 1

Long-term aquatic hazard

Category 1

Label elements

Pictograms or hazard symbols



Signal word

Danger

Hazard statements

Combustible liquid
Toxic if swallowed
Causes severe skin burns and eye damage
May cause an allergic skin reaction
Suspected of causing genetic defects
Suspected of causing cancer
Causes damage to organs : Liver Kidney Central nervous system
Causes damage to organs through prolonged or repeated exposure : Liver Digestive tract Nervous system Kidney
Very toxic to aquatic life
Very toxic to aquatic life with long lasting effects

Precautionary statements:

2. HAZARDS IDENTIFICATION**[Prevention]**

Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from flames and hot surfaces.
Do not breathe dust/fume/gas/mist/vapours/spray.
Avoid release to the environment.
Do not eat, drink or smoke when using this product.
Contaminated work clothing should not be allowed out of the workplace.
Wash hands thoroughly after handling.

[Response]

Wear protective gloves and eye/face protection.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Rinse mouth.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
If skin irritation or rash occurs: Get medical advice/attention.
Wash contaminated clothing before reuse.
Immediately call a POISON CENTER or doctor/physician.

[Storage]

Collect spillage.
Store in a well-ventilated place. Keep cool.
Store locked up.

[Disposal]

Dispose of contents/container through a waste management company authorized by the local government.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/mixture:	Substance
Components:	Hydrazine Monohydrate
Percent:	>98.0%(T)
CAS Number:	7803-57-8
Chemical Formula:	H ₄ N ₂ ·H ₂ O
Notice Through Official Gazettes Reference Number	
ENCS:	(1)-374
ISHL:	Official announcement chemistry substance.

4. FIRST-AID MEASURES

Inhalation:	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/physician.
Skin contact:	Remove/Take off immediately all contaminated clothing. Gently wash with plenty of soap and water. Immediately call a POISON CENTER or doctor/physician.
Eye contact:	Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.
Ingestion:	Immediately call a POISON CENTER or doctor/physician. Rinse mouth.
Most important symptoms/effects, acute and delayed:	Burning sensation, Cough, Headache, Nausea, Shortness of breath, Sore throat, Convulsions, Gastrospasm, Confusion, Unconsciousness, Vomiting, Weakness, Redness, Burn, Pain
Protection of first-aiders:	A rescuer should wear personal protective equipment, such as rubber gloves and air-tight goggles.
Indication of immediate medical attention and special treatment needed, if necessary:	Depending on the degree of exposure, periodic medical examination is indicated. Medical observation is indicated.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media:	Dry chemical, foam, water in large amounts, carbon dioxide.
--------------------------------------	---

5. FIRE-FIGHTING MEASURES

Specific hazards arising from the chemical:	Explosion risk in case of fire. Fight fire remotely due to the risk of explosion. Take care as it may decompose upon combustion or in high temperatures to generate poisonous fume.
Precautions for firefighters:	Fire-extinguishing work is done from the windward and the suitable fire-extinguishing method according to the surrounding situation is used. Uninvolved persons should evacuate to a safe place. In case of fire in the surroundings: Keep containers cool by spraying with water. Eliminate all ignition sources if safe to do so.
Special protective equipment for firefighters:	When extinguishing fire, be sure to wear personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:	Use extra personal protective equipment (self-contained breathing apparatus). Keep people away from and upwind of spill/leak. Ensure adequate ventilation. Entry to non-involved personnel should be controlled around the leakage area by roping off, etc.
Environmental precautions:	Be careful not to let it flow into rivers, etc., since adverse effects on the environment are concerned.
Methods and materials for containment and cleaning up:	Absorb spilled material in a suitable absorbent (e.g. rag, dry sand, earth, saw-dust). In case of large amount of spillage, contain a spill by bunding. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.
Prevention of secondary hazards:	Remove all sources of ignition. Fire-extinguishing devices should be prepared in case of a fire. Use spark-proof tools and explosion-proof equipment.

7. HANDLING AND STORAGE

Precautions for safe handling

Technical measures:	Handling is performed in a well ventilated place. Wear suitable protective equipment. Prevent generation of vapour or mist. Keep away from flames and hot surfaces. Take measures to prevent the build up of electrostatic charge. Use explosion-proof equipment. Wash hands and face thoroughly after handling. Use a closed system, ventilation.
Advice on safe handling:	Avoid all contact!

Conditions for safe storage, including any incompatibilities

Storage conditions:	Keep container tightly closed. Store in a cool, dark and well-ventilated place. Store locked up. Be sure not to give the container unexpected impacts, such as falling down or falling off. Store away from incompatible materials such as oxidizing agents.
Packaging material:	Comply with laws.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls:	Install a closed system or local exhaust. Also install safety shower and eye bath.
Control parameters:	Not set up
Personal protective equipment	
Respiratory protection:	Half or full facepiece respirator, self-contained breathing apparatus(SCBA), supplied air respirator, etc. Use respirators approved under appropriate government standards and follow local and national regulations.
Hand protection:	Impervious gloves.
Eye protection:	Safety goggles. A face-shield, if the situation requires.
Skin and body protection:	Impervious protective clothing. Protective boots, if the situation requires.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state (20°C):	Liquid
Form:	Clear
Colour:	Colorless
Odour:	Slight Ammoniacal
pH:	No data available
Melting point/freezing point:	-52°C
Boiling point/range:	119°C

9. PHYSICAL AND CHEMICAL PROPERTIES

Flash point:	75°C
Flammability or explosive limits:	
Lower:	No data available
Upper:	No data available
Vapour pressure:	0.7kPa/25°C
Vapour density:	>1
Relative density:	1.03
Solubility(ies):	
[Water]	Miscible
[Other solvents]	
Miscible:	Alcohols
Insoluble:	Ether, Chloroform

10. STABILITY AND REACTIVITY

Chemical stability:	Stable under proper conditions.
Possibility of hazardous reactions:	May explosively decompose on heating, shock, friction, etc.
Conditions to avoid:	Heat, Open flame, Shock, Friction
Incompatible materials:	Oxidizing agents, Acids, Heavy metals, Metal oxides
Hazardous decomposition products:	Carbon monoxide, Carbon dioxide, Nitrogen oxides (NOx)

11. TOXICOLOGICAL INFORMATION

Acute Toxicity:	ipr-mus LD50:156 mg/kg orl-mus LD50:83 mg/kg orl-rat LD50:129 mg/kg orl-rbt LD50:55 mg/kg
Skin corrosion/irritation:	No data available
Serious eye damage/irritation:	No data available
Germ cell mutagenicity:	mno-sat 10 umol/plate (+S9) mno-sat 800 ug/plate (-S9)
Carcinogenicity:	skn-mus TDLo:80 g/kg/43W-I
IARC =	No data available
NTP =	No data available
Reproductive toxicity:	No data available
RTECS Number:	MV8050000

12. ECOLOGICAL INFORMATION

Ecotoxicity:	
Fish:	96h LC50:1.4 mg/L (Oryzias latipes)
Crustacea:	48h EC50:0.30 mg/L (Daphnia magna)
Algae:	72h EC50:0.19 mg/L (Selenastrum capricornutum)
Persistence / degradability:	2 % (by BOD), 0% (by IC) *The substance was determined as "Non-biodegradability" under the Chemical Substances Control Law.
Bioaccumulative potential(BCF):	No data available *The substance was determined as "Low bioconcentration " under the Chemical Substances Control Law.
Mobility in soil	
Log Pow:	No data available
Soil adsorption (Koc):	No data available
Henry's Law constant(PaM ³ /mol):	No data available

13. DISPOSAL CONSIDERATIONS

Recycle to process, if possible. Consult your local regional authorities. You may be able to burn in a chemical incinerator equipped with an afterburner and scrubber system. Observe all federal, state and local regulations when disposing of the substance.

14. TRANSPORT INFORMATION

Hazards Class: 8: Corrosive.
Subsidiary risk: 6.1: Toxic substance.
UN-No: 2030
Proper shipping name: Hydrazine, aqueous solution
Packing group: II
Marine pollutant Y

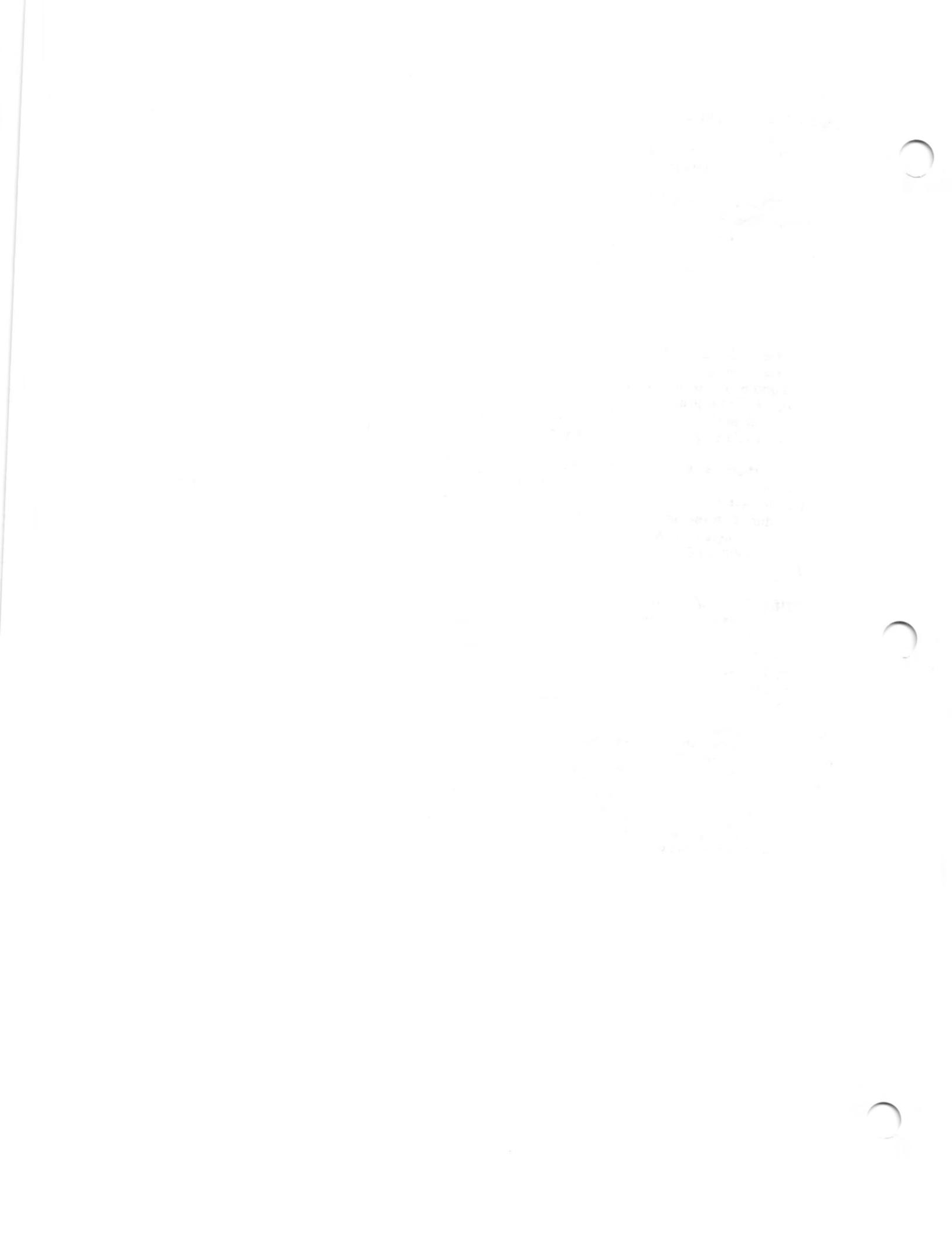
15. JAPANESE REGULATORY INFORMATION

Fire Defense Law: Class-4 No.3 petroleum Dangerous grade 3 Water-soluble fluid
Poisonous and Deleterious Substances Control Law: on Deleterious Substances List.
ISHL(Article 57): Dangerous or Harmful Substances Subject to Be Indicated their Names, etc.
ISHL(Article 57-2): Dangerous or Harmful Substances Subject to Be Notified their Names, etc.
ISHL(Article 28 (3)): Publication of Technical Guidelines
ENCS: Priority Assessment Chemical Substance
Law for safety of vessels: Hazardous materials notification, Schedule form No.1 Corrosive substance
Pollutant Release and Transfer Register Law: on Designated Chemical Substances, Class I List(No.333)
Water Pollution Control Law: Designated Substance

16. OTHER INFORMATION**The reference company name of written contents**

Company: TOKYO CHEMICAL INDUSTRY CO., LTD.
Address: 4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Department: Global Business Department
Telephone: +81-3-5640-8872
Fax: +81-3-5640-8902

This SDS was prepared sincerely on the basis of the information we could obtained, however, any warranty shall not be given regarding the data contained and the assessment of hazards and toxicity. Prior to use, please investigate not only the hazards and toxicity information but also the laws and regulations of the organization, area and country where the products are to be used, which shall be given the first priority. The products are supposed to be used promptly after purchase in consideration of safety. Some new information or amendments may be added afterwards. If the products are to be used far behind the expected time of use or you have any questions, please feel free to contact us. The stated cautions are for normal handling only. In case of special handling, sufficient care should be taken, in addition to the safety measures suitable for the situation. All chemical products should be treated with the recognition of "having unknown hazards and toxicity", which differ greatly depending on the conditions and handling when in use and/or the conditions and duration of storage. The products must be handled only by those who are familiar with specialized knowledge and have experience or under the guidance of those specialists throughout use from opening to storage and disposal. Safe usage conditions shall be set up on each user's own responsibility.



*This SDS for user in JP - Not correspond to the regulation of other countries.



TOKYO CHEMICAL INDUSTRY CO., LTD.

Hydrazine Monohydrochloride

Revision 6
number:

Revision date: 12/18/2013

Page 1 of 5

Revision date: 12/18/2013

SAFETY DATA SHEET

1. IDENTIFICATION

Product name: Hydrazine Monohydrochloride
Product code: H0174
Company: TOKYO CHEMICAL INDUSTRY CO., LTD.
Address: 4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Responsible department: Global Business Department
Telephone: +81-3-5640-8872
Fax: +81-3-5640-8902
e-mail: globalbusiness@TCIchemicals.com
Revision number: 6

2. HAZARDS IDENTIFICATION

GHS classification

PHYSICAL HAZARDS

Not classified

HEALTH HAZARDS

Acute toxicity (Oral)

Category 3

Skin corrosion/irritation

Category 1B

Serious eye damage/eye irritation

Category 1

Skin sensitization

Category 1

Carcinogenicity

Category 2

ENVIRONMENTAL HAZARDS

Acute aquatic hazard

Category 1

Long-term aquatic hazard

Category 1

GHS label elements, including precautionary statements

Pictograms or hazard symbols



Signal word

Danger

Hazard statements

Toxic if swallowed
Causes severe skin burns and eye damage
May cause an allergic skin reaction
Suspected of causing cancer
Very toxic to aquatic life
Very toxic to aquatic life with long lasting effects

Precautionary statements:

[Prevention]

Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Do not breathe dust/fume/gas/mist/vapours/spray.
Avoid release to the environment.
Do not eat, drink or smoke when using this product.
Contaminated work clothing should not be allowed out of the workplace.
Wash hands thoroughly after handling.
Wear protective gloves/eye protection/face protection.

2. HAZARDS IDENTIFICATION

[Response]

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Rinse mouth.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

If skin irritation or rash occurs: Get medical advice/attention.

Wash contaminated clothing before reuse.

Immediately call a POISON CENTER or doctor/physician.

Collect spillage.

Store locked up.

Dispose of contents/container through a waste management company authorized by the local government.

[Storage]

[Disposal]

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/mixture:	Substance
Components:	Hydrazine Monohydrochloride
Percent:	>98.0%(T)
CAS Number:	2644-70-4
Synonyms:	Hydrazinium Monochloride
Chemical Formula:	H ₄ N ₂ ·HCl
Notice Through Official Gazettes Reference Number	
ENCS:	(1)-374
ISHL:	Official announcement chemistry substance.

4. FIRST-AID MEASURES

Inhalation:	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/physician.
Skin contact:	Remove/Take off immediately all contaminated clothing. Gently wash with plenty of soap and water. Immediately call a POISON CENTER or doctor/physician.
Eye contact:	Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.
Ingestion:	Immediately call a POISON CENTER or doctor/physician. Rinse mouth.
Protection of first-aiders:	A rescuer should wear personal protective equipment, such as rubber gloves and air-tight goggles.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media:	Dry chemical, foam, water spray, carbon dioxide.
Specific hazards arising from the chemical:	Explosion risk in case of fire. Fight fire remotely due to the risk of explosion. Take care as it may decompose upon combustion or in high temperatures to generate poisonous fume.
Precautions for firefighters:	Fire-extinguishing work is done from the windward and the suitable fire-extinguishing method according to the surrounding situation is used. Uninvolved persons should evacuate to a safe place. In case of fire in the surroundings: Keep containers cool by spraying with water. Eliminate all ignition sources if safe to do so.
Special protective equipment for firefighters:	When extinguishing fire, be sure to wear personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:	Use extra personal protective equipment (P3 filter respirator for toxic particles). Keep people away from and upwind of spill/leak. Entry to non-involved personnel should be controlled around the leakage area by roping off, etc.
Environmental precautions:	Be careful not to let it flow into rivers, etc., since adverse effects on the environment are concerned.

6. ACCIDENTAL RELEASE MEASURES

Methods and materials for containment and cleaning up: Sweep dust to collect it into an airtight container, taking care not to disperse it. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

7. HANDLING AND STORAGE

Precautions for safe handling

Technical measures: Handling is performed in a well ventilated place. Wear suitable protective equipment. Be careful not to cause leakage, overflow, or dispersion. Steam should not be generated unnecessarily. Keep away from heat/sparks/open flame/hot surfaces. -No smoking. Take measures to prevent the build up of electrostatic charge. Use explosion-proof equipment. Avoid shock and friction. Wash hands and face before breaks and immediately after handling the product.
Use a closed system if possible. Use a local exhaust if dust or aerosol will be generated.

Advice on safe handling: Avoid all contact!

Conditions for safe storage, including any incompatibilities

Storage conditions: Keep container tightly closed. Store in a cool and dark place.
Store under inert gas.
Protect from moisture.
Store locked up.
Be sure not to give the container unexpected impacts, such as falling down or falling off.
Store away from incompatible materials such as oxidizing agents.
Hygroscopic, Air-sensitive

Packaging material: Comply with laws.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls: Install a closed system or local exhaust. Also install safety shower and eye bath.

Control parameters: Not set up

Personal protective equipment

Respiratory protection: Dust respirator, self-contained breathing apparatus(SCBA), supplied air respirator, etc. Use respirators approved under appropriate government standards and follow local and national regulations.

Hand protection: Impervious gloves.

Eye protection: Safety goggles. A face-shield, if the situation requires.

Skin and body protection: Impervious protective clothing. Protective boots, if the situation requires.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state (20°C): Solid

Form: Crystal- Powder

Colour: White - Almost white

Odour: No data available

pH: No data available

Melting point/freezing point: 93°C

Boiling point/range: No data available

Flash point: No data available

Flammability or explosive limits:

Lower: No data available

Upper: No data available

Relative density: No data available

Solubility(ies):

[Water] Soluble

[Other solvents] No data available

10. STABILITY AND REACTIVITY

Chemical stability: Stable under proper conditions.

10. STABILITY AND REACTIVITY

Possibility of hazardous reactions: May explosively decompose on heating, shock, friction, etc.
Conditions to avoid: Heat, Shock, Friction
Incompatible materials: Oxidizing agents
Hazardous decomposition products: Nitrogen oxides (NO_x), Hydrogen chloride

11. TOXICOLOGICAL INFORMATION

Acute Toxicity: orl-mus LD50:126 mg/kg
orl-rat LD50:128 mg/kg
Skin corrosion/irritation: No data available
Serious eye damage/irritation: No data available
Germ cell mutagenicity: sce-ham-Ing 500 umol/L
slt-mus-ipr 80 mg/kg
Carcinogenicity:
IARC = No data available
NTP = No data available
Reproductive toxicity: No data available
RTECS Number: MV4625000

12. ECOLOGICAL INFORMATION

Ecotoxicity:
Fish: No data available
Crustacea: No data available
Algae: No data available
Persistence / degradability: No data available
Bioaccumulative potential(BCF): No data available
Mobility in soil
Log Pow: No data available
Soil adsorption (Koc): No data available
Henry's Law constant(PaM³/mol): No data available

13. DISPOSAL CONSIDERATIONS

Recycle to process, if possible. Consult your local regional authorities and an expert of disposal. You may be able to dissolve or mix material with a combustible solvent and little by little burn in a chemical incinerator equipped with an afterburner and scrubber system. If a large amount of the substance is burned at a time, an explosion may occur. Observe all federal, state and local regulations when disposing of the substance.

14. TRANSPORT INFORMATION

Hazards Class: 6.1: Toxic substance.
Subsidiary risk: 8: Corrosive.
UN-No: 3290
Proper shipping name: Toxic solid, corrosive, inorganic, n.o.s.
Packing group: II
Marine pollutant Y

15. JAPANESE REGULATORY INFORMATION

Fire Defense Law: Class-5 Hydrazine derivatives Dangerous grade 2 Type-2 Self-reactive substance
ISHL(Article 28 (3)): Publication of Technical Guidelines
Law for safety of vessels: Hazardous materials notification, Schedule form No.1 Toxic substance

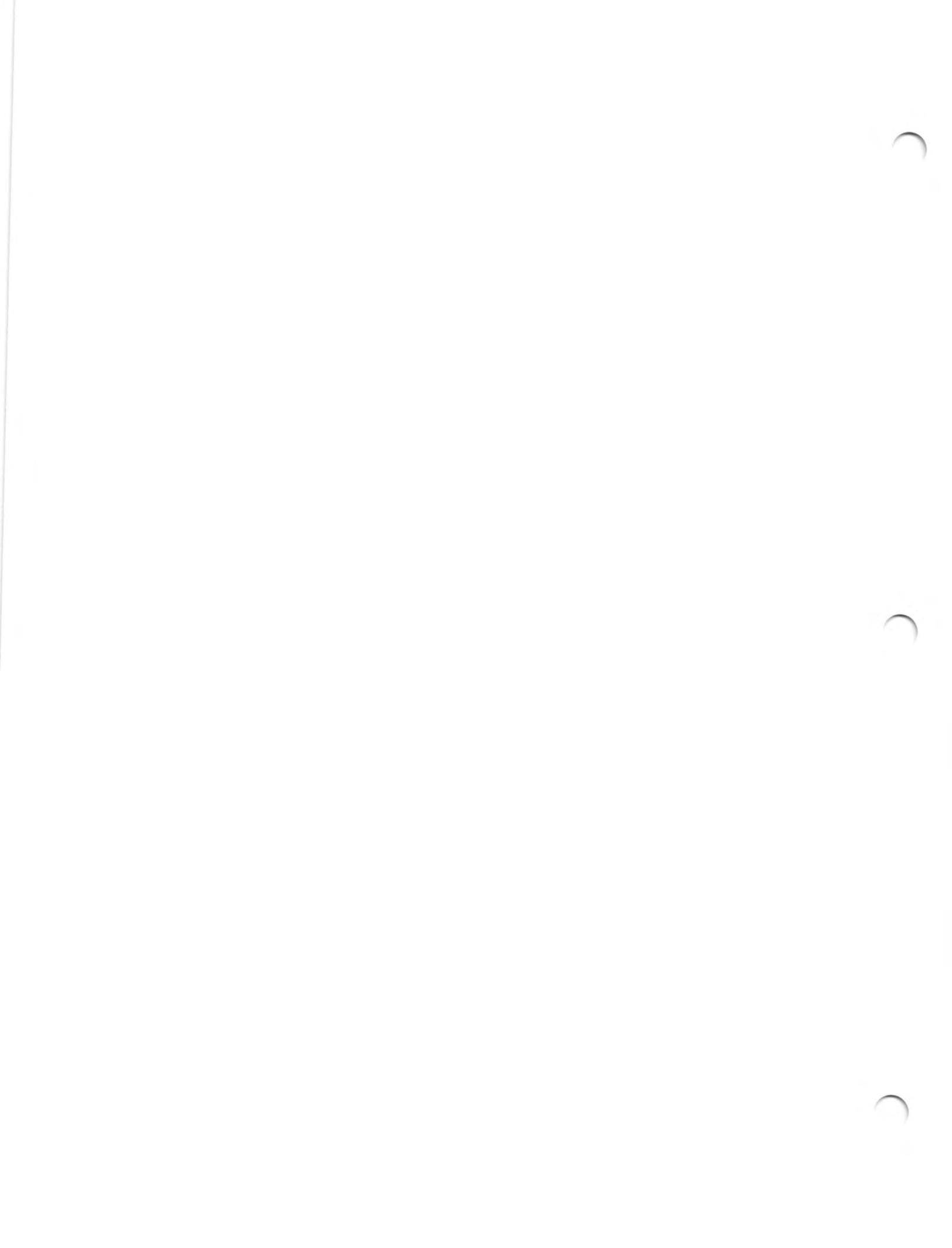
16. OTHER INFORMATION

The reference company name of written contents
Company: TOKYO CHEMICAL INDUSTRY CO., LTD.

16. OTHER INFORMATION

Address: 4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Department: Global Business Department
Telephone: +81-3-5640-8872
Fax: +81-3-5640-8902

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Univar USA Inc.
 6100 Carillon Point
 Kirkland, WA 98033
 (425) 889-3400

For Emergency Assistance involving chemicals call - CHEMTREC (800) 424-9300

The Version Date for this MSDS is : 12/14/2005

INDUSTRIAL, AND COMMERCIAL GRADE AND WEAKER STRENGTHS

PRODUCT NAME: MURIATIC ACID, 20 DEG AND 22 DEG BAURNE,
 TECHNICAL, INDUSTRIAL, AND COMMERCIAL GRADE
 AND WEAKER STRENGTHS

MSDS NUMBER: OZ34514

DATE ISSUED: 07/01/2005

SUPERSEDES: 03/07/2000

ISSUED BY: 008820

MATERIAL SAFETY DATA SHEET

SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Distributed by:
 Univar USA Inc.
 6100 Carillon Point
 Kirkland, WA 98003-7357
 425-889-5000

24 HOUR EMERGENCY TELEPHONE: 1-800-733-3665 or 1-972-404-3228
 (U.S.); 32.3.575.55.55 (Europe);

1800-033-111 (Australia)

PRODUCT NAME: MURIATIC ACID, 20 DEG AND 22 DEG BAURNE, TECHNICAL,
INDUSTRIAL, AND COMMERCIAL GRADE

CHEMICAL NAME	SYNONYMS
Hydrogen Chloride, Aqueous Solution	Hydrochloric Acid

SECTION 2 COMPOSITION INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS NUMBER	% RANGE
*Hydrogen Chloride	7647-01-0	35

This Material Safety Data Sheet is also valid for hydrogen chloride solutions weaker than 35%. The specific gravity and vapor pressure may be different from the values listed.

* Denotes chemical subject to reporting requirements of Section 313 of Title III of the 1986 Superfund Amendments and Reauthorization Act (SARA) and 40 CFR Part 372

SECTION 3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

A clear, colorless liquid with pungent, irritating odor.
DANGER! CORROSIVE! Causes severe burns to skin, eyes and digestive tract.
Harmful or fatal if swallowed or inhaled.

POTENTIAL HEALTH EFFECTS

INHALATION

Breathing of vapor or mist is possible. Breathing this material is harmful and may cause death. Harmful effects include burns and permanent damage to the airways, including the nose, throat, and lungs.

SKIN

Causes skin burns and permanent skin damage.

EYE

Causes burns and permanent injury to eye tissue. May cause blindness.

INGESTION

Swallowing this material may be harmful or cause death. Harmful effects include burns and permanent damage to the digestive tract, including the mouth, throat, stomach and intestines. Symptoms may include severe abdominal pain and vomiting of blood. Blood loss through damaged tissue may lead to low blood pressure and shock.

SIGNS AND SYMPTOMS OF EXPOSURE

Depending upon level and duration of exposure, other possible signs and symptoms from breathing, swallowing, and/or entry of this material through the skin may include: irritation of the nose, throat, airways, and lungs with cough and difficult breathing, severe stomach or intestinal upset with pain, nausea, vomiting, and/or diarrhea, excess fluid in the lungs with difficult breathing, and shock.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

Preexisting disorders of the following organs or systems, which may be aggravated by exposure to this material include: respiratory system

(including asthma and other breathing disorders), gastrointestinal system, skin.

EFFECTS FOLLOWING REPEATED EXPOSURE

This material may cause the following effects: respiratory tract damage (nose, throat, airways), lung damage, dental erosion, gastrointestinal effects, and skin effects.

SECTION 4 FIRST AID MEASURES

INHALATION

Remove individual to fresh air and get immediate medical attention. If breathing is difficult, give oxygen. If breathing stops, give artificial respiration.

SKIN

Immediately wash exposed skin with plenty of soap and water while removing contaminated clothing and shoes. Get immediate medical attention. Wash clothing before reuse and throw away shoes which cannot be thoroughly cleaned.

EYES

Hold the eyelids apart and flush the eye gently with a large amount of water for at least 15 minutes. Get immediate medical attention.

INGESTION

Have person drink a glass of water immediately if able to swallow. Get medical attention immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person.

NOTES TO PHYSICIAN

Probable mucosal damage may contraindicate the use of gastric lavage. See Section 11 for Toxicological Information

SECTION 5 FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT	AUTOIGNITION TEMPERATURE
None	None

FLAMMABLE LIMITS IN AIR (PERCENT BY VOLUME)
None

HAZARDOUS COMBUSTION PRODUCTS
None

EXTINGUISHING MEDIA
Nonflammable, use agent suitable for surrounding fire.

FIRE FIGHTING INSTRUCTIONS
Approach fire from upwind to avoid hazardous vapors. Use flooding quantities of water as fog or spray to keep fire-exposed containers cool. Extinguish fire using agent suitable for surrounding fire.

Firefighters should wear chemical protective suit with self-contained positive pressure breathing apparatus. Refer to Reactivity Data Section 10.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Evacuate immediate area where concentrated fumes are present. Cleanup personnel must wear proper protective equipment (see Section 8). Completely contain spilled acid with dikes, etc., and prevent run-off into ground and surface waters or into sewers. Neutralize with soda ash or dilute caustic soda. If spill occurs indoors, turn off heating and/or air conditioning systems, to prevent vapors from contaminating entire building. Neutralization products, both liquid and solid, must be recovered for proper disposal.

Reportable Quantity (RQ) is 5000 lbs. Notify National Response Center (800/424-8802) of uncontained releases to the environment in excess of the RQ.

For all transportation accidents, call CHEMTREC at 800/424-9300.

SECTION 7 HANDLING AND STORAGE HANDLING

Do not get in eyes, on skin or on clothing. Avoid breathing vapors or mist. Do not taste or swallow. Do not eat, drink, or smoke in work area. Wash hands prior to eating, drinking, or using restroom. Any protective clothing, or shoes that become contaminated with hydrochloric acid should be removed immediately, and laundered before wearing again. Follow protective controls set forth in Section 8 when handling this product.

Carefully monitor handling, use and storage to avoid spills and leaks. Follow protective controls set forth in Section 8 when handling this product. Do not use in poorly ventilated or confined spaces. Do not enter confined spaces such as tanks or pits without following proper entry procedures as required by 29 CFR 1910.146.

STORAGE

STORAGE CONDITIONS

Store in closed, properly labeled, rubber-lined steel, acid-resistant plastic, or glass containers. Do not store near strong alkalis or reactive materials. Do not remove or deface label or tag. Hydrogen chloride can react with cyanide, forming lethal concentrations of hydrocyanic acid.

INCOMPATIBLE MATERIALS FOR STORAGE OR TRANSPORT Aluminum equipment should not be used for storage and/or transfer.

SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION

ENGINEERING CONTROLS

VENTILATION

Ventilate as necessary to maintain air concentration below 2 ppm, at all times. Monitoring should be performed regularly to determine exposure level(s). See Exposure Guidelines below.

PERSONAL PROTECTIVE EQUIPMENT

EYE AND FACE PROTECTION

Wear splashproof chemical goggles. A face shield should be worn in addition to goggles where splashing or spraying is a possibility.

SKIN PROTECTION

Wear impervious clothing, boots, and gloves.

RESPIRATORY PROTECTION

Where vapor concentration exceeds or is likely to exceed 2 ppm, a NIOSH approved full-face respirator with acid gas canister is acceptable. A NIOSH approved self-contained breathing apparatus with full-face piece is required for air concentrations above 50 ppm and for spills and/or emergencies. Follow any applicable respirator use standards or regulations.

GENERAL

Safety showers and eyewash station must be available in immediate area. Protective equipment and clothing should be selected, used, and maintained according to applicable standards and regulations. For further information, contact the clothing or equipment manufacturer.

EXPOSURE GUIDELINES

Vulcan Chemicals recommends that its customers minimize employee exposure. For the purpose of evaluating employee exposure, customers should adopt the lower of the current OSHA PEL or the ACGIH TLV.

ACGIH: 2 ppm Ceiling (2003) (based on irritation and corrosion effects)
OSHA: 5 ppm Ceiling

IMMEDIATELY DANGEROUS TO LIFE OR HEALTH
IDLH: 50 ppm

ODOR THRESHOLD

Odor threshold is approximately 0.3 ppm.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

CHEMICAL FORMULA HC I	MOLECULAR WEIGHT 36.46
APPEARANCE AND ODOR clear, colorless liquid with pungent, irritating odor	SPECIFIC GRAVITY 20 deg Be: 1.1600 15.6/15.6 deg C; 22 deg Be: 1.1789 15.6/15.6 deg C
VAPOR PRESSURE 78 mm Hg 20 deg C	VOLATILES, PERCENT BY VOLUME 35
BOILING POINT 150 deg F - 230 deg F (65.6 deg C - 110.0 deg C)	VAPOR DENSITY 1.27 (Air = 1)
EVAPORATION RATE (Butyl Acetate = 1) < 1.00	SOLUBILITY IN WATER Complete

SECTION 10 STABILITY AND REACTIVITY

CHEMICAL STABILITY
Stable

CONDITIONS TO AVOID

Contact with strong bases can cause violent reaction generating large amounts of heat. Reactions with metals can release flammable hydrogen gas.

INCOMPATIBILITY WITH OTHER MATERIALS

Bases, metals, mercuric sulfate, perchloric acid, carbides of calcium, cesium, rubidium, acetylides of cesium and rubidium, phosphides of calcium and uranium and lithium silicide.

HAZARDOUS DECOMPOSITION PRODUCTS
None (Refer to Conditions to Avoid)

HAZARDOUS POLYMERIZATION
Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

ANIMAL TOXICOLOGY

Oral LD50: 900 mg/kg (rabbit)
Inhalation LC50: 3124 ppm for 1Hour (rat)
Inhalation LC50: 1108 ppm for 1Hour (mouse)

ACUTE TOXICITY

Hydrogen chloride gas, mist and vapor may cause irritation of respiratory tract, with burning, choking, coughing, headaches and rapid heartbeat. Levels of 10 to 35 ppm may cause irritation of throat and 50-100 ppm is nearly unbearable for 1 hour. Inflammation, destruction of nasal passages and breathing difficulties may occur with higher concentrations and may be delayed in onset. 10002000 ppm can be fatal.

EFFECTS FOLLOWING PROLONGED OR REPEATED EXPOSURE

Repeated skin exposures to low concentrations of acid solutions, mist or vapor can cause dermatitis. Repeated inhalation exposures to low concentrations of HCl mist can cause erosion of dental enamel, nasal ulceration, dermatitis, gastritis and chronic bronchitis. Experimental evidence in various animal species confirms many of these effects.

CARCINOGENICITY

No standard carcinogenicity studies for hydrogen chloride were identified. In a lifetime exposure study (rats, 10 ppm for 6 h/day, 5 d/wk), there was no significant increase in mortality or tumor response among exposed animals compared to control groups.

The International Agency for Research on Cancer (IARC) has concluded there is inadequate evidence of carcinogenicity to experimental animals and inadequate evidence of carcinogenicity to humans (Group 3: not classifiable as to carcinogenicity to humans). Hydrogen chloride is not listed on the IARC, NTP or OSHA carcinogen lists.

DEVELOPMENTAL TOXICITY

Based on available data, it is not known whether exposure of the mother to this material can cause harm to the fetus.

SECTION 12 ECOLOGICAL INFORMATION

ENVIRONMENTAL FATE

Water: Hydrogen Chloride in water dissociates almost completely, and will be neutralized by natural alkalinity and carbon dioxide.

Soil: Hydrochloric acid will sink into the soil. This acid will dissolve some soil material (in particular, anything with a carbonate base), and will be somewhat neutralized. The remaining portion is thought to transport downward to the water table

ECOTOXICITY

Acute LC50 (48 Hours, static) for Bluegill: 3.6 mg/L
Acute LC50 (96 Hours, static) for Mosquito Fish: 282 ppm

SECTION 13 DISPOSAL CONSIDERATIONS

All disposals of this material must be done in accordance with Federal, state, and local regulations. Waste characterization and compliance with disposal regulations are the responsibilities of the waste generator.

SPILL RESIDUES

Recovered solids or liquids may be sent to a licensed reclaimer or disposed of in a permitted waste management facility. Consult Federal, state, or local disposal authorities for approved procedures. Do not dump into any sewers, on the ground, or into any body of water. Any disposal must be in compliance with Federal, state, or local regulations.

SECTION 14 TRANSPORT INFORMATION

DOT IDENTIFICATION NO.
UN 1789

DOT SHIPPING DESCRIPTION (49 CFR 172.101)
Hydrochloric Acid, 8, UN 1789, PG II, RQ

PLACARD REQUIRED
Corrosive, 1789, Class 8

LABEL REQUIRED
Corrosive, Class 8
Label as required by OSHA Hazard Communication Standard, and any applicable state and local regulations.

IMO REQUIREMENTS
EmS No.: 8-03

SECTION 15 REGULATORY INFORMATION

U S FEDERAL REGULATIONS

REPORTABLE QUANTITY (RQ)
Reportable Quantity (RQ) is 5000 lbs.

TOXIC SUBSTANCES CONTROL ACT
Listed on TSCA Inventory

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) TITLE III
Components identified with an asterisk (*) in Section 2 are subject to the reporting requirements of Section 313 of Title III of the 1986 Superfund Amendments and Reauthorization Act (SARA) and 40 CFR Part 372.

SARA HAZARD CATEGORIES (40 CFR 370.2)
HEALTH: Immediate Health

INTERNATIONAL REGULATIONS

CANADA
WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS)

CLASSIFICATION
WHMIS Classifications applicable to this product:
E (Corrosive Material) based on assignment to TDG Class 8

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA)

All components of this product are on the Domestic Substances List (DSL).

HAZARDOUS PRODUCTS ACT

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR).

EUROPE

EINECS No.: 231-595-7

STATE REGULATIONS

CALIFORNIA PROPOSITION 65

Hydrochloric acid does not appear on the California Proposition 65 list.

SECTION 16 OTHER INFORMATION

NFPA RATINGS

Health 3, Flammability 0, Instability 0

For Additional Information:

Contact: MSDS Coordinator - Univar USA

During business hours, Pacific Time - (425) 889-3400

NOTICE

Univar USA expressly disclaims all express or implied warranties of merchantability and fitness for a particular purpose with respect to the product or information provided herein, and shall under no circumstances be liable for incidental or consequential damages.

Do not use ingredient information and/or ingredient percentages in this MSDS as a product specification. For product specification information refer to a Product Specification Sheet and/or a Certificate of Analysis. These can be obtained from your local Univar USA Sales Office.

All information appearing herein is based upon data obtained from the manufacturer and/or recognized technical sources. While the information is believed to be accurate, Univar USA makes no representations as to its accuracy or sufficiency. Conditions of use are beyond Univar USA's control. Therefore, users are responsible to verify this data under their own operating conditions to determine whether the product is suitable for their particular purposes, and they assume all risks of their use, handling, and disposal of the product or from the publication or use of, or reliance upon, information contained herein. This information relates only to the product designated herein and does not relate to its use in combination with any other material or in any other process.

END OF MSDS

HYDROFLUORIC ACID 49%

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SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1 Product identifier**

- Trade name HYDROFLUORIC ACID 49%
- Chemical Name Hydrofluoric acid
- Molecular formula HF

1.2 Relevant identified uses of the substance or mixture and uses advised against**Uses of the Substance / Mixture**

- Chemical industry
- Glass industry
- Metallurgy.
- Fuel additive
- Chemical intermediate

1.3 Details of the supplier of the safety data sheet**Company**

SOLVAY FLUORIDES, LLC
3333 RICHMOND AVENUE
77098-3099, HOUSTON
USA
Tel: +1-713-5256700
Fax: +1-713-5257805

1.4 Emergency telephone

FOR EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT CONTACT: CHEMTREC 800-424-9300 within the United States and Canada, or 703-527-3887 for international collect calls.

SECTION 2: Hazards identification

Although OSHA has not adopted the environmental portion of the GHS regulations, this document may include information on environmental effects.

2.1 Classification of the substance or mixture**HCS 2012 (29 CFR 1910.1200)**

Acute toxicity, Category 2
Acute toxicity, Category 2
Acute toxicity, Category 1
Skin corrosion, Category 1A
Serious eye damage, Category 1

H300: Fatal if swallowed.
H330: Fatal if inhaled.
H310: Fatal in contact with skin.
H314: Causes severe skin burns and eye damage.
H318: Causes serious eye damage.

2.2 Label elements**HCS 2012 (29 CFR 1910.1200)****Pictogram****Signal Word**

- Danger

P00000031491
Version : 1.02 / US (Z8)



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Hazard Statements

- H300 + H310 + H330 Fatal if swallowed, in contact with skin or if inhaled.
- H314 Causes severe skin burns and eye damage.
- H318 Causes serious eye damage.

Precautionary StatementsPrevention

- P260 Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
- P262 Do not get in eyes, on skin, or on clothing.
- P264 Wash skin thoroughly after handling.
- P270 Do not eat, drink or smoke when using this product.
- P271 Use only outdoors or in a well-ventilated area.
- P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
- P284 Wear respiratory protection.

Response

- P301 + P310 + P330 IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician. Rinse mouth.
- P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
- P303 + P361 + P353 IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
- P304 + P340 + P310 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
- P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/ physician.
- P363 Wash contaminated clothing before reuse.

Storage

- P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
- P405 Store locked up.

Disposal

- P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Other hazards which do not result in classification

- Chronic exposure may entail dental or skeletal fluorosis

SECTION 3: Composition/information on ingredients**3.1 Substance**

- Not applicable, this product is a mixture.

3.2 Mixture

- Formula HF

Hazardous Ingredients and Impurities

Chemical Name	Identification number CAS-No.	Concentration [%]
Hydrogen fluoride	7664-39-3	49

SECTION 4: First aid measures**4.1 Description of first-aid measures****General advice**

- Call a physician immediately.
- Take victim immediately to hospital.

In case of inhalation

- In case of accident by inhalation: remove casualty to fresh air and keep at rest.
- Oxygen or artificial respiration if needed.
- Victim to lie down in the recovery position, cover and keep him warm.
- Call a physician immediately.
- Take victim immediately to hospital.

In case of skin contact

- Call a physician immediately.
- Take victim immediately to hospital.
- Take off contaminated clothing and shoes immediately.
- Wash off with plenty of water.
- First treatment with calcium gluconate paste.
- Rinse with lukewarm running water.
- Please make sure that hospital staff is aware of the unique characteristics of injuries caused by HF exposures and the fact that the systemic toxic effects of the exposure will require prompt serum monitoring of fluorides, calcium, magnesium and sodium, and calcium replacement by infusion.

In case of eye contact

- Immediate medical attention is required.
- Take victim immediately to hospital.
- Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
- In the case of difficulty of opening the lids, administer an analgesic eye wash (oxybuprocaine).

In case of ingestion

- Call a physician immediately.
- Take victim immediately to hospital.
- If victim is conscious:
- Rinse mouth with water.
- Give to drink a 1% aqueous calcium gluconate solution.
- Do NOT induce vomiting.
- Artificial respiration and/or oxygen may be necessary.

4.2 Most important symptoms and effects, both acute and delayed**In case of inhalation****Symptoms**

- Breathing difficulties
- sore throat
- Nose bleeding

Effects

- Inhalation of vapors is irritating to the respiratory system, may cause throat pain and cough.
- Aspiration may cause pulmonary edema and pneumonitis.
- risk of hypocalcemia with nervous problems (tetany) and cardiac arrhythmia

Repeated or prolonged exposure

- chronic bronchitis

In case of skin contact**Symptoms**

- Irritation
- Redness
- Swelling of tissue
- Burn

Effects

- Causes severe burns.
- Risk of shock.
- Risk of hypocalcemia following the extent of the lesions.

In case of eye contact**Symptoms**

- Lachrymation
- Redness
- Swelling of tissue
- Burn

Effects

- May cause permanent eye injury.
- May cause blindness.

In case of ingestion**Symptoms**

- Nausea
- Bloody vomiting
- Abdominal pain
- Diarrhea
- Cough
- Severe shortness of breath

Effects

- If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the esophagus and the stomach.
- Risk of throat (o)edema and suffocation.
- Risk of chemical pneumonitis from product inhalation.
- risk of hypocalcemia with nervous problems (tetany) and cardiac arrhythmia
- Risk of convulsions, loss of consciousness, deep coma and cardiopulmonary arrest.

4.3 Indication of any immediate medical attention and special treatment needed**Notes to physician**

- Please make sure that hospital staff is aware of the unique characteristics of injuries caused by HF exposures and the fact that the systemic toxic effects of the exposure will require prompt serum monitoring of fluorides, calcium, magnesium and sodium, and calcium replacement by infusion.
- Immediately apply calcium gluconate gel 2.5% and massage into the affected area using rubber gloves; continue to massage while repeatedly applying gel until 15 minutes after pain is relieved.
- HF-Antidote Gel from IPS Healthcare is recommended as treatment for injuries from hydrofluoric acid.

SECTION 5: Firefighting measures**Flash point**

Not applicable

<u>Autoignition temperature</u>	Not applicable
<u>Flammability / Explosive limit</u>	no data available

5.1 Extinguishing media

Suitable extinguishing media

- Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media

- Water may be ineffective.

5.2 Special hazards arising from the substance or mixture

Specific hazards during fire fighting

- The product is not flammable.
- Not combustible.
- Hazardous decomposition products formed under fire conditions.
- Gives off hydrogen by reaction with metals.

Hazardous combustion products:

- Hydrogen

5.3 Advice for firefighters

Special protective equipment for fire-fighters

- Wear self-contained breathing apparatus and protective suit.
- Wear chemical resistant oversuit
- Special protective actions for fire-fighters
- In case of fire, use water spray.
- Keep product and empty container away from heat and sources of ignition.
- Cool containers/tanks with water spray.
- Keep from any possible contact with water.
- Approach from upwind.

Further information

- Suppress (knock down) gases/vapors/mists with a water spray jet.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel

- Immediately evacuate personnel to safe areas.
- Keep people away from and upwind of spill/leak.

Advice for emergency responders

- Wear self-contained breathing apparatus and protective suit.
- Suppress (knock down) gases/vapors/mists with a water spray jet.
- Avoid spraying the leak source.
- Ventilate the area.
- Prevent further leakage or spillage if safe to do so.
- Keep away from incompatible products

6.2 Environmental precautions

- Discharge into the environment must be avoided.
- If the product contaminates rivers and lakes or drains inform respective authorities.
- Prevent product from entering sewage system.

6.3 Methods and materials for containment and cleaning up

- Prevent product from entering sewage system.
- Dilute with water.
- Contact with water may produce heat release and presents risks of splashing.
- Keep in properly labeled containers.
- Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

- Refer to protective measures listed in sections 7 and 8.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

- Use only in well-ventilated areas.
- Used in closed system
- Use only clean and dry utensils.
- Keep away from water.
- Preferably transfer by pump or gravity.
- Avoid inhalation, ingestion and contact with skin and eyes.
- Keep away from incompatible products

Hygiene measures

- Ensure that eyewash stations and safety showers are close to the workstation location.
- Take off contaminated clothing and shoes immediately.
- Wash contaminated clothing before re-use.
- May not get in touch with:
 - Leather
- Wash hands before breaks and at the end of workday.
- Handle in accordance with good industrial hygiene and safety practice.

7.2 Conditions for safe storage, including any incompatibilities

Technical measures/Storage conditions

- Keep container tightly closed.
- Keep in a cool, well-ventilated place.
- Keep away from heat.
- Prevent spreading over a wide area (e.g. by containment or oil barriers).
- Information about special precautions needed for bulk handling is available on request.

- Keep away from:
 - Incompatible products

Packaging material

Suitable material

- Steel drum
- Coated steels.

- Plastic drum
- Polyethylene

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Unsuitable material

- glass

7.3 Specific end use(s)

- Contact your supplier for additional information

SECTION 8: Exposure controls/personal protection

Introductory Remarks: These recommendations provide general guidance for handling this product. Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. Assistance with selection, use and maintenance of worker protection equipment is generally available from equipment manufacturers.

8.1 Control parameters**Components with workplace occupational exposure limits**

Ingredients	Value type	Value	Basis
Hydrogen fluoride	TWA	0.5 ppm	American Conference of Governmental Industrial Hygienists
			Danger of cutaneous absorption Expressed as :Fluorine
Hydrogen fluoride	C	2 ppm	American Conference of Governmental Industrial Hygienists
			Danger of cutaneous absorption Expressed as :Fluorine
Hydrogen fluoride	TWA	3 ppm 2.5 mg/m3	National Institute for Occupational Safety and Health
Hydrogen fluoride	C	6 ppm 5 mg/m3	National Institute for Occupational Safety and Health
			15 minute ceiling value
Hydrogen fluoride			Occupational Safety and Health Administration - Table Z-1 Limits for Air Contaminants
			See Table Z-2 Expressed as :Fluorine
Hydrogen fluoride	TWA	3 ppm	Occupational Safety and Health Administration - Table Z-2
			Z37.28-1969

NIOSH IDLH (Immediately Dangerous to Life or Health Concentrations)

Ingredients	CAS-No.	Concentration
Hydrogen fluoride	7664-39-3	30 ppm

Biological Exposure Indices

Ingredients	Value type	Value	Basis
Hydrogen fluoride	BEI	2 mg/l Fluoride Urine Prior to shift (16 hours after exposure ceases)	American Conference of Governmental Industrial Hygienists

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Version : 1.02 / US (Z8)



Hydrogen fluoride	BEI	3 mg/l Fluoride Urine End of shift (As soon as possible after exposure ceases)	American Conference of Governmental Industrial Hygienists
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8.2 Exposure controls

Control measures

Engineering measures

- Provide appropriate exhaust ventilation at machinery.
- Apply technical measures to comply with the occupational exposure limits.

Individual protection measures

Respiratory protection

- Use only respiratory protection that conforms to international/ national standards.
- Use NIOSH approved respiratory protection.
- In the case of dust or aerosol formation use respirator with an approved filter.
- Respirator with a full face mask.
- Self-contained breathing apparatus in confined spaces/insufficient oxygen/in case of large uncontrolled emissions/in all circumstances when the mask and cartridge do not give adequate protection.
- Use respirator when performing operations involving potential exposure to vapor of the product.

Hand protection

- Heat insulating gloves
- Impervious gloves
- Take note of the information given by the producer concerning permeability and break through times, and of special workplace conditions (mechanical strain, duration of contact).

Suitable material

- Fluoroelastomer

Eye protection

- Chemical resistant goggles must be worn.
- If splashes are likely to occur, wear:
- Face-shield

Skin and body protection

- Complete suit protecting against chemicals
- Boots
- Do not wear leather shoes.

Hygiene measures

- Ensure that eyewash stations and safety showers are close to the workstation location.
- Take off contaminated clothing and shoes immediately.
- Wash contaminated clothing before re-use.
- May not get in touch with:
- Leather
- Wash hands before breaks and at the end of workday.
- Handle in accordance with good industrial hygiene and safety practice.

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SECTION 9: Physical and chemical properties

Physical and Chemical properties here represent typical properties of this product. Contact the business area using the Product information phone number in Section 1 for its exact specifications.

9.1 Information on basic physical and chemical properties

<u>Appearance</u>	<u>Physical state:</u> liquid <u>Color:</u> colorless colorless
<u>Odor</u>	pungent
<u>Odor Threshold</u>	no data available
<u>pH</u>	< 1.0
<u>Freezing point</u>	-33.0 °F (-36.1 °C)
<u>Boiling point/boiling range</u>	223 °F (106 °C)
<u>Flash point</u>	Not applicable
<u>Evaporation rate (Butylacetate = 1)</u>	no data available
<u>Flammability (solid, gas)</u>	Not applicable
<u>Flammability (liquids)</u>	The product is not flammable.
<u>Flammability / Explosive limit</u>	<u>Explosiveness:</u> With certain materials (see section 10).
<u>Autoignition temperature</u>	Not applicable
<u>Vapor pressure</u>	23.03 mmHg (30.70 hPa) (68 °F (20 °C))
<u>Vapor density</u>	no data available
<u>Density</u>	<u>Bulk density:</u> Not applicable
<u>Solubility</u>	<u>Water solubility :</u> completely miscible, Reacts violently with water.
<u>Partition coefficient: n-octanol/water</u>	Not applicable
<u>Thermal decomposition</u>	no data available
<u>Viscosity</u>	no data available
<u>Explosive properties</u>	no data available
<u>Oxidizing properties</u>	Not applicable

9.2 Other information

Molecular weight 20 g/mol

SECTION 10: Stability and reactivity**10.1 Reactivity**

- Reacts violently with water.
- Risk of explosion.

10.2 Chemical stability

- Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

- Corrosive in contact with metals, Gives off hydrogen by reaction with metals.

10.4 Conditions to avoid

- Exposure to moisture.

10.5 Incompatible materials

- Water
- glass
- Metals
- Strong bases
- Alkali metals

10.6 Hazardous decomposition products

- Hydrogen

SECTION 11: Toxicological information**11.1 Information on toxicological effects****Acute toxicity****Acute oral toxicity**

LD100 : 80 mg/kg - Guinea pig
Test substance: 2 % solution

Acute inhalation toxicity

LC50 - 1 h 2240 - 2340 ppm - Rat
Test substance: gas

**Acute dermal toxicity
sodium fluoride**

LD 10 : ca. 300 mg/kg - Mouse

**Acute toxicity (other routes of
administration)**

no data available

Skin corrosion/irritation

Corrosive

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Serious eye damage/eye irritation

sodium fluoride	Rabbit Eye irritation
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Respiratory or skin sensitization

sodium fluoride	not sensitizing
-----------------	-----------------

Mutagenicity**Genotoxicity in vitro**

sodium fluoride	In vitro tests did not show mutagenic effects
-----------------	---

Genotoxicity in vivo

sodium fluoride	In vivo tests did not show mutagenic effects
-----------------	--

Carcinogenicity

	no data available
--	-------------------

This product does not contain any ingredient designated as probable or suspected human carcinogens by:

NTP
IARC
OSHA
ACGIH

Toxicity for reproduction and development**Toxicity to reproduction / fertility**

sodium fluoride	Rat NOAEL parent: 10 - 14 mg/kg
	Rabbit NOAEL parent: 14 mg/kg not significant Developmental Toxicity

Developmental Toxicity/Teratogenicity	no data available
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STOT

STOT-single exposure	no data available
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STOT-repeated exposure	Inhalation Prolonged exposure - Rat Test substance: gas Target Organs: Cardio-vascular system, Nervous system observed effect
	Inhalation - Rat Target Organs: Respiratory system, Kidney, Liver, Testes observed effect gas

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Aspiration toxicity no data available

Further information corrosive effects
Liver and kidney injuries may occur.
Chronic exposure may entail dental or skeletal fluorosis
The carcinogenic effect is not demonstrated in human
risk of effect to:
toxic effects for reproduction

SECTION 12: Ecological information**12.1 Toxicity****Aquatic Compartment**

Acute toxicity to fish
sodium fluoride LC50 - 96 h : 51 mg/l - Fishes, Salmo gairdneri
static test
Fresh water

Acute toxicity to daphnia and other aquatic invertebrates.
sodium fluoride EC50 - 48 h : 26 mg/l - Daphnia magna (Water flea)
Fresh water
EC50 - 96 h : 10.5 mg/l - Daphnia magna (Water flea)
salt water

Chronic toxicity to fish
sodium fluoride NOEC: 4 mg/l - 21 Days - Oncorhynchus mykiss (rainbow trout)
static test
Fresh water

Chronic toxicity to daphnia and other aquatic invertebrates.
sodium fluoride NOEC: 8.9 mg/l - 21 Days - Daphnia magna (Water flea)
static test
Fresh water

12.2 Persistence and degradability**Abiotic degradation**

Photodegradation neutralization by natural alkalinity
Medium
Air

Biodegradation

Biodegradability The methods for determining the biological degradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential

Bioconcentration factor (BCF) Does not bioaccumulate.

12.4 Mobility in soil

Adsorption potential (Koc)

Water
Solubility(ies)
Mobility

Soil/sediments
potential adsorption
pH
fluorides

Air
mobility as solid aerosols

12.5 Results of PBT and vPvB assessment no data available

12.6 Other adverse effects no data available

Ecotoxicity assessment

Acute aquatic toxicity
sodium fluoride Harmful to aquatic organisms.

Chronic aquatic toxicity
sodium fluoride . low chronic toxicity.

Remarks No data is available on the product itself., Ecological data therefore refers only to the effects of the decomposition products., Harmful to aquatic organisms., Nevertheless, hazard for the environment is limited due to product properties: . low chronic toxicity., Product fate is highly dependent on environmental conditions: pH, temperature, redox potential, mineral and organic content of the medium ,...

SECTION 13: Disposal considerations**13.1 Waste treatment methods****Product Disposal**

- or

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Waste Code

- Environmental Protection Agency
- Hazardous Waste – YES
- RCRA Hazardous Waste (40 CFR 302)
- Corrosive waste – (C)

Advice on cleaning and disposal of packaging

- Clean container with water.
- The empty and clean containers are to be reused in conformity with regulations.
- To avoid treatments, as far as possible, use dedicated containers.

SECTION 14: Transport information

Transportation status: IMPORTANT! Statements below provide additional data on listed transport classification. The listed Transportation Classification does not address regulatory variations due to changes in package size, mode of shipment or other regulatory descriptors.

DOT

14.1 UN number	UN 1790
14.2 Proper shipping name	HYDROFLUORIC ACID
14.3 Transport hazard class	8
Subsidiary hazard class	6.1
Label(s)	8 (6.1)
14.4 Packing group	
Packing group	II
ERG No	157
14.5 Environmental hazards	NO
Marine pollutant	

14.6 Special precautions for user

This product contains one or more ingredients identified as a hazardous substance in Appendix A of 49 CFR 172.101. The product quantity, in one package, which triggers the RQ requirements under 49 CFR for each hazardous substance is shown.

Reportable quantities : RQ substance: Hydrogen fluoride
RQ limit for substance: 100 lb
RQ limit for product: 201.08 lb

TDG

14.1 UN number	UN 1790
14.2 Proper shipping name	HYDROFLUORIC ACID
14.3 Transport hazard class	8
Subsidiary hazard class	6.1
Label(s)	8 (6.1)

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14.4 Packing group

Packing group	II
ERG No	157

14.5 Environmental hazards

Marine pollutant	NO
------------------	----

NOM

no data available

IMDG

14.1 UN number	UN 1790
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14.2 Proper shipping name	HYDROFLUORIC ACID
----------------------------------	-------------------

14.3 Transport hazard class	8
Subsidiary hazard class	6.1
Label(s)	8 (6.1)

14.4 Packing group

Packing group	II
---------------	----

14.5 Environmental hazards

Marine pollutant	NO
------------------	----

14.6 Special precautions for user

EmS	F-A , S-B
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For personal protection see section 8.

IATA

14.1 UN number	UN 1790
-----------------------	---------

14.2 Proper shipping name	HYDROFLUORIC ACID
----------------------------------	-------------------

14.3 Transport hazard class	8
Subsidiary hazard class:	6.1
Label(s):	8 (6.1)

14.4 Packing group

Packing group	II
---------------	----

Packing instruction (cargo aircraft)	855
Max net qty / pkg	30.00 L
Packing instruction (passenger aircraft)	851
Max net qty / pkg	1.00 L

14.5 Environmental hazards	NO
-----------------------------------	----

14.6 Special precautions for user

For personal protection see section 8.

Note: The above regulatory prescriptions are those valid on the date of publication of this sheet. Given the possible evolution of transportation regulations for hazardous materials, it would be advisable to check their validity with your sales office.

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SECTION 15: Regulatory information**15.1 Notification status**

Inventory Information	Status
United States TSCA Inventory	Listed on Inventory
Mexico INSQ (INSQ)	In compliance with the inventory
Canadian Domestic Substances List (DSL)	Listed on Inventory
New Zealand. Inventory of Chemical Substances	In compliance with the inventory
Australia Inventory of Chemical Substances (AICS)	Listed on Inventory
Japan. CSCL - Inventory of Existing and New Chemical Substances	One or more components not listed on inventory
Korea. Korean Existing Chemicals Inventory (KECI)	Listed on Inventory
China. Inventory of Existing Chemical Substances in China (IECSC)	Listed on Inventory
Philippines Inventory of Chemicals and Chemical Substances (PICCS)	Listed on Inventory

15.2 Federal Regulations**US. EPA EPCRA SARA Title III****SARA HAZARD DESIGNATION SECTIONS 311/312 (40 CFR 370)**

Fire Hazard	no
Reactivity Hazard	no
Sudden Release of Pressure Hazard	no
Acute Health Hazard	yes
Chronic Health Hazard	yes

Section 313 Toxic Chemicals (40 CFR 372.65)

The following components are subject to reporting levels established by SARA Title III, Section 313:

Ingredients	CAS-No.	Concentration
Hydrogen fluoride	7664-39-3	49 %

Section 302 Emergency Planning Extremely Hazardous Substance Threshold Planning Quantity (40 CFR 355)

The following components are subject to reporting levels established by SARA Title III, Section 302:

Ingredients	CAS-No.	Threshold planning quantity	Remarks
Hydrogen fluoride	7664-39-3	100 lb	

Section 302 Emergency Planning Extremely Hazardous Substance Reportable Quantity (40 CFR 355)

Ingredients	CAS-No.	Reportable quantity
Hydrogen fluoride	7664-39-3	100 lb

Section 304 Emergency Release Notification Reportable Quantity (40 CFR 355)

Ingredients	CAS-No.	Reportable quantity
Hydrogen fluoride	7664-39-3	100 lb

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US. EPA CERCLA Hazardous Substances and Reportable Quantities (40 CFR 302.4)

Ingredients	CAS-No.	Reportable quantity
Hydrogen fluoride	7664-39-3	100 lb

15.3 State Regulations**US. California Safe Drinking Water & Toxic Enforcement Act (Proposition 65)**

This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

SECTION 16: Other information**NFPA (National Fire Protection Association) - Classification**

Health	4 severe
Flammability	0 minimal
Instability or Reactivity	1 slight
Special Notices	None

HMIS (Hazardous Materials Identification System (Paint & Coating)) - Classification

Health	4 severe
Flammability	0 minimal
Reactivity	1 slight
PPE	Determined by User; dependent on local conditions

Further information

- Environmental Protection Agency (EPA) requirements for a Risk Management Plan must be followed anytime at least 1000 lbs. of Hydrogen fluoride/Hydrofluoric acid (conc 50% or greater) are used or stored. Refer to 40 CFR 68.150 for specific details.
- Occupational Safety and Health Administration (OSHA) requirements for process safety management must be followed anytime at least 1000 lbs. of Hydrogen Fluoride are used or stored. Refer to 29 CFR 1910.119 for specific details.
- Product evaluated under the US GHS format.

Date Prepared: 04/01/2015

Key or legend to abbreviations and acronyms used in the safety data sheet

- C	Ceiling limit
- STEL	Short-term exposure limit
- TWA	8-hour, time-weighted average
- ACGIH	American Conference of Governmental Industrial Hygienists
- OSHA	Occupational Safety and Health Administration
- NTP	National Toxicology Program
- IARC	International Agency for Research on Cancer
- NIOSH	National Institute for Occupational Safety and Health

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information, and belief at the date of its publication. Such information is only given as a guidance to help the user handle, use, process, store, transport, dispose, and release the product in satisfactory safety conditions and is not to be considered as a warranty or quality specification. It should be used in conjunction with technical sheets but do not replace them. Thus, the information only relates to the designated specific product and may not be applicable if such product is used in combination with other materials or in another manufacturing process, unless otherwise specifically indicated. It does not release the user from ensuring he is in conformity with all regulations linked to its activity.



TCI AMERICA

SAFETY DATA SHEET

Revision number: 1
Revision date: 11/19/2013

1. IDENTIFICATION

Product name: 1-Hydroxyethane-1,1-diphosphonic Acid (ca. 60% in Water, ca. 4.2mol/L)
Product code: H0587

Product use: For laboratory research purposes.
Restrictions on use: Not for drug or household use.

Company:
TCI America
9211 N. Harborage Street
Portland, OR 97203 U.S.A.
Telephone:
+1-800-423-8616 / +1-503-283-1681
Fax:
+1-888-520-1075 / +1-503-283-1987
e-mail:
sales@tciamerica.com
www.TCIchemicals.com

Emergency telephone number:
Chemical Emergencies:
TCI America (8:00am - 5:00pm) PST
+1-503-286-7624
Transportation Emergencies:
Chemtrec 24-Hour
+1-800-424-9300 (U.S.A.)
+1-703-527-3887 (International)
Responsible department:
TCI America
Environmental Health Safety and Security
+1- 503-286-7624

2. HAZARD(S) IDENTIFICATION

OSHA Haz Com: CFR 1910.1200: Eye Damage/Irritation [Category 1]
Corrosive to Metals [Category 1]
Skin Corrosion/Irritation [Category 1C]

Signal word: Danger!

Hazard Statement(s): Causes serious eye damage
Causes severe skin burns and eye damage
May be corrosive to metals

Pictogram(s) or Symbol(s):



Precautionary Statement(s):
[Prevention]

[Response]

[Storage]
[Disposal]

Do not breathe dusts or mists. Use only outdoors or in a well-ventilated area. Wear protective gloves, protective clothing, eye protection and face protection. Wear eye protection. Wear face protection (full length face shield). Keep only in original container.
If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. Wash contaminated clothing before reuse. If inhaled: Remove person to fresh air and keep comfortable for breathing. Immediately call a poison center or doctor. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Absorb spillage to prevent material damage.
Store locked up. Store in corrosive resistant container with a resistant inner liner.
Dispose of contents and container in accordance with US EPA guidelines for the classification and determination of hazardous waste listed in 40 CFR 261.3. (See Section 13)

Hazards not otherwise classified: [HNOC] May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/Mixture:	Mixture
Components:	1-Hydroxyethane-1,1-diphosphonic Acid (ca. 60% in Water, ca. 4.2mol/L)
Percent:
CAS Number:	2809-21-4
Molecular Weight:	206.03
Chemical Formula:	C ₂ H ₆ O ₇ P ₂
Synonyms:	1-Hydroxyethylidene-1,1-diphosphonic Acid , Etidronic Acid

4. FIRST-AID MEASURES

Inhalation:	Immediately call a poison center or doctor. Effects of exposure (inhalation) to substance may be delayed. Move victim to fresh air. Give artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult. Keep victim warm and quiet. Treat symptomatically and supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
Skin contact:	For severe burns, immediate medical attention is required. Immediately call a poison center or doctor. Remove and wash contaminated clothing before re-use. In case of contact with substance, immediately flush skin with running water for at least 20 minutes. Treat symptomatically and supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
Eye contact:	IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. Eye contact with vapors or substance may cause severe injury, burns, or death. Call emergency medical service. Move victim to fresh air. Check for and remove any contact lenses. Keep victim warm and quiet. Treat symptomatically and supportively. Effects of exposure to substance may be delayed. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
Ingestion:	Do not induce vomiting with out medical advice. Call a physician or Poison Control Center immediately. Do not use mouth-to-mouth method if victim ingested the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Loosen tight clothing such as a collar, tie, belt or waistband. If a person vomits place them in the recovery position so that vomit will not reenter the mouth and throat. Rinse mouth. Keep victim warm and quiet. Treat symptomatically and supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
Symptoms/effects:	
Acute:	Pain. Redness.
Delayed:	No data available
Immediate medical attention:	WARNING: It might be hazardous to the person providing aid to give mouth-to-mouth respiration, because the inhaled material is corrosive. For severe burns, immediate medical attention is required. If breathing has stopped, perform artificial respiration. Use first aid treatment according to the nature of the injury. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: Dry chemical, CO₂ or water spray. Consult with local fire authorities before attempting large scale fire fighting operations.

Specific hazards arising from the chemical

Hazardous combustion products: These products include: Carbon oxides Phosphates
Other specific hazards: Closed containers may explode from heat of a fire.

Special precautions for fire-fighters:

Use water spray or fog; do not use straight streams. Dike fire-control water for later disposal; do not scatter the material. Containers may explode when heated. Move containers from fire area if you can do it without risk.

Special protective equipment for fire-fighters:

Wear positive pressure self-contained breathing apparatus (SCBA). Structural fire fighters' protective clothing provides limited protection in fire situations ONLY; it may not be effective in spill situations. Wear chemical protective clothing which is specifically recommended by the manufacturer. It may provide little or no thermal protection.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Avoid contact with skin, eyes, and clothing. Keep people away from and upwind of spill/leak. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing (Section 8). Warn unnecessary personnel to move away. Stop leak if you can do it without risk. Ensure adequate ventilation. Isolate the hazard area and deny entry to unnecessary and unprotected personnel.

Personal protective equipment: Wear eye protection (splash goggles) and face protection (full length face shield). Lab coat. Vapor respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent. Wear protective gloves (nitrile).

6. ACCIDENTAL RELEASE MEASURES

Emergency procedures: In case of a spill and/or a leak, always shut off any sources of ignition, ventilate the area, and exercise caution. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Warn personnel to move away. Prevent entry into sewers, basements or confined areas; dike if needed.

Methods and materials for containment and cleaning up:

ELIMINATE all ignition sources (no smoking, flares, sparks, or flames in immediate area). Stop leak if without risk. Absorb with an inert material and put the spilled material in an appropriate waste disposal container. Use clean non-sparking tools to collect absorbed material. Ventilate the area.

Environmental precautions:

Prevent further leakage or spillage if safe to do so. Water runoff can cause environmental damage. Prevent entry into sewers, basements or confined areas; dike if needed.

7. HANDLING AND STORAGE

Precautions for safe handling: Do NOT breath gas, fumes, vapor, or spray. Manipulate under an adequate fume hood. Avoid contact with skin and eyes. May corrode metallic surfaces. Good general ventilation should be sufficient to control airborne levels. Keep container dry. Handle and open container with care. Wear suitable protective clothing, gloves and eye/face protection. When using do not eat, drink, or smoke. Keep away from sources of ignition.

Conditions for safe storage: Store in corrosive resistant container with a resistant inner liner. Keep containers tightly closed in a cool, well-ventilated place. Store locked up. Keep away from incompatibles. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Avoid prolonged storage periods.

Storage incompatibilities: Bases, Store away from oxidizing agents

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure limits: No data available

Appropriate engineering controls:

Good general ventilation should be sufficient to control airborne levels. Ventilation is normally required when handling or using this product. Eyewash fountains should be provided in areas where there is any possibility that workers could be exposed to the substance. Follow safe industrial engineering/laboratory practices when handling any chemical.

Personal protective equipment

Respiratory protection: Vapor respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent.

Hand protection: Nitrile gloves.

Eye protection: Wear eye protection (splash goggles) and face protection (full length face shield).

Skin and body protection: Wear protective clothing (lab coat and chemical resistant boots).

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state (20°C): Liquid
Form: Clear
Color: Colorless - Yellow
Odor: No data available
Odor threshold: No data available

Melting point/freezing point:	-40°C (-40°F)	pH:	No data available
Boiling point/range:	105°C (221°F)	Vapor pressure:	<3.2kPa/25°C
Decomposition temperature:	No data available	Vapor density:	No data available
Relative density:	1.45	Dynamic Viscosity:	No data available
Kinematic viscosity:	No data available	Evaporation rate:	No data available
Partition coefficient:	-2.54	(Butyl Acetate = 1)	

Flash point:	No data available	Autoignition temperature:	No data available
Flammability (solid, gas):	No data available	Flammability or explosive limits:	
		Lower:	No data available
		Upper:	No data available

Solubility(ies):

10. STABILITY AND REACTIVITY

Reactivity: Corrodes in contact with metals.
Chemical Stability: Stable under recommended storage conditions. (See Section 7)

10. STABILITY AND REACTIVITY

Possibility of Hazardous Reactions: No hazardous reactivity has been reported.
Conditions to avoid: Avoid excessive heat and light.
Incompatible materials: Oxidizing agents
Hazardous Decomposition Products: No data available

11. TOXICOLOGICAL INFORMATION

RTECS Number: SZ8562100

Acute Toxicity:
ori-mus LD50:1800 mg/kg

Skin corrosion/irritation:
No data available

Serious eye damage/irritation:
No data available

Respiratory or skin sensitization:
No data available

Germ cell mutagenicity:
No data available

Carcinogenicity:
No data available

IARC: No data available

NTP: No data available

OSHA: No data available

Reproductive toxicity:
scu-mus TDLo:200 mg/kg(13D preg)

ipr-mus TDLo:200 mg/kg(7D preg)

Routes of Exposure: Inhalation, Eye contact, Ingestion, Skin contact.

Symptoms related to exposure:
Skin contact may produce burns. Skin contact may result in inflammation; characterized by itching, scaling, reddening, or occasionally blistering. Eye contact can result in corneal damage or blindness. Overexposure may result in serious illness or death.

Potential Health Effects:
May be harmful if inhaled or ingested. Overexposure may result in serious illness or death.
Target organ(s): No data available

12. ECOLOGICAL INFORMATION

Ecotoxicity

Fish: No data available
Crustacea: No data available
Algae: No data available

Persistence and degradability: No data available
Bioaccumulative potential (BCF): No data available
Mobility in soil: No data available
**Partition coefficient:
n-octanol/water (log P_{ow}):** -2.54
Soil adsorption (K_{oc}): No data available
**Henry's Law:
constant (PaM³/mol):** 9.9 x 10⁻²¹

13. DISPOSAL CONSIDERATIONS

Disposal of product: Recycle to process if possible. It is the generator's responsibility to comply with Federal, State and Local rules and regulations. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. This section is intended to provide assistance but does not replace these laws, nor does compliance in accordance with this section ensure regulatory compliance according to the law. US EPA guidelines for Identification and Listing of Hazardous Waste are listed in 40 CFR Parts 261. The product should not be allowed to enter the environment, drains, water ways, or the soil.

13. DISPOSAL CONSIDERATIONS

Disposal of container: Dispose of as unused product. Do not re-use empty containers.
Other considerations: Observe all federal, state and local regulations when disposing of the substance.

14. TRANSPORT INFORMATION

DOT (US)
UN number: UN3265 Proper Shipping Name: Corrosive liquid, acidic, organic, n.o.s. Class or Division: 8 Corrosive material Packing Group: III

IATA
UN number: UN3265 Proper Shipping Name: Corrosive liquid, acidic, organic, n.o.s. Class or Division: 8 Corrosive material Packing Group: III

IMDG
UN number: UN3265 Proper Shipping Name: Corrosive liquid, acidic, organic, n.o.s. Class or Division: 8 Corrosive material Packing Group: III

EmS number: F-A, S-B

15. REGULATORY INFORMATION

Toxic Substance Control Act (TSCA 8b.):
This product is ON the EPA Toxic Substances Control Act (TSCA) inventory.

US Federal Regulations

CERCLA Hazardous substance and Reportable Quantity:
SARA 313: Not Listed
SARA 302: Not Listed

State Regulations

State Right-to-Know

Massachusetts: Not Listed
New Jersey: Not Listed
Pennsylvania: Not Listed
California Proposition 65: Not Listed

Other Information

NFPA Rating: **HMIS Classification:**
Health: 2 Health: 2
Flammability: 0 Flammability: 0
Instability: 0 Physical: 0

International Inventories

WHMIS hazard class: E: Corrosive material,
EC-No: 220-552-8
Notice Through Official Gazettes Reference Number: (Japan)
ENCS: (2)-2936

16. OTHER INFORMATION

Revision date: 11/19/2013
Revision number: 1

16. OTHER INFORMATION

TCI chemicals are for research purposes only and are NOT intended for use as drugs, food additives, households, or pesticides. The information herein is believed to be correct, but does not claim to be all inclusive and should be used only as a guide. Neither the above named supplier nor any of its affiliates or subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All chemical reagents must be handled with the recognition that their chemical, physiological, toxicological, and hazardous properties have not been fully investigated or determined. All chemical reagents should be handled only by individuals who are familiar with their potential hazards and who have been fully trained in proper safety, laboratory, and chemical handling procedures. Although certain hazards are described herein, we can not guarantee that these are the only hazards which exist. Our SDS are based only on data available at the time of shipping and are subject to change without notice as new information is obtained. Avoid long storage periods since the product is subject to degradation with age and may become more dangerous or hazardous. It is the responsibility of the user to request updated SDS for products that are stored for extended periods. Disposal of unused product must be undertaken by qualified personnel who are knowledgeable in all applicable regulations and follow all pertinent safety precautions including the use of appropriate protective equipment (e.g. protective goggles, protective clothing, breathing equipment, face mask, fume hood). For proper handling and disposal, always comply with federal, state and local regulations.



TOKYO CHEMICAL INDUSTRY CO., LTD.

Hydroxylamine (50% in Water)

Revision number: 6.3

Revision date: 09/16/2014

Page 1 of 5

Revision date: 09/16/2014

SAFETY DATA SHEET

1. IDENTIFICATION

Product name: Hydroxylamine (50% in Water)
Product code: H1223
Company: TOKYO CHEMICAL INDUSTRY CO., LTD.
Address: 4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Responsible department: Global Business Department
Telephone: +81-3-5640-8872
Fax: +81-3-5640-8902
e-mail: globalbusiness@TCIchemicals.com
Revision number: 6.3

2. HAZARDS IDENTIFICATION

GHS classification

PHYSICAL HAZARDS

Corrosive to metals Category 1

HEALTH HAZARDS

Acute toxicity (Oral) Category 4

Acute toxicity (Dermal) Category 4

Skin corrosion/irritation Category 1C

Serious eye damage/eye irritation Category 2A

Skin sensitization Category 1

Carcinogenicity Category 2

Specific target organ toxicity Blood, Nervous system

- Single exposure [Category 2]

Specific target organ toxicity Respiratory tract irritation

- Single exposure [Category 3]

Specific target organ toxicity Liver, Blood, Nervous system

- Repeated exposure [Category 2]

ENVIRONMENTAL HAZARDS

Acute aquatic hazard Category 1

GHS label elements, including precautionary statements

Pictograms or hazard symbols



Signal word

Danger

Hazard statements

May be corrosive to metals
Harmful if swallowed or in contact with skin
Causes severe skin burns and eye damage
Causes serious eye irritation
May cause an allergic skin reaction
Suspected of causing cancer
May cause damage to organs : Blood Nervous system
May cause damage to organs through prolonged or repeated exposure : Liver Blood Nervous system
May cause respiratory irritation
Very toxic to aquatic life

Precautionary statements:

2. HAZARDS IDENTIFICATION**[Prevention]**

Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep only in original container.
Do not breathe dust/fume/gas/mist/vapours/spray.
Use only outdoors or in a well-ventilated area.
Avoid release to the environment.
Do not eat, drink or smoke when using this product.
Contaminated work clothing should not be allowed out of the workplace.
Wash hands thoroughly after handling.

[Response]

Wear protective gloves and eye/face protection.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists: Get medical advice/attention.
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
If skin irritation or rash occurs: Get medical advice/attention.
Wash contaminated clothing before reuse.
Immediately call a POISON CENTER or doctor/physician.
Absorb spillage to prevent material damage.
Collect spillage.
Store in a well-ventilated place. Keep container tightly closed.
Store locked up.
Dispose of contents/container through a waste management company authorized by the local government.

[Storage]**[Disposal]****3. COMPOSITION/INFORMATION ON INGREDIENTS**

Substance/mixture: Mixture
Components: Hydroxylamine (50% in Water)
Percent:
CAS Number: 7803-49-8
Chemical Formula: H₃NO
Notice Through Official Gazettes Reference Number
ENCS: (1)-375
ISHL: Official announcement chemistry substance.

4. FIRST-AID MEASURES

Inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/physician.
Skin contact: Remove/Take off immediately all contaminated clothing. Gently wash with plenty of soap and water. Immediately call a POISON CENTER or doctor/physician.
Eye contact: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.
Ingestion: Immediately call a POISON CENTER or doctor/physician. Rinse mouth. Do NOT induce vomiting.
Protection of first-aiders: A rescuer should wear personal protective equipment, such as rubber gloves and air-tight goggles.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: Dry chemical, foam, water spray, carbon dioxide.
Specific hazards arising from the chemical: Explosion risk in case of fire. Fight fire remotely due to the risk of explosion.

5. FIRE-FIGHTING MEASURES

Precautions for firefighters: Fire-extinguishing work is done from the windward and the suitable fire-extinguishing method according to the surrounding situation is used. Uninvolved persons should evacuate to a safe place. In case of fire in the surroundings: Keep containers cool by spraying with water. Eliminate all ignition sources if safe to do so.

Special protective equipment for firefighters: When extinguishing fire, be sure to wear personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Use extra personal protective equipment (self-contained breathing apparatus). Keep people away from and upwind of spill/leak. Ensure adequate ventilation. Entry to non-involved personnel should be controlled around the leakage area by roping off, etc.

Environmental precautions: Be careful not to let it flow into rivers, etc., since adverse effects on the environment are concerned.

Methods and materials for containment and cleaning up: Absorb spilled material in a suitable absorbent (e.g. rag, dry sand, earth, saw-dust). In case of large amount of spillage, contain a spill by bunding. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

7. HANDLING AND STORAGE**Precautions for safe handling**

Technical measures: Handling is performed in a well ventilated place. Wear suitable protective equipment. Be careful not to cause leakage, overflow, or dispersion. Steam should not be generated unnecessarily. Keep away from heat/sparks/open flame/hot surfaces. -No smoking. Take measures to prevent the build up of electrostatic charge. Use explosion-proof equipment. Avoid shock and friction. Wash hands and face before breaks and immediately after handling the product.

Use a closed system if possible. Use a ventilation, local exhaust if vapour or aerosol will be generated.

Advice on safe handling: Avoid all contact!
May develop pressure. Open carefully.
Use corrosive resistant equipment.

Conditions for safe storage, including any incompatibilities

Storage conditions: Keep container tightly closed. Store in a refrigerator.
Store locked up.
Be sure not to give the container unexpected impacts, such as falling down or falling off.
Store away from incompatible materials such as oxidizing agents.
Heat-sensitive

Packaging material: Comply with laws. Keep only in original container.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls: Install a closed system or local exhaust. Also install safety shower and eye bath.

Control parameters: Not set up

Personal protective equipment

Respiratory protection: Half or full facepiece respirator, self-contained breathing apparatus(SCBA), supplied air respirator, etc. Use respirators approved under appropriate government standards and follow local and national regulations.

Hand protection: Impervious gloves.

Eye protection: Safety goggles. A face-shield, if the situation requires.

Skin and body protection: Impervious protective clothing. Protective boots, if the situation requires.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state (20°C): Liquid

Form: Clear

Colour: Colorless - Almost colorless

Odour: No data available

pH: No data available

Melting point/freezing point: 8°C

9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling point/range:	No data available
Flash point:	No data available
Flammability or explosive limits:	
Lower:	No data available
Upper:	No data available
Relative density:	1.12
Solubility(ies):	
[Water]	No data available
[Other solvents]	No data available
Log Pow:	-1.5

10. STABILITY AND REACTIVITY

Chemical stability:	Stable under proper conditions.
Possibility of hazardous reactions:	May explosively decompose on heating, shock, friction, etc.
Conditions to avoid:	Heat, Shock, Friction
Incompatible materials:	Oxidizing agents, Acids, Bases, Reducing agents, Metal ions, Heavy metals, Iron
Hazardous decomposition products:	carbon monoxide, carbon dioxide etc.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity:	ipr-rat LD50:59 mg/kg
Skin corrosion/irritation:	No data available
Serious eye damage/irritation:	No data available
Germ cell mutagenicity:	mno-sat 5 pph (+S9) cyt-hmn-leu 25 mg/L
Carcinogenicity:	
IARC =	No data available
NTP =	No data available
Reproductive toxicity:	No data available
RTECS Number:	NC2975000

12. ECOLOGICAL INFORMATION

Ecotoxicity:	
Fish:	No data available
Crustacea:	No data available
Algae:	No data available
Persistence / degradability:	No data available
Bioaccumulative potential(BCF):	No data available
Mobility in soil	
Log Pow:	-1.5
Soil adsorption (Koc):	14
Henry's Law constant(PaM³/mol):	7.0 x 10 ⁻⁴

13. DISPOSAL CONSIDERATIONS

Recycle to process, if possible. Consult your local regional authorities and an expert of disposal. You may be able to dissolve or mix material with a combustible solvent and little by little burn in a chemical incinerator equipped with an afterburner and scrubber system. If a large amount of the substance is burned at a time, an explosion may occur. Observe all federal, state and local regulations when disposing of the substance.

14. TRANSPORT INFORMATION

Hazards Class:	8: Corrosive.
UN-No:	3266
Proper shipping name:	Corrosive liquid, basic, inorganic, n.o.s.

14. TRANSPORT INFORMATION

Packing group: III
Marine pollutant Y

15. JAPANESE REGULATORY INFORMATION

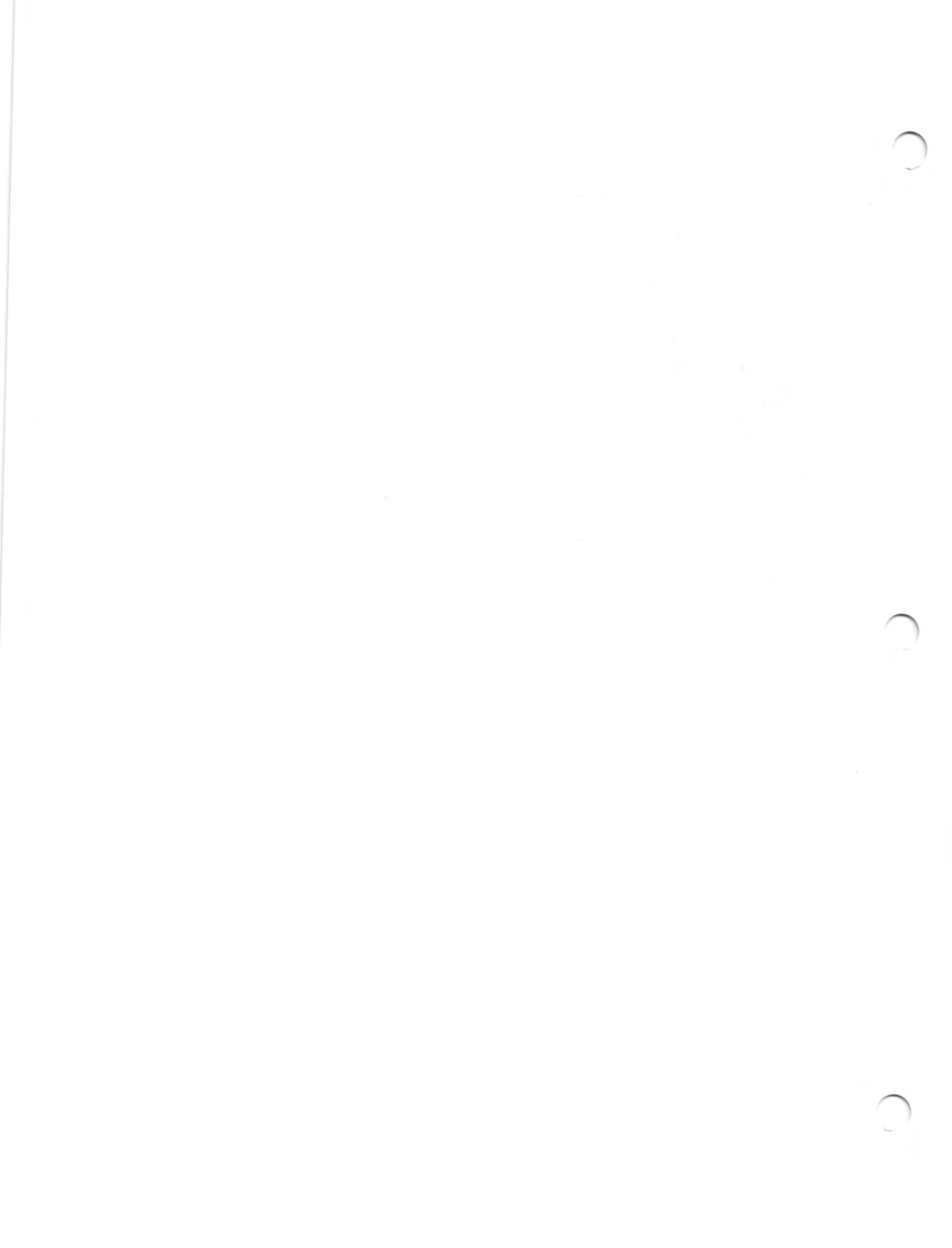
Fire Defense Law: Class-5 Hydroxylamine Dangerous grade 2 Type-2 Self-reactive substance
Poisonous and Deleterious Substances Control Law: on Deleterious Substances List.
ENCS: Priority Assessment Chemical Substance
Law for safety of vessels: Hazardous materials notification, Schedule form No.1 Corrosive substance
Water Pollution Control Law: Designated Substance

16. OTHER INFORMATION**The reference company name of written contents**

Company: TOKYO CHEMICAL INDUSTRY CO., LTD.
Address: 4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Department: Global Business Department
Telephone: +81-3-5640-8872
Fax: +81-3-5640-8902

This SDS was prepared sincerely on the basis of the information we could obtained, however, any warranty shall not be given regarding the data contained and the assessment of hazards and toxicity. Prior to use, please investigate not only the hazards and toxicity information but also the laws and regulations of the organization, area and country where the products are to be used, which shall be given the first priority.

The products are supposed to be used promptly after purchase in consideration of safety. Some new information or amendments may be added afterwards. If the products are to be used far behind the expected time of use or you have any questions, please feel free to contact us. The stated cautions are for normal handling only. In case of special handling, sufficient care should be taken, in addition to the safety measures suitable for the situation. All chemical products should be treated with the recognition of "having unknown hazards and toxicity", which differ greatly depending on the conditions and handling when in use and/or the conditions and duration of storage. The products must be handled only by those who are familiar with specialized knowledge and have experience or under the guidance of those specialists throughout use from opening to storage and disposal. Safe usage conditions shall be set up on each user's own responsibility.



SAFETY DATA SHEET

According to JIS Z 7253:2012

Revision Date 09-Apr-2014

Version 1

Section 1: PRODUCT AND COMPANY IDENTIFICATION

Product name	2-Propanol
Product code	161-25021
CAS No	67-63-0
Formula	(CH ₃) ₂ CHOH
Manufacturer	Wako Pure Chemical Industries, Ltd 1-2 Doshomachi 3-Chome, Chuo-ku, Osaka 540-8605, Japan Phone: +81 (0)6-6203-3741 Fax: +81 (0)6-6203-5964
Supplier	Wako Pure Chemical Industries, Ltd 1-2 Doshomachi 3-Chome, Chuo-ku, Osaka 540-8605, Japan Phone: +81 (0)6-6203-3741 Fax: +81 (0)6-6203-5964
Emergency telephone number	+81-6-6203-3741 / +81-3-3270-8571
Recommended uses and restrictions on use	For research purposes

Section 2: HAZARDS IDENTIFICATION

GHS classification

Classification of the substance or mixture

Flammable liquids

Category 2 -(H225)

Aspiration toxicity

Category 2 - (H305)

Serious eye damage/eye irritation

Category 2A - (H319)

Reproductive Toxicity

Category 2 - (H361)

Specific target organ toxicity (single exposure)

Category 1 - (H370,H335)

Category 1 Central Nervous System, kidneys, systemic toxicity

Category 3 Respiratory tract irritation

Specific target organ toxicity (repeated exposure)

Category 2 - (H373)

Category 2 Blood system, liver, spleen

Pictograms



Signal word

Danger

Hazard statements

H225 - Highly flammable liquid and vapor

H319 - Causes serious eye irritation

H305 - May be harmful if swallowed and enters airways

H335 - May cause respiratory irritation

H361 - Suspected of damaging fertility or the unborn child

H370 - Causes damage to the following organs: Central Nervous System, kidneys, systemic toxicity

H373 - May cause damage to the following organs through prolonged or repeated exposure: Blood system, liver, spleen

Precautionary statements-(Prevention)

- Obtain special instructions before use
- Do not handle until all safety precautions have been read and understood
- Use personal protective equipment as required
- Wash face, hands and any exposed skin thoroughly after handling
- Do not breathe dust/fume/gas/mist/vapors/spray
- Do not eat, drink or smoke when using this product
- Keep away from heat/sparks/open flames/hot surfaces. — No smoking
- Keep container tightly closed
- Ground/bond container and receiving equipment
- Use explosion-proof electrical/ventilating/lighting/equipment
- Use only non-sparking tools
- Take precautionary measures against static discharge

Precautionary statements-(Response)

- IF exposed: Call a POISON CENTER or doctor/physician
- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
- If eye irritation persists: Get medical advice/attention
- IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
- In case of fire: Use CO₂, dry chemical, or foam for extinction

Precautionary statements-(Storage)

- Store in a well-ventilated place. Keep cool

Precautionary statements-(Disposal)

- Dispose of contents/container to an approved waste disposal plant

Others

Other hazards Not available

Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

Single Substance or Mixture Substance
Formula (CH₃)₂CHOH

Chemical Name	Weight-%	Molecular weight	ENCS	ISHL No.	CAS No
2-Propanol	99.9	60.10	(2)-207	2-(8)-319	67-63-0

Impurities and Stabilizing additives No
which constitute the substance

Section 4: FIRST AID MEASURES

Inhalation

Remove to fresh air If symptoms persist, call a physician

Skin contact

Wash skin with soap and water

Eye contact

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing Immediate medical attention is required

Ingestion

Rinse mouth Never give anything by mouth to an unconscious person Call a physician or poison control center immediately Do not induce vomiting without medical advice

Protection of first-aiders

Use personal protective equipment as required

Section 5: FIRE FIGHTING MEASURES

Suitable extinguishing media

Dry chemical, CO₂, water spray or alcohol-resistant foam

Unsuitable extinguishing media

No information available

Special extinguishing method

No information available

Specific hazards arising from the chemical product

Thermal decomposition can lead to release of irritating and toxic gases and vapors.

Protection of fire-fighters

Use personal protective equipment as required Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear

Section 6: ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

For indoor, provide adequate ventilation process until the end of working. Deny unnecessary entry other than the people involved by, for example, using a rope. While working, wear appropriate protective equipments to avoid adhering it on skin, or inhaling the gas. Work from windward, and retract the people downwind.

Environmental precautions

To be careful not discharged to the environment without being properly handled waste water contaminated

Methods and materials for contaminant and methods and materials for cleaning up

Absorb dry sand, earth, sawdust and the waste. Collect empty container that can be sealed. Please wash the rest with plenty of water.

Recovery, neutralization

No information available

Secondary disaster prevention measures

Clean contaminated objects and areas thoroughly observing environmental regulations

Section 7: HANDLING AND STORAGE

Handling**Technical measures**

Highly flammable. Avoid contact with high temperature objects, spark, and strong oxidizing agents. Use with local exhaust ventilation.

Precautions

Do not rough handling containers, such as upsetting, falling, giving a shock, and dragging. Prevent leakage, overflow, and scattering. Not to generate steam and dust in vain. Seal the container after use. After handling, wash hands and face, and then gargle. In places other than those specified, should not be smoking or eating and drinking. Should not be brought contaminated protective equipment and gloves to rest stops. Deny unnecessary entry of non-emergency personnel to the handling area.

Safety handling precautions

Use personal protective equipment as required

Storage**Safe storage conditions****Storage conditions**

Keep container protect from light, store in well-ventilated place at room temperature (preferably cool). Keep container tightly closed.

Safe packaging material

Glass

Incompatible substances

Strong oxidizing agents, Acids, Acid anhydrides, Aluminum

Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls

For indoor, provide adequate ventilation process until the end of working. Deny unnecessary entry other than the people involved by, for example, using a rope. While working, wear appropriate protective equipments to avoid adhering it on skin, or inhaling the gas. Work from windward, and retract the people downwind.

Control parameters

200 ppm

Exposure limits

Chemical Name	Japan	ISHL Working Environmental Evaluation Standards - Administrative Control Levels	ACGIH
2-Propanol 67-63-0	400ppm (980g/m ³)	N/A	STEL: 400 ppm TWA: 200 ppm

Personal protective equipment

Respiratory protection	gas mask for organic gas
Hand protection	Impermeable protective gloves
Eye protection	protective eyeglasses or chemical safety goggles
Skin and body protection	Long-sleeved work clothes, protective boots
General hygiene considerations	No information available

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

Form	colorless clear liquid
Odor	characteristic odor
pH	
Melting point/freezing point	-88 °C
Boiling point, initial boiling point and boiling range	82 °C
Flash point	12 °C / 54 °F (CC)
Evaporation rate:	No data available
Flammability (solid, gas):	No data available
Upper/lower flammability or explosive limits	
Upper :	No data available
Lower :	No data available
Vapour pressure	59 hPa
Vapour density	2.07 (air = 1)
Specific Gravity (relative density)	0.784 - 0.786 g/ml (20°C)
Solubilities	water , ethanol , diethyl ether : Very soluble
n-Octanol/water partition coefficient: (log Pow)	No data available
Auto-ignition temperature:	460 °C / 860 °F
Decomposition temperature:	No data available
Viscosity (coefficient of viscosity)	No data available
Dynamic viscosity	No data available

Section 10: STABILITY AND REACTIVITY

Stability

Stability	altered by light.
Reactivity	No data available
Hazardous reactions	None under normal processing
Conditions to avoid	Extremes of temperature and direct sunlight, Heat, flames and sparks, static electricity, spark
Incompatible materials	Strong oxidizing agents, Acids, Acid anhydrides, Aluminum
Hazardous decomposition products	Carbon monoxide (CO), carbon dioxide (CO ₂)

Section 11: TOXICOLOGICAL INFORMATION

Acute toxicity

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
2-Propanol	5280 mg/kg (Rat)	12870 mg/kg (Rabbit)	16000 ppm (Rat) 8 h

Component	Acute toxicity -oral- source information	Acute toxicity -Dermal- source information	Acute toxicity -inhalation gas-source information
2-Propanol 67-63-0 (99.9)	LD50(ori, rat): 5280 mg/kg (EHC(1990) 、 SIDS(1997)) 、 LD50(ori, rat): 5500 mg/kg (EHC(1990) 、 SIDS(1997) 、 CERIHazard Data Collection(1999)) 、 LD50(ori, rat): 5480 mg/kg (EHC(1990) 、 PATTY(1994)) 、 LD50(ori, rat): 4710 mg/kg (EHC(1990) 、 PATTY(1994) 、 SIDS(1997)) 、 LD50(ori, rat): 1870 mg/kg (CERIHazard Data Collection(1999))	LD50(skn, rabbit): 12870 mg/kg (EHC(1990) 、 PATTY(1994) 、 SIDS(1997)) 、 CERIハザードデータ集(1999)) 、 LD50(skn, rabbit): 4059 mg/kg (CERIハザードデータ集(1999))	Acute toxicity -inhalation gas-source 232

Component	Acute toxicity -inhalation vapor-source information	Acute toxicity -inhalation dust-source information	Acute toxicity -inhalation mist-source information
2-Propanol 67-63-0 (99.9)	Acute toxicity -inhalation vapor-source 419	Acute toxicity -inhalation dust-source 2	Acute toxicity -inhalation mist-source 2

Skin irritation/corrosion

Component	Skin corrosion irritation source information
2-Propanol 67-63-0 (99.9)	Skin corrosion irritation source 1202

Serious eye damage/ irritation

Component	Serious eye damage source information
2-Propanol 67-63-0 (99.9)	Serious eye damage source 1210

Respiratory or skin sensitization

Component	Respiratory, Skin sensitization source information
2-Propanol 67-63-0 (99.9)	Respiratory, Skin sensitization source 791

Reproductive cell mutagenicity

Component	Mutagenic source information
2-Propanol 67-63-0 (99.9)	Mutagenic Source 1250

Carcinogenicity

Component	Carcinogenicity source information
2-Propanol 67-63-0 (99.9)	Carcinogenicity information source 854

Reproductive toxicity

Component	Reproductive toxicity source information
2-Propanol 67-63-0 (99.9)	Reproductive toxicity source 902

STOT-single exposure

Component	STOT -single exposure- source information
2-Propanol 67-63-0 (99.9)	STOT -single exposure- source 1167

STOT-repeated exposure

Component	STOT -repeated exposure- source information
2-Propanol 67-63-0 (99.9)	STOT -repeated exposure- source 1191

Aspiration hazard

Component	Aspiration Hazard source information
2-Propanol 67-63-0 (99.9)	Aspiration Hazard source 145

Section 12: ECOLOGICAL INFORMATION**Ecotoxicity**

Chemical Name	Algae/aquatic plants	Fish	Crustacea
2-Propanol	EC50:Desmodesmus subspicatus 1000 mg/L 72 h	LC50: Orange-red killifish >100mg/L 96h	EC50:Daphnia magna 13299 mg/L 48 h

Other data

Component	Aquatic toxicity -Acute- source information	Aquatic toxicity -Chronic- source information
2-Propanol 67-63-0 (99.9)	LC50 (Oryzias latipes) :>100mg/L/96h (Ministry of the Environment ecological effects test. 1997) .	Aquatic toxicity -chronic- source26

Persistence and degradability	No information available
Bioaccumulative potential	No information available
Mobility in soil	No information available
Hazard to the ozone layer	No information available

Section 13: DISPOSAL CONSIDERATIONS

Waste from residues

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Contaminated container and contaminated packaging

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Section 14: TRANSPORT INFORMATION

ADR/RID

UN number	UN1219
Proper shipping name:	Isopropanol
UN classification	3
Subsidiary hazard class	
Labels	3
Packing group	II
ERG Code	3L
Marine pollutant	No

IMDG

UN number	UN1219
Proper shipping name:	Isopropanol
UN classification	3
Subsidiary hazard class	
Packing group	II
EmS-No	F-E, S-D
Marine pollutant (Sea)	No

IATA

UN number	UN1219
Proper shipping name:	Isopropanol
UN classification	3
Subsidiary hazard class	
Packing group	II
Environmentally Hazardous Substance	No

Section 15: REGULATORY INFORMATION

International Inventories

EINECS/ELINCS	Listed
TSCA	Listed

Japanese regulations

Fire Service Act	Category IV, alcohols, dangerous grade 2 water-soluble
Poisonous and Deleterious Substances Control Law	No
Industrial Safety and Health Act	Harmful Substances Whose Names Are to be Indicated on the Label (Law Art.57, Para.1, Enforcement Order Art.18), Notifiable Substances (Law Art.57-2, Enforcement Order Art.18-2 Attached Table No.9, and Law Art.56-1), Class 2 Organic Solvents, Dangerous Substances - Flammable Substance (Enforcement Order Attached Table 1 Item 4), Working Environment Evaluation Standards, Administrative Control Levels (Law Art.65-2, Para.1)
Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc	Priority Assessment Chemical Substances (Law Article 2, Para.5)
Regulations for the carriage and storage of dangerous goods in ship	Flammable Liquids (Ordinance Art.3, Ministry of Transportation Ordinance Regarding Transport by Ship and Storage, Attached Table 1)
Civil Aeronautics Law	Flammable Liquids (Ordinance Art.194, MITL Notification for Air Transportation of Explosives etc., Attached Table 1)
Marine Pollution Prevention Law	
Pollutant Release and Transfer Register Law	No
Water Pollution Control Act	No
Gunpowder Control Law	No
High Pressure Gas Safety Law	No
ETCO	Not applicable

Section 16: OTHER INFORMATION

Literature and references

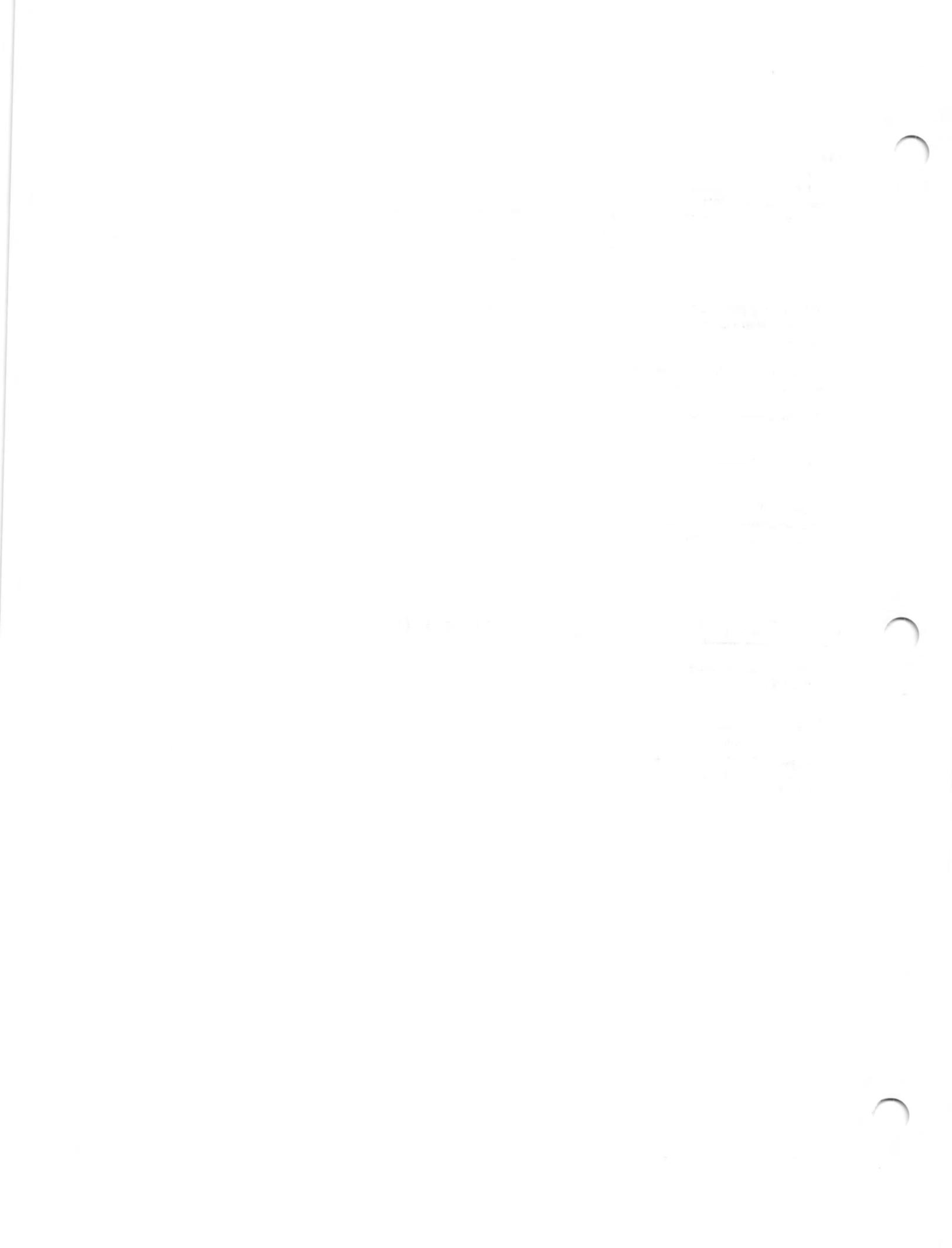
Revision Note No information available

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

GHS Classification is according to JIS Z7252(2010). *JIS: Japanese Industrial Standards

End of Safety Data Sheet



1 Identification

Product identifier

Product name: Magnesium nitrate hydrate, Puratronic®

Stock number: 10799

CAS Number:

10377-60-3

EC number:

233-826-7

Relevant identified uses of the substance or mixture and uses advised against.

Identified use: SU24 Scientific research and development

Details of the supplier of the safety data sheet

Manufacturer/Supplier:

Alfa Aesar

Thermo Fisher Scientific Chemicals, Inc.

30 Bond Street

Ward Hill, MA 01835-8099

Tel: 800-343-0660

Fax: 800-322-4757

Email: tech@alfa.com

www.alfa.com

Information Department: Health, Safety and Environmental Department

Emergency telephone number:

During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660. After normal business hours, call Carechem 24 at (866) 928-0789.

2 Hazard(s) identification

Classification of the substance or mixture in accordance with 29 CFR 1910 (OSHA HCS)



GHS03 Flame over circle

Ox. Sol. 2 H272 May intensify fire; oxidizer.



GHS07

Skin Irrit. 2 H315 Causes skin irritation.

Eye Irrit. 2A H319 Causes serious eye irritation.

STOT SE 3 H335 May cause respiratory irritation.

Hazards not otherwise classified No information known.

Label elements

GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)

Hazard pictograms



GHS03 GHS07

Signal word Danger

Hazard statements

H272 May intensify fire; oxidizer.

H315 Causes skin irritation.

H319 Causes serious eye irritation.

H335 May cause respiratory irritation.

Precautionary statements

P221 Take any precaution to avoid mixing with combustibles.

P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P220 Keep/Store away from clothing/combustible materials.

P261 Avoid breathing dust/fume/gas/mist/vapours/spray.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P362 Take off contaminated clothing and wash before reuse.

P405 Store locked up.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

WHMIS classification

C - Oxidizing materials

D2B - Toxic material causing other toxic effects



Classification system

HMIS ratings (scale 0-4)

(Hazardous Materials Identification System)

HEALTH 1 Health (acute effects) = 1

FIRE 0 Flammability = 0

REACTIVITY 2 Physical Hazard = 2

Other hazards

Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

3 Composition/information on ingredients

Chemical characterization: Substances

CAS# Description:

10377-60-3 Magnesium nitrate hydrate

Product name: **Magnesium nitrate hydrate, Puratronic®**

Concentration: ≤100%
Identification number(s):
EC number: 233-826-7

(Contd. of page 1)

4 First-aid measures

Description of first aid measures

After inhalation

Supply fresh air. If required, provide artificial respiration. Keep patient warm.
Seek immediate medical advice.

After skin contact

Immediately wash with water and soap and rinse thoroughly.
Seek immediate medical advice.

After eye contact Rinse opened eye for several minutes under running water. Then consult a doctor.

After swallowing Seek medical treatment.

Information for doctor

Most important symptoms and effects, both acute and delayed

Causes skin irritation.

Causes serious eye irritation.

May cause respiratory irritation.

Indication of any immediate medical attention and special treatment needed No further relevant information available.

5 Fire-fighting measures

Extinguishing media

Suitable extinguishing agents Carbon dioxide, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

For safety reasons unsuitable extinguishing agents Halocarbon extinguisher

Special hazards arising from the substance or mixture

This substance is an oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition.

If this product is involved in a fire, the following can be released:

Nitrogen oxides (NO_x)

Magnesium oxide

Advice for firefighters

Protective equipment:

Wear self-contained respirator.

Wear fully protective impervious suit.

6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

Wear protective equipment. Keep unprotected persons away.

Ensure adequate ventilation

Environmental precautions: Do not allow product to reach sewage system or any water course.

Methods and material for containment and cleaning up: Ensure adequate ventilation.

Prevention of secondary hazards:

Acts as an oxidizing agent on organic materials such as wood, paper and fats

Keep away from combustible material.

Reference to other sections

See Section 7 for information on safe handling

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

7 Handling and storage

Handling

Precautions for safe handling

Handle under dry protective gas.

Keep container tightly sealed.

Store in cool, dry place in tightly closed containers.

Ensure good ventilation at the workplace.

Information about protection against explosions and fires:

Substance/product can reduce the ignition temperature of flammable substances.

This substance is an oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition.

Conditions for safe storage, including any incompatibilities

Storage

Requirements to be met by storerooms and receptacles: No special requirements.

Information about storage in one common storage facility:

Store away from flammable substances.

Store away from reducing agents.

Do not store with organic materials.

Store away from metal powders.

Store away from water/moisture.

Further information about storage conditions:

Store under dry inert gas.

This product is hygroscopic.

Keep container tightly sealed.

Store in cool, dry conditions in well sealed containers.

Protect from humidity and water.

Specific end use(s) No further relevant information available.

8 Exposure controls/personal protection

Additional information about design of technical systems:

Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Control parameters

Components with limit values that require monitoring at the workplace:

The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.

Additional information: No data

Exposure controls

Personal protective equipment

General protective and hygienic measures

The usual precautionary measures for handling chemicals should be followed.

Keep away from foodstuffs, beverages and feed.

Remove all soiled and contaminated clothing immediately.

(Contd. on page 3)
USA

Product name: **Magnesium nitrate hydrate, Puratronic®**

(Contd. of page 2)

Wash hands before breaks and at the end of work.
Avoid contact with the eyes and skin.
Maintain an ergonomically appropriate working environment.
Breathing equipment: Use suitable respirator when high concentrations are present.
Recommended filter device for short term use:
Use a respirator with type P100 (USA) or P3 (EN 143) cartridges as a backup to engineering controls. Risk assessment should be performed to determine if air-purifying respirators are appropriate. Only use equipment tested and approved under appropriate government standards.
Protection of hands:
Impervious gloves
Check protective gloves prior to each use for their proper condition.
The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.
Eye protection: Safety glasses
Body protection: Protective work clothing.

9 Physical and chemical properties

Information on basic physical and chemical properties

General Information

Appearance:

Form: Crystalline aggregates
Odor: Odorless
Odor threshold: Not determined.

pH-value: Not applicable.

Change in condition

Melting point/Melting range: 89 °C (192 °F)
Boiling point/Boiling range: 330 °C (626 °F) (dec)
Sublimation temperature / start: Not determined
Flammability (solid, gaseous) Contact with combustible material may cause fire.
Ignition temperature: Not determined
Decomposition temperature: Not determined
Auto igniting: Not determined.

Danger of explosion:

Explosion limits: Not determined.

Lower:

Not determined

Upper:

Not determined

Vapor pressure:

Not applicable.

Density at 20 °C (68 °F):

1.46 g/cm³ (12.184 lbs/gal)

Relative density

Not determined.

Vapor density

Not applicable.

Evaporation rate

Not applicable.

Solubility in / Miscibility with

Water: Soluble

Partition coefficient (n-octanol/water): Not determined.

Viscosity:

dynamic: Not applicable.

kinematic: Not applicable.

Other information No further relevant information available.

10 Stability and reactivity

Reactivity May intensify fire; oxidizer.

Chemical stability Stable under recommended storage conditions.

Thermal decomposition / conditions to be avoided: Decomposition will not occur if used and stored according to specifications.

Possibility of hazardous reactions

Reacts with reducing agents

Reacts with flammable substances

Conditions to avoid No further relevant information available.

Incompatible materials:

Flammable substances

Reducing agents

Water/moisture

Organic materials

Metal powders

Hazardous decomposition products:

Nitrogen oxides

Magnesium oxide

11 Toxicological information

Information on toxicological effects

Acute toxicity: No effects known.

LD/LC50 values that are relevant for classification: No data

Skin irritation or corrosion: Causes skin irritation.

Eye irritation or corrosion: Causes serious eye irritation.

Sensitization: No sensitizing effects known.

Germ cell mutagenicity: No effects known.

Carcinogenicity: No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.

Reproductive toxicity: No effects known.

Specific target organ system toxicity - repeated exposure: No effects known.

Specific target organ system toxicity - single exposure: May cause respiratory irritation.

Aspiration hazard: No effects known.

Subacute to chronic toxicity: No effects known.

Additional toxicological information: To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

Carcinogenic categories

OSHA-Ca (Occupational Safety & Health Administration) Substance is not listed.

12 Ecological information

Toxicity

Aquatic toxicity: No further relevant information available.

Persistence and degradability No further relevant information available.

Bioaccumulative potential No further relevant information available.

(Contd. on page 4)
USA

Product name: **Magnesium nitrate hydrate, Puratronic®**

(Contd. of page 3)

Mobility in soil No further relevant information available.

Additional ecological information:

General notes:

Do not allow undiluted product or large quantities to reach ground water, water course or sewage system.

Avoid transfer into the environment.

Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

Other adverse effects No further relevant information available.

13 Disposal considerations

Waste treatment methods

Recommendation Consult state, local or national regulations to ensure proper disposal.

Uncleaned packagings:

Recommendation: Disposal must be made according to official regulations.

Recommended cleansing agent: Water, if necessary with cleansing agents.

14 Transport information

UN-Number

DOT, IMDG, IATA

UN1474

UN proper shipping name

DOT

IMDG, IATA

Magnesium nitrate
MAGNESIUM NITRATE

Transport hazard class(es)

DOT



Class

Label

Class

Label

IMDG, IATA

5.1 Oxidising substances.

5.1

5.1 (O2) Oxidizing substances

5.1



Class

Label

5.1 Oxidising substances.

5.1

Packing group

DOT, IMDG, IATA

III

Environmental hazards:

Not applicable.

Special precautions for user

EMS Number:

Warning: Oxidizing substances
F-A,S-Q

Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code Not applicable.

Transport/Additional information:

DOT

Marine Pollutant (DOT):

No

UN "Model Regulation":

UN1474, Magnesium nitrate, 5.1, III

15 Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture

GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)

Hazard pictograms



GHS03 GHS07

Signal word Danger

Hazard statements

H272 May intensify fire; oxidizer.

H315 Causes skin irritation.

H319 Causes serious eye irritation.

H335 May cause respiratory irritation.

Precautionary statements

P221 Take any precaution to avoid mixing with combustibles.

P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P220 Keep/Store away from clothing/combustible materials.

P261 Avoid breathing dust/fume/gas/mist/vapours/spray.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P362 Take off contaminated clothing and wash before reuse.

P405 Store locked up.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

National regulations

All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.

All components of this product are listed on the Canadian Domestic Substances List (DSL).

SARA Section 313 (specific toxic chemical listings) Substance is not listed.

California Proposition 65

Prop 65 - Chemicals known to cause cancer Substance is not listed.

Prop 65 - Developmental toxicity Substance is not listed.

Prop 65 - Developmental toxicity, female Substance is not listed.

(Contd. on page 5)
USA

Product name: **Magnesium nitrate hydrate, Puratronic®**

(Contd. of page 4)

Prop 65 - Developmental toxicity, male Substance is not listed.

Information about limitation of use: For use only by technically qualified individuals.

Other regulations, limitations and prohibitive regulations

Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006. Substance is not listed.

The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing on the market and use must be observed.

Substance is not listed.

Annex XIV of the REACH Regulations (requiring Authorisation for use) Substance is not listed.

Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing SDS: Global Marketing Department

Date of preparation / last revision 01/18/2017 / -

Abbreviations and acronyms:

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

EINECS: European Inventory of Existing Commercial Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

HMS: Hazardous Materials Identification System (USA)

WHMIS: Workplace Hazardous Materials Information System (Canada)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

vPvB: very Persistent and very Bioaccumulative

ACGIH: American Conference of Governmental Industrial Hygienists (USA)

OSHA: Occupational Safety and Health Administration (USA)

NTP: National Toxicology Program (USA)

IARC: International Agency for Research on Cancer

EPA: Environmental Protection Agency (USA)

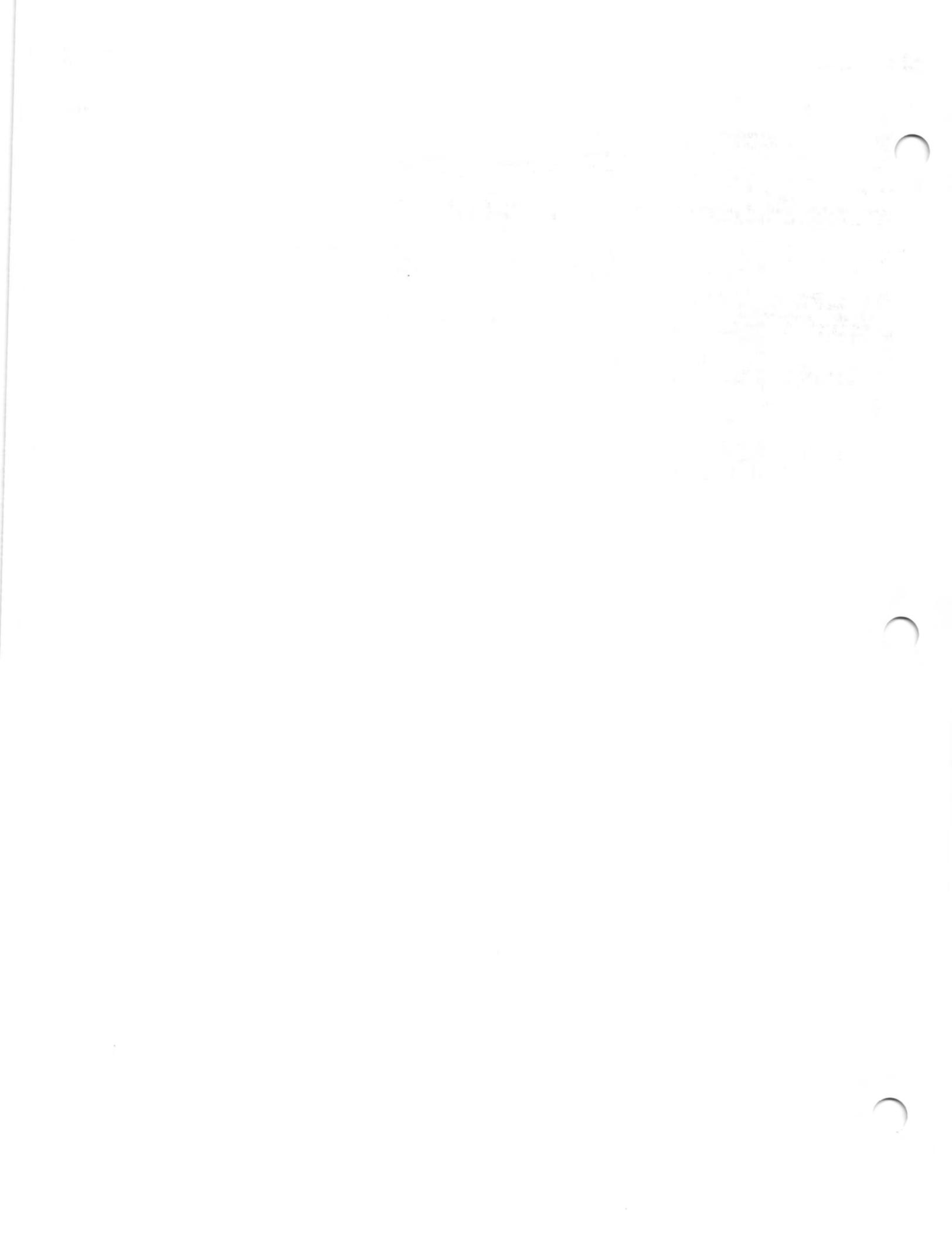
Ox. Sol. 2: Oxidising Solids, Hazard Category 2

Skin Irrit. 2: Skin corrosion/irritation, Hazard Category 2

Eye Irrit. 2A: Serious eye damage/eye irritation, Hazard Category 2A

STOT SE 3: Specific target organ toxicity - Single exposure, Hazard Category 3

USA





TCI Chemicals (India) Pvt. Ltd.

SAFETY DATA SHEET

According to 1907/2006/EC, Article 31

Revision number: 2

Revision date: 03/04/2014

1. IDENTIFICATION

Identification of the substance or preparation

Product name: 5-Methyl-1H-benzotriazole
Product code: M0249

Use of the substance/preparation

Recommended use: Reagents

Company/undertaking identification

TCI Chemicals (India) Pvt. Ltd.
Plot No. B-28, Phase II,
5th Cross Street, MEPZ-SEZ, Tambaram,
Chennai, Tamilnadu - 600045
India
Telephone: +91-44-2262 0909

Emergency telephone number:

+91-44-2262 0909

2. HAZARDS IDENTIFICATION

Indication of danger:

Xn - Harmful.
Xi - Irritant

R-phrases(s)

R22 - Harmful if swallowed.
R36/37/38 - Irritating to eyes, respiratory system and skin.

GHS classification

PHYSICAL HAZARDS

Not classified

HEALTH HAZARDS

Acute toxicity (Oral)

Category 4

Skin corrosion/irritation

Category 2

Serious eye damage/eye irritation

Category 2

ENVIRONMENTAL HAZARDS

Not classified

GHS label elements, including precautionary statements

Pictograms or hazard symbols



Signal word

Warning

Hazard statements

H302-Harmful if swallowed.
H315-Causes skin irritation.
H319-Causes serious eye irritation.

Precautionary statements

[Prevention]

P270-Do not eat, drink or smoke when using this product.
P264-Wash hands thoroughly after handling.

[Response]

P280-Wear protective gloves/eye protection/face protection.
P301+P312-IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
P330-Rinse mouth.
P305+P351+P338-IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313-If eye irritation persists: Get medical advice/attention.
P302+P352-IF ON SKIN: Wash with plenty of soap and water.
P332+P313-If skin irritation occurs: Get medical advice/attention.
P362-Take off contaminated clothing and wash before reuse.

[Disposal]

P501-Dispose of contents/container through a waste management company authorized by the local government

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/mixture: Substance
Components: 5-Methyl-1H-benzotriazole
Percent: >99.0%(T)
CAS Number: 136-85-6
EC-No: 205-265-8

M0249

5-Methyl-1H-benzotriazole

Page 1 of 4

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Formula: $C_7H_7N_3$

4. FIRST AID MEASURES

Inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical advice/attention if you feel unwell.

Skin contact: Remove/Take off immediately all contaminated clothing. Gently wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention.

Eye contact: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

Ingestion: Call a POISON CENTER or doctor/physician if you feel unwell. Rinse mouth.

Protection of first-aiders: A rescuer should wear personal protective equipment, such as rubber gloves and air-tight goggles.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: Dry chemical, foam, water spray, carbon dioxide.

Specific hazards arising from the chemical: Take care as it may decompose upon combustion or in high temperatures to generate poisonous fume.

Precautions for firefighters: Fire-extinguishing work is done from the windward and the suitable fire-extinguishing method according to the surrounding situation is used. Uninvolved persons should evacuate to a safe place. In case of fire in the surroundings: Remove movable containers if safe to do so.

Special protective equipment for firefighters: When extinguishing fire, be sure to wear personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Use personal protective equipment. Keep people away from and upwind of spill/leak. Entry to non-involved personnel should be controlled around the leakage area by roping off, etc.

Environmental precautions: Prevent product from entering drains.

Methods and materials for containment and cleaning up: Sweep dust to collect it into an airtight container, taking care not to disperse it. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

7. HANDLING AND STORAGE

Precautions for safe handling

Technical measures: Handling is performed in a well ventilated place. Wear suitable protective equipment. Prevent dispersion of dust. Wash hands and face thoroughly after handling. Use a local exhaust if dust or aerosol will be generated.

Advice on safe handling: Avoid contact with skin, eyes and clothing.

Conditions for safe storage, including any incompatibilities

Storage conditions: Keep container tightly closed. Store in a refrigerator. Store away from incompatible materials such as oxidizing agents. Heat-sensitive

Packaging material: Comply with laws.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls: Install a closed system or local exhaust as possible so that workers should not be exposed directly. Also install safety shower and eye bath.

Personal protective equipment

Respiratory protection: Dust respirator. Follow local and national regulations.

Hand protection: Protective gloves.

Eye protection: Safety glasses. A face-shield, if the situation requires.

Skin and body protection: Protective clothing. Protective boots, if the situation requires.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state (20°C): Solid

Form: Crystal- Powder

Colour: White - Pale yellow red

Odour: No data available

pH: No data available

Melting point/freezing point: 83°C

Boiling point/range: 323°C

Flash point: No data available (Calculated value:>60°C)

Flammability or explosive limits:

Lower: No data available

Upper: No data available

Relative density: No data available

Solubility(ies):

[Water] Slightly soluble

[Other solvents]

Soluble: Methanol

Slightly soluble: Toluene

10. STABILITY AND REACTIVITY

Chemical stability:	Stable under proper conditions.
Possibility of hazardous reactions:	No special reactivity has been reported.
Incompatible materials:	Oxidizing agents, Strong acids
Hazardous decomposition products:	Carbon monoxide, Carbon dioxide, Nitrogen oxides (NOx)

11. TOXICOLOGICAL INFORMATION

Acute Toxicity:	ori-rat LD50:1600 mg/kg skn-gpg LD50:>1 g/kg
Skin corrosion/irritation:	
Serious eye damage/irritation:	
Germ cell mutagenicity:	
Carcinogenicity:	
Reproductive toxicity:	
RTECS Number:	DM1400000

*We judged that this product was not classified into Class 6.1 Toxic Substance of current edition of IATA Dangerous Goods Regulations (DGR) according to acute toxicity values and/or Quantitative Structure-Activity Relationship (QSAR).

12. ECOLOGICAL INFORMATION

Ecotoxicity:	
Fish:	No data available
Crustacea:	No data available
Algae:	No data available
Persistence / degradability:	No data available
Bioaccumulative potential (BCF):	No data available
Mobility in soil	
Log Pow:	No data available
Soil adsorption (Koc):	No data available
Henry's Law constant (PaM ³ /mol):	No data available

13. DISPOSAL CONSIDERATIONS

Recycle to process, if possible. Consult your local regional authorities. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. Observe all federal, state and local regulations when disposing of the substance.

14. TRANSPORT INFORMATION

UN-No:	Not listed
ADR/RID Hazards Class:	Does not correspond to the classification standard of the United Nations
IMDG/IMO Hazards Class:	Does not correspond to the classification standard of the United Nations
ICAO/IATA Hazards Class:	Does not correspond to the classification standard of the United Nations

This substance is not regulated by IATA/ICAO/ARD/RID/IMO/IMDG and is considered to be Non Hazardous for transport by Air/Rail/Road/Sea

15. REGULATORY INFORMATION

Indication of danger:	
Xn - Harmful.	
Xi - Irritant	
In accordance with local and national regulations	
R-phrases(s)	R22 - Harmful if swallowed. R36/37/38 - Irritating to eyes, respiratory system and skin.
S-phrases(s)	S22 - Do not breathe dust. S26 - In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S36/37/39 - Wear suitable protective clothing, gloves and eye/face protection.

16. OTHER INFORMATION

Prepared by:	TCI Chemicals (India) Pvt. Ltd.
Issue date:	03/04/2014

This SDS was prepared sincerely on the basis of the information we could obtain, however, any warranty shall not be given regarding the data contained and the assessment of hazards and toxicity. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated. Prior to use, please investigate not only the hazards and toxicity information but also the laws and regulations of the organization, area and country where the products are to be used, which shall be given the first priority.

The products are supposed to be used promptly after purchase in consideration of safety. Some new information or amendments may be added afterwards. If the products are to be used far behind the expected time of use or you have any questions, please feel free to contact us. The stated cautions are for normal handling only. In case of special handling, sufficient care should be taken, in addition to the safety measures suitable for the situation. All chemical products should be treated with the recognition of "having unknown hazards and toxicity", which differ greatly depending on the conditions and handling when in use and/or the conditions and duration of storage. The products must be handled only by those who are familiar with specialized knowledge and have experience or under the guidance of those specialists throughout use from opening to storage and disposal. Safe usage conditions shall be set up on each user's own responsibility.



TOKYO CHEMICAL INDUSTRY CO., LTD.

2-(Methylamino)ethanol

Revision 6
number:

Revision date: 12/19/2013

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Revision date: 12/19/2013

SAFETY DATA SHEET

1. IDENTIFICATION

Product name: 2-(Methylamino)ethanol
Product code: M0144
Company: TOKYO CHEMICAL INDUSTRY CO., LTD.
Address: 4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Responsible department: Global Business Department
Telephone: +81-3-5640-8872
Fax: +81-3-5640-8902
e-mail: globalbusiness@TCIchemicals.com
Revision number: 6

2. HAZARDS IDENTIFICATION

GHS classification

PHYSICAL HAZARDS

Flammable liquids Category 4

HEALTH HAZARDS

Acute toxicity (Oral) Category 4

Acute toxicity (Dermal) Category 4

Skin corrosion/irritation Category 1C

Serious eye damage/eye irritation Category 1

ENVIRONMENTAL HAZARDS

Not classified

GHS label elements, including precautionary statements

Pictograms or hazard symbols



Signal word

Danger

Hazard statements

Combustible liquid
Harmful if swallowed or in contact with skin
Causes severe skin burns and eye damage

Precautionary statements:

[Prevention]

Keep away from flames and hot surfaces.
Do not breathe dust/fume/gas/mist/vapours/spray.
Do not eat, drink or smoke when using this product.
Wash hands thoroughly after handling.

[Response]

Wear protective gloves and eye/face protection.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

[Storage]

Wash contaminated clothing before reuse.
Immediately call a POISON CENTER or doctor/physician.
Store in a well-ventilated place. Keep cool.
Store locked up.

[Disposal]

Dispose of contents/container through a waste management company authorized by the local government.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/mixture:	Substance
Components:	2-(Methylamino)ethanol
Percent:	>99.0%(GC)(T)
CAS Number:	109-83-1
Synonyms:	N-Methylethanolamine
Chemical Formula:	C ₃ H ₉ NO
Notice Through Official Gazettes Reference Number	
ENCS:	(2)-295
ISHL:	Official announcement chemistry substance.

4. FIRST-AID MEASURES

Inhalation:	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/physician.
Skin contact:	Remove/Take off immediately all contaminated clothing. Gently wash with plenty of soap and water. Immediately call a POISON CENTER or doctor/physician.
Eye contact:	Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.
Ingestion:	Immediately call a POISON CENTER or doctor/physician. Rinse mouth. Do NOT induce vomiting.
Most important symptoms/effects, acute and delayed:	Sore throat, Cough, Burning sensation, Shortness of breath, Laboured breathing, Abdominal pain, Collapse, Pain, Redness, Blistering, Burn, Loss of vision
Protection of first-aiders:	A rescuer should wear personal protective equipment, such as rubber gloves and air-tight goggles.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media:	Dry chemical, foam, water in large amounts, carbon dioxide.
Specific hazards arising from the chemical:	Take care as it may decompose upon combustion or in high temperatures to generate poisonous fume.
Precautions for firefighters:	Fire-extinguishing work is done from the windward and the suitable fire-extinguishing method according to the surrounding situation is used. Uninvolved persons should evacuate to a safe place. In case of fire in the surroundings: Remove movable containers if safe to do so.
Special protective equipment for firefighters:	When extinguishing fire, be sure to wear personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:	Use extra personal protective equipment (self-contained breathing apparatus). Keep people away from and upwind of spill/leak. Ensure adequate ventilation. Entry to non-involved personnel should be controlled around the leakage area by roping off, etc.
Environmental precautions:	Prevent product from entering drains.
Methods and materials for containment and cleaning up:	Absorb spilled material in a suitable absorbent (e.g. rag, dry sand, earth, saw-dust). In case of large amount of spillage, contain a spill by bunding. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.
Prevention of secondary hazards:	Remove all sources of ignition. Fire-extinguishing devices should be prepared in case of a fire. Use spark-proof tools and explosion-proof equipment.

7. HANDLING AND STORAGE**Precautions for safe handling**

Technical measures:	Handling is performed in a well ventilated place. Wear suitable protective equipment. Prevent generation of vapour or mist. Keep away from flames and hot surfaces. Take measures to prevent the build up of electrostatic charge. Use explosion-proof equipment. Wash hands and face thoroughly after handling. Use a closed system, ventilation.
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7. HANDLING AND STORAGE

Advice on safe handling: Avoid contact with skin, eyes and clothing.

Conditions for safe storage, including any incompatibilities

Storage conditions: Keep container tightly closed. Store in a cool, dark and well-ventilated place.
Store locked up.
Store away from incompatible materials such as oxidizing agents.

Packaging material: Comply with laws.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls: Install a closed system or local exhaust. Also install safety shower and eye bath.

Control parameters: Not set up

Personal protective equipment

Respiratory protection: Half or full facepiece respirator, self-contained breathing apparatus(SCBA), supplied air respirator, etc. Use respirators approved under appropriate government standards and follow local and national regulations.

Hand protection: Impervious gloves.

Eye protection: Safety goggles. A face-shield, if the situation requires.

Skin and body protection: Impervious protective clothing. Protective boots, if the situation requires.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state (20°C): Liquid
Form: Clear
Colour: Colorless - Very pale yellow
Odour: No data available
pH: No data available
Melting point/freezing point: -5°C
Boiling point/range: 156°C
Flash point: 73°C
Flammability or explosive limits:
Lower: 0.9%
Upper: 2.6%
Vapour pressure: 0.93kPa/20°C
Vapour density: 2.6
Relative density: 0.94
Solubility(ies):
[Water] Miscible
[Other solvents]
Miscible: Ether, Alcohols
Autoignition temperature: 350°C

10. STABILITY AND REACTIVITY

Chemical stability: Stable under proper conditions.

Possibility of hazardous reactions: No special reactivity has been reported.

Conditions to avoid: Open flame

Incompatible materials: Oxidizing agents, Acids

Hazardous decomposition products: Carbon monoxide, Carbon dioxide, Nitrogen oxides (NOx)

11. TOXICOLOGICAL INFORMATION

Acute Toxicity: ipr-rat LD50:1330 mg/kg
orl-rat LD50:1391 mg/kg
skn-rbt LD50:1070 uL/kg
scu-mus LD50:1802 mg/kg

Skin corrosion/irritation: No data available

Serious eye damage/irritation: No data available

Germ cell mutagenicity: No data available

11. TOXICOLOGICAL INFORMATION**Carcinogenicity:**

IARC =	No data available
NTP =	No data available
Reproductive toxicity:	No data available
RTECS Number:	KL6650000

12. ECOLOGICAL INFORMATION**Ecotoxicity:**

Fish:	No data available
Crustacea:	No data available
Algae:	No data available
Persistence / degradability:	68% (by BOD), 97% (by TOC), 100% (by HPLC)

*The substance was determined as "Ready biodegradability" under the Chemical Substances Control Law.

Bioaccumulative potential(BCF): No data available

Mobility in soil

Log Pow:	No data available
Soil adsorption (Koc):	No data available
Henry's Law constant(PaM³/mol):	No data available

13. DISPOSAL CONSIDERATIONS

Recycle to process, if possible. Consult your local regional authorities. You may be able to burn in a chemical incinerator equipped with an afterburner and scrubber system. Observe all federal, state and local regulations when disposing of the substance.

14. TRANSPORT INFORMATION

Hazards Class:	8: Corrosive.
UN-No:	2735
Proper shipping name:	Amines, liquid, corrosive, n.o.s.
Packing group:	III

15. JAPANESE REGULATORY INFORMATION

Fire Defense Law:	Class-4 No.3 petroleum Dangerous grade 3 Water-soluble fluid
Law for safety of vessels:	Hazardous materials notification, Schedule form No.1 Corrosive substance

16. OTHER INFORMATION**The reference company name of written contents**

Company:	TOKYO CHEMICAL INDUSTRY CO., LTD.
Address:	4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Department:	Global Business Department
Telephone:	+81-3-5640-8872
Fax:	+81-3-5640-8902

This SDS was prepared sincerely on the basis of the information we could obtained, however, any warranty shall not be given regarding the data contained and the assessment of hazards and toxicity. Prior to use, please investigate not only the hazards and toxicity information but also the laws and regulations of the organization, area and country where the products are to be used, which shall be given the first priority. The products are supposed to be used promptly after purchase in consideration of safety. Some new information or amendments may be added afterwards. If the products are to be used far behind the expected time of use or you have any questions, please feel free to contact us. The stated cautions are for normal handling only. In case of special handling, sufficient care should be taken, in addition to the safety measures suitable for the situation. All chemical products should be treated with the recognition of "having unknown hazards and toxicity", which differ greatly depending on the conditions and handling when in use and/or the conditions and duration of storage. The products must be handled only by those who are familiar with specialized knowledge and have experience or under the guidance of those specialists throughout use from opening to storage and disposal. Safe usage conditions shall be set up on each user's own responsibility.



TCI AMERICA

SAFETY DATA SHEET

Revision number: 3
Revision date: 10/06/2014

1. IDENTIFICATION

Product name: N,N,N',N'-Ethylenediaminetetrakis(methylenephosphonic Acid)
Product code: E0393

Product use: For laboratory research purposes.
Restrictions on use: Not for drug or household use.

Company:
TCI America
9211 N. Harborage Street
Portland, OR 97203 U.S.A.
Telephone:
+1-800-423-8616 / +1-503-283-1681
Fax:
+1-888-520-1075 / +1-503-283-1987
e-mail:
sales-US@TCIchemicals.com
www.TCIchemicals.com

Emergency telephone number:
Chemical Emergencies:
TCI America (8:00am - 5:00pm) PST
+1-503-286-7624
Transportation Emergencies:
Chemtrec 24-Hour
+1-800-424-9300 (U.S.A.)
+1-703-527-3887 (International)
Responsible department:
TCI America
Environmental Health Safety and Security
+1- 503-286-7624

2. HAZARD(S) IDENTIFICATION

OSHA Haz Com: CFR 1910.1200: Skin Corrosion/Irritation [Category 2]
Eye Damage/Irritation [Category 2A]

Signal word: Warning!

Hazard Statement(s): Causes serious eye irritation
Causes skin irritation

Pictogram(s) or Symbol(s):



Precautionary Statement(s):

[Prevention]
[Response]

Wash hands and face thoroughly after handling. Wear protective gloves. Wear eye and face protection.
If on skin: Wash with plenty of water. If skin irritation or rash occurs: Get medical advice/attention. Take off contaminated clothing and wash it before reuse. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice or attention.

[Storage]
[Disposal]

None
None

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/Mixture: Substance
Components: N,N,N',N'-Ethylenediaminetetrakis(methylenephosphonic Acid)
Percent: >98.0%(T)
CAS Number: 1429-50-1
Molecular Weight: 436.12
Chemical Formula: C₆H₂₀N₂O₁₂P₄

4. FIRST-AID MEASURES

Inhalation:	Call a poison center or doctor if you feel unwell. Move victim to fresh air. Give artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult. Keep victim warm and quiet. Treat symptomatically and supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
Skin contact:	If skin irritation occurs get medical advice/attention. Remove and wash contaminated clothing before re-use. In case of contact with substance, immediately flush skin with running water for at least 20 minutes. Treat symptomatically and supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
Eye contact:	IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. Contact with material may irritate or burn eyes. Call emergency medical service. Move victim to fresh air. Check for and remove any contact lenses. Keep victim warm and quiet. Treat symptomatically and supportively. Effects of exposure to substance may be delayed. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
Ingestion:	Do not induce vomiting with out medical advice. If swallowed, seek medical advice immediately and show the container or label. Do not use mouth-to-mouth method if victim ingested the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Loosen tight clothing such as a collar, tie, belt or waistband. If a person vomits place them in the recovery position so that vomit will not reenter the mouth and throat. Rinse mouth. Keep victim warm and quiet. Treat symptomatically and supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
Symptoms/effects:	
Acute:	Redness.
Delayed:	No data available
Immediate medical attention:	If breathing has stopped, perform artificial respiration. Use first aid treatment according to the nature of the injury. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: Dry chemical, CO₂, sand, earth, water spray or regular foam Consult with local fire authorities before attempting large scale fire fighting operations.

Specific hazards arising from the chemical

Hazardous combustion products: These products include: Carbon oxides Nitrogen oxides Phosphates
Other specific hazards: Closed containers may explode from heat of a fire.

Special precautions for fire-fighters:

Use water spray or fog; do not use straight streams. Dike fire-control water for later disposal; do not scatter the material. Containers may explode when heated. Move containers from fire area if you can do it without risk.

Special protective equipment for fire-fighters:

Wear positive pressure self-contained breathing apparatus (SCBA). Structural fire fighters' protective clothing provides limited protection in fire situations ONLY; it may not be effective in spill situations. Wear chemical protective clothing which is specifically recommended by the manufacturer. It may provide little or no thermal protection.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Avoid contact with skin, eyes, and clothing. Keep people away from and upwind of spill/leak. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing (Section 8). Warn unnecessary personnel to move away. Stop leak if you can do it without risk. Ensure adequate ventilation. Isolate the hazard area and deny entry to unnecessary and unprotected personnel.
Personal protective equipment:	Wear eye protection (splash goggles) and face protection (full length face shield). Lab coat. Dust respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent. Wear protective gloves (nitrile).
Emergency procedures:	Prevent dust cloud. In case of a spill and/or a leak, always shut off any sources of ignition, ventilate the area, and exercise caution. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Warn personnel to move away. Prevent entry into sewers, basements or confined areas; dike if needed.

Methods and materials for containment and cleaning up:

ELIMINATE all ignition sources (no smoking, flares, sparks, or flames in immediate area). Stop leak if without risk. Ventilate the area. Absorb with an inert material and put the spilled material in an appropriate waste disposal container. Use clean non-sparking tools to collect absorbed material.

Environmental precautions:

Prevent further leakage or spillage if safe to do so. Water runoff can cause environmental damage. Prevent entry into sewers, basements or confined areas; dike if needed.

7. HANDLING AND STORAGE

Precautions for safe handling:	Avoid inhalation of vapor or mist. Avoid contact with skin and eyes. Good general ventilation should be sufficient to control airborne levels. Keep container dry. Handle and open container with care. Wear suitable protective clothing, gloves and eye/face protection. When using do not eat, drink, or smoke. Keep away from sources of ignition.
Conditions for safe storage:	Keep only in the original container in a cool well-ventilated place. Keep away from incompatibles. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Avoid prolonged storage periods.
Storage incompatibilities:	Store away from oxidizing agents

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure limits: No data available

Appropriate engineering controls:

Good general ventilation should be sufficient to control airborne levels. Ventilation is normally required when handling or using this product. Eyewash fountains should be provided in areas where there is any possibility that workers could be exposed to the substance. Follow safe industrial engineering/laboratory practices when handling any chemical.

Personal protective equipment

Respiratory protection:	Dust respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent.
Hand protection:	Nitrile gloves.
Eye protection:	Safety glasses.
Skin and body protection:	Lab coat.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state (20°C):	Solid		
Form:	Crystal - Powder		
Color:	White - Almost white		
Odor:	No data available		
Odor threshold:	No data available		
Melting point/freezing point:	No data available	pH:	<2 (1% H ₂ O soln. 25°C)
Boiling point/range:	No data available	Vapor pressure:	No data available
Decomposition temperature:	No data available	Vapor density:	No data available
Relative density:	No data available	Dynamic Viscosity:	No data available
Kinematic Viscosity:	No data available		
Partition coefficient: n-octanol/water (log P_{ow})	No data available	Evaporation rate: (Butyl Acetate = 1)	No data available
Flash point:	No data available	Autoignition temperature:	No data available
Flammability (solid, gas):	No data available	Flammability or explosive limits:	
		Lower:	No data available
		Upper:	No data available
Solubility(ies):			
Water:	Soluble		

10. STABILITY AND REACTIVITY

Reactivity:	Not Available.
Chemical Stability:	Stable under recommended storage conditions. (See Section 7)
Possibility of Hazardous Reactions:	No hazardous reactivity has been reported.
Conditions to avoid:	Avoid excessive heat and light.
Incompatible materials:	Oxidizing agents
Hazardous Decomposition Products:	No data available

11. TOXICOLOGICAL INFORMATION

Acute Toxicity:
No data available

Skin corrosion/irritation:
No data available

Serious eye damage/irritation:
No data available

Respiratory or skin sensitization:
No data available

Germ cell mutagenicity:
No data available

Carcinogenicity:
No data available

IARC: No data available

NTP: No data available

OSHA: No data available

Reproductive toxicity:
No data available

Routes of Exposure: Inhalation, Eye contact, Ingestion, Skin contact.

Symptoms related to exposure:
Skin contact may result in inflammation; characterized by itching, scaling, reddening, or occasionally blistering. Skin contact may result in redness, pain or dry skin. Eye contact may result in redness or pain.

Potential Health Effects:
Skin and eye contact may result in irritation.

Target organ(s): No data available

12. ECOLOGICAL INFORMATION

Ecotoxicity

Fish:	No data available
Crustacea:	No data available
Algae:	No data available

Persistence and degradability:	No data available
Bioaccumulative potential (BCF):	No data available
Mobility in soil:	No data available
Partition coefficient: n-octanol/water (log P_{ow})	No data available
Soil adsorption (Koc):	No data available
Henry's Law: constant (PaM³/mol)	No data available

13. DISPOSAL CONSIDERATIONS

Disposal of product: Recycle to process if possible. It is the generator's responsibility to comply with Federal, State and Local rules and regulations. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. This section is intended to provide assistance but does not replace these laws, nor does compliance in accordance with this section ensure regulatory compliance according to the law. US EPA guidelines for Identification and Listing of Hazardous Waste are listed in 40 CFR Parts 261. The product should not be allowed to enter the environment, drains, water ways, or the soil.

Disposal of container: Dispose of as unused product. Do not re-use empty containers.

Other considerations: Observe all federal, state and local regulations when disposing of the substance.

14. TRANSPORT INFORMATION

DOT (US) Non-hazardous for transportation.

IATA Non-hazardous for transportation.

IMDG Non-hazardous for transportation.

14. TRANSPORT INFORMATION

15. REGULATORY INFORMATION

Toxic Substance Control Act (TSCA 8b.):

This product is ON the EPA Toxic Substances Control Act (TSCA) inventory.

US Federal Regulations

CERCLA Hazardous substance and Reportable Quantity:

SARA 313: Not Listed
SARA 302: Not Listed

State Regulations

State Right-to-Know

Massachusetts Not Listed
New Jersey Not Listed
Pennsylvania Not Listed
California Proposition 65: Not Listed

Other Information

NFPA Rating:

Health: 2
Flammability: 0
Instability: 0

HMIS Classification:

Health: 2
Flammability: 0
Physical: 0

International Inventories

WHMIS hazard class: D2B: Materials causing other toxic effects. (Toxic)
Canada: DSL On DSL
EC-No: 215-851-5

16. OTHER INFORMATION

Revision date: 10/06/2014

Revision number: 3

TCI chemicals are for research purposes only and are NOT intended for use as drugs, food additives, households, or pesticides. The information herein is believed to be correct, but does not claim to be all inclusive and should be used only as a guide. Neither the above named supplier nor any of its affiliates or subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All chemical reagents must be handled with the recognition that their chemical, physiological, toxicological, and hazardous properties have not been fully investigated or determined. All chemical reagents should be handled only by individuals who are familiar with their potential hazards and who have been fully trained in proper safety, laboratory, and chemical handling procedures. Although certain hazards are described herein, we can not guarantee that these are the only hazards which exist. Our SDS are based only on data available at the time of shipping and are subject to change without notice as new information is obtained. Avoid long storage periods since the product is subject to degradation with age and may become more dangerous or hazardous. It is the responsibility of the user to request updated SDS for products that are stored for extended periods. Disposal of unused product must be undertaken by qualified personnel who are knowledgeable in all applicable regulations and follow all pertinent safety precautions including the use of appropriate protective equipment (e.g. protective goggles, protective clothing, breathing equipment, face mask, fume hood). For proper handling and disposal, always comply with federal, state and local regulations.





TOKYO CHEMICAL INDUSTRY CO., LTD.

N,N-Diethylhydroxylamine

Revision 11
number:

Revision date: 02/08/2016

Page 1 of 5

Revision date: 02/08/2016

SAFETY DATA SHEET

1. IDENTIFICATION

Product name: N,N-Diethylhydroxylamine
Product code: D1339
Company: TOKYO CHEMICAL INDUSTRY CO., LTD.
Address: 4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Responsible department: Global Business Department
Telephone: +81-3-5640-8872
Fax: +81-3-5640-8902
e-mail: globalbusiness@TCIchemicals.com
Revision number: 11

2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

PHYSICAL HAZARDS

Flammable liquids Category 3

HEALTH HAZARDS

Acute toxicity (Oral) Category 5

Acute toxicity (Dermal) Category 4

Acute toxicity (Inhalation) Category 4

Skin corrosion/irritation Category 2

Serious eye damage/eye irritation Category 2A

Specific target organ toxicity Nervous system

- Single exposure [Category 2]

ENVIRONMENTAL HAZARDS

Not classified

Label elements

Pictograms or hazard symbols



Signal word

Hazard statements

Warning

Flammable liquid and vapour

May be harmful if swallowed

Harmful in contact with skin or if inhaled

Causes skin irritation

Causes serious eye irritation

May cause damage to organs : Nervous system

Precautionary statements:

[Prevention]

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

Keep container tightly closed.

Use explosion-proof electrical/ventilating/lighting equipment. Take precautionary measures against ignition by the static discharge and the spark.

Do not breathe dust/fume/gas/mist/vapours/spray.

Use only outdoors or in a well-ventilated area.

Do not eat, drink or smoke when using this product.

Wash hands thoroughly after handling.

Wear protective gloves and eye/face protection.

2. HAZARDS IDENTIFICATION**[Response]**

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

If eye irritation persists: Get medical advice/attention.

IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

If skin irritation occurs: Get medical advice/attention.

Wash contaminated clothing before reuse.

If exposed or if you feel unwell: Call a POISON CENTER or doctor/physician.

[Storage]

Store in a well-ventilated place. Keep cool.

Store locked up.

[Disposal]

Dispose of contents/container through a waste management company authorized by the local government.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/mixture:	Substance
Components:	N,N-Diethylhydroxylamine
Percent:	>98.0%(GC)(T)
CAS Number:	3710-84-7
Chemical Formula:	C ₄ H ₁₁ NO
Notice Through Official Gazettes Reference Number	
ENCS:	(2)-190
ISHL:	Official announcement chemistry substance.

4. FIRST-AID MEASURES

Inhalation:	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician.
Skin contact:	Remove/Take off immediately all contaminated clothing. Gently wash with plenty of soap and water. Call a POISON CENTER or doctor/physician.
Eye contact:	Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Call a POISON CENTER or doctor/physician.
Ingestion:	Call a POISON CENTER or doctor/physician. Rinse mouth.
Protection of first-aiders:	A rescuer should wear personal protective equipment, such as rubber gloves and air-tight goggles.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media:	Dry chemical, foam, carbon dioxide.
Unsuitable extinguishing media:	Water (It may scatter and spread fire.)
Specific hazards arising from the chemical:	Take care as it may decompose upon combustion or in high temperatures to generate poisonous fume.
Precautions for firefighters:	Fire-extinguishing work is done from the windward and the suitable fire-extinguishing method according to the surrounding situation is used. Uninvolved persons should evacuate to a safe place. In case of fire in the surroundings: Keep containers cool by spraying with water. Eliminate all ignition sources if safe to do so.
Special protective equipment for firefighters:	When extinguishing fire, be sure to wear personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:	Use extra personal protective equipment (self-contained breathing apparatus). Keep people away from and upwind of spill/leak. Ensure adequate ventilation. Entry to non-involved personnel should be controlled around the leakage area by roping off, etc.
Environmental precautions:	Prevent product from entering drains.

6. ACCIDENTAL RELEASE MEASURES

Methods and materials for containment and cleaning up:	Absorb spilled material in dry sand or inert absorbent before recovering it into an airtight container. In case of large amount of spillage, contain a spill by bunding. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.
Prevention of secondary hazards:	Remove all sources of ignition. Fire-extinguishing devices should be prepared in case of a fire. Use spark-proof tools and explosion-proof equipment.

7. HANDLING AND STORAGE**Precautions for safe handling**

Technical measures:	Handling is performed in a well ventilated place. Wear suitable protective equipment. Prevent generation of vapour or mist. Keep away from heat/sparks/open flame/hot surfaces. -No smoking. Take measures to prevent the build up of electrostatic charge. Use explosion-proof equipment. Wash hands and face thoroughly after handling. Use a closed system if possible. Use a ventilation, local exhaust if vapour or aerosol will be generated.
Advice on safe handling:	Avoid contact with skin, eyes and clothing.

Conditions for safe storage, including any incompatibilities

Storage conditions:	Keep container tightly closed. Store in a cool, dark and well-ventilated place. Store under inert gas. Protect from moisture. Store locked up. Store away from incompatible materials such as oxidizing agents. Hygroscopic
Packaging material:	Comply with laws. Do not use containers made of metals.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls:	Install a closed system or local exhaust. Also install safety shower and eye bath.
Control parameters:	Not set up
Exposure limits:	
ACGIH TLV(TWA):	2 ppm
Personal protective equipment	
Respiratory protection:	Half or full facepiece respirator, self-contained breathing apparatus(SCBA), supplied air respirator, etc. Use respirators approved under appropriate government standards and follow local and national regulations.
Hand protection:	Impervious gloves.
Eye protection:	Safety goggles. A face-shield, if the situation requires.
Skin and body protection:	Impervious protective clothing. Protective boots, if the situation requires.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state (20°C):	Liquid
Form:	Clear
Colour:	Colorless - Pale yellow
Odour:	No data available
pH:	No data available
Melting point/freezing point:	No data available
Boiling point/range:	122°C
Flash point:	51°C
Flammability or explosive limits:	
Lower:	1.9%
Upper:	10%
Relative density:	0.87
Solubility(ies):	
[Water]	Soluble (89g/L, 25°C)
[Other solvents]	No data available

10. STABILITY AND REACTIVITY

Chemical stability:	Stable under proper conditions.
Possibility of hazardous reactions:	No special reactivity has been reported.
Conditions to avoid:	Spark, Open flame, Static discharge
Incompatible materials:	Oxidizing agents, Metals, Metal ions
Hazardous decomposition products:	Carbon monoxide, Carbon dioxide, Nitrogen oxides (NOx)

11. TOXICOLOGICAL INFORMATION

Acute Toxicity:	orl-rat LD50:2190 mg/kg skn-rbt LD50:1300 mg/kg ihl-rat LC50:3140 ppm/4H
Skin corrosion/irritation:	No data available
Serious eye damage/irritation:	eye-rbt 0.1 mL MLD
Germ cell mutagenicity:	No data available
Carcinogenicity:	
IARC =	No data available
NTP =	No data available
Reproductive toxicity:	No data available
RTECS Number:	NC3500000

12. ECOLOGICAL INFORMATION

Ecotoxicity:	
Fish:	No data available
Crustacea:	No data available
Algae:	No data available
Persistence / degradability:	No data available
Bioaccumulative potential(BCF):	No data available
Mobility in soil	
Log Pow:	No data available
Soil adsorption (Koc):	No data available
Henry's Law constant(PaM³/mol):	No data available

13. DISPOSAL CONSIDERATIONS

Recycle to process, if possible. Consult your local regional authorities. You may be able to burn in a chemical incinerator equipped with an afterburner and scrubber system. Observe all federal, state and local regulations when disposing of the substance.

14. TRANSPORT INFORMATION

Hazards Class:	3: Flammable liquid.
UN-No:	1993
Proper shipping name:	Flammable liquid, n.o.s.
Packing group:	III

15. JAPANESE REGULATORY INFORMATION

Fire Defense Law:	Class-4 No.2 petroleum Dangerous grade 3 Not water-soluble fluid
ISHL(Enforcement Order of the Industrial Safety and Health Act Appended Table 1):	Inflammable Substances
Law for safety of vessels:	Hazardous materials notification, Schedule form No.1 Flammable liquid

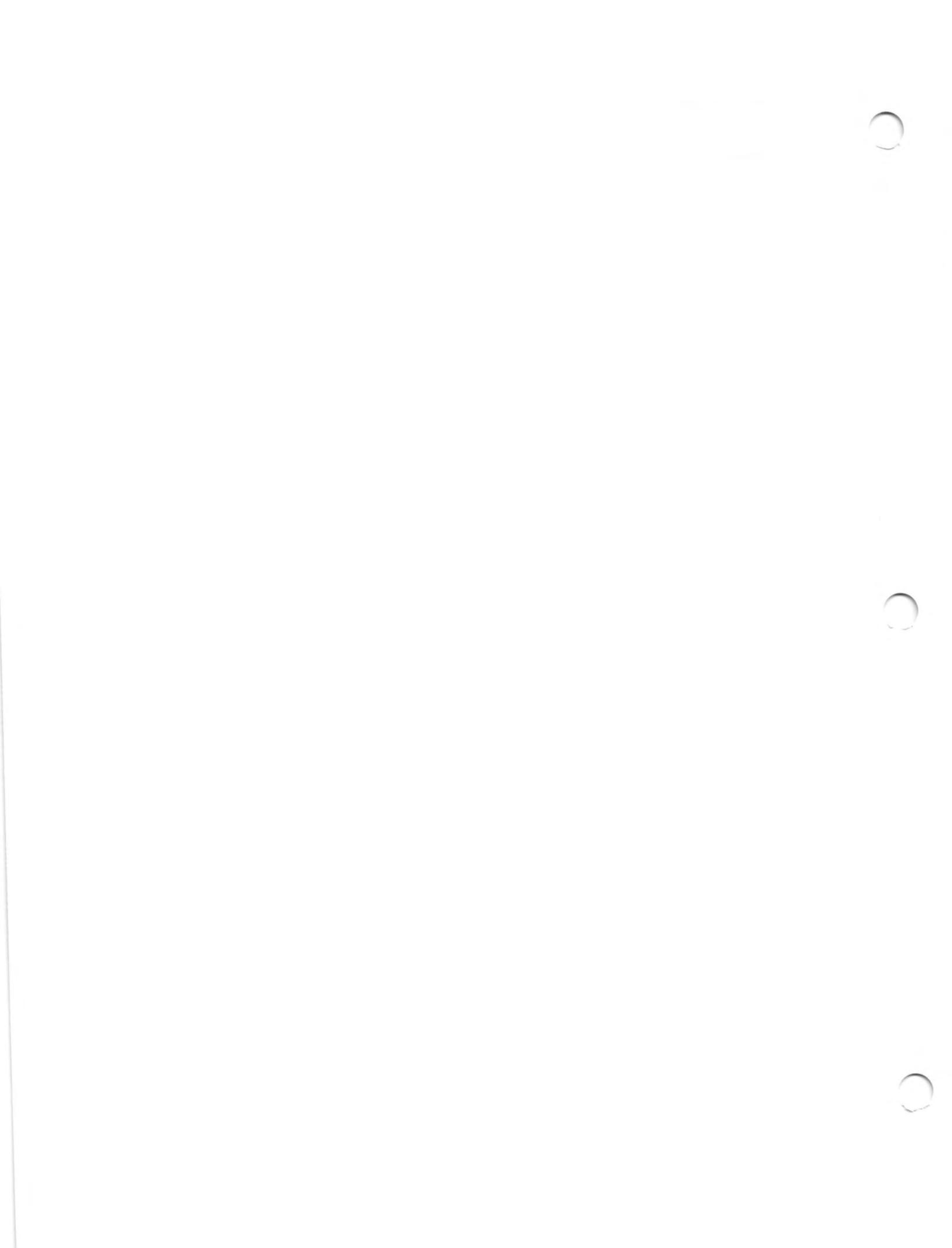
16. OTHER INFORMATION

The reference company name of written contents

16. OTHER INFORMATION

Company: TOKYO CHEMICAL INDUSTRY CO., LTD.
Address: 4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Department: Global Business Department
Telephone: +81-3-5640-8872
Fax: +81-3-5640-8902

This SDS was prepared sincerely on the basis of the information we could obtained, however, any warranty shall not be given regarding the data contained and the assessment of hazards and toxicity. Prior to use, please investigate not only the hazards and toxicity information but also the laws and regulations of the organization, area and country where the products are to be used, which shall be given the first priority. The products are supposed to be used promptly after purchase in consideration of safety. Some new information or amendments may be added afterwards. If the products are to be used far behind the expected time of use or you have any questions, please feel free to contact us. The stated cautions are for normal handling only. In case of special handling, sufficient care should be taken, in addition to the safety measures suitable for the situation. All chemical products should be treated with the recognition of "having unknown hazards and toxicity", which differ greatly depending on the conditions and handling when in use and/or the conditions and duration of storage. The products must be handled only by those who are familiar with specialized knowledge and have experience or under the guidance of those specialists throughout use from opening to storage and disposal. Safe usage conditions shall be set up on each user's own responsibility.





SAFETY DATA SHEET

1. IDENTIFICATION

Product name: N,N-Dimethylacetamide
Product code: D0641
Company: TOKYO CHEMICAL INDUSTRY CO., LTD.
Address: 4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Responsible department: Global Business Department
Telephone: +81-3-5640-8872
Fax: +81-3-5640-8902
e-mail: globalbusiness@TCIchemicals.com
Revision number: 12

2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

PHYSICAL HAZARDS

Flammable liquids

Category 4

HEALTH HAZARDS

Acute toxicity (Oral)

Category 5

Acute toxicity (Dermal)

Category 5

Acute toxicity (Inhalation)

Category 4

Skin corrosion/irritation

Category 3

Serious eye damage/eye irritation

Category 2B

Carcinogenicity

Category 2

Reproductive toxicity

Category 1B

Specific target organ toxicity

Narcotic effects

- Single exposure [Category 3]

Specific target organ toxicity

Liver

- Repeated exposure [Category 1]

Specific target organ toxicity

Respiratory system

- Repeated exposure [Category 2]

ENVIRONMENTAL HAZARDS

Not classified

Label elements

Pictograms or hazard symbols



Signal word

Danger

Hazard statements

Combustible liquid
May be harmful if swallowed or in contact with skin
Harmful if inhaled
Causes mild skin irritation
Causes eye irritation
Suspected of causing cancer
May damage fertility or the unborn child
Causes damage to organs through prolonged or repeated exposure : Liver
May cause damage to organs through prolonged or repeated exposure : Respiratory system
May cause drowsiness or dizziness

Precautionary statements:

2. HAZARDS IDENTIFICATION**[Prevention]**

Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from flames and hot surfaces.
Do not breathe dust/fume/gas/mist/vapours/spray.
Use only outdoors or in a well-ventilated area.
Do not eat, drink or smoke when using this product.
Wash hands thoroughly after handling.

[Response]

Wear protective gloves and eye/face protection.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists: Get medical advice/attention.
If skin irritation occurs: Get medical advice/attention.
IF exposed or concerned: Get medical advice/attention.

[Storage]

Store in a well-ventilated place. Keep container tightly closed.
Store locked up.

[Disposal]

Dispose of contents/container through a waste management company authorized by the local government.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/mixture:	Substance
Components:	N,N-Dimethylacetamide
Percent:	>99.0%(GC)
CAS Number:	127-19-5
Synonyms:	N-Acetyldimethylamine , DMA
Chemical Formula:	C ₄ H ₉ NO
Notice Through Official Gazettes Reference Number	
ENCS:	(2)-723
ISHL:	Official announcement chemistry substance.

4. FIRST-AID MEASURES

Inhalation:	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical advice/attention.
Skin contact:	Remove/Take off immediately all contaminated clothing. Gently wash with plenty of soap and water. Get medical advice/attention.
Eye contact:	Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Get medical advice/attention.
Ingestion:	Get medical advice/attention. Rinse mouth.
Most important symptoms/effects, acute and delayed:	Headache, Nausea, Vomiting, Gastrospasm, Diarrhoea, Redness, Pain
Protection of first-aiders:	A rescuer should wear personal protective equipment, such as rubber gloves and air-tight goggles.
Indication of immediate medical attention and special treatment needed, if necessary:	Depending on the degree of exposure, periodic medical examination is indicated.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media:	Dry chemical, foam, water in large amounts, carbon dioxide.
Specific hazards arising from the chemical:	Take care as it may decompose upon combustion or in high temperatures to generate poisonous fume.
Precautions for firefighters:	Fire-extinguishing work is done from the windward and the suitable fire-extinguishing method according to the surrounding situation is used. Uninvolved persons should evacuate to a safe place. In case of fire in the surroundings: Remove movable containers if safe to do so.

5. FIRE-FIGHTING MEASURES

Special protective equipment for firefighters: When extinguishing fire, be sure to wear personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Use extra personal protective equipment (self-contained breathing apparatus). Keep people away from and upwind of spill/leak. Ensure adequate ventilation. Entry to non-involved personnel should be controlled around the leakage area by roping off, etc.

Environmental precautions: Prevent product from entering drains.

Methods and materials for containment and cleaning up: Absorb spilled material in a suitable absorbent (e.g. rag, dry sand, earth, saw-dust). In case of large amount of spillage, contain a spill by bunding. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

Prevention of secondary hazards: Remove all sources of ignition. Fire-extinguishing devices should be prepared in case of a fire. Use spark-proof tools and explosion-proof equipment.

7. HANDLING AND STORAGE**Precautions for safe handling**

Technical measures: Handling is performed in a well ventilated place. Wear suitable protective equipment. Prevent generation of vapour or mist. Keep away from flames and hot surfaces. Take measures to prevent the build up of electrostatic charge. Use explosion-proof equipment. Wash hands and face thoroughly after handling. Use a closed system, ventilation.

Advice on safe handling: Avoid all contact!

Conditions for safe storage, including any incompatibilities

Storage conditions: Keep container tightly closed. Store in a cool, dark and well-ventilated place. Store locked up. Store away from incompatible materials such as oxidizing agents.

Packaging material: Comply with laws.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls: Install a closed system or local exhaust. Also install safety shower and eye bath.

Control parameters: Not set up

Exposure limits:

ACGIH TLV(TWA): 10 ppm (skin)

OSHA PEL(TWA): 10 ppm (skin)

JSOH OELs(TWA): 10 ppm (skin)

Personal protective equipment

Respiratory protection: Half or full facepiece respirator, self-contained breathing apparatus(SCBA), supplied air respirator, etc. Use respirators approved under appropriate government standards and follow local and national regulations.

Hand protection: Impervious gloves.

Eye protection: Safety goggles. A face-shield, if the situation requires.

Skin and body protection: Impervious protective clothing. Protective boots, if the situation requires.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state (20°C): Liquid

Form: Clear

Colour: Colorless - Almost colorless

Odour: Ammoniacal

Odour threshold: 47 ppm

pH: No data available

Melting point/freezing point: -20°C

Boiling point/range: 165°C

Flash point: 66°C

Flammability or explosive limits:

Lower: 1.8%

Upper: 11.5%

9. PHYSICAL AND CHEMICAL PROPERTIES

Vapour pressure:	0.33kPa/20°C
Vapour density:	3.01
Relative density:	0.94
Solubility(ies):	
[Water]	Miscible
[Other solvents]	
Miscible:	Many organic solvents
Log Pow:	-0.77
Autoignition temperature:	490°C

10. STABILITY AND REACTIVITY

Chemical stability:	Stable under proper conditions.
Possibility of hazardous reactions:	No special reactivity has been reported.
Conditions to avoid:	Open flame
Incompatible materials:	Oxidizing agents, Halogenated compounds
Hazardous decomposition products:	Carbon monoxide, Carbon dioxide, Nitrogen oxides (NOx)

11. TOXICOLOGICAL INFORMATION

Acute Toxicity:	ori-rat LD50:4300 mg/kg skn-rbt LD50:2240 mg/kg ihl-rat LC50:2475 ppm/1H ipr-rat LD50:2750 mg/kg
Skin corrosion/irritation:	skn-rbt 10 mg/24H open MLD
Serious eye damage/irritation:	eye-rbt 100 mg MLD
Germ cell mutagenicity:	dni-mus-unr 4400 mg/kg sce-ham-ovr 10 g/L
Carcinogenicity:	
IARC =	No data available
NTP =	No data available
Reproductive toxicity:	No data available
RTECS Number:	AB7700000

12. ECOLOGICAL INFORMATION

Ecotoxicity:	
Fish:	96h LC50:1.50 g/L (Pimephales promelas)
Crustacea:	No data available
Algae:	No data available
Persistence / degradability:	80 % (NO ₂) (by BOD), 107 % (NH ₃) (by BOD), 92 % (by TOC), 100 % (by GC) *The substance was determined as "Ready biodegradability" under the Chemical Substances Control Law.
Bioaccumulative potential(BCF):	3
Mobility in soil	
Log Pow:	-0.77
Soil adsorption (Koc):	9
Henry's Law constant(PaM ³ /mol):	1.33 x 10 ⁻³

13. DISPOSAL CONSIDERATIONS

Recycle to process, if possible. Consult your local regional authorities. You may be able to burn in a chemical incinerator equipped with an afterburner and scrubber system. Observe all federal, state and local regulations when disposing of the substance.

14. TRANSPORT INFORMATION

Hazards Class:	Does not correspond to the classification standard of the United Nations
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14. TRANSPORT INFORMATION

UN-No: Not listed

15. JAPANESE REGULATORY INFORMATION

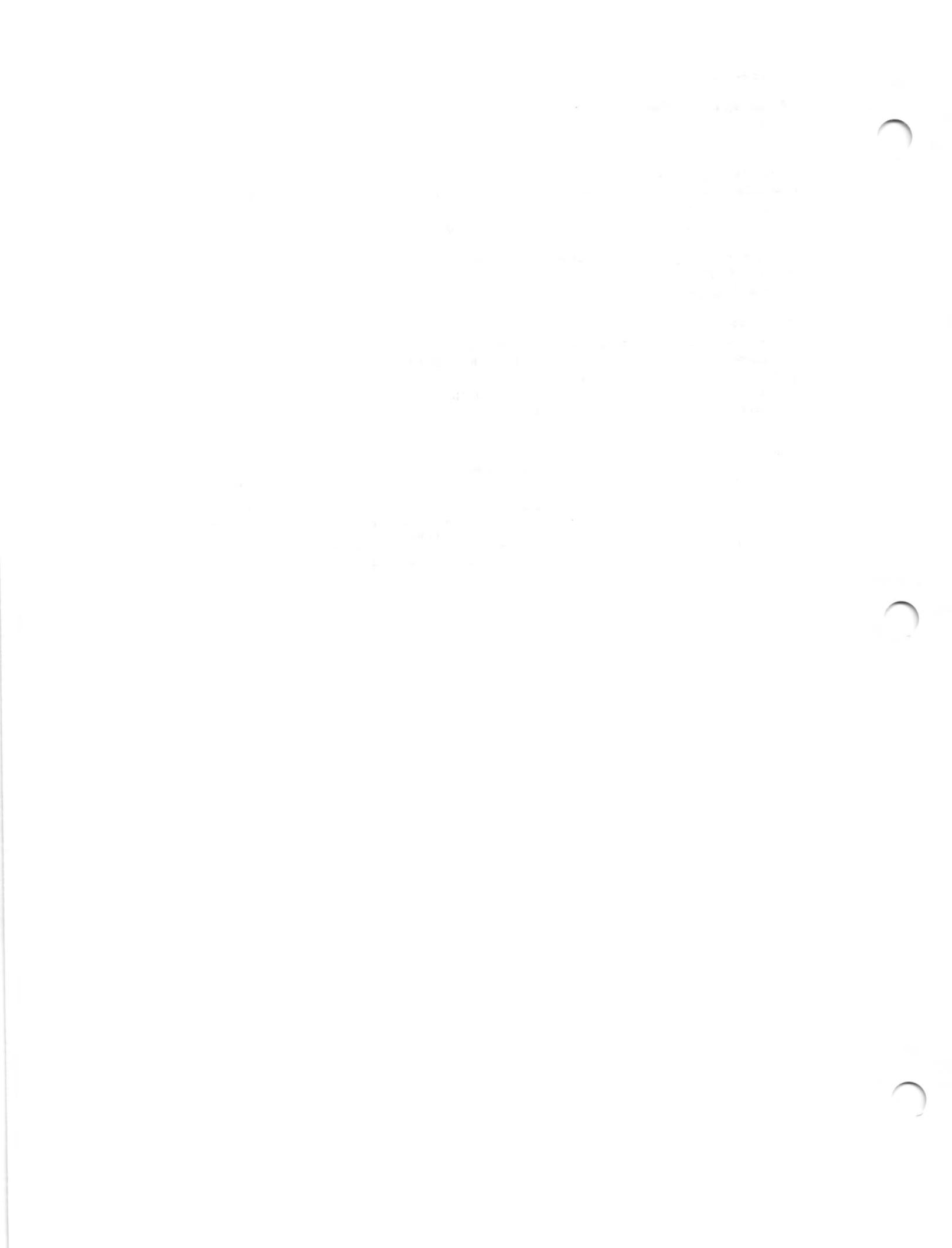
Fire Defense Law: Class-4 No.2 petroleum Dangerous grade 3 Water-soluble fluid
ISHL(Article 57): Dangerous or Harmful Substances Subject to Be Indicated their Names, etc.
ISHL(Article 57-2): Dangerous or Harmful Substances Subject to Be Notified their Names, etc.

ISHL(Article 28 (3)): Publication of Technical Guidelines
Pollutant Release and Transfer Register Law: on Designated Chemical Substances, Class I List(No.213)

16. OTHER INFORMATION**The reference company name of written contents**

Company: TOKYO CHEMICAL INDUSTRY CO., LTD.
Address: 4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Department: Global Business Department
Telephone: +81-3-5640-8872
Fax: +81-3-5640-8902

This SDS was prepared sincerely on the basis of the information we could obtained, however, any warranty shall not be given regarding the data contained and the assessment of hazards and toxicity. Prior to use, please investigate not only the hazards and toxicity information but also the laws and regulations of the organization, area and country where the products are to be used, which shall be given the first priority. The products are supposed to be used promptly after purchase in consideration of safety. Some new information or amendments may be added afterwards. If the products are to be used far behind the expected time of use or you have any questions, please feel free to contact us. The stated cautions are for normal handling only. In case of special handling, sufficient care should be taken, in addition to the safety measures suitable for the situation. All chemical products should be treated with the recognition of "having unknown hazards and toxicity", which differ greatly depending on the conditions and handling when in use and/or the conditions and duration of storage. The products must be handled only by those who are familiar with specialized knowledge and have experience or under the guidance of those specialists throughout use from opening to storage and disposal. Safe usage conditions shall be set up on each user's own responsibility.



SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Version 7.0 Revision Date 03.03.2016

Print Date 22.03.2017

GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Nitric acid

Product Number : 258113

Brand : Sigma-Aldrich

REACH No. : 01-2119487297-23-XXXX

CAS-No. : 7697-37-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Japan G.K.
Tennoz Central Tower, 2-2-24 Higashi-Shinagawa
SHINAGAWA-KU 140-0002
JAPAN

Telephone : +81 3 5796 7310

Fax : +81 3 5796 7315

1.4 Emergency telephone number

Emergency Phone # (03) 6758-3625

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

Oxidizing liquids (Category 3), H272

Corrosive to metals (Category 1), H290

Skin corrosion (Category 1A), H314

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram



Signal word

Danger

Hazard statement(s)

H272

May intensify fire; oxidizer.

H290

May be corrosive to metals.

H314

Causes severe skin burns and eye damage.

Precautionary statement(s)

P210

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P220	Keep/Store away from clothing/ combustible materials.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P370 + P378	In case of fire: Use dry powder or dry sand to extinguish.
Supplemental Hazard information (EU)	
EUH071	Corrosive to the respiratory tract.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Formula	: HNO ₃
Molecular weight	: 63,01 g/mol

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component	Classification	Concentration
Nitric acid		
CAS-No.	7697-37-2	Ox. Liq. 2; Met. Corr. 1; Skin Corr. 1A; H272, H290, H314 Concentration limits: ≥ 20 %: Skin Corr. 1A, H314; 5 - < 20 %: Skin Corr. 1B, H314; 65 - < 99 %: Ox. Liq. 3, H272; ≥ 99 %: Ox. Liq. 2, H272; 1 - < 3 %: Eye Irrit. 2A, H319; 3 - < 5 %: 1, H318; ≥ 1 %: Met. Corr. 1, H290; 1 - < 5 %: Skin Irrit. 2, H315;
EC-No.	231-714-2	
Index-No.	007-004-00-1	
Registration number	01-2119487297-23-XXXX	
		≥ 65 - < 70 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

- 4.3 Indication of any immediate medical attention and special treatment needed**
No data available

SECTION 5: Firefighting measures

- 5.1 Extinguishing media**
Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
- 5.2 Special hazards arising from the substance or mixture**
No data available
- 5.3 Advice for firefighters**
Wear self-contained breathing apparatus for firefighting if necessary.
- 5.4 Further information**
Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

- 6.1 Personal precautions, protective equipment and emergency procedures**
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. For personal protection see section 8.
- 6.2 Environmental precautions**
Do not let product enter drains.
- 6.3 Methods and materials for containment and cleaning up**
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).
- 6.4 Reference to other sections**
For disposal see section 13.

SECTION 7: Handling and storage

- 7.1 Precautions for safe handling**
Avoid inhalation of vapour or mist. Keep away from sources of ignition - No smoking. Keep away from heat and sources of ignition. For precautions see section 2.2.
- 7.2 Conditions for safe storage, including any incompatibilities**
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Storage class (TRGS 510): Oxidizing hazardous materials
- 7.3 Specific end use(s)**
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

Derived No Effect Level (DNEL)

Application Area	Exposure routes	Health effect	Value
Workers	Inhalation	Acute local effects	2,6 mg/m ³
Workers	Inhalation	Long-term local effects	1,3 mg/m ³
Consumers	Inhalation	Acute local effects	1,3 mg/m ³
Consumers	Inhalation	Long-term local effects	0,65 mg/m ³

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact

Material: Fluorinated rubber

Minimum layer thickness: 0,7 mm

Break through time: 480 min

Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact

Material: Nature latex/chloroprene

Minimum layer thickness: 0,6 mm

Break through time: 120 min

Material tested: Lapren® (KCL 706 / Aldrich Z677558, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

- | | |
|--------------------|------------------------------------|
| a) Appearance | Form: liquid
Colour: colourless |
| b) Odour | No data available |
| c) Odour Threshold | No data available |
| d) pH | < 1,0 |

e) Melting point/freezing point	No data available
f) Initial boiling point and boiling range	120,5 °C - lit.
g) Flash point	No data available
h) Evaporation rate	No data available
i) Flammability (solid, gas)	No data available
j) Upper/lower flammability or explosive limits	No data available
k) Vapour pressure	49 hPa at 50 °C
l) Vapour density	No data available
m) Relative density	1,413 g/mL at 25 °C
n) Water solubility	No data available
o) Partition coefficient: n-octanol/water	No data available
p) Auto-ignition temperature	No data available
q) Decomposition temperature	No data available
r) Viscosity	No data available
s) Explosive properties	No data available
t) Oxidizing properties	The substance or mixture is classified as oxidizing with the category 3.

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

No data available

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Nitrogen oxides (NO_x)

Other decomposition products - No data available

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

No data available

Skin corrosion/irritation

No data available

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: Not available

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin. Inhalation may provoke the following symptoms: spasm, inflammation and edema of the bronchi, spasm, inflammation and edema of the larynx, pneumonitis, pulmonary edema, Symptoms and signs of poisoning are: burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Pulmonary edema. Effects may be delayed. Large doses may cause: conversion of hemoglobin to methemoglobin, producing cyanosis; marked fall in blood pressure, leading to collapse, coma, and possibly death.

Liver - Irregularities - Based on Human Evidence (Nitric acid)

SECTION 12: Ecological information**12.1 Toxicity**

No data available

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

No data available

liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

SAFETY DATA SHEET

According to JIS Z 7253:2012

Revision Date 17-Nov-2014

Version 1.04

Section 1: PRODUCT AND COMPANY IDENTIFICATION

Product name	Phosphonic Acid
Product code	163-26321 , 165-26325
CAS No	13598-36-2
Formula	H ₃ PO ₃
Manufacturer	Wako Pure Chemical Industries, Ltd. 1-2 Doshomachi 3-Chome, Chuo-ku, Osaka 540-8605, Japan Phone: +81 (0)6-6203-3741 Fax: +81 (0)6-6201-5964
Supplier	Wako Pure Chemical Industries, Ltd. 1-2 Doshomachi 3-Chome, Chuo-ku, Osaka 540-8605, Japan Phone: +81 (0)6-6203-3741 Fax: +81 (0)6-6201-5964
Emergency telephone number	+81-6-6203-3741 / +81-3-3270-8571
Recommended uses and restrictions on use	For research purposes

Section 2: HAZARDS IDENTIFICATION**GHS classification****Classification of the substance or mixture**

Corrosive to metals

Acute toxicity - Oral

Acute toxicity - Dermal

Skin corrosion/irritation

Serious eye damage/eye irritation

Category 1

Category 4

Category 4

Category 1 A

Category 1

Pictograms**Signal word**

Danger

Hazard statements

H290 - May be corrosive to metals

H302 - Harmful if swallowed

H312 - Harmful in contact with skin

H314 - Causes severe skin burns and eye damage

H318 - Causes serious eye damage

Precautionary statements-(Prevention)

- Wash face, hands and any exposed skin thoroughly after handling
- Do not eat, drink or smoke when using this product
- Wear protective gloves/protective clothing/eye protection/face protection
- Do not breathe dust/fume/gas/mist/vapors/spray
- Keep only in original container

Precautionary statements-(Response)

- Immediately call a POISON CENTER or doctor/physician
- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- Call a POISON CENTER or doctor/physician if you feel unwell.
- Wash contaminated clothing before reuse.
- IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
- Rinse mouth.
- Do NOT induce vomiting.
- Absorb spillage to prevent material damage

Precautionary statements-(Storage)

- Store in corrosive resistant/container with a resistant inner liner

Precautionary statements-(Disposal)

- Dispose of contents/container to an approved waste disposal plant

Others

Other hazards Not available

Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

Single Substance or Mixture Substance

Formula H3PO3

Chemical Name	Weight-%	Molecular weight	ENCS	ISHL No.	CAS No
Phosphorous acid	97	82.00	(1)-421	N/A	13598-36-2

Impurities and/or Additives : Not applicable

Section 4: FIRST AID MEASURES

Inhalation

Remove to fresh air. If symptoms persist, call a physician.

Skin contact

Wash off immediately with soap and plenty of water. If symptoms persist, call a physician.

Eye contact

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediate medical attention is required.

Ingestion

Rinse mouth. Never give anything by mouth to an unconscious person. Call a physician or poison control center immediately. Do not induce vomiting without medical advice.

Protection of first-aiders

Use personal protective equipment as required.

Section 5: FIRE FIGHTING MEASURES

Suitable extinguishing media

Water spray (fog), Foam, Extinguishing powder, carbon dioxide (CO₂), Sand

Unsuitable extinguishing media

No information available

Special extinguishing method

No information available

Specific hazards arising from the chemical product

Thermal decomposition can lead to release of irritating and toxic gases and vapors.

Protection of fire-fighters

Use personal protective equipment as required. Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear.

Section 6: ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

For indoor, provide adequate ventilation process until the end of working. Deny unnecessary entry other than the people involved by, for example, using a rope. While working, wear appropriate protective equipments to avoid adhering it on skin, or inhaling the gas. Work from windward, and retract the people downwind.

Environmental precautions

To be careful not discharged to the environment without being properly handled waste water contaminated. See Section 12 for additional ecological information.

Methods and materials for contaminant and methods and materials for cleaning up

Do not touch spilled material without suitable protection(See section 8). After material is completely picked up, wash the spill site with soap and water and ventilate the area. Put all wastes in a plastic bag for disposal and seal it tightly. Remove, clean, or dispose of contaminated clothing.

Recovery, neutralization

No information available

Secondary disaster prevention measures

Clean contaminated objects and areas thoroughly observing environmental regulations.

Section 7: HANDLING AND STORAGE

Handling**Technical measures**

No information available Use with local exhaust ventilation.

Precautions

Do not rough handling containers, such as upsetting, falling, giving a shock, and dragging. Prevent leakage, overflow, and scattering. Not to generate steam and dust in vain. Seal the container after use. After handling, wash hands and face, and then gargle. In places other than those specified, should not be smoking or eating and drinking. Should not be brought contaminated protective equipment and gloves to rest stops. Deny unnecessary entry of non-emergency personnel to the handling area.

Safety handling precautions

Avoid contact with skin, eyes or clothing. Do not breathe dust/fume/gas/mist/vapors/spray Use personal protective equipment as required.

Storage**Safe storage conditions****Storage conditions**

Store away from sunlight in well-ventilated place at room temperature (under 25 °C). Keep container tightly closed.

Safe packaging material

Glass

Incompatible substances

Strong oxidizing agents, Strong bases, Strong acids

Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls

In case of indoor workplace, seal the source or use a local exhaust system. Provide the safety shower facility, and hand- and eye-wash facility. And display their position clearly.

Exposure limits

This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Personal protective equipment

Respiratory protection	Dust mask
Hand protection	Impermeable protective gloves
Eye protection	Wear safety glasses with side shields (or goggles), Face protection shield
Skin and body protection	Long-sleeved work clothes, protective boots
General hygiene considerations	
Handle in accordance with good industrial hygiene and safety practice.	

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

Form	
Color	white
Appearance	crystals
Odor	characteristic odor
pH	No data available
Melting point/freezing point	73 °C
Boiling point, initial boiling point and boiling range	No data available
Flash point	No data available
Evaporation rate:	No data available
Flammability (solid, gas):	No data available
Upper/lower flammability or explosive limits	
Upper :	No data available
Lower :	No data available
Vapour pressure	No data available
Vapour density	No data available
Specific Gravity (relative density)	1.65
Solubilities	Water and Ethanol : Very soluble.
n-Octanol/water partition coefficient:(log Pow)	No data available
Auto-ignition temperature:	No data available
Decomposition temperature:	No data available
Viscosity (coefficient of viscosity)	No data available
Dynamic viscosity	No data available

Section 10: STABILITY AND REACTIVITY

Stability

Stability	Stable under recommended storage conditions.
Reactivity	No data available
Hazardous reactions	None under normal processing
Conditions to avoid	Extremes of temperature and direct sunlight, Moisture
Incompatible materials	Strong oxidizing agents, Strong bases, Strong acids
Hazardous decomposition products	Phosphorus oxide

Section 11: TOXICOLOGICAL INFORMATION

Acute toxicity

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Phosphorous acid	1500 mg/kg (Rat)	N/A	N/A

Component	Acute toxicity -oral- source information	Based on the NITE GHS classification results.	Acute toxicity -inhalation gas- source information

Phosphorous acid 13598-36-2 (97)	LD50 (ori,rat) : 1500 mg/kg and 1720 mg/kg(IUCLID (2000))	LD50(skn,rat): >5000 mg/kg (RTECS (2008) : Federal Register. (U.S. Government Printing Office, Supt. Of Documents, Washington, DC 20402) V71, 36731, 2006)	Based on the NITE GHS classification results.
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Component	Acute toxicity -inhalation vapor- source information	Acute toxicity -inhalation dust- source information	Acute toxicity -inhalation mist- source information
Phosphorous acid 13598-36-2 (97)	Based on the NITE GHS classification results.	LC50(ihl,rat): >2.06 mg/L/4h(RTECS (2008) : Federal Register. (U.S. Government Printing Office, Supt. Of Documents, Washington, DC 20402) V71, 36731, 2006).	LC50(ihl,rat): >2.06 mg/L/4H(RTECS (2008) : Federal Register. (U.S. Government Printing Office, Supt. Of Documents, Washington, DC 20402) V71, 36731, 2006).

Skin irritation/corrosion

Component	Skin corrosion irritation source information
Phosphorous acid 13598-36-2 (97)	Rabbit:corrosive(IUCLID (2000)). EU C; R35(EU-Annex 1).

Serious eye damage/ irritation

Component	Serious eye damage source information
Phosphorous acid 13598-36-2 (97)	For skin corrosion / irritation is a Category 1.

Respiratory or skin sensitization

Component	Respiratory, Skin sensitization source information
Phosphorous acid 13598-36-2 (97)	Based on the NITE GHS classification results.

Reproductive cell mutagenicity**Carcinogenicity****Reproductive toxicity****STOT-single exposure****STOT-repeated exposure****Aspiration hazard****Section 12: ECOLOGICAL INFORMATION****Ecotoxicity**

Chemical Name	Algae/aquatic plants	Fish	Crustacea
Phosphorous acid	N/A	LC50:Brachydanio rerio 6980 - 9784 mg/L 96 h	N/A

Other data

Component	Aquatic toxicity -Acute- source information	Aquatic toxicity -Chronic- source information
Phosphorous acid 13598-36-2 (97)	Based on the NITE GHS classification results.	Based on the NITE GHS classification results.

Persistence and degradability	No information available
Bioaccumulative potential	No information available
Mobility in soil	No information available
Hazard to the ozone layer	No information available

Section 13: DISPOSAL CONSIDERATIONS**Waste from residues**

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Contaminated container and contaminated packaging

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Section 14: TRANSPORT INFORMATION

ADR/RID

UN number	UN2834
Proper shipping name:	Phosphorous acid
UN classification	8
Subsidiary hazard class	
Packing group	III
ERG Code	8L
Marine pollutant	Not applicable

IMDG

UN number	UN2834
Proper shipping name:	Phosphorous acid
UN classification	8
Subsidiary hazard class	
Packing group	III
EmS-No	F-A, S-B
Marine pollutant (Sea)	Not applicable

IATA

UN number	UN2834
Proper shipping name:	Phosphorous acid
UN classification	8
Subsidiary hazard class	
Packing group	III
Environmentally Hazardous Substance	Not applicable

Section 15: REGULATORY INFORMATION

International Inventories

EINECS/ELINCS	Listed
TSCA	Listed

Japanese regulations

Fire Service Act	Not applicable
Poisonous and Deleterious Substances Control Law	Not applicable
Industrial Safety and Health Act	Not applicable
Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc	Not applicable
Regulations for the carriage and storage of dangerous goods in ship	Corrosive Substances (Ordinance Art.3, Ministry of Transportation Ordinance Regarding Transport by Ship and Storage, Attached Table 1)
Civil Aeronautics Law	Corrosive Substances (Ordinance Art.194, MITL Notification for Air Transportation of Explosives etc., Attached Table 1)
Pollutant Release and Transfer Register Law	Not applicable

Section 16: OTHER INFORMATION

Literature and references

Revision Note	No information available
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Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

GHS Classification is according to JIS Z7252(2010). *JIS: Japanese Industrial Standards

End of Safety Data Sheet

SAFETY DATA SHEET

According to JIS Z 7253:2012

Revision Date 28-Nov-2013

Version 1

Section 1: PRODUCT AND COMPANY IDENTIFICATION

Product name	Polyethylene Glycol 1,000
Product code	165-09085
CAS No	25322-68-3
Formula	H(OCH ₂ CH ₂) _n OH
Manufacturer	Wako Pure Chemical Industries, Ltd. 1-2 Doshomachi 3-Chome, Chuo-ku, Osaka 540-8605, Japan Phone: +81 (0)6-6203-3741 Fax: +81 (0)6-6201-5964
Supplier	Wako Pure Chemical Industries, Ltd. 1-2 Doshomachi 3-Chome, Chuo-ku, Osaka 540-8605, Japan Phone: +81 (0)6-6203-3741 Fax: +81 (0)6-6201-5964
Emergency telephone number	+81-6-6203-3741 / +81-3-3270-8571
Recommended uses and restrictions on use	For research purposes

Section 2: HAZARDS IDENTIFICATION

GHS classification

Classification of the substance or mixture

Not a hazardous substance or mixture according to the Globally Harmonized System (GHS)

Pictograms

Signal word none

Hazard statements

Not a hazardous substance or mixture according to the Globally Harmonized System (GHS)

Precautionary statements-(Prevention)

• Not applicable

Precautionary statements-(Response)

• Not applicable

Precautionary statements-(Storage)

• Not applicable

Precautionary statements-(Disposal)

• Not applicable

Others

Other hazards Not available

Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

Single Substance or Mixture Substance**Formula** H(OCH₂CH₂)_nOH

Chemical Name	Weight-%	Molecular weight	ENCS	ISHL No.	CAS No
Polyethylene Glycol	<= 100	N/A	(8)-429,(7)-129,(2)-4 41	N/A	25322-68-3

Impurities and/or Additives : Not applicable
Substances Remarks: Average Mol. Wt.: abt. 1,000

Section 4: FIRST AID MEASURES

Inhalation

Remove to fresh air. If symptoms persist, call a physician.

Skin contact

Wash off immediately with soap and plenty of water. If symptoms persist, call a physician.

Eye contact

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediate medical attention is required.

Ingestion

Rinse mouth. Never give anything by mouth to an unconscious person. Call a physician or poison control center immediately. Do not induce vomiting without medical advice.

Protection of first-aiders

Use personal protective equipment as required.

Section 5: FIRE FIGHTING MEASURES

Suitable extinguishing media

Water spray (fog), carbon dioxide (CO₂), Foam, Extinguishing powder, Sand

Unsuitable extinguishing media

No information available

Special extinguishing method

No information available

Specific hazards arising from the chemical product

Thermal decomposition can lead to release of irritating and toxic gases and vapors.

Protection of fire-fighters

Use personal protective equipment as required. Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear.

Section 6: ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

For indoor, provide adequate ventilation process until the end of working. Deny unnecessary entry other than the people involved by, for example, using a rope. While working, wear appropriate protective equipments to avoid adhering it on skin, or inhaling the gas. Work from windward, and retract the people downwind.

Environmental precautions

To be careful not discharged to the environment without being properly handled waste water contaminated. See Section 12 for additional ecological information.

Methods and materials for contaminant and methods and materials for cleaning up

Do not touch spilled material without suitable protection(See section 8). After material is completely picked up, wash the spill site with soap and water and ventilate the area. Put all wastes in a plastic bag for disposal and seal it tightly. Remove, clean, or dispose of contaminated clothing.

Recovery, neutralization

No information available

Secondary disaster prevention measures

Clean contaminated objects and areas thoroughly observing environmental regulations.

Section 7: HANDLING AND STORAGE

Handling

Technical measures

Avoid contact with strong oxidizing agents. Use with local exhaust ventilation.

Precautions

Do not rough handling containers, such as upsetting, falling, giving a shock, and dragging. Prevent leakage, overflow, and scattering. Not to generate steam and dust in vain. Seal the container after use. After handling, wash hands and face, and then gargle. In places other than those specified, should not be smoking or eating and drinking. Should not be brought contaminated protective equipment and gloves to rest stops. Deny unnecessary entry of non-emergency personnel to the handling area.

Safety handling precautions

Avoid contact with skin, eyes or clothing. Use personal protective equipment as required.

Storage

Safe storage conditions

Storage conditions

Store away from sunlight in well-ventilated place at room temperature (preferably cool).
Keep container tightly closed.

Safe packaging material

Polypropylene

Incompatible substances

Strong oxidizing agents

Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls

In case of indoor workplace, seal the source or use a local exhaust system. Provide the safety shower facility, and hand- and eye-wash facility. And display their position clearly.

Exposure limits

This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Personal protective equipment

Respiratory protection

Dust mask

Hand protection

Protection gloves

Eye protection

protective eyeglasses or chemical safety goggles

Skin and body protection

Long-sleeved work clothes

General hygiene considerations

Handle in accordance with good industrial hygiene and safety practice.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

Form

Color

white - nearly white

Appearance

mass

Odor

Odorless

pH

4.0 - 7.0 (50 g/L, 25 °C)

Melting point/freezing point

30-40 °C

Boiling point, initial boiling point and boiling range

No data available

Flash point

No data available

Evaporation rate:

No data available

Flammability (solid, gas):

No data available

Upper/lower flammability or explosive limits

Upper :

No data available

Lower :

No data available

Vapour pressure

No data available

Vapour density

No data available

Specific Gravity / Relative density	No data available
Solubilities	water , Ethanol , acetone : Very soluble.
n-Octanol/water partition coefficient:(log Pow)	No data available
Auto-ignition temperature:	No data available
Decomposition temperature:	No data available
Viscosity (coefficient of viscosity)	No data available
Dynamic viscosity	15 - 35 mPa·s

Section 10: STABILITY AND REACTIVITY

Stability

Stability Stable under recommended storage conditions.

Reactivity No data available

Hazardous reactions

None under normal processing

Conditions to avoid

Extremes of temperature and direct sunlight

Incompatible materials

Strong oxidizing agents

Hazardous decomposition products

Carbon monoxide (CO), carbon dioxide (CO₂)

Section 11: TOXICOLOGICAL INFORMATION

Acute toxicity

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Polyethylene Glycol	N/A	> 20 mL/kg (Rabbit)	N/A

Skin irritation/corrosion

No data available

Serious eye damage/ irritation

Chemical Name	Serious eye damage source information
Polyethylene Glycol	Based on the NITE GHS classification results.

Respiratory or skin sensitization

No data available

Reproductive cell mutagenicity

No data available

Carcinogenicity

No data available

Reproductive toxicity

No data available

STOT-single exposure

No data available

STOT-repeated exposure

No data available

Aspiration hazard

No data available

Section 12: ECOLOGICAL INFORMATION

Ecotoxicity

No information available

Other data

No data available

Persistence and degradability

Degree of decomposition : 53 % by BOD (METI Existing chemical safety inspections)

Bioaccumulative potential

No information available

Mobility in soil

No information available

Hazard to the ozone layer No information available

Section 13: DISPOSAL CONSIDERATIONS

Waste from residues

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Contaminated container and contaminated packaging

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Section 14: TRANSPORT INFORMATION

ADR/RID	Not regulated
UN number	-
Proper shipping name:	
UN classification	
Subsidiary hazard class	
Packing group	
Marine pollutant	Not applicable
IMDG	Not regulated
UN number	-
Proper shipping name:	
UN classification	
Subsidiary hazard class	
Packing group	
Marine pollutant (Sea)	Not applicable
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	No information available
IATA	Not regulated
UN number	-
Proper shipping name:	
UN classification	
Subsidiary hazard class	
Packing group	
Environmentally Hazardous Substance	Not applicable

Section 15: REGULATORY INFORMATION

International Inventories

EINECS/ELINCS	Listed
TSCA	Listed

Japanese regulations

Fire Service Act	Not applicable
Poisonous and Deleterious Substances Control Law	Not applicable
Industrial Safety and Health Act	Not applicable
Regulations for the carriage and storage of dangerous goods in ship	Not applicable
Civil Aeronautics Law	Not applicable
Marine Pollution Prevention Law	
Pollutant Release and Transfer Register Law	Not applicable

Export Trade Control Order

Not applicable

Section 16: OTHER INFORMATION

Literature and references

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

GHS Classification is according to JIS Z7252(2010). *JIS: Japanese Industrial Standards

End of Safety Data Sheet

1: Identification

Product Identifier

Product name: Polyethyleneimine, branched, M. W. 600

Stock number: 40527

CAS Number:

9002-98-6

Relevant identified uses of the substance or mixture and uses advised against. No further relevant information available.

Identified use: SU24 Scientific research and development

Details of the supplier of the safety data sheet

Manufacturer/Supplier:

Alfa Aesar, A Johnson Matthey Company

Johnson Matthey Catalog Company, Inc.

30 Bond Street

Ward Hill, MA 01835-8099

Tel: 800-343-0660

Fax: 800-322-4757

Email: tech@alfa.com

www.alfa.com

Information Department: Health, Safety and Environmental Department

Emergency telephone number:

During normal hours the Health, Safety and Environmental Department at (800) 343-0660. After normal hours call Carechem 24 at (866) 928-0789.

2: Hazard(s) identification

Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008



GHS07

Acute Tox. 4 H302 Harmful if swallowed.

Classification according to Directive 67/548/EEC or Directive 1999/45/EC

Xn; Harmful

R22: Harmful if swallowed.

Information concerning particular hazards for human and environment: Not applicable

Hazards not otherwise classified No information known.

Label elements

Labelling according to Regulation (EC) No 1272/2008 The substance is classified and labeled according to the CLP regulation.

Hazard pictograms



GHS07

Signal word

Warning

Hazard statements

H302 Harmful if swallowed.

Precautionary statements

P264 Wash thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.

P330 Rinse mouth.

P301+P312 IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

WHMIS classification Not controlled

Classification system

HMIS ratings (scale 0-4)

(Hazardous Materials Identification System)

HEALTH	2	Health (acute effects) = 2
FIRE	1	Flammability = 1
REACTIVITY	1	Physical Hazard = 1

 REACTIVITY | 1 | Physical Hazard = 1 |

Other hazards

Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

3: Composition/information on ingredients

Chemical characterization: Substances

CAS# Description:

9002-98-6 Polyethyleneimine

4: First-aid measures

Description of first aid measures

After inhalation

Supply fresh air. If required, provide artificial respiration. Keep patient warm.

Seek immediate medical advice.

After skin contact

Immediately wash with water and soap and rinse thoroughly.

Seek immediate medical advice.

After eye contact Rinse opened eye for several minutes under running water. Then consult a doctor.

After swallowing Seek medical treatment.

Information for doctor

Most important symptoms and effects, both acute and delayed No further relevant information available.

Indication of any immediate medical attention and special treatment needed No further relevant information available.

Product name: **Polyethyleneimine, branched, M. W. 600**

(Contd. of page 1)

5: Fire-fighting measures

Extinguishing media

Suitable extinguishing agents Carbon dioxide, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

Special hazards arising from the substance or mixture

If this product is involved in a fire, the following can be released:

Carbon monoxide and carbon dioxide

Nitrogen oxides (NOx)

Advice for firefighters

Protective equipment:

Wear self-contained respirator.

Wear fully protective impervious suit.

6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

Wear protective equipment. Keep unprotected persons away.

Ensure adequate ventilation

Environmental precautions:

Do not allow material to be released to the environment without proper governmental permits.

Do not allow product to reach sewage system or any water course.

Do not allow to penetrate the ground/soil.

Methods and material for containment and cleaning up:

Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

Dispose contaminated material as waste according to item 13.

Prevention of secondary hazards: No special measures required.

Reference to other sections

See Section 7 for information on safe handling

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

7: Handling and storage

Handling

Precautions for safe handling

Keep container tightly sealed.

Store in cool, dry place in tightly closed containers.

Ensure good ventilation at the workplace.

Information about protection against explosions and fires: No information known.

Conditions for safe storage, including any incompatibilities

Storage

Requirements to be met by storerooms and receptacles: No special requirements.

Information about storage in one common storage facility: Store away from oxidizing agents.

Further information about storage conditions:

Keep container tightly sealed.

Store in cool, dry conditions in well sealed containers.

Specific end use(s) No further relevant information available.

8: Exposure controls/personal protection

Additional information about design of technical systems:

Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Control parameters

Components with limit values that require monitoring at the workplace:

The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.

Additional information: No data

Exposure controls

Personal protective equipment

General protective and hygienic measures

The usual precautionary measures for handling chemicals should be followed.

Keep away from foodstuffs, beverages and feed.

Remove all soiled and contaminated clothing immediately.

Wash hands before breaks and at the end of work.

Maintain an ergonomically appropriate working environment.

Breathing equipment: Use suitable respirator when high concentrations are present.

Protection of hands:

Impervious gloves

Check protective gloves prior to each use for their proper condition.

The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.

Eye protection: Safety glasses

Body protection: Protective work clothing.

9: Physical and chemical properties

Information on basic physical and chemical properties

General Information

Appearance:

Form: Viscous liquid

Color: Pale yellow

Odor: Amine-like

Odor threshold: Not determined.

pH-value: Not determined.

Change in condition

Melting point/Melting range: Not determined

Boiling point/Boiling range: Not determined

Sublimation temperature / start: Not determined

Flammability (solid, gaseous) Not determined.

Ignition temperature: Not determined

Decomposition temperature: Not determined

Auto igniting: Not determined.

Danger of explosion: Not determined.

(Contd. on page 3)
USA

Product name: **Polyethyleneimine, branched, M. W. 600**

(Contd. of page 2)

Explosion limits:
Lower: Not determined
Upper: Not determined
Vapor pressure: Not determined
Density: Not determined
Relative density: Not determined.
Vapor density: Not determined.
Evaporation rate: Not determined.
Solubility in / Miscibility with Water: Fully miscible
Partition coefficient (n-octanol/water): Not determined.
Viscosity:
dynamic: Not determined.
kinematic: Not determined.
Other information: No further relevant information available.

10: Stability and reactivity

Reactivity: No information known.
Chemical stability: Stable under recommended storage conditions.
Thermal decomposition / conditions to be avoided: Decomposition will not occur if used and stored according to specifications.
Possibility of hazardous reactions: Reacts with strong oxidizing agents
Incompatible materials: Oxidizing agents
Hazardous decomposition products:
 Carbon monoxide and carbon dioxide
 Nitrogen oxides

11: Toxicological information

Information on toxicological effects

Acute toxicity:
 Harmful if swallowed.
 The Registry of Toxic Effects of Chemical Substances (RTECS) contains acute toxicity data for components in this product.

LD/LC50 values that are relevant for classification:

Oral LD50	940 mg/kg (guinea pig)
	1150 mg/kg (mouse)
	1350 mg/kg (rat)

Skin irritation or corrosion: May cause irritation
Eye irritation or corrosion: May cause irritation
Sensitization: No sensitizing effects known.
Germ cell mutagenicity: No effects known.
Carcinogenicity: No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.
Reproductive toxicity: No effects known.
Specific target organ system toxicity - repeated exposure: No effects known.
Specific target organ system toxicity - single exposure: No effects known.
Aspiration hazard: No effects known.
Subacute to chronic toxicity: No effects known.
Additional toxicological information: To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
Carcinogenic categories:
OSHA-Ca (Occupational Safety & Health Administration) Substance is not listed.

12: Ecological information

Toxicity:
Aquatic toxicity: No further relevant information available.
Persistence and degradability: No further relevant information available.
Bioaccumulative potential: No further relevant information available.
Mobility in soil: No further relevant information available.
Additional ecological information:
General notes:
 Do not allow material to be released to the environment without proper governmental permits.
 Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
 Avoid transfer into the environment.
Results of PBT and vPvB assessment:
PBT: Not applicable.
vPvB: Not applicable.
Other adverse effects: No further relevant information available.

13: Disposal considerations

Waste treatment methods:
Recommendation: Consult state, local or national regulations to ensure proper disposal.
Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.
Recommended cleansing agent: Water, if necessary with cleansing agents.

14: Transport information

UN-Number DOT, ADN, IMDG, IATA	Not applicable
UN proper shipping name DOT, ADN, IMDG, IATA	Not applicable
Transport hazard class(es) DOT, ADR, ADN, IMDG, IATA Class	Not applicable
Packing group DOT, IMDG, IATA	Not applicable
Environmental hazards:	Not applicable.

(Contd. on page 4)
USA

Product name: Polyethyleneimine, branched, M. W. 600

(Contd. of page 3)

Special precautions for user Not applicable.

Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code Not applicable.

Transport/Additional information:

DOT
Marine Pollutant (DOT): No

UN "Model Regulation": -

15: Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture

National regulations

All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.

All components of this product are listed on the Canadian Domestic Substances List (DSL).

SARA Section 313 (specific toxic chemical listings) Substance is not listed.

California Proposition 65

Prop 65 - Chemicals known to cause cancer Substance is not listed.

Prop 65 - Developmental toxicity Substance is not listed.

Prop 65 - Developmental toxicity, female Substance is not listed.

Prop 65 - Developmental toxicity, male Substance is not listed.

Information about limitation of use: For use only by technically qualified individuals.

Other regulations, limitations and prohibitive regulations

Use of PEI for transfection is covered by existing intellectual property rights, including US Patent 6,013,240, European Patent 0,770,140, and foreign equivalents, for which Polyplus-transfection™ is the worldwide exclusive licensee. Please make sure you do not potentially infringe. Further information may be obtained by contacting Polyplus-transfection at licensing@polyplus-transfection.com. They will happily discuss licensing possibilities.

Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006. Substance is not listed.

REACH - Pre-registered substances Substance is listed.

Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16: Other information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing SDS: Health, Safety and Environmental Department.

Date of preparation / last revision 08/07/2014 / -

Abbreviations and acronyms:

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

DOT: US Department of Transportation

GHS: Globally Harmonized System of Classification and Labelling of Chemicals

CAS: Chemical Abstracts Service (division of the American Chemical Society)

HMIS: Hazardous Materials Identification System (USA)

WHMIS: Workplace Hazardous Materials Information System (Canada)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

vPvB: very Persistent and very Bioaccumulative

ACGIH: American Conference of Governmental Industrial Hygienists (USA)

OSHA: Occupational Safety and Health Administration (USA)

NTP: National Toxicology Program (USA)

IARC: International Agency for Research on Cancer

EPA: Environmental Protection Agency (USA)

Acute Tox. 4: Acute toxicity, Hazard Category 4

Safety Data Sheet

acc. to OSHA HCS

Printing date 01/23/2014

Reviewed on 01/23/2007

1 Identification**Product identifier****Product name:** Polypropylene glycol 1000**Stock number:** 40812**CAS Number:**

25322-69-4

NLP Number:

500-039-8

Relevant identified uses of the substance or mixture and uses advised against.**Identified use:** SU24 Scientific research and development**Details of the supplier of the safety data sheet****Manufacturer/Supplier:**

Alfa Aesar, A Johnson Matthey Company

Johnson Matthey Catalog Company, Inc.

30 Bond Street

Ward Hill, MA 01835-8099

Tel: 800-343-0660

Fax: 800-322-4757

Email: tech@alfa.com

www.alfa.com

Information Department: Health, Safety and Environmental Department**Emergency telephone number:**

During normal hours the Health, Safety and Environmental Department at (800) 343-0660. After normal hours call Carechem 24 at (866) 928-0789.

2 Hazard(s) identification**Classification of the substance or mixture****Classification according to Regulation (EC) No 1272/2008**

The substance is not classified as hazardous to health or the environment according to the CLP regulation.

Classification according to Directive 67/548/EEC or Directive 1999/45/EC Not applicable**Information concerning particular hazards for human and environment:**

Not applicable

No information known.

Hazards not otherwise classified No information known.**Label elements****Labelling according to Regulation (EC) No 1272/2008** Not applicable**Hazard pictograms** Not applicable**Signal word** Not applicable**Hazard statements** Not applicable**WEMIS classification** Not controlled**Classification system****HMIS ratings (scale 0-4)****(Hazardous Materials Identification System)**

HEALTH	0	Health (acute effects) = 0
FIRE	1	Flammability = 1
REACTIVITY	0	Physical Hazard = 0

Other hazards**Results of PBT and vPvB assessment**

PBT: Not applicable.

vPvB: Not applicable.

3 Composition/information on ingredients**Chemical characterization:** Substances**CAS# Description:**

25322-69-4 Polypropylene glycol 1000

Identification number(s):**NLP Number:** 500-039-8**4 First-aid measures****Description of first aid measures****After inhalation**

Supply fresh air. If required, provide artificial respiration. Keep patient warm.

Seek immediate medical advice.

After skin contact

Immediately wash with water and soap and rinse thoroughly.

Seek immediate medical advice.

Safety Data Sheet
acc. to OSHA HCS

Printing date 01/23/2014

Reviewed on 01/23/2007

Product name: Polypropylene glycol 1000

(Contd. of page 1)

After eye contact

Rinse opened eye for several minutes under running water. Then consult a doctor.

After swallowing Seek medical treatment.**Information for doctor****Most important symptoms and effects, both acute and delayed**

No further relevant information available.

Indication of any immediate medical attention and special treatment needed

No further relevant information available.

5 Fire-fighting measures**Extinguishing media****Suitable extinguishing agents**

Use carbon dioxide, extinguishing powder or foam. Water may be ineffective but may be used for cooling exposed containers.

Special hazards arising from the substance or mixture

If this product is involved in a fire, the following can be released:

Carbon monoxide and carbon dioxide

Advice for firefighters**Protective equipment:**

Wear self-contained respirator.

Wear fully protective impervious suit.

6 Accidental release measures**Personal precautions, protective equipment and emergency procedures**

Wear protective equipment. Keep unprotected persons away.

Ensure adequate ventilation

Environmental precautions:

Do not allow material to be released to the environment without proper governmental permits.

Do not allow product to reach sewage system or any water course.

Do not allow to penetrate the ground/soil.

Methods and material for containment and cleaning up:

Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

Prevention of secondary hazards: No special measures required.**Reference to other sections**

See Section 7 for information on safe handling

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

7 Handling and storage**Handling****Precautions for safe handling**

Keep container tightly sealed.

Store in cool, dry place in tightly closed containers.

Information about protection against explosions and fires: No information known.**Conditions for safe storage, including any incompatibilities****Storage****Requirements to be met by storerooms and receptacles:** No special requirements.**Information about storage in one common storage facility:** Store away from oxidizing agents.**Further information about storage conditions:**

Keep container tightly sealed.

Store in cool, dry conditions in well sealed containers.

Specific end use(s) No further relevant information available.**8 Exposure controls/personal protection****Additional information about design of technical systems:**

Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Control parameters**Components with limit values that require monitoring at the workplace:** Not required.**Additional information:** No data**Exposure controls****Personal protective equipment****General protective and hygienic measures**

The usual precautionary measures for handling chemicals should be followed.

(Contd. on page 3)

USA

Safety Data Sheet
acc. to OSHA HCS

Printing date 01/23/2014

Reviewed on 01/23/2007

Product name: Polypropylene glycol 1000

(Contd. of page 2)

Keep away from foodstuffs, beverages and feed.
Remove all soiled and contaminated clothing immediately.
Wash hands before breaks and at the end of work.
Maintain an ergonomically appropriate working environment.
Breathing equipment: Use suitable respirator when high concentrations are present.
Protection of hands:
Impervious gloves
Check protective gloves prior to each use for their proper condition.
The selection of suitable gloves not only depends on the material, but also on quality.
Quality will vary from manufacturer to manufacturer.
Eye protection: Safety glasses
Body protection: Protective work clothing.

9 Physical and chemical properties

Information on basic physical and chemical properties

General Information

Appearance:

Form:	Liquid
Color:	Colorless
Odor:	Not determined
Odor threshold:	Not determined.

pH-value:	Not determined.
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Change in condition

Melting point/Melting range:	Not determined
Boiling point/Boiling range:	Not determined
Sublimation temperature / start:	Not determined

Flash point:	Not applicable
	Not determined

Flammability (solid, gaseous)	Not determined.
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Ignition temperature:	Not determined
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Decomposition temperature:	Not determined
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Auto igniting:	Not determined.
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Danger of explosion:	Product does not present an explosion hazard.
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Explosion limits:	
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Lower:	Not determined
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Upper:	Not determined
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Vapor pressure:	Not determined
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Density:	Not determined
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Relative density	Not determined.
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Vapor density	Not determined.
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Evaporation rate	Not determined.
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Solubility in / Miscibility with

Water:	Not miscible or difficult to mix
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Partition coefficient (n-octanol/water):	Not determined.
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Viscosity:

dynamic:	Not determined.
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kinematic:	Not determined.
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Other information	No further relevant information available.
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10 Stability and reactivity

Reactivity No information known.

Chemical stability Stable under recommended storage conditions.

Thermal decomposition / conditions to be avoided:

Decomposition will not occur if used and stored according to specifications.

Possibility of hazardous reactions No dangerous reactions known

Incompatible materials: Oxidizing agents

Hazardous decomposition products: Carbon monoxide and carbon dioxide

11 Toxicological information

Information on toxicological effects

Acute toxicity: No effects known.

LD/LC50 values that are relevant for classification: No data

Skin irritation or corrosion: May cause irritation

Eye irritation or corrosion: May cause irritation

(Contd. on page 4)
USA

Safety Data Sheet
acc. to OSHA HCS

Printing date 01/23/2014

Reviewed on 01/23/2007

Product name: Polypropylene glycol 1000

(Contd. of page 3)

Sensitization: No sensitizing effects known.
Germ cell mutagenicity: No effects known.
Carcinogenicity:
 No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.
Reproductive toxicity: No effects known.
Specific target organ system toxicity - repeated exposure: No effects known.
Specific target organ system toxicity - single exposure: No effects known.
Aspiration hazard: No effects known.
Subacute to chronic toxicity:
 Other than potential irritation (see above), no information on illness or injury to humans from acute or chronic exposure to this product is available.
Additional toxicological information:
 To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

12 Ecological information

Toxicity
Aquatic toxicity: No further relevant information available.
Persistence and degradability No further relevant information available.
Behavior in environmental systems:
Bioaccumulative potential No further relevant information available.
Mobility in soil No further relevant information available.
Additional ecological information:
General notes:
 Do not allow material to be released to the environment without proper governmental permits.
 Avoid transfer into the environment.
Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.
Other adverse effects No further relevant information available.

13 Disposal considerations

Waste treatment methods
Recommendation Consult state, local or national regulations to ensure proper disposal.
Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.

14 Transport information

Not a hazardous material for transportation.

UN-Number DOT, ADR, IMDG, IATA	None
UN proper shipping name DOT, ADR, IMDG, IATA	None
Transport hazard class(es) DOT, ADR, IMDG, IATA Class	None
Packing group DOT, ADR, IMDG, IATA	None
Environmental hazards:	Not applicable.
Special precautions for user	Not applicable.
Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	Not applicable.
Transport/Additional information:	Not dangerous according to the above specifications.
DOT Marine Pollutant (DOT):	No

USA
(Contd. on page 5)

Safety Data Sheet
acc. to OSHA HCS

Printing date 01/23/2014

Reviewed on 01/23/2007

Product name: Polypropylene glycol 1000

(Contd. of page 4)

15 Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture

National regulations

All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.

SARA Section 313 (specific toxic chemical listings) Substance is not listed.

California Proposition 65

Prop 65 - Chemicals known to cause cancer Substance is not listed.

Prop 65 - Developmental toxicity Substance is not listed.

Prop 65 - Developmental toxicity, female Substance is not listed.

Prop 65 - Developmental toxicity, male Substance is not listed.

Information about limitation of use: For use only by technically qualified individuals.

Other regulations, limitations and prohibitive regulations

Substances of very high concern (SVHC) according to REACH, Article 57

Substance is not listed.

REACH - Pre-registered substances Substance is listed.

Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing SDS: Health, Safety and Environmental Department.

Abbreviations and acronyms:

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

GHS: Globally Harmonized System of Classification and Labelling of Chemicals

EINECS: European Inventory of Existing Commercial Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

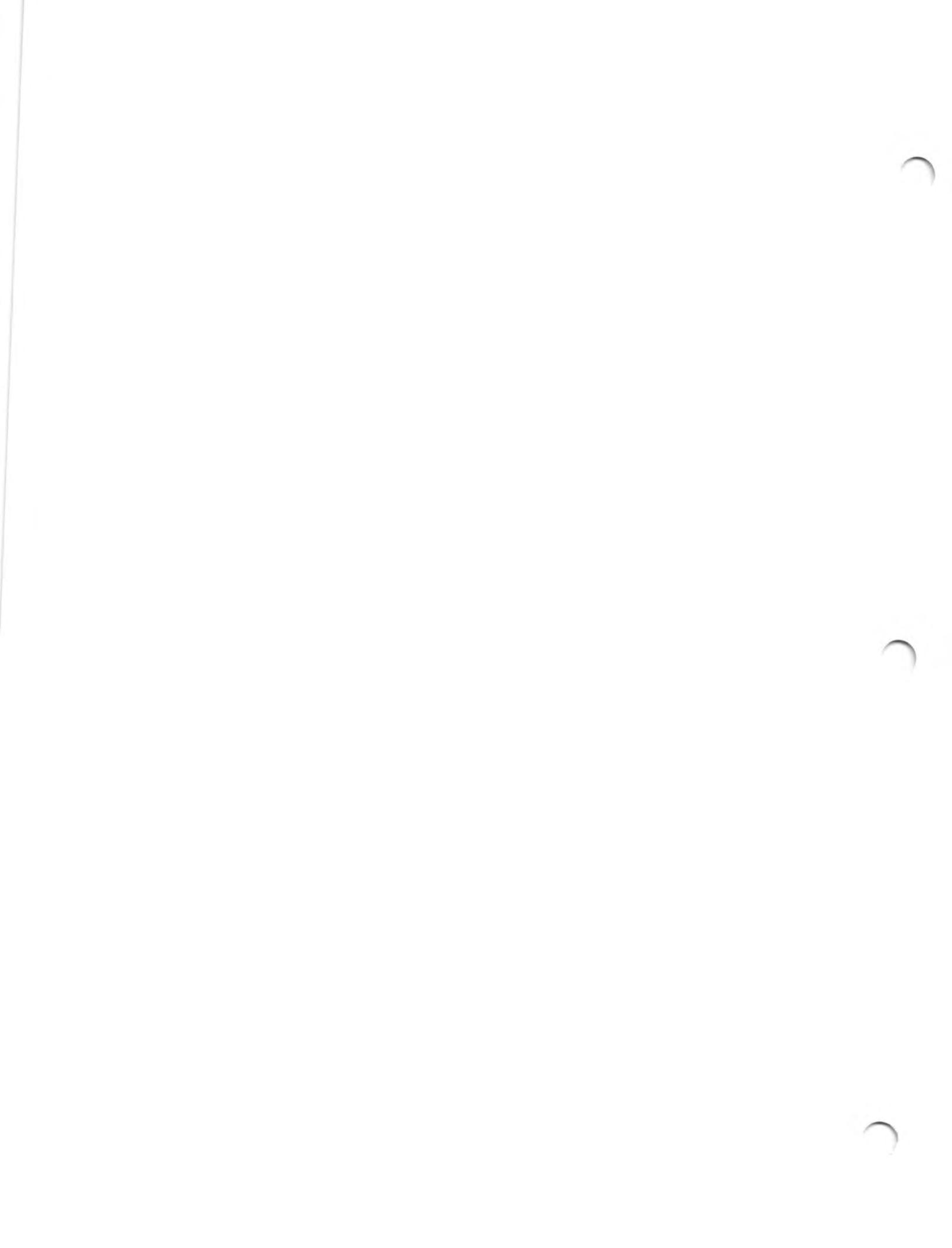
HMIS: Hazardous Materials Identification System (USA)

WHMIS: Workplace Hazardous Materials Information System (Canada)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

USA





TCI AMERICA

SAFETY DATA SHEET

Revision number: 2
Revision date: 10/06/2014

1. IDENTIFICATION

Product name: Poly(vinyl Alcohol) n=1750±50
Product code: P0469

Product use: For laboratory research purposes.
Restrictions on use: Not for drug or household use.

Company:
TCI America
9211 N. Harborgate Street
Portland, OR 97203 U.S.A.
Telephone:
+1-800-423-8616 / +1-503-283-1681
Fax:
+1-888-520-1075 / +1-503-283-1987
e-mail:
sales-US@TCIchemicals.com
www.TCIchemicals.com

Emergency telephone number:
Chemical Emergencies:
TCI America (8:00am - 5:00pm) PST
+1-503-286-7624
Transportation Emergencies:
Chemtrec 24-Hour
+1-800-424-9300 (U.S.A.)
+1-703-527-3887 (International)
Responsible department:
TCI America
Environmental Health Safety and Security
+1- 503-286-7624

2. HAZARD(S) IDENTIFICATION

OSHA Haz Com: CFR 1910.1200: Not classifiable

Signal word: None

Hazard Statement(s): None

Pictogram(s) or Symbol(s): None

Precautionary Statement(s): None

Supplementary Information: While this material is not classified as hazardous under OSHA, this SDS contains valuable information critical to safe handling and proper use of the product. This SDS should be retained and available for employees and other users of this product.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/Mixture: Substance
Components: Poly(vinyl Alcohol) n=1750±50
Percent:
CAS Number: 9002-89-5
Chemical Formula:

4. FIRST-AID MEASURES

Inhalation: Move victim to fresh air. Call emergency medical service. Give artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult. Keep victim warm and quiet. Treat symptomatically and supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Skin contact: Remove and isolate contaminated clothing and shoes. In case of contact with substance, immediately flush skin with running water for at least 20 minutes. Treat symptomatically and supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Eye contact: Move victim to fresh air. Check for and remove any contact lenses. In case of contact with substance, immediately flush eyes with running water for at least 20 minutes. Keep victim warm and quiet. Treat symptomatically and supportively. Effects of exposure to substance may be delayed. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

4. FIRST-AID MEASURES

Ingestion:	If a person vomits place them in the recovery position so that vomit will not reenter the mouth and throat. Rinse mouth. Keep victim warm and quiet. Loosen tight clothing such as a collar, tie, belt or waistband. If swallowed, seek medical advice immediately and show the container or label. Treat symptomatically and supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves. Effects of exposure (ingestion) to substance may be delayed.
Symptoms/effects:	
Acute:	No data available
Delayed:	No data available
Immediate medical attention:	If breathing has stopped, perform artificial respiration. Use first aid treatment according to the nature of the injury. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: Dry chemical, CO₂, water spray, or alcohol-resistant foam. Consult with local fire authorities before attempting large scale fire fighting operations.

Specific hazards arising from the chemical

Hazardous combustion products: None
Other specific hazards: Closed containers may explode from heat of a fire.

Special precautions for fire-fighters:

Not available

Special protective equipment for fire-fighters:

Structural fire fighters' protective clothing provides limited protection in fire situations ONLY; it may not be effective in spill situations.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Do not touch damaged containers or spilled material unless wearing appropriate protective clothing (Section 8).
Personal protective equipment: Wear protective clothing, gloves and eye protection.
Emergency procedures: In case of a spill and/or a leak, always shut off any sources of ignition, ventilate the area, and exercise caution.

Methods and materials for containment and cleaning up:

Dike far ahead of liquid spill for later disposal.

Environmental precautions:

Prevent entry into sewers, basements or confined areas.

7. HANDLING AND STORAGE

Precautions for safe handling: Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection. Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.
Conditions for safe storage: Keep container tightly closed in a dry and well-ventilated place.
Storage incompatibilities: Store away from oxidizing agents

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure limits: No data available

Appropriate engineering controls:

Good general ventilation should be sufficient to control airborne levels. Eyewash fountains should be provided in areas where there is any possibility that workers could be exposed to the substance. Follow safe industrial engineering/laboratory practices when handling any chemical.

Personal protective equipment

Respiratory protection: Dust respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent.
Hand protection: Wear protective gloves.
Eye protection: Safety glasses.
Skin and body protection: Lab coat.

9. PHYSICAL AND CHEMICAL PROPERTIES

Potential Health Effects:

No specific information available; skin and eye contact may result in irritation. May be harmful if inhaled or ingested.

Target organ(s): No data available**12. ECOLOGICAL INFORMATION****Ecotoxicity**

Fish:	48h LC50:>1000 ppm (Oryzias latipes)
Crustaceas:	No data available
Algae:	No data available

Persistence and degradability:

No data available

Bioaccumulative potential (BCF):

<0.99 (conc. 4 ppm), <7.5 (conc. 0.4 ppm)

Mobility in soil:

No data available

Partition coefficient:

No data available

n-octanol/water (log P_{ow})**Soil adsorption (K_{oc}):**

No data available

Henry's Law:

No data available

constant (PaM³/mol)**13. DISPOSAL CONSIDERATIONS****Disposal of product:**

Recycle to process if possible. It is the generator's responsibility to comply with Federal, State and Local rules and regulations. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. This section is intended to provide assistance but does not replace these laws, nor does compliance in accordance with this section ensure regulatory compliance according to the law. US EPA guidelines for Identification and Listing of Hazardous Waste are listed in 40 CFR Parts 261.

Disposal of container:

Dispose of as unused product.

Other considerations:

Observe all federal, state and local regulations when disposing of the substance.

14. TRANSPORT INFORMATION**DOT (US)**

Non-hazardous for transportation.

IATA

Non-hazardous for transportation.

IMDG

Non-hazardous for transportation.

15. REGULATORY INFORMATION**Toxic Substance Control Act (TSCA 8b.):**

This product is ON the EPA Toxic Substances Control Act (TSCA) inventory.

US Federal Regulations**CERCLA Hazardous substance and Reportable Quantity:**

SARA 313:	Not Listed
SARA 302:	Not Listed

State Regulations**State Right-to-Know**

Massachusetts	Not Listed
New Jersey	Not Listed
Pennsylvania	Not Listed
California Proposition 65:	Not Listed

Other Information**NFPA Rating:**

Health:	0
Flammability:	2
Instability:	0

HMIS Classification:

Health:	0
Flammability:	2
Physical:	0

15. REGULATORY INFORMATION**International Inventories**

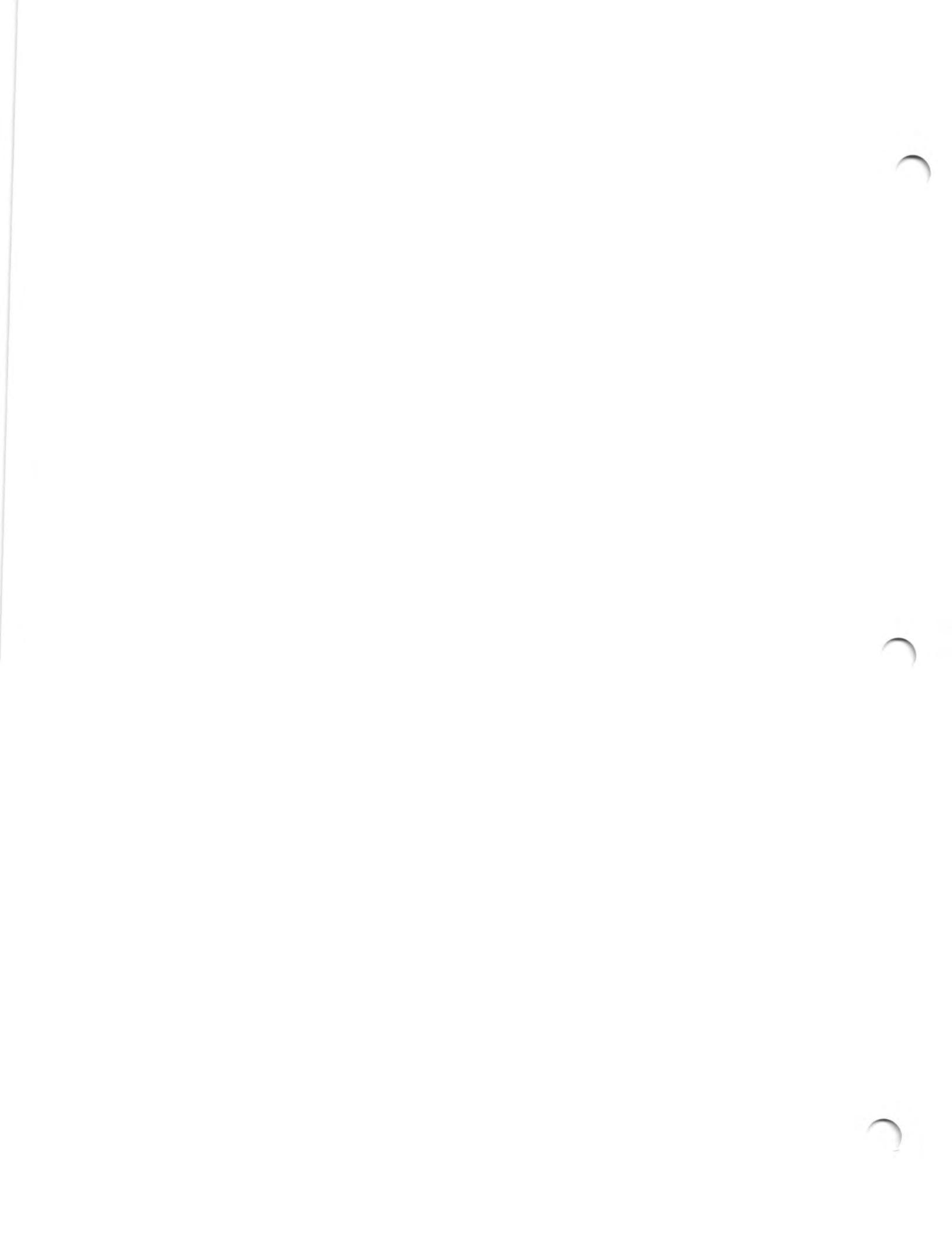
WHMIS hazard class: No data available.

16. OTHER INFORMATION

Revision date: 10/06/2014

Revision number: 2

TCI chemicals are for research purposes only and are NOT intended for use as drugs, food additives, households, or pesticides. The information herein is believed to be correct, but does not claim to be all inclusive and should be used only as a guide. Neither the above named supplier nor any of its affiliates or subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All chemical reagents must be handled with the recognition that their chemical, physiological, toxicological, and hazardous properties have not been fully investigated or determined. All chemical reagents should be handled only by individuals who are familiar with their potential hazards and who have been fully trained in proper safety, laboratory, and chemical handling procedures. Although certain hazards are described herein, we can not guarantee that these are the only hazards which exist. Our SDS are based only on data available at the time of shipping and are subject to change without notice as new information is obtained. Avoid long storage periods since the product is subject to degradation with age and may become more dangerous or hazardous. It is the responsibility of the user to request updated SDS for products that are stored for extended periods. Disposal of unused product must be undertaken by qualified personnel who are knowledgeable in all applicable regulations and follow all pertinent safety precautions including the use of appropriate protective equipment (e.g. protective goggles, protective clothing, breathing equipment, face mask, fume hood). For proper handling and disposal, always comply with federal, state and local regulations.



*This SDS for user in JP - Not correspond to the regulation of other countries.



TOKYO CHEMICAL INDUSTRY CO., LTD.

Polyvinylpyrrolidone K 15 Average Molecular Wt. 10,000 Revision 8
number:

Revision date: 05/14/2015

Page 1 of 4

Revision date: 05/14/2015

SAFETY DATA SHEET

1. IDENTIFICATION

Product name: Polyvinylpyrrolidone K 15 Average Molecular Wt. 10,000
Product code: P0471
Company: TOKYO CHEMICAL INDUSTRY CO., LTD.
Address: 4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Responsible department: Global Business Department
Telephone: +81-3-5640-8872
Fax: +81-3-5640-8902
e-mail: globalbusiness@TCIchemicals.com
Revision number: 8

2. HAZARDS IDENTIFICATION

GHS classification

PHYSICAL HAZARDS Not classified
HEALTH HAZARDS Not classified
ENVIRONMENTAL HAZARDS Not classified

GHS label elements, including precautionary statements

Pictograms or hazard symbols None
Signal word No signal word
Hazard statements None
Precautionary statements: None

Other hazards which do not result in classification Dust explosion possible if in powder or granular form, mixed with air.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/mixture: Substance
Components: Polyvinylpyrrolidone K 15 Average Molecular Wt. 10,000
Percent:
CAS Number: 9003-39-8
Synonyms: PVP K 15 Average Molecular Wt. 10,000
Chemical Formula: (C₆H₉NO)_n
Notice Through Official Gazettes Reference Number
ENCS: (6)-1007, (6)-1048
ISHL: Official announcement chemistry substance.

4. FIRST-AID MEASURES

Inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical advice/attention if you feel unwell.
Skin contact: Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. If skin irritation or rash occurs: Get medical advice/attention.
Eye contact: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
Ingestion: Get medical advice/attention if you feel unwell. Rinse mouth.
Protection of first-aiders: A rescuer should wear personal protective equipment, such as rubber gloves and air-tight goggles.

5. FIRE-FIGHTING MEASURES

- Suitable extinguishing media:** Dry chemical, foam, water spray, carbon dioxide.
- Specific hazards arising from the chemical:** Take care as it may decompose upon combustion or in high temperatures to generate poisonous fume.
- Precautions for firefighters:** Fire-extinguishing work is done from the windward and the suitable fire-extinguishing method according to the surrounding situation is used. Uninvolved persons should evacuate to a safe place. In case of fire in the surroundings: Remove movable containers if safe to do so.
- Special protective equipment for firefighters:** When extinguishing fire, be sure to wear personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

- Personal precautions, protective equipment and emergency procedures:** Use personal protective equipment. Keep people away from and upwind of spill/leak. Entry to non-involved personnel should be controlled around the leakage area by roping off, etc.
- Environmental precautions:** Prevent product from entering drains.
- Methods and materials for containment and cleaning up:** Sweep dust to collect it into an airtight container, taking care not to disperse it. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

7. HANDLING AND STORAGE

Precautions for safe handling

- Technical measures:** Handling is performed in a well ventilated place. Wear suitable protective equipment. Prevent dispersion of dust. Wash hands and face thoroughly after handling. Use a local exhaust if dust or aerosol will be generated.

- Advice on safe handling:** Avoid contact with skin, eyes and clothing.

Conditions for safe storage, including any incompatibilities

- Storage conditions:** Keep container tightly closed. Store in a cool and dark place. Store under inert gas. Protect from moisture. Store away from incompatible materials such as oxidizing agents. Hygroscopic.
- Packaging material:** Comply with laws.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

- Engineering controls:** Install a closed system or local exhaust as possible so that workers should not be exposed directly. Also install safety shower and eye bath.
- Control parameters:** Not set up
- Personal protective equipment**
- Respiratory protection:** Dust respirator. Follow local and national regulations.
- Hand protection:** Protective gloves.
- Eye protection:** Safety glasses. A face-shield, if the situation requires.
- Skin and body protection:** Protective clothing. Protective boots, if the situation requires.

9. PHYSICAL AND CHEMICAL PROPERTIES

- Physical state (20°C):** Solid
- Form:** Powder
- Colour:** White - Pale yellow
- Odour:** Odorless
- pH:** No data available
- Melting point/freezing point:** No data available
- Boiling point/range:** No data available
- Flash point:** No data available
- Flammability or explosive limits:**
- Lower:** No data available
- Upper:** No data available
- Relative density:** No data available

9. PHYSICAL AND CHEMICAL PROPERTIES

Solubility(ies):

[Water]	Soluble
[Other solvents]	
Soluble:	Alcohols, Chloroform, Pyridine
Insoluble:	Ether, Esters, Ketones, Hydrocarbons

10. STABILITY AND REACTIVITY

Chemical stability:	Stable under proper conditions.
Possibility of hazardous reactions:	Dust explosion possible if in powder or granular form, mixed with air.
Conditions to avoid:	Static discharge
Incompatible materials:	Oxidizing agents
Hazardous decomposition products:	Carbon monoxide, Carbon dioxide, Nitrogen oxides (NOx)

11. TOXICOLOGICAL INFORMATION

Acute Toxicity:	ori-rbt LD50:1040 mg/kg ori-mus LD50:>40 g/kg ori-rat LD50:100 g/kg ipr-mus LD50:12 g/kg
Skin corrosion/irritation:	No data available
Serious eye damage/irritation:	No data available
Germ cell mutagenicity:	No data available
Carcinogenicity:	
IARC =	Group 3 (Not classifiable as carcinogenic to humans)
NTP =	No data available
Reproductive toxicity:	No data available
RTECS Number:	TR8370000

12. ECOLOGICAL INFORMATION

Ecotoxicity:	
Fish:	No data available
Crustacea:	No data available
Algae:	No data available
Persistence / degradability:	No data available
Bioaccumulative potential(BCF):	No data available
Mobility in soil	
Log Pow:	No data available
Soil adsorption (Koc):	No data available
Henry's Law constant(PaM ³ /mol):	No data available

13. DISPOSAL CONSIDERATIONS

Recycle to process, if possible. Consult your local regional authorities. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. Observe all federal, state and local regulations when disposing of the substance.

14. TRANSPORT INFORMATION

Hazards Class:	Does not correspond to the classification standard of the United Nations
UN-No:	Not listed

15. JAPANESE REGULATORY INFORMATION

- Not applicable

16. OTHER INFORMATION

The reference company name of written contents

Company: TOKYO CHEMICAL INDUSTRY CO., LTD.
Address: 4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Department: Global Business Department
Telephone: +81-3-5640-8872
Fax: +81-3-5640-8902

This SDS was prepared sincerely on the basis of the information we could obtained, however, any warranty shall not be given regarding the data contained and the assessment of hazards and toxicity. Prior to use, please investigate not only the hazards and toxicity information but also the laws and regulations of the organization, area and country where the products are to be used, which shall be given the first priority. The products are supposed to be used promptly after purchase in consideration of safety. Some new information or amendments may be added afterwards. If the products are to be used far behind the expected time of use or you have any questions, please feel free to contact us. The stated cautions are for normal handling only. In case of special handling, sufficient care should be taken, in addition to the safety measures suitable for the situation. All chemical products should be treated with the recognition of "having unknown hazards and toxicity", which differ greatly depending on the conditions and handling when in use and/or the conditions and duration of storage. The products must be handled only by those who are familiar with specialized knowledge and have experience or under the guidance of those specialists throughout use from opening to storage and disposal. Safe usage conditions shall be set up on each user's own responsibility.



SAFETY DATA SHEET

1. IDENTIFICATION

Product name: Potassium Chloride
Product code: P1757
Company: TOKYO CHEMICAL INDUSTRY CO., LTD.
Address: 4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Responsible department: Global Business Department
Telephone: +81-3-5640-8872
Fax: +81-3-5640-8902
e-mail: globalbusiness@TCIchemicals.com
Revision number: 12

2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

PHYSICAL HAZARDS Not classified

HEALTH HAZARDS

Acute toxicity (Oral) Category 5

ENVIRONMENTAL HAZARDS Not classified

Label elements

Pictograms or hazard symbols None

Signal word Warning

Hazard statements May be harmful if swallowed

Precautionary statements:

[Response] Call a POISON CENTER or doctor/physician if you feel unwell.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/mixture: Substance
Components: Potassium Chloride
Percent: >99.5%(T)
CAS Number: 7447-40-7
Chemical Formula: KCl
Notice Through Official Gazettes Reference Number
ENCS: (1)-228
ISHL: Official announcement chemistry substance.

4. FIRST-AID MEASURES

Inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.

Skin contact: Remove/Take off immediately all contaminated clothing. Gently wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention.

Eye contact: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

Ingestion: Call a POISON CENTER or doctor/physician if you feel unwell. Rinse mouth.

Most important symptoms/effects, acute and delayed: Cough, Sore throat, Diarrhoea, Nausea, Vomiting, Weakness, Convulsions, Redness, Pain

Protection of first-aiders: A rescuer should wear personal protective equipment, such as rubber gloves and air-tight goggles.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media:	Dry chemical, foam, water spray, carbon dioxide.
Specific hazards arising from the chemical:	Take care as it may decompose upon combustion or in high temperatures to generate poisonous fume.
Precautions for firefighters:	Fire-extinguishing work is done from the windward and the suitable fire-extinguishing method according to the surrounding situation is used. Uninvolved persons should evacuate to a safe place. In case of fire in the surroundings: Remove movable containers if safe to do so.
Special protective equipment for firefighters:	When extinguishing fire, be sure to wear personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:	Use personal protective equipment. Keep people away from and upwind of spill/leak. Entry to non-involved personnel should be controlled around the leakage area by roping off, etc.
Environmental precautions:	Prevent product from entering drains.
Methods and materials for containment and cleaning up:	Sweep dust to collect it into an airtight container, taking care not to disperse it. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

7. HANDLING AND STORAGE**Precautions for safe handling**

Technical measures:	Handling is performed in a well ventilated place. Wear suitable protective equipment. Prevent dispersion of dust. Wash hands and face thoroughly after handling. Use a local exhaust if dust or aerosol will be generated.
Advice on safe handling:	Avoid contact with skin, eyes and clothing.

Conditions for safe storage, including any incompatibilities

Storage conditions:	Keep container tightly closed. Store in a cool and dark place. Store under inert gas. Protect from moisture. Store away from incompatible materials such as oxidizing agents. Hygroscopic
Packaging material:	Comply with laws.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls:	Install a closed system or local exhaust as possible so that workers should not be exposed directly. Also install safety shower and eye bath.
Control parameters:	Not set up
Personal protective equipment	
Respiratory protection:	Dust respirator. Follow local and national regulations.
Hand protection:	Protective gloves.
Eye protection:	Safety glasses. A face-shield, if the situation requires.
Skin and body protection:	Protective clothing. Protective boots, if the situation requires.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state (20°C):	Solid
Form:	Crystal- Powder
Colour:	White
Odour:	Odorless
pH:	No data available
Melting point/freezing point:	773°C
Boiling point/range:	No data available
Flash point:	No data available
Flammability or explosive limits:	
Lower:	No data available
Upper:	No data available
Relative density:	No data available

9. PHYSICAL AND CHEMICAL PROPERTIES

Solubility(ies):

[Water] Soluble (34g/100g, 20°C)

[Other solvents]

Soluble: Ether, Glycerol

Very slightly Alcohols

soluble:

10. STABILITY AND REACTIVITY

Chemical stability: Stable under proper conditions.

Possibility of hazardous reactions: No special reactivity has been reported.

Incompatible materials:

Oxidizing agents

Hazardous decomposition products: Hydrogen chloride

11. TOXICOLOGICAL INFORMATION

Acute Toxicity: orl-rat LD50:2600 mg/kg

ipr-rat LD50:660 mg/kg

ivn-rat LD50:142 mg/kg

orl-man LDLo:20 mg/kg

Skin corrosion/irritation: No data available

Serious eye damage/irritation: eye-rbt 500 mg/24H MLD

Germ cell mutagenicity: mmo-sat 100 ug/plate (+/-S9)

dns-rat-ork 1500 ug/kg

Carcinogenicity:

IARC = No data available

NTP = No data available

Reproductive toxicity: No data available

RTECS Number: TS8050000

12. ECOLOGICAL INFORMATION

Ecotoxicity:

Fish: No data available

Crustacea: No data available

Algae: No data available

Persistence / degradability: No data available

Bioaccumulative potential(BCF): No data available

Mobility in soil

Log Pow: No data available

Soil adsorption (Koc): No data available

Henry's Law constant(PaM³/mol): No data available

13. DISPOSAL CONSIDERATIONS

Recycle to process, if possible. Consult your local regional authorities. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system.

Observe all federal, state and local regulations when disposing of the substance.

14. TRANSPORT INFORMATION

Hazards Class: Does not correspond to the classification standard of the United Nations

UN-No: Not listed

15. JAPANESE REGULATORY INFORMATION

ENCS: Substance excepted from notification

16. OTHER INFORMATION**The reference company name of written contents**

Company: TOKYO CHEMICAL INDUSTRY CO., LTD.
Address: 4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Department: Global Business Department
Telephone: +81-3-5640-8872
Fax: +81-3-5640-8902

This SDS was prepared sincerely on the basis of the information we could obtained, however, any warranty shall not be given regarding the data contained and the assessment of hazards and toxicity. Prior to use, please investigate not only the hazards and toxicity information but also the laws and regulations of the organization, area and country where the products are to be used, which shall be given the first priority. The products are supposed to be used promptly after purchase in consideration of safety. Some new information or amendments may be added afterwards. If the products are to be used far behind the expected time of use or you have any questions, please feel free to contact us. The stated cautions are for normal handling only. In case of special handling, sufficient care should be taken, in addition to the safety measures suitable for the situation. All chemical products should be treated with the recognition of "having unknown hazards and toxicity", which differ greatly depending on the conditions and handling when in use and/or the conditions and duration of storage. The products must be handled only by those who are familiar with specialized knowledge and have experience or under the guidance of those specialists throughout use from opening to storage and disposal. Safe usage conditions shall be set up on each user's own responsibility.

Material Safety Data Sheet

1. Product and company identification

Product name : 48% Potassium hydroxide solution
Name of manufacturer : KANTO CHEMICAL CO., INC.
Address : 11-5 Nihonbashi Honcho 3-Chome, Chuo-Ku, Tokyo 103-0023 Japan
Name of section : Reagent division, catalog and products information section
Telephone number : +81-3-3639-8301
Facsimile number : +81-3-3639-9435
MSDS No. : 32938

2. Composition/Information on ingredients

Substance/Mixture : Substance
Chemical name or commercial name : Potassium hydroxide
Ingredients and composition : 48% Potassium hydroxide in water
Chemical formula : KOH
CAS No. : 1310-58-3
TSCA Inventory : Registered
EINECS No. : 2151813
Dangerous and hazardous ingredients : Potassium hydroxide

3. Summary of danger and Hazard

The most important danger and hazard : Corrosive to the human body
Adverse human health hazards : Corrosive to skin, mucous membrane. If contacted with eyes, may cause loss of vision. If inhaled the dust, cause inflammation of nose, throat, and bronchi.
Environmental effects : Harmful to aquatic organisms.
Physical and Chemical hazards : Potassium hydroxide solution is noncombustible, but reacts with acids with generating heat. It corrodes aluminium, tin, and zinc with emitting explosive hydrogen gas.
Class name of hazardous chemicals for SDS in Japan : Acute toxic substances, Corrosive substances

4. First aid measures

Inhalation : Remove the victim to fresh air, and make him blow his nose and gargle.
Skin contact : Wash the affected areas under running water.
Eye contact : Wash the affected areas under running water for at least 15 minutes. Get medical treatment.
Ingestion : Give the victim water or milk with egg white, and get medical attention. Do not induce vomiting.
Protection for first aid person : Savers wear proper protective equipment like rubber gloves, goggles.

5. Fire fighting measures

Extinguishing media : This product is noncombustible.
Particular fire fighting : Move containers from fire area if it can be done without risk, if not possible, apply water from a safe distance to cool and protect surrounding area.
Protection for firefighters : Firefighters should wear protective equipment.

6. Accidental release measures

- Cautions for personnel : Wear proper equipment and avoid contact with skin and inhalation of vapor. Keep personnel removed from and upwind of fire. Keep away personnel except for authorized ones from spillage area by stretching ropes.
- Cautions for environment : Attention should be given not to cause damage to the environment by flowing of spillage to rivers. In case of the dilution of copious water, do not cause damage to the environment by untreated wastewater.
- Removal measure : Remove the spillage by absorption with diatomaceous earth or dry sand and transfer to a chemical container. Then neutralize the residual with diluted acid and wash thoroughly with water.

7. Cautions of handling and storage

Handling

- Engineering measures : Wear proper protective equipment not to contact with skin or inhale the vapor.

Storage

- Adequate storage condition : Do not store with acids.
Store in a dark, cool place and tightly closed.

8. Exposure control/Personal protection

- Engineering measures : Install a local ventilation system under dense vapor or dusty condition.
- Control parameters : ACGIH(2002) ; 2mg/m³(TLV-STEL)
- Protective equipment
- Hands protective equipment : Impervious protective gloves
- Eyes protective equipment : Safety goggles
- Skin and body protective equipment : Protective clothing, protective boots

9. Physical and chemical properties

Physical and chemical properties

- Appearance : Liquid
- Color : Colorless
- Odor : Odorless
- pH : Strong alkalinity
- Specific temperature or temperature range of physical conditions change
- Boiling point : 133°C
- Melting point : Not available
- Flash point : Noncombustible
- Specific gravity : 1.49g/ml(20°C)
- Solubility
- Solubility in solvents : Water ; Freely soluble

10. Stability and reactivity

- Stability : Absorbs carbon dioxide in air.
- Reactivity : Reacts with acids and generates heat.
- Incompatible conditions : Light, heat
- Incompatible materials : The chemical corrodes aluminium, tin, zinc, chromium, and their alloy with generating explosive hydrogen gas.

11. Toxicological information

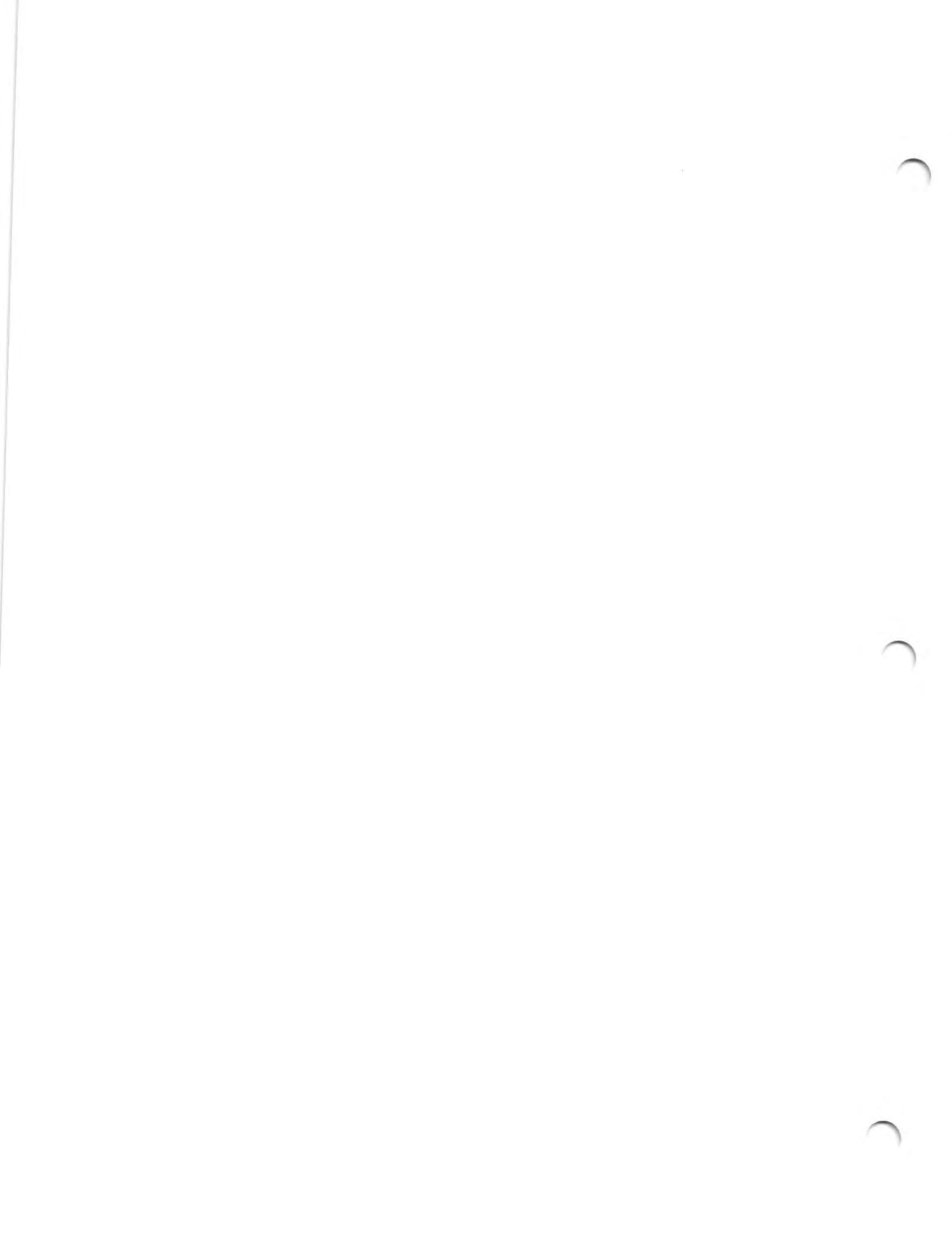
- Acute toxicity : If swallowed, cause erosion of mouth, throat, and stomach.
rat oral LD50=365mg/kg
- Local effect :
- Skin corrosiveness : Cause severe irritation to skin, mucous membrane.

- Irritation to skin, eyes : If contacted with eyes, cause severe irritation to conjunctiva, and cornea.
May cause reduced visual acuity or loss of vision.
rabbit skin 50mg/24H Severe
rabbit eyes 1mg/24H rinse Moderate
- Allergenic and sensitizing effects : Not available
- Chronic and long term toxicity : Not available
- Carcinogenic effects : Listed on neither IARC nor NTP.
- Mutagenicity : Chromosome aberration; Hamster (in vitro); Positive
- Teratogenic effects : Not available
- Effects on the reproductive system : Not available
12. Ecological information
- Rediualbility and degradability : Not available
- Ecorediualbility : Not available
- Ecotoxicity
- Fish toxicty : The lethal dose of fish:28.6mg/l/24H
13. Disposal consideration
- Residual disposal : Dilute the chemical with a large amount of water and flush in a drain after neutralizing with diluted acid. Or consult approved disposal companies.
- Containers : In case of disposal of empty bottles, dispose bottles after removing the content thoroughly.
14. Transport information
- UN class : Class 8(Corrosive substances) P. G. II
- UN number : 1814

The information contained herein is based on several references and the present state of our knowledge. However the MSDS does not always cover all information about the product, handle the product carefully.

The information is intended to ordinary usage, in case of particular handlings, conduct appropriate safety measurements.

The information herein is only provision of information, and it does not represent a guarantee the properties of the product.



SAFETY DATA SHEET

Version 4.9
 Revision Date 03/02/2015
 Print Date 02/17/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Potassium permanganate

Product Number : 223468
 Brand : Sigma-Aldrich
 Index-No. : 025-002-00-9

CAS-No. : 7722-64-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
 3050 Spruce Street
 SAINT LOUIS MO 63103
 USA

Telephone : +1 800-325-5832
 Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Oxidizing solids (Category 2), H272
 Acute toxicity, Oral (Category 4), H302
 Skin corrosion (Category 1B), H314
 Serious eye damage (Category 1), H318
 Acute aquatic toxicity (Category 1), H400
 Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H272 : May intensify fire; oxidiser.
 H302 : Harmful if swallowed.
 H314 : Causes severe skin burns and eye damage.
 H318 : Causes serious eye damage.
 H410 : Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P210 : Keep away from heat.
 P220 : Keep/Store away from clothing/ combustible materials.

P221	Take any precaution to avoid mixing with combustibles.
P260	Do not breathe dust or mist.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/ physician.
P363	Wash contaminated clothing before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	: KMnO ₄
Molecular weight	: 158.03 g/mol
CAS-No.	: 7722-64-7
EC-No.	: 231-760-3
Index-No.	: 025-002-00-9

Hazardous components

Component	Classification	Concentration
Potassium permanganate	Ox. Sol. 2; Acute Tox. 4; Skin Corr. 1B; Eye Dam. 1; Aquatic Acute 1; Aquatic Chronic 1; H272, H302, H314, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Continue rinsing eyes during transport to hospital.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES**5.1 Extinguishing media****Suitable extinguishing media**

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Potassium oxides, Manganese/manganese oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES**6.1 Personal precautions, protective equipment and emergency procedures**

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE**7.1 Precautions for safe handling**

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed. Keep away from sources of ignition - No smoking. Keep away from heat and sources of ignition.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Storage class (TRGS 510): Oxidizing hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**8.1 Control parameters**

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Potassium permanganate	7722-64-7	C	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Remarks	Ceiling limit is to be determined from breathing-zone air samples.		
		TWA	0.200000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Adopted values or notations enclosed are those for which changes are proposed in the NIC See Notice of Intended Changes (NIC) varies		
		TWA	1.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	3.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	0.100000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment 2014 Adoption varies		
		TWA	0.020000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment 2014 Adoption varies		
		C	5 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Ceiling limit is to be determined from breathing-zone air samples.		
		TWA	0.1 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment varies		
		TWA	0.02 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment varies		
		TWA	1 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	3 mg/m3	USA. NIOSH Recommended Exposure Limits

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- | | |
|---|--|
| a) Appearance | Form: crystalline
Colour: dark violet |
| b) Odour | odourless |
| c) Odour Threshold | No data available |
| d) pH | 7.2 - 9.7 at 20 g/l at 20 °C (68 °F) |
| e) Melting point/freezing point | Melting point/range: > 240 °C (> 464 °F) - Decomposes on heating. |
| f) Initial boiling point and boiling range | No data available |
| g) Flash point | Not applicable |
| h) Evaporation rate | No data available |
| i) Flammability (solid, gas) | No data available |
| j) Upper/lower flammability or explosive limits | No data available |
| k) Vapour pressure | No data available |
| l) Vapour density | No data available |
| m) Relative density | 2.710 g/cm ³ |
| n) Water solubility | 28.3 g/l at 0 °C (32 °F) 65.1 g/l at 20 °C (68 °F) 125 g/l at 40 °C (104 °F) 224 g/l at 60 °C (140 °F) |
| o) Partition coefficient: n-octanol/water | No data available |

- p) Auto-ignition temperature No data available
- q) Decomposition temperature > 240 °C (> 464 °F) -
- r) Viscosity No data available
- s) Explosive properties No data available
- t) Oxidizing properties The substance or mixture is classified as oxidizing with the category 2.

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong reducing agents, Powdered metals, Peroxides, Zinc, Copper, Alcohols, Hydrogen fluoride, Acids, Sulfuric acid

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 1,090 mg/kg

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation

Skin - Rabbit

Result: Corrosive - 4 h

Serious eye damage/eye irritation

No data available

Respiratory or skin sensitisation

Maximisation Test (GPMT) - Guinea pig

Result: Does not cause skin sensitisation.
(OECD Test Guideline 406)

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Additional Information

RTECS: SD6475000

Contact with skin can cause: Oedema, Necrosis, Effects due to ingestion may include: methemoglobinemia, psychological disturbances, Vomiting, Nausea, Diarrhoea

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish LC50 - *Oncorhynchus mykiss* (rainbow trout) - 0.3 - 0.6 mg/l - 96.0 h

Toxicity to daphnia and other aquatic invertebrates EC50 - *Daphnia magna* (Water flea) - 0.084 mg/l - 48 h

12.2 Persistence and degradability

The methods for determining biodegradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential

Bioaccumulation Lamellibranchia (mussel)

Bioconcentration factor (BCF): < 10,000

Remarks: Can accumulate in aquatic organisms.

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION**DOT (US)**

UN number: 1490 Class: 5.1 Packing group: II
Proper shipping name: Potassium permanganate
Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 1490 Class: 5.1 Packing group: II EMS-No: F-H, S-Q
Proper shipping name: POTASSIUM PERMANGANATE
Marine pollutant: yes

IATA

UN number: 1490 Class: 5.1 Packing group: II
Proper shipping name: Potassium permanganate

15. REGULATORY INFORMATION**SARA 302 Components**

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Potassium permanganate	7722-64-7	1993-04-24

SARA 311/312 Hazards

Reactivity Hazard, Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Potassium permanganate	7722-64-7	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Potassium permanganate	7722-64-7	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Potassium permanganate	7722-64-7	1993-04-24

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION**Full text of H-Statements referred to under sections 2 and 3.**

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Eye Dam.	Serious eye damage
H272	May intensify fire; oxidiser.
H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard: 3
Chronic Health Hazard:
Flammability: 0
Physical Hazard 2

NFPA Rating

Health hazard: 3
Fire Hazard: 0
Reactivity Hazard: 2
Special hazard.I: OX

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

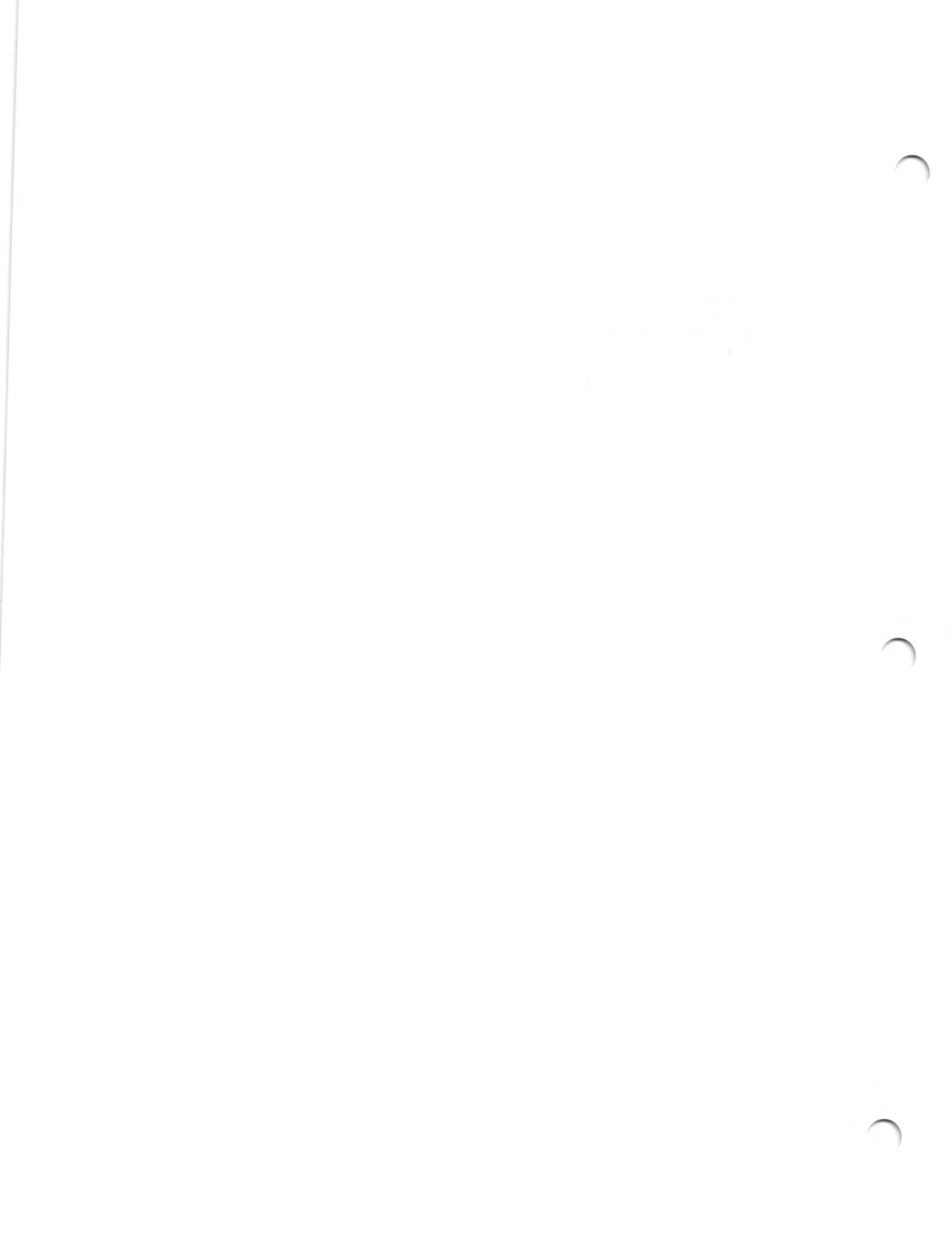
Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.9

Revision Date: 03/02/2015

Print Date: 02/17/2016



SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Version 5.0 Revision Date 03.12.2012

Print Date 22.03.2017

GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifiers

Product name : Potassium permanganate solution

Product Number : 24-5160

Brand : Katayama OEM Partner

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Japan G.K.
Tennoz Central Tower, 2-2-24 Higashi-Shinagawa
SHINAGAWA-KU 140-0002
JAPAN

Telephone : +81 3 5796 7310

Fax : +81 3 5796 7315

1.4 Emergency telephone number

Emergency Phone # : (03) 6758-3625

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 [EU-GHS/CLP]

Acute aquatic toxicity (Category 1)

Chronic aquatic toxicity (Category 1)

Classification according to EU Directives 67/548/EEC or 1999/45/EC

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008 [CLP]

Pictogram



Signal word : Warning

Hazard statement(s)

H410

Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P273

Avoid release to the environment.

P501

Dispose of contents/ container to an approved waste disposal plant.

Supplemental Hazard

none

Statements

According to European Directive 67/548/EEC as amended.

Hazard symbol(s)



R-phrases(s)
R50/53

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

S-phrases(s)
S61

Avoid release to the environment. Refer to special instructions/ Safety data sheets.

2.3 Other hazards - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Formula : KMnO_4
Molecular Weight : 158,03 g/mol

Component	Classification	Concentration
Potassium permanganate		
CAS-No.	7722-64-7	2,5 - 10 %
EC-No.	231-760-3	
Index-No.	025-002-00-9	
		Ox. Sol. 2; Acute Tox. 4; Aquatic Acute 1; Aquatic Chronic 1; H272, H302, H410 O, Xn, N, R 8 - R22 - R50/53

For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

Men exposed to manganese dusts showed a decrease in fertility. Chronic manganese poisoning primarily involves the central nervous system. Early symptoms include languor, sleepiness and weakness in the legs. A stolid mask-like appearance of the face, emotional disturbances such as uncontrollable laughter and a spastic gait with tendency to fall in walking are findings in more advanced cases. High incidence of pneumonia has been found in workers exposed to the dust or fume of some manganese compounds., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

4.3 Indication of any immediate medical attention and special treatment needed

no data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Potassium oxides, Manganese/manganese oxides

5.3 Advice for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

- 5.4 Further information**
no data available

6. ACCIDENTAL RELEASE MEASURES

- 6.1 Personal precautions, protective equipment and emergency procedures**
Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
- 6.2 Environmental precautions**
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.
- 6.3 Methods and materials for containment and cleaning up**
Keep in suitable, closed containers for disposal.
- 6.4 Reference to other sections**
For disposal see section 13.

7. HANDLING AND STORAGE

- 7.1 Precautions for safe handling**
no data available
- 7.2 Conditions for safe storage, including any incompatibilities**
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
- 7.3 Specific end use(s)**
no data available

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Body Protection

impervious clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Respiratory protection not required. For nuisance exposures use type OV/AG (US) or type ABEK (EU EN 14387) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance	Form: clear, liquid Colour: dark violet
b) Odour	no data available
c) Odour Threshold	no data available
d) pH	no data available
e) Melting point/freezing point	no data available
f) Initial boiling point and boiling range	no data available
g) Flash point	not applicable
h) Evaporation rate	no data available
i) Flammability (solid, gas)	no data available
j) Upper/lower flammability or explosive limits	no data available
k) Vapour pressure	no data available
l) Vapour density	no data available
m) Relative density	no data available
n) Water solubility	no data available
o) Partition coefficient: n-octanol/water	no data available
p) Auto-ignition temperature	no data available
q) Decomposition temperature	no data available
r) Viscosity	no data available
s) Explosive properties	no data available
t) Oxidizing properties	no data available

9.2 Other safety information

no data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

no data available

10.2 Chemical stability

no data available

10.3 Possibility of hazardous reactions

no data available

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

Zinc, Powdered metals, Peroxides, Copper, Strong reducing agents

10.6 Hazardous decomposition products

Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION**11.1 Information on toxicological effects****Acute toxicity****Skin corrosion/irritation**

no data available

Serious eye damage/eye irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

no data available

Specific target organ toxicity - single exposure

no data available

Specific target organ toxicity - repeated exposure

no data available

Aspiration hazard

no data available

Potential health effects**Inhalation**

May be harmful if inhaled. May cause respiratory tract irritation.

Ingestion

May be harmful if swallowed.

Skin

May be harmful if absorbed through skin. May cause skin irritation.

Eyes

May cause eye irritation.

Signs and Symptoms of Exposure

Men exposed to manganese dusts showed a decrease in fertility. Chronic manganese poisoning primarily involves the central nervous system. Early symptoms include languor, sleepiness and weakness in the legs. A stolid mask-like appearance of the face, emotional disturbances such as uncontrollable laughter and a spastic gait with tendency to fall in walking are findings in more advanced cases. High incidence of pneumonia has been found in workers exposed to the dust or fume of some manganese compounds. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Additional Information

RTECS: Not available

12. ECOLOGICAL INFORMATION**12.1 Toxicity**

no data available

12.2 Persistence and degradability

no data available

12.3 Bioaccumulative potential

no data available

12.4 Mobility in soil

no data available

12.5 Results of PBT and vPvB assessment

no data available

12.6 Other adverse effects
Very toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

14.1 UN number

ADR/RID: 3082

IMDG: 3082

IATA: 3082

14.2 UN proper shipping name

ADR/RID: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Potassium permanganate)

IMDG: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Potassium permanganate)

IATA: Environmentally hazardous substance, liquid, n.o.s. (Potassium permanganate)

14.3 Transport hazard class(es)

ADR/RID: 9

IMDG: 9

IATA: 9

14.4 Packaging group

ADR/RID: III

IMDG: III

IATA: III

14.5 Environmental hazards

ADR/RID: yes

IMDG Marine Pollutant: yes

IATA: yes

14.6 Special precautions for user

Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

no data available

15.2 Chemical Safety Assessment

no data available

16. OTHER INFORMATION

Text of H-code(s) and R-phrases mentioned in Section 3

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
H272	May intensify fire; oxidiser.
H302	Harmful if swallowed.
H410	Very toxic to aquatic life with long lasting effects.
Ox. Sol.	Oxidizing solids
N	Dangerous for the environment
R 8	Contact with combustible material may cause fire.
R22	Harmful if swallowed.
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
O	Oxidising

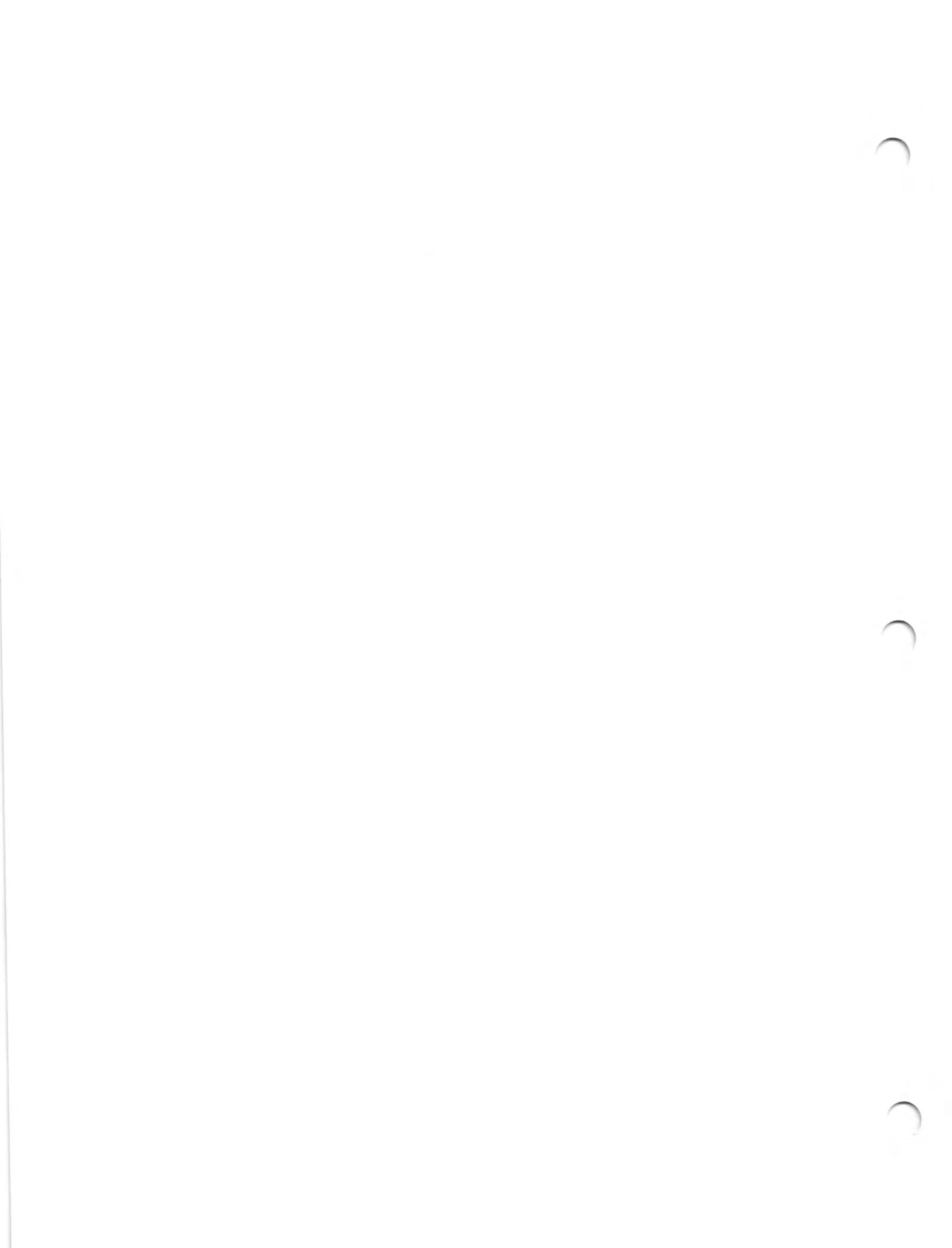
Xn

Harmful

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.



SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Version 5.5 Revision Date 14.05.2014

Print Date 22.03.2017

GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Potassium phosphate monobasic

Product Number : 221309

Brand : Aldrich

REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

CAS-No. : 7778-77-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Japan G.K.
Tennoz Central Tower, 2-2-24 Higashi-Shinagawa
SHINAGAWA-KU 140-0002
JAPAN

Telephone : +81 3 5796 7310

Fax : +81 3 5796 7315

1.4 Emergency telephone number

Emergency Phone # : (03) 6758-3625

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.
This substance is not classified as dangerous according to Directive 67/548/EEC.

2.2 Label elements

The product does not need to be labelled in accordance with EC directives or respective national laws.

2.3 Other hazards - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms : Monopotassium phosphate
Potassium dihydrogen phosphate
prim.-Potassium phosphate

Formula : H_2KO_4P

Molecular Weight : 136,09 g/mol

CAS-No. : 7778-77-0

EC-No. : 231-913-4

No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

no data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

5.2 Special hazards arising from the substance or mixture

Oxides of phosphorus, Potassium oxides

5.3 Advice for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information

The product itself does not burn.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

hygroscopic

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0,11 mm

Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0,11 mm

Break through time: 480 min

Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

- | | |
|---|------------------------------------|
| a) Appearance | Form: crystalline
Colour: white |
| b) Odour | no data available |
| c) Odour Threshold | no data available |
| d) pH | no data available |
| e) Melting point/freezing point | 252,6 °C |
| f) Initial boiling point and boiling range | > 450 °C |
| g) Flash point | no data available |
| h) Evaporation rate | no data available |
| i) Flammability (solid, gas) | no data available |
| j) Upper/lower flammability or explosive limits | no data available |
| k) Vapour pressure | no data available |
| l) Vapour density | no data available |
| m) Relative density | 2,338 g/cm ³ |
| n) Water solubility | 208 g/l at 20 °C |
| o) Partition coefficient: n-octanol/water | no data available |
| p) Auto-ignition temperature | no data available |
| q) Decomposition temperature | no data available |
| r) Viscosity | no data available |
| s) Explosive properties | no data available |
| t) Oxidizing properties | no data available |

9.2 Other safety information

no data available

SECTION 10: Stability and reactivity

10.1 Reactivity

no data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

no data available

10.4 Conditions to avoid

Exposure to moisture.

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - no data available

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - rat - > 2.000 mg/kg

LD50 Dermal - rabbit - > 4.640 mg/kg

Skin corrosion/irritation

Skin - rabbit

Result: No skin irritation - 4 h

Serious eye damage/eye irritation

Eyes - rabbit

Result: No eye irritation

Respiratory or skin sensitisation

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

no data available

Specific target organ toxicity - single exposure

no data available

Specific target organ toxicity - repeated exposure

no data available

Aspiration hazard

no data available

Additional Information

RTECS: TC6615500

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

no data available

12.2 Persistence and degradability

The methods for determining the biological degradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential

Does not bioaccumulate.

12.4 Mobility in soil

no data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects



SAFETY DATA SHEET

1. IDENTIFICATION

Product name: Pyrazole
Product code: P0546
Company: TOKYO CHEMICAL INDUSTRY CO., LTD.
Address: 4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Responsible department: Global Business Department
Telephone: +81-3-5640-8872
Fax: +81-3-5640-8902
e-mail: globalbusiness@TCIchemicals.com
Revision number: 6

2. HAZARDS IDENTIFICATION

GHS classification

PHYSICAL HAZARDS

Not classified

HEALTH HAZARDS

Acute toxicity (Oral)

Category 4

Skin corrosion/irritation

Category 2

Serious eye damage/eye irritation

Category 2A

ENVIRONMENTAL HAZARDS

Acute aquatic hazard

Category 3

GHS label elements, including precautionary statements

Pictograms or hazard symbols



Signal word

Warning

Hazard statements

Harmful if swallowed

Causes skin irritation

Causes serious eye irritation

Harmful to aquatic life

Precautionary statements:

[Prevention]

Avoid release to the environment.

Do not eat, drink or smoke when using this product.

Wash hands thoroughly after handling.

Wear protective gloves/eye protection/face protection.

[Response]

IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.

Rinse mouth.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

If eye irritation persists: Get medical advice/attention.

IF ON SKIN: Gently wash with plenty of soap and water.

If skin irritation occurs: Get medical advice/attention.

Take off contaminated clothing and wash before reuse.

[Disposal]

Dispose of contents/container through a waste management company authorized by the local government.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/mixture:

Substance

3. COMPOSITION/INFORMATION ON INGREDIENTS

Components:	Pyrazole
Percent:	>98.0%(GC)(T)
CAS Number:	288-13-1
Synonyms:	1,2-Diazole
Chemical Formula:	C ₃ H ₄ N ₂
Notice Through Official Gazettes Reference Number	
ENCS:	(5)-5624
ISHL:	8-(2)-1212

4. FIRST-AID MEASURES

Inhalation:	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical advice/attention if you feel unwell.
Skin contact:	Remove/Take off immediately all contaminated clothing. Gently wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention.
Eye contact:	Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
Ingestion:	Call a POISON CENTER or doctor/physician if you feel unwell. Rinse mouth.
Protection of first-aiders:	A rescuer should wear personal protective equipment, such as rubber gloves and air-tight goggles.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media:	Dry chemical, foam, water spray, carbon dioxide.
Specific hazards arising from the chemical:	Take care as it may decompose upon combustion or in high temperatures to generate poisonous fume.
Precautions for firefighters:	Fire-extinguishing work is done from the windward and the suitable fire-extinguishing method according to the surrounding situation is used. Uninvolved persons should evacuate to a safe place. In case of fire in the surroundings: Remove movable containers if safe to do so.
Special protective equipment for firefighters:	When extinguishing fire, be sure to wear personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:	Use personal protective equipment. Keep people away from and upwind of spill/leak. Entry to non-involved personnel should be controlled around the leakage area by roping off, etc.
Environmental precautions:	Prevent product from entering drains.
Methods and materials for containment and cleaning up:	Sweep dust to collect it into an airtight container, taking care not to disperse it. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

7. HANDLING AND STORAGE

Precautions for safe handling

Technical measures:	Handling is performed in a well ventilated place. Wear suitable protective equipment. Prevent dispersion of dust. Wash hands and face thoroughly after handling. Use a local exhaust if dust or aerosol will be generated.
Advice on safe handling:	Avoid contact with skin, eyes and clothing.

Conditions for safe storage, including any incompatibilities

Storage conditions:	Keep container tightly closed. Store in a cool and dark place. Store under inert gas. Protect from moisture. Store away from incompatible materials such as oxidizing agents. Hygroscopic, Air-sensitive
Packaging material:	Comply with laws.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls:	Install a closed system or local exhaust as possible so that workers should not be exposed directly. Also install safety shower and eye bath.
Control parameters:	Not set up
Personal protective equipment	
Respiratory protection:	Dust respirator. Follow local and national regulations.
Hand protection:	Protective gloves.
Eye protection:	Safety glasses. A face-shield, if the situation requires.
Skin and body protection:	Protective clothing. Protective boots, if the situation requires.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state (20°C):	Solid
Form:	Crystal- Powder
Colour:	White - Very pale yellow
Odour:	No data available
pH:	No data available
Melting point/freezing point:	69°C
Boiling point/range:	188°C
Flash point:	No data available
Flammability or explosive limits:	
Lower:	No data available
Upper:	No data available
Relative density:	No data available
Solubility(ies):	
[Water]	Soluble
[Other solvents]	
Soluble:	Ether, Alcohols, Benzene

10. STABILITY AND REACTIVITY

Chemical stability:	Stable under proper conditions.
Possibility of hazardous reactions:	No special reactivity has been reported.
Incompatible materials:	Oxidizing agents
Hazardous decomposition products:	Carbon monoxide, Carbon dioxide, Nitrogen oxides (NOx)

11. TOXICOLOGICAL INFORMATION

Acute Toxicity:	ipr-rat LD50:900 mg/kg ori-rat LD50:1010 mg/kg ivn-rat LD50:1021 mg/kg
Skin corrosion/irritation:	No data available
Serious eye damage/irritation:	No data available
Germ cell mutagenicity:	No data available
Carcinogenicity:	
IARC =	No data available
NTP =	No data available
Reproductive toxicity:	No data available
RTECS Number:	UQ490000

12. ECOLOGICAL INFORMATION

Ecotoxicity:	
Fish:	No data available
Crustacea:	No data available
Algae:	No data available
Persistence / degradability:	No data available
Bioaccumulative potential(BCF):	No data available

12. ECOLOGICAL INFORMATION**Mobility in soil**

Log Pow:	No data available
Soil adsorption (Koc):	No data available
Henry's Law constant(PaM³/mol):	No data available

13. DISPOSAL CONSIDERATIONS

Recycle to process, if possible. Consult your local regional authorities. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. Observe all federal, state and local regulations when disposing of the substance.

14. TRANSPORT INFORMATION

Hazards Class:	Does not correspond to the classification standard of the United Nations
UN-No:	Not listed

15. JAPANESE REGULATORY INFORMATION

- Not applicable

16. OTHER INFORMATION**The reference company name of written contents**

Company:	TOKYO CHEMICAL INDUSTRY CO., LTD.
Address:	4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Department:	Global Business Department
Telephone:	+81-3-5640-8872
Fax:	+81-3-5640-8902

This SDS was prepared sincerely on the basis of the information we could obtained, however, any warranty shall not be given regarding the data contained and the assessment of hazards and toxicity. Prior to use, please investigate not only the hazards and toxicity information but also the laws and regulations of the organization, area and country where the products are to be used, which shall be given the first priority. The products are supposed to be used promptly after purchase in consideration of safety. Some new information or amendments may be added afterwards. If the products are to be used far behind the expected time of use or you have any questions, please feel free to contact us. The stated cautions are for normal handling only. In case of special handling, sufficient care should be taken, in addition to the safety measures suitable for the situation. All chemical products should be treated with the recognition of "having unknown hazards and toxicity", which differ greatly depending on the conditions and handling when in use and/or the conditions and duration of storage. The products must be handled only by those who are familiar with specialized knowledge and have experience or under the guidance of those specialists throughout use from opening to storage and disposal. Safe usage conditions shall be set up on each user's own responsibility.

Bill Of Lading#: 0375212
Product: SODIUM HYDROXIDE 33%

BRENNTAG

November 12, 2014

SAFETY CONTACT
MGC PURE CHEMICALS
6560 S MOUNTAIN RD
MESA, AZ 85212-9716

To Whom It May Concern,

Enclosed please find the Material Safety Data Sheet (MSDS) for the material listed below. Either you recently purchased this product from us, and/or we are furnishing this MSDS as required by the notification procedures under Section 313 of SARA Title III. The law requires that you distribute these to those people in your company who are involved in the use and/or handling of these chemicals.

Product Name: SODIUM HYDROXIDE 33%

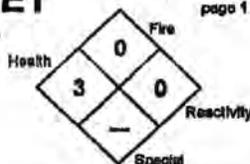
We thank you for your order and hope we may continue to merit serving your future requirements.

BRENNTAG MATERIAL SAFETY DATA SHEET

Brenntag MSDS #: BPI-08532
MSDS Revision/Issue Date: 07/10/11
Superseded Revision Date: 10/03/08

NFPA 704 DESIGNATION
HAZARD RATING

4=Extreme
3=High
2=Moderate
1=Sligh
0=Insignificant



1. CHEMICAL PRODUCT IDENTIFICATION & COMPANY IDENTIFICATION

PRODUCT IDENTIFIER:	Sodium Hydroxide Solutions 5% - 45% (All Grades)	
GENERAL USE:	Used in industry to neutralize acids; to precipitate alkaloids; in metal finishing; in cleaners; and to precipitate most metals (as hydroxides) from aqueous solutions.	
PRODUCT DESCRIPTION:	An aqueous solution of Sodium Hydroxide. Synonyms for Sodium Hydroxide include: caustic soda, lye, soda lye, sodium hydrate, and white caustic.	
INFORMATION PROVIDED BY:	Brenntag Pacific, Inc. 10747 Patterson Place Santa Fe Springs, CA 90670	EMERGENCY PHONE NUMBERS
For MSDS call: PHONE: 862-863-8828	CHEMTREC:	800-424-9300

2. COMPOSITION & INFORMATION ON INGREDIENTS

COMPONENT	CAS #	OSHA HAZARD	WT %	ACGIH		OSHA	
				TLV _{mg/m³}	STEL	PEL _{mg/m³}	STEL
Sodium Hydroxide	1310-73-2	Corrosive; Lung Toxin	5%-45%	None	None	2 mg/m ³	None
				Ceiling: 2 mg/m ³			

NDA = No Data Available N/A = Not Applicable

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:	Clear, to slightly turbid, strongly alkaline, colorless liquids having no characteristic odor. The liquids and mists can be corrosive to all tissues contacted. Inhalation of mist can cause permanent lung damage. These products may react violently with acids and other substances. The NIOSH LD ₅₀ for Sodium Hydroxide is: 10 mg/m ³ .
POTENTIAL HEALTH EFFECTS	
INHALATION:	Inhalation of mists may be severely irritating or corrosive to the nose, mouth, throat, mucous membranes and lungs. Exposure may cause burns to the respiratory tract with the production of lung edema, which can result in shortness of breath, sneezing, coughing, choking, chest pain and impairment of lung function. Inhalation of high mist concentrations may result in permanent lung damage.
EYE CONTACT:	Exposure to the liquids or mists can cause severe eye irritation and/or burns. Symptoms of exposure may include tearing, redness, swelling, pain and possible mucous discharge. Corneal damage with impairment of vision may result from direct contact with the mists or liquids.
SKIN CONTACT:	Exposure to the liquids or mists can cause severe skin irritation and/or burns. Symptoms of exposure may include redness, swelling, pain and scab formation. Prolonged skin exposure to the liquids or mist may cause destruction of the dermis with impairment of the skin, at site of contact, to regenerate. No published data indicates these products are absorbed through the intact skin.
INGESTION:	Ingestion can cause severe irritation and/or burns to the entire gastrointestinal tract, including the stomach and intestines, characterized by nausea, vomiting, diarrhea, abdominal discomfort or pain, bleeding and / or tissue ulceration.
CHRONIC:	The chronic health effects of exposure, to the liquids or mists, are expected to be the same as for acute exposure.

IMPORTANT: While Brenntag believes the information contained herein to be accurate, Brenntag makes no representation or warranty, express or implied, regarding, and assumes no liability for, the accuracy or completeness of the information. The Buyer assumes all responsibility for handling, using and/or recycling the Product in accordance with the applicable federal, state, and local laws. This MSDS is intended in any way limit or preclude the operation and effect of any of the provisions of Brenntag's terms and conditions of sale.

PRODUCT IDENTIFIER: Sodium Hydroxide Solutions 5% - 45% (All Grades)

page 2 of 8

4. FIRST AID MEASURES

INHALATION:	If inhaled, immediately move to fresh air. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; use the Holger Nielsen method (back pressure-arm lift) or proper respiratory device. If breathing is difficult, give oxygen. Call a physician.
EYE CONTACT:	In case of contact, immediately flush eyes with plenty of clean running water for at least 15 minutes, lifting the upper and lower lids occasionally. Remove contact lenses, if worn. Get medical attention immediately.
SKIN CONTACT:	In case of contact, immediately flush skin with plenty of clean running water for at least 15 minutes, while removing contaminated clothing and shoes. If burn or irritation occurs, call a physician.
INGESTION:	If swallowed, DO NOT induce vomiting. Get medical attention immediately. If victim is fully conscious, give plenty of water to drink. Never give anything by mouth to an unconscious person.
NOTE TO PHYSICIANS:	Sodium Hydroxide solutions have a relatively low oral toxicity, but can be corrosive to the eyes, skin and mucous membranes. If ingested, consideration should be given to careful endoscopy as stomach or esophageal burns, perforations or strictures may occur. Careful gastric lavage with an endotracheal tube in place should be considered. Treat exposure symptomatically.

5. FIRE FIGHTING MEASURES

Flashpoint and Method: These products do not flash.	
Flammable Limits (in air, % by volume)	Lower: Not applicable Upper: Not applicable
Autoignition Temperature: Not applicable	
GENERAL HAZARD:	These products are non-combustible, highly alkaline, aqueous solutions. The Uniform Fire Code health hazard classifications for these products are: Corrosive (Alkaline). Diluted solutions of these products may also be corrosive and may generate flammable / explosive Hydrogen gas on contact with some soft metals (i.e. Aluminum). They may produce hazardous mists or hazardous decomposition products.
FIRE FIGHTING INSTRUCTIONS:	EXTINGUISHING MEDIA: Water, foam, CO ₂ or dry chemicals. Use the extinguishing media that is appropriate for the surrounding fire. Use a water spray or fog to cool the containers exposed to the heat of a fire.
FIRE FIGHTING EQUIPMENT:	Fire fighters should wear full protective equipment, including self-contained breathing apparatus.
HAZARDOUS COMBUSTION PRODUCTS:	When heated to dryness and decomposition, these products emit toxic sodium oxide.

6. ACCIDENTAL RELEASE MEASURES

LAND SPILL:	Wearing recommended protective equipment and clothing, dike the spill and pick up the bulk of liquid using pumps or a vacuum truck, or absorb the liquid in sand or a commercial absorbent. Place in approved containers for recovery, disposal, or satellite accumulation. Neutralize the alkalinity of the remaining liquid, using a dilute acid solution appropriate for neutralizing alkaline liquids. Liberally cover the spill area with sodium bicarbonate. Flush the spill area with water; collect the residues for disposal or sewer, as appropriate.
WATER SPILL:	Wear recommended protective equipment and clothing if contact with hazardous material can occur. Stop or divert water flow. Dike contaminated water and remove for disposal and/or treatment. As appropriate, notify all downstream users of possible contamination.

PRODUCT IDENTIFIER: Sodium Hydroxide Solutions 5% - 45% (All Grades)

page 3 of 6

7. HANDLING AND STORAGE

STORAGE TEMPERATURE: Ambient **STORAGE PRESSURE:** Ambient

GENERAL: Store in a cool, dry, well-ventilated area, away from incompatible materials and products. Do not get these products in eyes, on skin, or on clothing. Wear recommended personal protective equipment when handling these products. Do not breathe mists. Use with adequate ventilation. Do not take internally. Keep the containers tightly closed when not in use. Wash thoroughly after handling any of these products.

These products are corrosive to Tin, Aluminum, Magnesium, Zinc and alloys containing these metals, and may react violently with these metals in powder form. Never add water to these products. Always add these products, with constant stirring, slowly to the surface of cool to lukewarm (60 - 80° F.) water.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

CONTROL MEASURES: Use a local or general, mechanical exhaust ventilation system capable of maintaining emissions, in the work area, below the OSHA-PEL, ACGIH-TLV or those levels that may cause irritation.

RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

RESPIRATOR: For exposure above the OSHA-PEL or ACGIH-TLV, wear a NIOSH-approved full facepiece or half mask air-purifying cartridge respirator equipped with a good mist / particulate filter cartridge or supplied air. For exposure to Sodium Hydroxide above 10 mg/m³, wear a supplied air respirator or a self-contained breathing apparatus (SCBA) operated in the positive pressure mode.

EYES: Wear chemical goggles (recommended by ANSI Z87.1-1979), unless a full facepiece respirator is worn.

GLOVES: Wear Neoprene, Nitrile, Butyl Rubber, Viton, Barrier or Natural Rubber gloves.

CLOTHING & EQUIPMENT: Wear a Neoprene, Nitrile, Butyl Rubber or Natural Rubber apron or full protective clothing when handling this product. An eye wash station and safety shower should be available in the work area.

FOOTWEAR: Wear Neoprene, Nitrile, Butyl Rubber or Natural Rubber boots.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear to slightly turbid, colorless	Bulk Density (pounds/m³):	Not applicable
Physical State:	Liquid	Vapor Pressure:	Varies
Odor:	No characteristic	Vapor Density (air=1):	No data available
Odor Threshold:	No data available	Evaporation Rate (n-Butyl Acetate=1):	Varies
Molecular Formula:	NaOH (in water)	VOC Content:	Nil
Molecular Weight:	40.00 (in water)	% Volatile:	55 to 85%
Boiling Point:	(110° C, 230° F.) - (144° C, 291° F.)	Solubility in H₂O:	Complete
Freezing/Melting Point:	(-32° C, -26° F.) - (5° C, 41° F.)	Octanol/Water Partition Coefficient:	No data available
Specific Gravity:	1.080 to 1.490 @ 20° C.	pH (as is):	Greater than 13.5
Density (pounds/gallon):	8.84 to 12.43	pH (1% solution):	11.0 - 13.0

10. STABILITY AND REACTIVITY

GENERAL: This product is stable and hazardous polymerization will not occur.

CONDITIONS TO AVOID: None known.

INCOMPATIBLE MATERIAL: Chlorinated and fluorinated hydrocarbons, Acetaldehyde, Acrolein, Chlorine trifluoride, Hydroquinone, Maleic anhydride, Phosphorous pentoxide, Tetrahydrofuran, Aluminum, Magnesium, Tin, Zinc, alloys of these metals and all acids or acidic materials.

HAZARDOUS DECOMPOSITION PRODUCTS: When heated to dryness and decomposition, the solutions emit toxic oxides of sodium.

SENSITIVITY TO MECHANICAL IMPACT: This product is not sensitive to mechanical impact.

SENSITIVITY TO STATIC DISCHARGE: This product is not sensitive to static discharge.

PRODUCT IDENTIFIER: Sodium Hydroxide Solutions 5% - 48% (All Grades)

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11. TOXICOLOGICAL INFORMATION

Components: Sodium Hydroxide
Eye Contact: Rabbit: 50 ug/24 hours; Severe
Skin Contact: Rabbit: 500 mg/24 hours; Severe
Oral Rat LD₅₀: No data available (Oral Rabbit LD₅₀: 500 mg/kg)
Dermal Rabbit LD₅₀: 1,350 mg/kg
Inhalation Rat LC₅₀: No data available
Human Data: No data available
Other Toxicological Data: Intraperitoneal Mouse LD₅₀: 40 mg/kg
Carcinogenicity: No data available
Teratogenicity: No data available
Mutagenicity: Hamster Ocyogenetic Analysis; Lung: 10 mmol/Liter
Synergistic Products: None reported
Target Organs: Eyes, Skin, Mucous membranes & Lungs
Medical Conditions Aggravated By Exposure: Skin or Respiratory disorders

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL FATE:
 These products are completely soluble in water. No specific environmental fate information is available. These products will affect the pH of water significantly.
ENVIRONMENTAL CONSIDERATIONS:
 The aquatic toxicity for these products have not been determined. However, the aquatic toxicity for pure Sodium Hydroxide is: TLm Mosquito fish = 125 ppm/96 hours (freshwater); TLm Bluegill = 99 mg/Liter/48 hours (tap water).

13. DISPOSAL CONSIDERATIONS

RCRA 49 CFR 261 CLASSIFICATION: Corrosive Waste
U.S. EPA WASTE NUMBER/DESCRIPTION: D002
 If any of these products are disposed of as shipped, they meet the criteria of a hazardous waste as defined under 40 CFR 261 due to their corrosivity. If these products become a waste, they will be a hazardous waste, which is subject to the Land Disposal Restrictions under 40 CFR 268 and must be managed accordingly. As a hazardous liquid waste, it must be disposed of in accordance with local, state and federal regulations in a permitted hazardous waste treatment, storage and disposal facility by treatment.

14. TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME: Sodium hydroxide solution
Hazard Class: 8 **UN Number:** UN1824 **Packing Group:** II
Primary Label: Corrosive **Subsidiary Label(s):** None Required
Primary/Subsidiary Placards: Corrosive
DOT Reportable Quantity (RQ): 1,000 pounds (NaOH) **RQ for Product:** Varies (See section 16)
Marine Pollutant: No
2008 North American Emergency Response Guidebook No.: 164
TDG PROPER SHIPPING NAME: SODIUM HYDROXIDE SOLUTION
Hazard Class: 8 **UN Number:** UN1824 **Packing Group:** II
Primary Label: Corrosive **Subsidiary Label(s):** None Required
Primary/Subsidiary Placards: Corrosive
TDG Reportable Quantity (RQ):[§] At least 5 kg or 5 liters.
TDG Schedule XII: Not listed
Regulated Limit (RL):^{§§} 50 kg (NaOH) **RL for Product:** Varies (See section 16)
Other Shipping Information: None

[§] Canadian Transportation of Dangerous Goods Regulations (TDGR), Part 04, Table 1, Quantities or levels for immediate reporting: releases of reportable quantities, RQ, that meet the definition of a "dangerous occurrence" (a threat to life, health, property, or the environment) must be reported to the appropriate authorities as outlined in TDGR 8.13(1) and 8.14(1).
^{§§} Reporting to Environment Canada is required for any releases exceeding the regulated limits, RL, of 0.2 materials (primary or secondary). The regulated limits are found in Schedule XIII of the TDGR.

IMPORTANT: While Brenntag believes the information contained herein to be accurate, Brenntag makes no representation or warranty, express or implied, regarding, and assumes no liability for, the accuracy or completeness of the information. The Buyer assumes all responsibility for handling, using and/or reselling the Product in accordance with the applicable federal, state, and local law. This MSDS is not in any way meant to preclude the operation and effect of any of the provisions of Brenntag's terms and conditions of sale.

PRODUCT IDENTIFIER: Sodium Hydroxide Solutions 8% - 45% (All Grades)

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15. REGULATORY INFORMATION

COMPONENTS: Sodium Hydroxide
OSHA Target Organs: Eyes, Skin, Mucous membranes & Lungs

Carcinogenic Potential:
 Regulated by OSHA: No
 Listed on NTP Report: No
 Listed by IARC: No
 IARC Group: Not applicable
 ACGIH Appendix A: Not listed
 A1 Confirmed Human: Not applicable
 A2 Suspected Human: Not applicable

U.S. EPA Requirements
Release Reporting
CERCLA (40 CFR 302)
 Listed Substance: Yes
 Reportable Quantity: 1,000 pounds
 Category: C
 RCRA Waste No.: None listed
 Unlisted Substance: Not applicable
 Reportable Quantity: Not applicable
 Characteristic: Not applicable
 RCRA Waste No.: Not applicable

SARA TITLE III
Section 302 & 303 (40 CFR 305):
 Listed Substance: Not listed
 Reportable Quantity: Not applicable
 Planning Threshold: Not applicable

Section 311 & 312 (40 CFR 370):
 Hazard Categories (product): Fire: Sudden Release of Pressure: Reactive: Acute Health: Chronic Health:
 Planning threshold: 10,000 pounds

Section 313 (40 CFR 372):
 Listed Toxic Chemical: Not listed
 Reporting Threshold: Not applicable

U.S. TSCA Status
 Listed (40 CFR 710): Yes

State Regulations
State of California: Safe Drinking Water and Toxics Enforcement Act, 1985 (Proposition 65):
 Carcinogen: No
 Reproductive Toxin: No

Other Regulations
 State Right To Know Laws: MA, NJ, PA, CA

Canadian Regulations
Product Information:
 Controlled Product: Yes
 WHMIS Hazard Symbols: Corrosive Material
 WHMIS Class & Division: E
Ingredient Information:
 IDL Substance: Yes
 DSL or NDGL Lists: DSL

PRODUCT IDENTIFIER: Sodium Hydroxide Solutions 5% - 45% (All Grades)

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16. OTHER INFORMATION

EPA Registration number: Not applicable
Approved Product Uses: Not applicable

Special Notes:

These products are not formulated or manufactured to contain any material, which the State of California has found to cause cancer and/or birth defects or other reproductive harm.

Note: Deadly carbon monoxide gas may form when these products contact food soil containing sugars. After cleaning operations are completed, thoroughly ventilate enclosed areas before entering. Always monitor oxygen and carbon monoxide levels when personnel are in enclosed areas. For proper tank entry procedures, see ANSI Z117.1-1977.

RQ Calculation for a typical Sodium Hydroxide 15% Solution:
 $1,000 \text{ pounds} / 0.15 = 6,667 \text{ pounds}$ (to the nearest pound). The only variable is the concentration percentage.

RL Calculation for a typical Sodium Hydroxide 25% Solution:
 $60 \text{ kg} / 0.25 = 240 \text{ kg}$ (to the nearest kilogram). The only variable is the concentration percentage.

Special Instructions:

When making solutions, always add these products to cool water with adequate mixing to avoid any uneven heating and to make a uniform solution.

Do not allow these products to contact Aluminum, Magnesium or Zinc surfaces as this causes corrosion of the metal and generation of flammable / explosive Hydrogen gas.

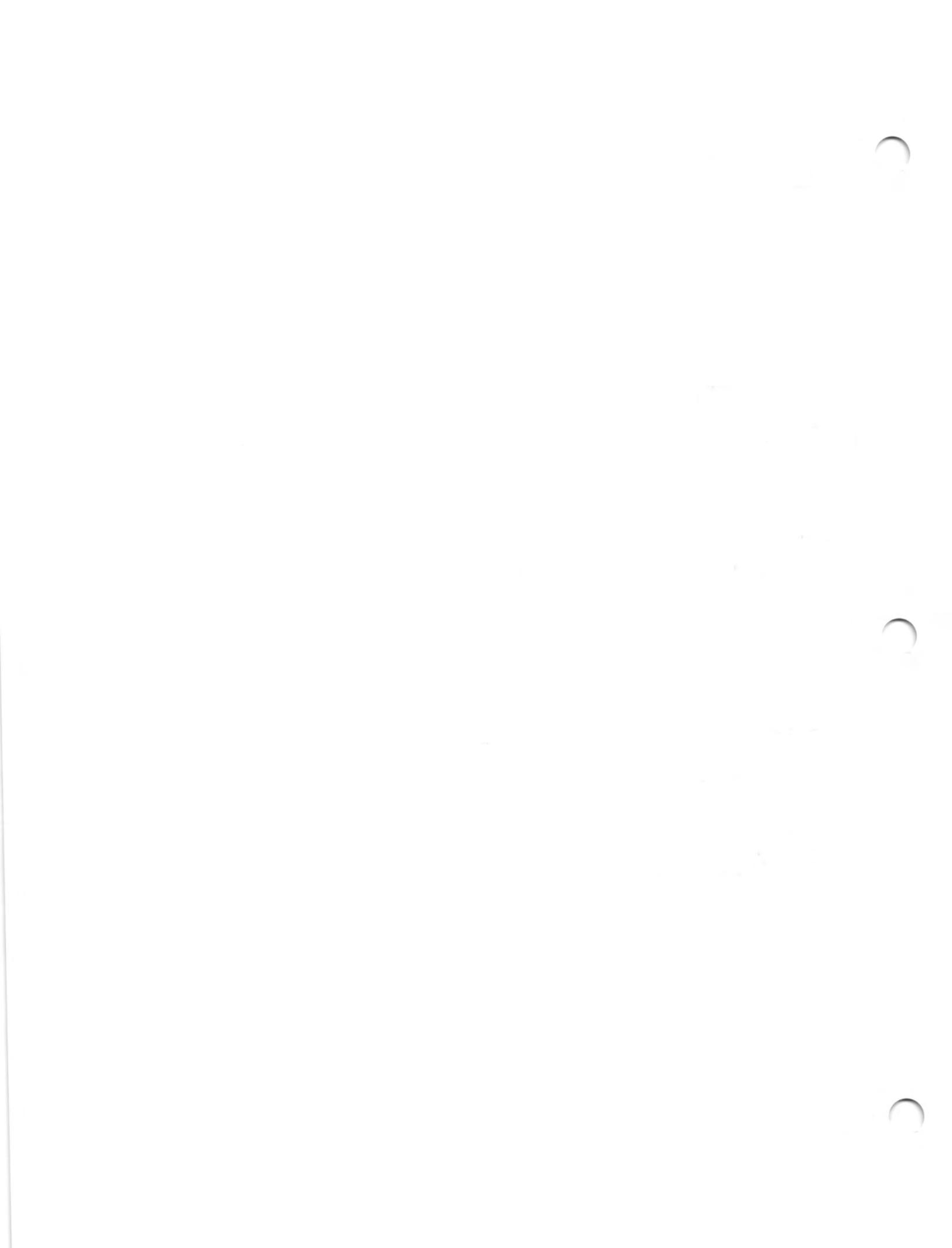
MSDS Revision Information: Information Revised This Issue Date: Updated per new format with additional information.
Form Revision made 2/19/09

MSDS Distributed by: Brenntag Pacific, Inc.

Prepared By: Edward Doherty Date Prepared: July 19, 2011

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1. 化学物質等及び会社情報

1.1 製品識別名

化学品の名称 : Sodium phosphate

カタログ番号 : 342483

ブランド : Aldrich

1.2 他の特定手段

Trisodium phosphate

1.3 物質または混合物の用途、および使用を差し控える用途

研究開発での使用のみ。薬事、家庭用その他の用途には用いない。

1.4 安全データシート作成者の詳細

会社名 : Sigma-Aldrich Japan G.K.
 Tennoz Central Tower, 2-2-24 Higashi-Shinagawa
 SHINAGAWA-KU 140-0002
 JAPAN
 シグマ アルドリッチ ジャパン合同会社
 東京都品川区東品川 2-2-24
 担当部門 : コンプライアンス

電話番号 : +81 3 5796 7310

FAX : +81 3 5796 7315

1.5 緊急連絡電話番号

緊急連絡先 : (03) 6758-3625

2. 危険有害性の要約

2.1 GHS分類

皮膚腐食性及び皮膚刺激性 (区分2)
 眼に対する重篤な損傷性又は眼刺激性 (区分2A)
 特定標的臓器毒性, 単回ばく露 (区分3), 気道刺激性

2.2 注意書きも含むGHSラベル要素

絵表示又はシンボル



注意喚起語

警告

危険有害性情報

H315

皮膚刺激。

H319

強い眼刺激。

H335

呼吸器への刺激のおそれ。

注意書き

安全対策

P280 保護眼鏡／保護面を着用すること。

応急措置

P304 + P340 + P312 吸入した場合：空気の新鮮な場所に移し、呼吸しやすい姿勢で休息させること。気分が悪いときは医師に連絡すること。

P305 + P351 + P338 眼に入った場合：水で数分間注意深く洗うこと。次にコンタクトレンズを着用していて容易に外せる場合は外すこと。その後も洗浄を続けること。

P337 + P313 眼の刺激が続く場合：医師の診断/手当てを受けること。

2.3 他の危険有害性 - なし

3. 組成及び成分情報

3.1 化学物質

別名 : Trisodium phosphate

化学特性(示性式、構造式等) : $\text{Na}_3\text{O}_4\text{P}$

分子量 : 163.94 g/mol

化学名	濃度
Trisodium orthophosphate	
CAS番号	7601-54-9
EC番号	231-509-8
	<= 100 %

4. 応急処置

4.1 必要な応急手当

一般的アドバイス

医師に相談する。この安全データシートを担当医に見せる。

吸入した場合

吸い込んだ場合、新鮮な空気の場所に移す。呼吸していない場合には、人工呼吸を施す。医師に相談する。

皮膚に付着した場合

石けんと多量の水で洗い流す。医師に相談する。

眼に入った場合

多量の水で15分以上よく洗浄し、医師の診察を受けること。

飲み込んだ場合

意識がない場合、口から絶対に何も与えないこと。口を水ですすぐ。医師に相談する。

4.2 急性症状及び遅発性症状の最も重要な徴候症状

化学的、物理的および毒性学的性質の研究は不十分と考えられる。

4.3 緊急治療及び必要とされる特別処置の指示

データなし

5. 火災時の措置

5.1 消火剤

消火剤

水噴霧、耐アルコール泡消火剤、粉末消火剤、二酸化炭素を使用すること。

5.2 特有の危険有害性

リンの酸化物, 酸化ナトリウム

5.3 消防士へのアドバイス

消火活動時には必要に応じて 自給式呼吸装置を装着する。

5.4 詳細情報

データなし

6. 漏出時の措置

6.1 人体に対する注意事項、保護具及び緊急時措置

保護具を使用する。粉塵の発生を避ける。蒸気、ミスト、またはガスの呼吸を避ける。十分な換気を確保する。安全な場所に避難する。粉塵を吸い込まないように留意。

6.2 環境に対する注意事項

物質が排水施設に流れ込まないようにする。

6.3 封じ込め及び浄化の方法及び機材

粉塵を発生させないように留意して回収し、廃棄する。掃いてシャベルですくい取る。廃棄に備え適切な容器に入れて蓋をしておく。

6.4 参照すべき他の項目

廃棄はセクション13を参照。

7. 取扱い及び保管上の注意

7.1 安全な取扱いのための予防措置

皮膚や眼への接触を避けること。粉塵やエアゾルを発生させない。粉塵が発生する場所では、換気を適切に行う。

7.2 配合禁忌等を踏まえた保管条件

冷所に保管。容器を密閉し、乾燥した換気の良い場所に保管する。

湿気に反応する。

7.3 特定の最終用途

データなし

8. ばく露防止及び保護措置

8.1 管理濃度

許容濃度

許容濃度が設定されている物質を含有していない。

8.2 曝露防止

適切な技術的管理

十分な衛生的作業を行い安全規定に従って取扱う。休憩前や終業時には手を洗う。

保護具

眼／顔面の保護

EN166に 適合するサイドシールド付き安全ゴーグル NIOSH (US) またはEN 166 (EU) などの適切な政府機関の規格で試験され、認められた眼の保護具を使用する。

皮膚及び身体の保護具

手袋を着用して取扱う。使用前に、必ず手袋を検査する。(手袋外面に触れずに)適切に手袋を脱ぎ、本製品の皮膚への付着を避ける。適用法令およびGLPIに従い、使用後に汚染手袋を廃棄する。手を洗い、乾燥させる。

選ばれた防護手袋は、EU指令89/686/EECの仕様と、それから派生する規格EN374を満たすものでなければならない。

フルコンタクト

材質: ニトリルゴム

最小厚: 0.11 mm

破過時間: 480 min

試験物質: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

飛沫への接触

材質: ニトリルゴム

最小厚: 0.11 mm

破過時間: 480 min

試験物質: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

データソース: KCL GmbH, D-36124 Eichenzell, 電話 +49 (0)6659 87300, e-mail sales@kcl.de,

試験方法: EN374

EN374とは違った条件の下で、溶液の中、または他の物質と混ぜて使われる場合は、EC認可手袋の供給業者に問い合わせる。この勧告は単なる助言であり、予想される用途の特定状況に精通した産業衛生専門家並びに安全管理者により評価されなければならない。任意の使用方法について許可を受けていると理解すべきではない。

身体の保護

不浸透性衣服、特定の作業場に存在する危険物質の濃度および量に応じて、保護装置のタイプを選択しなければならない。

呼吸用保護具

不快物質への暴露には、P95型 (US) 又はP1型 (EU EN 143) 呼吸用粒子保護具を使用する。より高度な保護には、OV/AG/P99型 (US) 又はABEK-P2型 (EU EN 143) 呼吸用保護具カートリッジを使用する。NIOSH (US) またはCEN (EU) などの適切な政府機関の規格で試験され、認められた呼吸用保護具および部品を使用する。

9. 物理的及び化学的性質

9.1 基礎物理および化学特性の情報

a) 外観	形状: 固体
b) 臭い	データなし
c) 臭いのしきい(閾)値	データなし
d) pH	11 at 20 ° C
e) 融点・凝固点	75 ° C - 融解前に分解。
f) 沸点, 初留点及び沸騰範囲	データなし
g) 引火点	データなし
h) 蒸発速度	データなし
i) 燃焼性 (固体、気体)	データなし
j) 引火上限/下限または爆発限界	データなし
k) 蒸気圧	データなし
l) 蒸気密度	データなし
m) 比重 (密度)	データなし

n) 水溶性	121 g/l at 20 ° C
o) n-オクタノール/水分 配係数	データなし
p) 自然発火温度	データなし
q) 分解温度	データなし
r) 粘度(粘性率)	データなし

10. 安定性及び反応性

10.1 反応性

データなし

10.2 化学的安定性

データなし

10.3 危険有害反応可能性

データなし

10.4 避けるべき条件

データなし

10.5 混触危険物質

強酸

10.6 危険有害な分解生成物

その他の分解生成物 - データなし

11. 有毒性情報

11.1 毒性情報

急性毒性

データなし

皮膚腐食性及び皮膚刺激性

皮膚 - ウサギ - 皮膚に刺激性。

眼に対する重篤な損傷性又は眼刺激性

眼 - ウサギ - 中等度の眼刺激

呼吸器感作性又は皮膚感作性

データなし

生殖細胞変異原性

データなし

発がん性

生殖毒性

データなし

特定標的臓器毒性, 単回ばく露

吸入 - 呼吸器への刺激のおそれ。

特定標的臓器毒性, 反復ばく露

データなし

吸引性呼吸器有害性

データなし

潜在した健康への影響

吸入	吸入すると有害のおそれ。呼吸器官に刺激を引き起こす。
摂取	飲み込むと有害のおそれ。
皮膚	皮膚から吸収すると有害となることがある。皮膚の刺激を引き起こす。
眼	強い眼刺激。

暴露による兆候および症状

化学的、物理的および毒性学的性質の研究は不十分と考えられる。

追加情報

RTECS: TC9490000

12. 環境影響情報

- 12.1 生態毒性
データなし
- 12.2 残留性・分解性
データなし
- 12.3 生体蓄積性
データなし
- 12.4 土壌中の移動性
データなし
- 12.5 PBT および vPvB の評価結果
データなし
- 12.6 他の有害影響
データなし

13. 廃棄上の注意

13.1 廃棄物処理方法

製品

免許を有する廃棄物処理業者に、余剰物で再使用不可の溶液として処理を依頼する。可燃性溶剤に溶解または混合し、アフターバーナーとスクラバーが備えられた化学焼却炉で焼却する。

汚染容器及び包装

製品入り容器と同様に処分する。

14. 輸送上の注意

14.1 国連番号

ADR/RID (陸上規制) : - IMDG (海上規制) : - IATA (航空規制) : -

14.2 国連輸送名

ADR/RID (陸 非危険物
上規制) :
IMDG (海上 非危険物
規制) :
IATA (航空 非危険物
規制) :

14.3 輸送危険有害性クラス

ADR/RID (陸上規制) : - IMDG (海上規制) : - IATA (航空規制) : -

14.4 容器等級

ADR/RID (陸上規制) : - IMDG (海上規制) : - IATA (航空規制) : -

14.5 環境危険有害性
ADR/RID (陸上規制) : 非該当 IMDG (海上規制) 海洋汚染物質 IATA (航空規制) : 非該当
(該当・非該当): 非該当

14.6 特別の安全対策
データなし

15. 適用法令

15.1 物質または混合物に固有の安全、健康および環境に関する規則/法律

国内適用法令

消防法: :危険物、指定可燃物に該当しない。

毒物及び劇物取締法: 非該当

労働安全衛生法

特定化学物質障害予防規則: 非該当

規則:

有機溶剤中毒予防規則: 非該当

規則:

製造の許可を受けるべき有害物: 非該当

名称等を通知すべき危険物及び有害物:

名称等を通知すべき危険物及び有害物: 非該当

名称等を表示すべき危険物及び有害物:

名称等を表示すべき危険物及び有害物: 非該当

変異原性の認められた化学物質 (既存化学物質):

変異原性の認められた化学物質 (既存化学物質): 非該当

変異原性の認められた化学物質 (新規届出化学物質):

変異原性の認められた化学物質 (新規届出化学物質): 非該当

製造等が禁止される有害物:

製造等が禁止される有害物: 非該当

健康障害防止指針公表物質:

健康障害防止指針公表物質: 非該当

鉛中毒予防規則: 非該当

四アルキル鉛中毒予防規則: 非該当

規則:

労働安全衛生法施行令 - 別表第一 (危険物): 非該当

化学物質排出把握管理促進法:

化学物質排出把握管理促進法: 非該当

化審法:

特定化学物質、監視化学物質、優先評価化学物質に該当しない。

16. その他の情報

詳細情報

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Safety Data Sheet

1. Product Identifier and Company Identification

Product name	: Sulfuric Acid (20%-93%)	
HBCC SDS number	: CS18100	
Synonym	: H ₂ SO ₄ ; Oil of Vitriol; Spirit of Sulfur; Hydrogen Sulfate; Oleum	
Product use and Restrictions	: Refer to label or call	
Manufacturer	: Corporate Headquarters	Corporate Safety & Compliance
Contact Address	Hill Brothers Chemical Company 1675 North Main Street Orange, California 92867 714-998-8800 800-821-7234	Hill Brothers Chemical Company 7121 West Bell Road, Suite 250 Glendale, Arizona 85308 623-535-9955 - Office 623-535-9944 - Fax
Emergency telephone	: 800-424-9300	
Number (Chemtrec)	: http://hillbrothers.com	
Website		

2. Hazard Identification

Classification	: Skin Corrosion/Irritation – Category 1 Serious Eye Damage/Eye Irritation – Category 1 Corrosive to Metals – Category 1
Signal Word	: DANGER
Pictogram(s)	: 
Hazard Statements	: H314: Causes severe skin burns and eye damage H290: May be corrosive to metals
Precautionary Statements	
Response	: P304 + P340 + P310: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or physician. P301 + P310 + P330 + P331: IF SWALLOWED: Immediately call a POISON CENTER or physician. P303 + P361 + P353 + P363 + P310: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. Wash contaminated clothing before reuse. Immediately call a POISON

CENTER or physician.

P305 + P351 + P338 + P310: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing. Immediately call a POISON CENTER or physician.

- Prevention** : P280: Wear protective gloves. Wear eye or face protection. Wear protective clothing.
P264: Wash hand thoroughly after handling.
- Storage** : P405: Store locked up.
- Disposal** : P501: Dispose of contents and container in accordance with all local, regional, national and international regulations.

3. Composition/Information on Ingredients

CAS Number	Ingredient Name	Weight %
7664-93-9	Sulfuric Acid	20-93%

4. First Aid Measures

- Ingestion** : If liquid sulfuric acid or solutions containing sulfuric acid have been swallowed and the person is conscious, give him 8oz. of water or milk (of water or milk to children under 5), immediately to dilute the sulfuric acid. Do NOT induce vomiting. Do not attempt to make the exposed person vomit. Do not leave victim unattended. GET MEDICAL ATTENTION IMMEDIATELY.
- Inhalation** : If a person breathes in large amounts of sulfuric acid, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. If breathing is difficult, give oxygen. Keep the affected person warm and at rest. GET MEDICAL ATTENTION AS SOON AS POSSIBLE.
- Skin** : If liquid sulfuric acid or solutions containing sulfuric acid get on the skin, immediately flush the contaminated skin with water for at least 15 minutes. If skin surface is damaged, apply a clean dressing. If liquid sulfuric acid or solutions containing sulfuric acid penetrate through the clothing, immediately remove the clothing, shoes and constrictive jewelry under a safety shower and continue to wash the skin for at least 15 minutes. GET MEDICAL ATTENTION IMMEDIATELY.
- Eyes** : If liquid sulfuric acid or solutions containing sulfuric acid get into the eyes, flush eyes immediately with a directed stream of water for at least 30 minutes while forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissue. GET MEDICAL ATTENTION IMMEDIATELY. Contact lenses should not be worn when working with this chemical.
- Medical Conditions** : Persons with pre-existing skin disorders and/or respiratory disorders (e.g. Asthma-like conditions) may be more susceptible to the effects of this material, and may be aggravated by exposure to this material.

Effects of Overexposure

: May cause severe irritation and burns of the mouth, nose, throat, respiratory and digestive tract, coughing, nausea, vomiting, abdominal pain, chest pain, pneumonitis (inflammation of the fluid in the lungs), pulmonary edema (accumulation of the fluid in the lungs), and perforation of the stomach. Overexposure to acid mists has been reported to cause erosion to tooth enamel.

Summary of Acute Health Hazards

: Concentrated sulfuric acid will effectively remove the elements of water from many organic materials with which it comes in contact. It is even more rapidly injurious to mucous membranes and exceedingly dangerous to the eyes.

Ingestion

: Corrosive. Causes serious burns of the mouth or perforation of the esophagus or stomach. May be fatal if swallowed.

Inhalation

: Corrosive and highly toxic. May be harmful or fatal if inhaled. May cause severe irritation and burns of the nose, throat and respiratory tract.

Skin

: Corrosive. Splashes on the skin will cause severe skin burns. Burning and charring of the skin are a result of the great affinity for, and strong exothermic reaction with, water. Direct contact can be severely irritating to the skin and may result in redness, swelling, burns and severe skin damage.

Eyes

: Corrosive. Direct contact with the liquid or exposure to vapors or mists may cause stinging, tearing, redness, swelling, corneal damage and irreversible eye damage. Splashes in the eyes will cause severe burns. Contact lenses should not be worn when working with this chemical.

Note to Physicians

: Sulfuric acid is reported to cause pulmonary function impairment. Periodic surveillance is indicated. Sulfuric acid may cause acute lung damage. Surveillance of the lungs is indicated. Ingestion may cause gastroesophageal perforation. Perforation may occur within 72 hours, but along with abscess formation, can occur weeks later. Long term complications may include esophageal, gastric or pyloric strictures or stenosis.

Summary of Chronic Health : N/A

5. Fire Fighting Measures

Extinguishing

: Fires involving small amount of combustibles may be smothered with suitable dry chemical, soda ash, lime, sand or CO₂. Use water on combustibles burning in vicinity of this material but use care as water applied directly to this acid result in evolution of heat and causes splattering.

Special Exposure Hazards

: Not flammable but highly reactive and capable of igniting finely divided combustible materials on contact. Reacts violently with water and organic materials with evolution of heat. If involved in fire, may release hazardous oxides of sulfur. Vapors are heavier than air and may accumulate in low areas. Containers exposed to extreme heat may rupture due to pressure buildup. Contact with common metals may generate hydrogen, which can

form flammable mixture with air. Fire may produce irritating, corrosive, and/or toxic gases.

Special Protective Equipment for Firefighters

: Causes severe, deep burns to tissue; very corrosive effect. Sulfuric Acid is extremely slippery. Emergency responders in the danger area should wear bunker gear and self-contained breathing apparatus for fires beyond the incipient stage (29CFR 1910.156). In addition, wear other appropriate protective equipment as conditions warrant (see Section 8). Water reactive. Contact with water may generate heat. Isolate damage area, keep unauthorized personnel out. If tank, railcar, or tank truck is involved in a fire, isolate for ½ mile in all directions. Consider initial evacuation for ½ mile in all directions. Stop spill/release if it can be done with minimal risk. Move undamaged containers from danger area if it can be done with minimal risk. Fires involving small amounts of combustibles may be smothered with suitable dry chemicals. Use water on combustibles burning but avoid using water directly on acid as it results in evolution of heat and causes splattering.

Fire Fighting Procedures

: Extinguish fire using agents suitable for nearby fires. Use water spray only to keep fire-exposed containers cool. No water. In case of fire in the surroundings: powder, foam, carbon dioxide.

NFPA Rating

: Health - 3
Flammability - 0
Instability - 2
Special Hazard: -W-



0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

Uniform Fire Code Rating

: N/A

6. Accidental Release Measures

Personal Precautions

: If sulfuric acid is spilled or leaked, ventilate area. Stay upwind and away from spill release. Avoid discharge into drains, water courses or onto the ground. Persons not wearing protective equipment and clothing should be restricted from areas of spills or leaks until cleanup has been completed.

Emergency Procedures

: Use Caution around spill area, Sulfuric Acid is extremely slippery.

Methods of Containment And Clean-Up

: Collect spilled or leaked material in the most convenient and safe manner for reclamation or for disposal in a secured sanitary landfill. Sulfuric acid should be absorbed in vermiculite, dry sand, earth, or a similar material. It may also be diluted and neutralized. Add slowly to solution of soda ash and calcium hydroxide aka: slaked lime with stirring.

7. Handling and Storage

- Safe Handling** : Protect against physical damage and water. Keep containers closed. Sulfuric Acid is extremely slippery. Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276.
- Storage** : Hydrogen gas is potentially explosive and special care must be taken when Performing maintenance on tanks. To prevent ignition of hydrogen gas Generated in metal containers (from metal contact) smoking, open flames and sparks must not be permitted in storage areas. This product has a great affinity for water, abstracting it from the air and also from many organic substances; hence it will char wood, etc. When diluting, the acid should be added to the diluent. Separate from carbides, chlorates, fulminates, nitrates, picrates, powdered metals, and combustible materials. Keep away from strong oxidizing agents including oxygen and chlorine.
- Work/Hygienic Practices** : Avoid contact with the skin and avoid breathing vapors. Do not eat, drink, or smoke in work area. Wash hands before eating, drinking, or using restroom. Do NOT place food, coffee or other drinks in the area where dusting or splashing of solutions is possible.
- Ventilation** : General mechanical ventilation (typically 10 air changes per hour) may be sufficient to keep sulfuric acid vapor concentrations within specified time-weighted TLV range. If general ventilation proves inadequate to maintain safe vapor concentrations, supplemental local exhaust may be required.

8. Exposure Controls/Personal Protection

Occupational Exposure Limits :

Chemical Name: Sulfuric Acid				
Exposure Limits (TWAs) in Air				
CAS Number	IDLH	ACGIH TLV	OSHA PEL	STEL
7664-93-9	15 mg/m ³	0.2 mg/m ³	1 mg/m ³	3 mg/m ³
7446-09-5	100 ppm	2 ppm	5 ppm	5 ppm

- Protective Equipment** : Employees should be provided with and required to use impervious clothing, gloves, face shields (eight-inch minimum), and other appropriate protective clothing necessary to prevent any possibility of skin contact with liquid sulfuric acid or solutions containing more than 1% sulfuric acid by weight. Rubber apron, rubber boots, eyewash stations and safety showers must be available in the immediate work area for emergency use.
- Eye Protection** : Employees should be provided with and required to use splash-proof safety goggles where there is any possibility of liquid sulfuric acid or solutions containing sulfuric acid contacting the eyes. Contact lenses should not be worn when working with this chemical.
- Respiratory Protection** : **Personal Protective Measures:** Good industrial hygiene practices recommend that engineering controls be used to reduce environmental concentrations to the permissible exposure level. However, there are some exceptions where respirators may be used to control exposure. Respirators

may be used when engineering and work practice controls are not technically feasible, when such controls are in the process of being installed, or when they fail and need to be supplemented. If the use of respirators is necessary, a NIOSH/MSHA approved air purifying respirator with N95 filter may be used under conditions where airborne concentrations are expected to exceed exposure limits (see Section II). Protection provided by air purifying respirators is limited (see manufacturers respirator selection guide). Use a positive pressure air supplied respirator if there is potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air purifying respirators may not provide adequate protection. A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.

9. Physical and Chemical Properties

Appearance: Colorless to dark brown	Odor: Odorless
Odor Threshold: > 1 mg/m ³	pH: 0.3 (1N Solution)
Melting Point/Freezing Point: 11°C; 51.8°F	Initial Boiling Point/Range: 105-325°C (221-616°F (20-100% H2SO4))
Flash Point: Non-flammable	Evaporation Rate (BuAc=1): < 1
Flammability: N/A	Lower/Upper Explosive Limit: N/A
Vapor Pressure (mmHg): < .00120 mm	Vapor Density (Air=1): 3.4
Relative Density: N/A	Solubility in Water: 100%
Partition Coefficient: N/A	Autoignition Temperature: N/A
Decomposition Temperature: N/A	Viscosity: N/A
% Volatiles: Negligible	Specific Gravity (Water=1): See Table Below
Molecular Weight: 98	VOC: N/A

% Acid in Solution	20	30	35	36	40	50	72	75-99
Specific Gravity	1.14-115	1.23	1.27	1.27	1.3	1.4	1.63	1.67-1.84
Weight (lb./gallon)	9.5	10.246	10.55	10.6	10.89	11.73	13.6	13.9-15.4

How to detect this compound: Sampling and analyses may be performed by collection of sulfuric acid on a cellulose membrane filter, followed by extraction with distilled water and isopropyl alcohol, treatment with perchloric acid, and titration with barium perchlorate. Also, detector tubes certified by NIOSH under 42 CFR Part 84 or other direct-reading devices calibrated to measure sulfuric acid may be used.

10. Stability and Reactivity

- Reactivity** : Sulfuric Acid reacts vigorously, violently or explosively with many organic and inorganic chemicals and with water.
- Chemical Stability** : Stable under normal conditions.

- Possibility of Hazardous Reactions or Polymerizations** : Hazardous Polymerization will not occur.
- Conditions to Avoid** : Temperatures above 150°F. Exposure to moist air or water.
- Incompatible Materials** : Contact of acid with organic materials (such as chlorates, carbides, fulminates, and picrates), alkaline materials and water may cause fires and explosions. Contact of acid with metals may form toxic sulfur dioxide fumes and flammable hydrogen gas. Contact with hypochlorites (e.g., chlorine bleach), sulfides, or cyanides will produce toxic gases.
- Hazardous Decomposition Products** : Toxic gases and vapors (such as sulfuric acid fume, sulfur dioxide, and carbon monoxide) may be released when sulfuric acid decomposes. Decomposes to water and sulfur trioxide above 644°F.

11. Toxicological Information

Acute and Chronic Effects : Sulfuric acid mist severely irritates the eyes, respiratory tract, and skin. Concentrated sulfuric acid destroys tissue due to its severe dehydrating action, whereas the dilute form acts as a mild irritant due to acid properties. A worker sprayed in the face with liquid fuming sulfuric acid suffered skin burns of the face and body, as well as pulmonary edema from inhalation. Splashed in the eye, the concentrated acid causes extremely severe damage, often leading to blindness, whereas dilute acid produces more transient effects from which recovery may be complete. Repeated exposure of workers to the mist causes chronic conjunctivitis, tracheobronchitis, stomatitis, and dermatitis, as well as dental erosion. While ingestion of the liquid is unlikely in ordinary industrial use, the highly corrosive nature of the substance may be expected to produce serious mucous membrane burns of the mouth and esophagus.

Routes of Exposure

- Ingestion** : Yes
Inhalation : Yes
Skin : Yes
Eyes : Yes

Symptoms related to Physical, Chemical & Toxicological Characteristics : Workers exposed to industrial sulfuric acid mist showed a statistical increase in laryngeal cancer. This suggests a possible relationship between carcinogenesis and inhalation of sulfuric acid mist.

Numerical Measures of Toxicity : The LC50 of mist of 1-micron particle size for an 8 hour exposure was 50 mg/m³ for adult guinea pigs and 18 mg/m³ for young animals. Continuous exposure of guinea pigs to 2 mg/m³ for 5 days caused pulmonary edema and thickening of the alveolar walls; exposure of guinea pigs to 2 mg/m³ for 1 hour caused an increase in pulmonary airway resistance from reflex bronchoconstriction. Sequelae were pulmonary fibrosis, residual bronchitis, and pulmonary emphysema; in addition, necrosis of the skin resulted in marked scarring. In human subjects, concentrations of about 5 mg/m³ were objectionable, usually causing cough, an increase in respiratory rate, and

impairment of ventilatory capacity. Workers exposed to concentrations of 12.6 to 35 mg/m³ had a markedly higher incidence of erosion and discoloration of teeth than was noted in unexposed individuals.

Chronic Toxicity : N/A

Carcinogenicity :

Product Name: Sulfuric Acid					
ACGIH	IARC	EPA	NIOSH	NTP	OSHA
N/A	N/A	N/A	N/A	N/A	N/A

TARGET ORGANS : N/A

12. Ecological Information

Ecotoxicity : Fish: Bluegill/Sunfish: 49 mg/L; 48 Hr; TLm (tap water @ 20°C)
Fish: Bluegill/Sunfish: 24.5 ppm; 48 Hr; TLm (fresh water)

Persistence and Degradability : Sulfuric acid (98% solution) is soluble in water and remains indefinitely in the environment as sulfate.

Bioaccumulative Potential :

Product/Ingredient	Log _{pow}	BCF	Potential
-	-	-	-

Sulfuric acid (98% solution) has low potential for bioaccumulation.

Mobility in Soil : Sulfuric acid (98% solution) is soluble in water and has high mobility in soil. During transport through the soil, sulfuric acid (98% solution) will dissolve some of the soil material; in particular, the carbonate based materials. The acid will be neutralised to some degree with adsorption of the proton also occurring on clay materials. However, significant amounts of acid are expected to remain for transport down towards the ground water table. Upon reaching the ground water table, the acid will continue to move, now in the direction of the ground water flow. Lime addition may be required to rectify low pH resulting from sulfuric acid (98% solution) spillages.

13. Disposal Considerations

Disposal of Container : Sulfuric acid may be placed in sealed containers or absorbed in vermiculite, dry sand, earth, or a similar material and disposed. Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification. of in a secured sanitary landfill. It may also be diluted and neutralized. Check with your Federal, State, and Local authorities as neutralized sulfuric acid may be allowed to be flushed down the drain. Empty containers must be handled with care due to material residue.

14. Transport Information

UN#	: UN2796, (with not more than 51% acid) UN1830, (with more than 51% acid)
Proper Shipping Name	: Sulfuric Acid
Hazard Class/Division	: 8
Packing Group	: II
Marine Pollutant	: No
Special Provisions	: UN2796: A3, A7, B2, B25, IB2, N6, N34, T8, TP2 UN1830: A3, A7, B3, B83, B84, IB2, N34, T8, TP2
Emergency Response Guidebook	: UN2796: 2012 ERG, Guide 157, pages 252-253 UN1830: 2012 ERG, Guide 137, pages 212-213
Placard Advisory	:



15. Regulatory Information

SARA 302 Extremely Hazardous Substance (EHS)	: Sulfuric Acid: CAS #7664-93-9 Threshold Planning Quantity (TPQ) = 1000 lbs. (454 kgs.) (85 gals.)
SARA 304 Extremely Hazardous Substance (EHS)	: Reportable Quantity (RQ) = 500 lbs. (227 kgs.) (42.5 gals.) Sulfuric Acid: CAS #7664-93-9 Reportable Quantity (RQ) = 1000 lbs. (454 kgs.) (85 gals.)
SARA 311/312 Hazard Classification	:

Sara 311/312 Hazards				
Acute	Chronic	Flammability	Pressure	Reactivity
Yes	Yes	No	No	Yes

SARA 313 Supplier Notification	: Sulfuric Acid is only subject to the requirements of the SARA 313 Supplier Notification when in aerosol form.
CERCLA Hazardous Substance	: Sulfuric Acid: CAS #7664-93-9 1000 lbs. (454 kgs.) (85 gals.) Reportable Quantity (RQ)
Clean Air Act (CAA)	: This product is not listed as a pollutant under the US Clean Air Act, Section 12 (40 CFR 61)
California Prop 65	: This product does not contain any chemicals known to the state of California to cause cancer.
Label Warning	: Corrosive
EPA Registration	: None

16. Other Information

Revision date : 04/15/2015
Supersedes : 09/28/2011
First Issue : 01/02/1986

Chemical Family/Type : Inorganic Acid

Section(s) changed since last revision : MSDS to First Issue SDS Conversion

IMPORTANT! Read this SDS before use or disposal of this product. Pass along the information to employees and any other persons who could be exposed to the product to be sure that they are aware of the information before use or other exposure. This SDS has been prepared in accordance with the Globally Harmonized System of Chemical and Labeling of Chemicals (GHS) Fifth Edition and the OSHA Hazard Communication Standard [29 CFR 1910.1200]. The SDS information is based on sources believed to be reliable. Available data, safety standards, and government regulations are subject to change and the conditions of handling and use, or misuse are beyond our control; **Hill Brothers Chemical Company** makes no warranty, either expressed or implied, with respect to the completeness or continuing accuracy of the information contained herein and disclaims all liability for reliance thereon. Additional information may be necessary or helpful for specific conditions and circumstances of use. It is the user's responsibility to determine the suitability of this product and to evaluate risks and exercise appropriate precautions for protection of employees and others prior to use.

Identification

Product identifier

Product name: Tetrafluoroboric acid, ca 50% w/w aqueous solution

Stock number: L14037

Relevant identified uses of the substance or mixture and uses advised against.

Identified use: SU24 Scientific research and development

Details of the supplier of the safety data sheet

Manufacturer/Supplier:

Alfa Aesar
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757
Email: tech@alfa.com
www.alfa.com

Information Department: Health, Safety and Environmental Department

Emergency telephone number:

During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660. After normal business hours, call Carechem 24 at (866) 928-0789.

2 Hazard(s) identification

Classification of the substance or mixture in accordance with 29 CFR 1910 (OSHA HCS)

 GHS06 Skull and crossbones

Acute Tox. 3 H301 Toxic if swallowed.

 GHS05 Corrosion

Skin Corr. 1B H314 Causes severe skin burns and eye damage.
Hazards not otherwise classified No information known.

Label elements

GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)

Hazard pictograms



GHS05 GHS06

Signal word Danger

Hazard-determining components of labeling:

Tetrafluoroboric acid

Hazard statements

H301 Toxic if swallowed.

H314 Causes severe skin burns and eye damage.

Precautionary statements

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor/...

P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P405 Store locked up.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

WHMIS classification

D1A - Very toxic material causing immediate and serious toxic effects

D2B - Toxic material causing other toxic effects

E - Corrosive material



Classification system

HMIS ratings (scale 0-4)

(Hazardous Materials Identification System)

HEALTH 3 Health (acute effects) = 3

FLAMM 0 Flammability = 0

REACTIVITY 1 Physical Hazard = 1

Other hazards

Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

3 Composition/information on ingredients

Chemical characterization: Mixtures

Dangerous components:

16872-11-0 Tetrafluoroboric acid		50.0%
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Additional information None known.

Non-Hazardous Ingredients

7732-18-5 Water		50.0%
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Product name: Tetrafluoroboric acid, ca 50% w/w aqueous solution

(Contd. of page 1)

4 First-aid measures

Description of first aid measures

General information

Immediately remove any clothing soiled by the product.
In case of irregular breathing or respiratory arrest provide artificial respiration.

After inhalation

Supply fresh air. If required, provide artificial respiration. Keep patient warm.
Seek immediate medical advice.

After skin contact

Immediately wash with water and soap and rinse thoroughly.
Seek immediate medical advice.

After eye contact Rinse opened eye for several minutes under running water. Then consult a doctor.

After swallowing Do not induce vomiting; immediately call for medical help.

Information for doctor

Most important symptoms and effects, both acute and delayed

Causes severe skin burns.

Causes serious eye damage.

Indication of any immediate medical attention and special treatment needed No further relevant information available.

5 Fire-fighting measures

Extinguishing media

Suitable extinguishing agents Product is not flammable. Use fire-fighting measures that suit the surrounding fire.

Special hazards arising from the substance or mixture

If this product is involved in a fire, the following can be released:

Hydrogen fluoride (HF)

Boron oxide

Advice for firefighters

Protective equipment:

Wear self-contained respirator.

Wear fully protective impervious suit.

6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

Wear protective equipment. Keep unprotected persons away.

Ensure adequate ventilation

Environmental precautions: Do not allow product to reach sewage system or any water course.

Methods and material for containment and cleaning up:

Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

Use neutralizing agent.

Dispose of contaminated material as waste according to section 13.

Ensure adequate ventilation.

Prevention of secondary hazards: No special measures required.

Reference to other sections

See Section 7 for information on safe handling

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

7 Handling and storage

Handling

Precautions for safe handling

Keep container tightly sealed.

Store in cool, dry place in tightly closed containers.

Ensure good ventilation at the workplace.

Information about protection against explosions and fires: The product is not flammable

Conditions for safe storage, including any incompatibilities

Storage

Requirements to be met by storerooms and receptacles: No special requirements.

Information about storage in one common storage facility:

Store away from strong bases.

Store away from oxidizing agents.

Water reacts with many metals to give hydrogen, often violently. Water is also incompatible with many reactive organic and inorganic chemicals.

Further information about storage conditions:

Keep container tightly sealed.

Store in cool, dry conditions in well sealed containers.

Specific end use(s) No further relevant information available.

8 Exposure controls/personal protection

Additional information about design of technical systems:

Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Control parameters

Components with limit values that require monitoring at the workplace:

16872-11-0 Tetrafluoroboric acid (50.0%)

PEL (USA) Long-term value: 2.5 mg/m³
as F

TLV (USA) Long-term value: 2.5 mg/m³
as F

Additional information: No data

Exposure controls

Personal protective equipment

General protective and hygienic measures

The usual precautionary measures for handling chemicals should be followed.

Keep away from foodstuffs, beverages and feed.

Remove all soiled and contaminated clothing immediately.

Wash hands before breaks and at the end of work.

Avoid contact with the eyes and skin.

Maintain an ergonomically appropriate working environment.

Breathing equipment: Use suitable respirator when high concentrations are present.

(Contd. on p. 3)

Product name: Tetrafluoroboric acid, ca 50% w/w aqueous solution

(Contd. of page 2)

Recommended filter device for short term use:

Use a respirator with acid gas cartridges as a backup to engineering controls. Risk assessment should be performed to determine if air-purifying respirators are appropriate. Only use equipment tested and approved under appropriate government standards such as NIOSH (USA) or CEN (EU).

Protection of hands:

Impermeable gloves

Check protective gloves prior to each use for their proper condition.

The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.

Material of gloves Latex/chloroprene

Penetration time of glove material (In minutes) Not determined

Eye protection:

Tightly sealed goggles

Full face protection

Body protection: Protective work clothing.

9 Physical and chemical properties

Information on basic physical and chemical properties

General Information

Appearance:

Form: Liquid
Color: Colorless to pale yellow
Odor: Pungent
Odor threshold: Not determined.

pH-value: Not determined.

Change in condition

Melting point/Melting range: Not determined
Boiling point/Boiling range: 130 °C (266 °F) (dec)
Sublimation temperature / start: Not determined
Flammability (solid, gaseous) Not determined.
Ignition temperature: Not determined
Decomposition temperature: Not determined
Auto igniting: Product is not selfigniting.

Danger of explosion: Not determined.

Explosion limits:

Lower: Not determined
Upper: Not determined
Vapor pressure at 20 °C (68 °F): 23 hPa (17 mm Hg)
Density at 20 °C (68 °F): 1.4 g/cm³ (11.683 lbs/gal)
Relative density Not determined.
Vapor density Not determined.
Evaporation rate Not determined.

Solubility in / Miscibility with

Water: Fully miscible
Partition coefficient (n-octanol/water): Not determined.
Viscosity:
dynamic: Not determined.
kinematic: Not determined.

solvent content:

Organic solvents: 0.0 %
Other information No further relevant information available.

10 Stability and reactivity

Reactivity No information known.

Chemical stability Stable under recommended storage conditions.

Thermal decomposition / conditions to be avoided: Decomposition will not occur if used and stored according to specifications.

Possibility of hazardous reactions

Reacts with strong oxidizing agents

Water reacts with many metals to give hydrogen, often violently. Water is also incompatible with many reactive organic and inorganic chemicals.

Water reacts violently with alkali metals.

Conditions to avoid No further relevant information available.

Incompatible materials:

Bases

Oxidizing agents

Hazardous decomposition products:

Hydrogen fluoride

Boron oxide

11 Toxicological information

Information on toxicological effects

Acute toxicity:

Toxic if swallowed.

Swallowing will lead to a strong corrosive effect on mouth and throat and to the danger of perforation of esophagus and stomach.

The Registry of Toxic Effects of Chemical Substances (RTECS) contains acute toxicity data for components in this product.

LD/LC50 values that are relevant for classification:

16872-11-0 Tetrafluoroboric acid

Oral | LD50 | 100 mg/kg (rat)

Skin irritation or corrosion: Causes severe skin burns.

Eye irritation or corrosion: Causes serious eye damage.

Sensitization: No sensitizing effects known.

Germ cell mutagenicity: No effects known.

Carcinogenicity: EPA-I: Data are inadequate for an assessment of human carcinogenic potential.

Reproductive toxicity: No effects known.

Specific target organ system toxicity - repeated exposure: No effects known.

Specific target organ system toxicity - single exposure: No effects known.

Aspiration hazard: No effects known.

Subacute to chronic toxicity: No effects known.

Additional toxicological information:

To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

The product shows the following dangers according to internally approved calculation methods for preparations:

(Contd. on page 4)
USA

Product name: **Tetrafluoroboric acid, ca 50% w/w aqueous solution**

Toxic
Corrosive

(Contd. of page 3)

12 Ecological information

Toxicity

Aquatic toxicity: No further relevant information available.
Persistence and degradability: No further relevant information available.
Bioaccumulative potential: No further relevant information available.
Mobility in soil: No further relevant information available.

Additional ecological information:

General notes:

Do not allow undiluted product or large quantities to reach ground water, water course or sewage system.
Avoid transfer into the environment.

Results of PBT and vPvB assessment

PBT: Not applicable.
vPvB: Not applicable.

Other adverse effects: No further relevant information available.

13 Disposal considerations

Waste treatment methods

Recommendation: Consult state, local or national regulations to ensure proper disposal.

Uncleaned packagings:

Recommendation: Disposal must be made according to official regulations.
Recommended cleansing agent: Water, if necessary with cleansing agents.

14 Transport information

UN-Number
DOT, IMDG, IATA

UN1775

UN proper shipping name
DOT
IMDG, IATA

Fluoroboric acid, solution
FLUOROBORIC ACID, solution

Transport hazard class(es)

DOT



Class
Label
Class
Label
IMDG, IATA

8 Corrosive substances.
8
8 (C1) Corrosive substances
8



Class
Label

8 Corrosive substances.
8

Packing group
DOT, IMDG, IATA

II

Environmental hazards:
Marine pollutant (IMDG):

No

Special precautions for user
EMS Number:
Segregation groups

Warning: Corrosive substances
F-A, S-B
Acids

Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Not applicable.

Transport/Additional information:

DOT
Marine Pollutant (DOT):
UN "Model Regulation":

No
UN1775, Fluoroboric acid, solution, 8, II

15 Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture
GHS label elements: The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)
Hazard pictograms



GHS05 GHS06

Signal word: Danger

Hazard-determining components of labeling:
Tetrafluoroboric acid

Hazard statements

H301 Toxic if swallowed.
H314 Causes severe skin burns and eye damage.

Precautionary statements

P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor/...
P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

(Contd. on

Product name: **Tetrafluoroboric acid, ca 50% w/w aqueous solution**

(Contd. of page 4)

National regulations

All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.
All components of this product are listed on the Canadian Domestic Substances List (DSL).

ARA Section 313 (specific toxic chemical listings)

None of the ingredients are listed.

California Proposition 65

Prop 65 - Chemicals known to cause cancer

None of the ingredients are listed.

Prop 65 - Developmental toxicity

None of the ingredients are listed.

Prop 65 - Developmental toxicity, female

None of the ingredients are listed.

Prop 65 - Developmental toxicity, male

None of the ingredients are listed.

Information about limitation of use: For use only by technically qualified individuals.

Other regulations, limitations and prohibitive regulations

Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006.

None of the ingredients are listed.

The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing on the market and use must be observed.

None of the ingredients is listed.

Annex XIV of the REACH Regulations (requiring Authorisation for use)

None of the ingredients is listed.

Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing SDS: Global Marketing Department

Date of preparation / last revision 11/24/2015 / -

Abbreviations and acronyms:

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

EINECS: European Inventory of Existing Commercial Chemical Substances

ELINCS: European List of Notified Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

HMIS: Hazardous Materials Identification System (USA)

WHMIS: Workplace Hazardous Materials Information System (Canada)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

vPvB: very Persistent and very Bioaccumulative

CGIH: American Conference of Governmental Industrial Hygienists (USA)

OSHA: Occupational Safety and Health Administration (USA)

NTS: National Toxicology Program (USA)

IARC: International Agency for Research on Cancer

EPA: Environmental Protection Agency (USA)



Safety Data Sheet

acc. to OSHA HCS

Printing date 01/22/2014

Reviewed on 07/23/2009

1 Identification**Product identifier****Product name:** Tetramethylammonium hydroxide, 25% aqueous solution**Stock number:** 20932**CAS Number:**

75-59-2

EC number:

200-882-9

Relevant identified uses of the substance or mixture and uses advised against.**Identified use:** SU24 Scientific research and development**Details of the supplier of the safety data sheet****Manufacturer/Supplier:**

Alfa Aesar, A Johnson Matthey Company

Johnson Matthey Catalog Company, Inc.

30 Bond Street

Ward Hill, MA 01835-8099

Tel: 800-343-0660

Fax: 800-322-4757

Email: tech@alfa.com

www.alfa.com

Information Department: Health, Safety and Environmental Department**Emergency telephone number:**

During normal hours the Health, Safety and Environmental Department at (800) 343-0660. After normal hours call Carechem 24 at (866) 928-0789.

2 Hazard(s) identification**Classification of the substance or mixture****Classification according to Regulation (EC) No 1272/2008**

GHS06 Skull and crossbones

Acute Tox. 2 H300 Fatal if swallowed.

Acute Tox. 1 H310 Fatal in contact with skin.



GHS05 Corrosion

Skin Corr. 1B H314 Causes severe skin burns and eye damage.

Eye Dam. 1 H318 Causes serious eye damage.

Classification according to Directive 67/548/EEC or Directive 1999/45/EC

T; Toxic

R25: Toxic if swallowed.



C; Corrosive

R34: Causes burns.



Xn; Harmful

R21: Harmful in contact with skin.

R52/53: Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Information concerning particular hazards for human and environment: Not applicable
Hazards not otherwise classified No information known.**Label elements****Labelling according to Regulation (EC) No 1272/2008**

The substance is classified and labeled according to the CLP regulation.

Hazard pictograms

GHS05



GHS06

Signal word Danger

Safety Data Sheet

acc. to OSHA HCS

Printing date 01/22/2014

Reviewed on 07/23/2009

Product name: Tetramethylammonium hydroxide, 25% aqueoussolution

(Contd. of page 1)

Hazard statements

H300+H310 Fatal if swallowed or in contact with skin.
 H314 Causes severe skin burns and eye damage.

Precautionary statements

P260 Do not breathe dust/fume/gas/mist/vapours/spray.
 P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor/...
 P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
 P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 P361 Take off immediately all contaminated clothing.
 P405 Store locked up.
 P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

WHMIS classification

D1A - Very toxic material causing immediate and serious toxic effects
 D2B - Toxic material causing other toxic effects
 E - Corrosive material

**Classification system**

HMIS ratings (scale 0-4)
(Hazardous Materials Identification System)

HEALTH	3	Health (acute effects) = 3
FIRE	0	Flammability = 0
REACTIVITY	1	Physical Hazard = 1

Other hazards**Results of PBT and vPvB assessment**

PBT: Not applicable.
 vPvB: Not applicable.

3 Composition/information on ingredients

Chemical characterization: Substances

CAS# Description:
 75-59-2 Tetramethylammonium hydroxide, 25% aqueoussolution

Identification number(s):

EC number: 200-882-9

4 First-aid measures

Description of first aid measures**General information**

Immediately remove any clothing soiled by the product.
 In case of irregular breathing or respiratory arrest provide artificial respiration.

After inhalation

Supply fresh air. If required, provide artificial respiration. Keep patient warm.
 Seek immediate medical advice.

After skin contact

Immediately wash with water and soap and rinse thoroughly.
 Seek immediate medical advice.

After eye contact

Rinse opened eye for several minutes under running water. Then consult a doctor.

After swallowing Do not induce vomiting; immediately call for medical help.

Information for doctor

Most important symptoms and effects, both acute and delayed

No further relevant information available.

Indication of any immediate medical attention and special treatment needed

No further relevant information available.

USA

(Contd. on page 3)

Safety Data Sheet

acc. to OSHA HCS

Printing date 01/22/2014

Reviewed on 07/23/2009

Product name: Tetramethylammonium hydroxide, 25% aqueous solution

(Contd. of page 2)

5 Fire-fighting measures

Extinguishing media

Suitable extinguishing agents

Carbon dioxide, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

Special hazards arising from the substance or mixture

If this product is involved in a fire, the following can be released:

Carbon monoxide and carbon dioxide

Nitrogen oxides (NOx)

Ammonia

Advice for firefighters

Protective equipment:

Wear self-contained respirator.

Wear fully protective impervious suit.

6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

Wear protective equipment. Keep unprotected persons away.

Ensure adequate ventilation

Environmental precautions:

Do not allow material to be released to the environment without proper governmental permits.

Do not allow product to reach sewage system or any water course.

Do not allow to penetrate the ground/soil.

Methods and material for containment and cleaning up:

Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

Use neutralizing agent.

Dispose contaminated material as waste according to item 13.

Ensure adequate ventilation.

Prevention of secondary hazards: No special measures required.

Reference to other sections

See Section 7 for information on safe handling

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

7 Handling and storage

Handling

Precautions for safe handling

Handle under dry protective gas.

Keep container tightly sealed.

Store in cool, dry place in tightly closed containers.

Ensure good ventilation at the workplace.

Information about protection against explosions and fires: No information known.

Conditions for safe storage, including any incompatibilities

Storage

Requirements to be met by storerooms and receptacles: No special requirements.

Information about storage in one common storage facility:

Store away from air.

Water reacts with many metals to give hydrogen, often violently. Water is also incompatible with many reactive organic and inorganic chemicals.

Further information about storage conditions:

Store under dry inert gas.

This product is air sensitive.

Keep container tightly sealed.

Store in cool, dry conditions in well sealed containers.

Specific end use(s) No further relevant information available.

8 Exposure controls/personal protection

Additional information about design of technical systems:

Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Control parameters

Components with limit values that require monitoring at the workplace: Not required.

Additional information: No data

(Contd. on page 4)

USA

Safety Data Sheet
acc. to OSHA HCS

Printing date 01/22/2014

Reviewed on 07/23/2009

Product name: Tetramethylammonium hydroxide, 25% aqueoussolution

(Contd. of page 3)

Exposure controls**Personal protective equipment****General protective and hygienic measures**

The usual precautionary measures for handling chemicals should be followed.

Keep away from foodstuffs, beverages and feed.

Remove all soiled and contaminated clothing immediately.

Wash hands before breaks and at the end of work.

Avoid contact with the eyes and skin.

Maintain an ergonomically appropriate working environment.

Breathing equipment: Use suitable respirator when high concentrations are present.**Protection of hands:**

Impervious gloves

Check protective gloves prior to each use for their proper condition.

The selection of suitable gloves not only depends on the material, but also on quality.

Quality will vary from manufacturer to manufacturer.

Eye protection:

Tightly sealed goggles

Full face protection

Body protection: Protective work clothing.**9 Physical and chemical properties****Information on basic physical and chemical properties****General Information****Appearance:**

Form:	Solution
Color:	Colorless
Odor:	Odorless
Odor threshold:	Not determined.

pH-value (neat g/l) at 20 °C (68 °F): >13

Change in condition

Melting point/Melting range:	Not determined
Boiling point/Boiling range:	Not determined
Sublimation temperature / start:	Not determined

Flash point:	Not determined
Flammability (solid, gaseous)	Not applicable.
Ignition temperature:	Not determined
Decomposition temperature:	Not determined
Auto igniting:	Not determined.

Danger of explosion: Product does not present an explosion hazard.**Explosion limits:**

Lower:	Not determined
Upper:	Not determined
Vapor pressure at 20 °C (68 °F):	23.3 hPa (17 mm Hg)
Density at 20 °C (68 °F):	1.016 g/cm ³ (8.479 lbs/gal)
Relative density	Not determined.
Vapor density	Not determined.
Evaporation rate	Not determined.
Solubility in / Miscibility with	
Water:	Fully miscible
Partition coefficient (n-octanol/water):	Not determined.
Viscosity:	
dynamic:	Not determined.
kinematic:	Not determined.
Other information	No further relevant information available.

10 Stability and reactivity**Reactivity** No information known.**Chemical stability** Stable under recommended storage conditions.**Thermal decomposition / conditions to be avoided:**

Decomposition will not occur if used and stored according to specifications.

Possibility of hazardous reactions

Water reacts violently with alkali metals.

Reacts with alkaline earth metals.

Incompatible materials:

Air

(Contd. on page 5)

USA

Safety Data Sheet

acc. to OSHA HCS

Printing date 01/22/2014

Reviewed on 07/23/2009

Product name: Tetramethylammonium hydroxide, 25% aqueous solution

(Contd. of page 4)

Carbon dioxide
Water reacts with many metals to give hydrogen, often violently. Water is also incompatible with many reactive organic and inorganic chemicals.

Hazardous decomposition products:
Carbon monoxide and carbon dioxide
Nitrogen oxides
Ammonia

11 Toxicological information

Information on toxicological effects

Acute toxicity:

Harmful in contact with skin.
Danger through skin absorption.
Fatal if swallowed.
Swallowing will lead to a strong corrosive effect on mouth and throat and to the danger of perforation of esophagus and stomach.

LD/LC50 values that are relevant for classification:

Dermal	LD50	25 mg/kg (guinea pig)
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Skin irritation or corrosion: Causes severe skin burns.

Eye irritation or corrosion: Causes serious eye damage.

Sensitization: No sensitizing effects known.

Germ cell mutagenicity: No effects known.

Carcinogenicity:

No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.

Reproductive toxicity: No effects known.

Specific target organ system toxicity - repeated exposure: No effects known.

Specific target organ system toxicity - single exposure: No effects known.

Aspiration hazard: No effects known.

Subacute to chronic toxicity:

Subacute to chronic toxicity:

The Registry of Toxic Effects of Chemical Substances (RTECS) reports the following effects in laboratory animals:

Skin and Appendages - dermatitis, other (after systemic exposure).

Vascular - BP elevation not characterized in autonomic section.

Behavioral - changes in motor activity (specific assay).

Lungs, Thorax, or Respiration - pulmonary emboli.

Related to Chronic Data - death.

Subacute to chronic toxicity:

Solutions of quaternary ammonium hydroxides are extremely corrosive and destructive to tissues that they come in contact with. They cause severe burns on contact with the skin and may cause blindness in contact with the eyes. Inhalation of the solution would be expected to cause burns of the upper respiratory tract along with symptoms such as coughing, wheezing, and shortness of breath. Will cause burns of the digestive tract if ingested. Symptoms of chronic exposure are not known. Dilute solutions have similar but less severe effects.

Additional toxicological information:

To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

12 Ecological information

Toxicity

Aquatic toxicity: No further relevant information available.

Persistence and degradability: No further relevant information available.

Behavior in environmental systems:

Bioaccumulative potential: No further relevant information available.

Mobility in soil: No further relevant information available.

Ecotoxicological effects:

Remark: Harmful to aquatic organisms

Additional ecological information:

General notes:

Do not allow material to be released to the environment without proper governmental permits.

Do not allow product to reach ground water, water course or sewage system.

Danger to drinking water if even small quantities leak into the ground.

May cause long lasting harmful effects to aquatic life.

Avoid transfer into the environment.

Harmful to aquatic organisms

(Contd. on page 6)
USA

Safety Data Sheet

acc. to OSHA HCS

Printing date 01/22/2014

Reviewed on 07/23/2009

Product name: Tetramethylammonium hydroxide, 25% aqueous solution

(Contd. of page 5)

Rinse off of bigger amounts into drains or the aquatic environment may lead to increased pH-values. A high pH-value harms aquatic organisms. In the dilution of the use-level the pH-value is considerably reduced, so that after the use of the product the aqueous waste, emptied into drains, is only low water-dangerous.

Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

Other adverse effects No further relevant information available.

13 Disposal considerations**Waste treatment methods****Recommendation** Consult state, local or national regulations to ensure proper disposal.**Uncleaned packagings:****Recommendation:** Disposal must be made according to official regulations.**Recommended cleansing agent:** Water, if necessary with cleansing agents.**14 Transport information****UN-Number**

DOT, ADR, IMDG, IATA

UN1835

UN proper shipping name

DOT

Tetramethylammonium hydroxide solution

ADR

1835 Tetramethylammonium hydroxide solution

IMDG, IATA

TETRAMETHYLAMMONIUM HYDROXIDE SOLUTION

Transport hazard class(es)

DOT

**Class**

8 Corrosive substances.

Label

8

ADR**Class**

8 (C7) Corrosive substances

Label

8

IMDG, IATA**Class**

8 Corrosive substances.

Label

8

Packing group

DOT, ADR, IMDG, IATA

II

Environmental hazards:

Not applicable.

Special precautions for user

Warning: Corrosive substances

Danger code (Kemler):

80

Segregation groups

Ammonium compounds, alkalis

Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

Not applicable.

Transport/Additional information:

DOT

Marine Pollutant (DOT):

No

(Contd. on page 7)

USA

Safety Data Sheet
acc. to OSHA HCS

Printing date 01/22/2014

Reviewed on 07/23/2009

Product name: Tetramethylammonium hydroxide, 25% aqueoussolution

(Contd. of page 6)

UN "Model Regulation":	UN1835, Tetramethylammonium hydroxide solution, 8, II
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15 Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture

National regulations

All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.

All components of this product are listed on the Canadian Domestic Substances List (DSL).

SARA Section 313 (specific toxic chemical listings) Substance is not listed.

California Proposition 65

Prop 65 - Chemicals known to cause cancer Substance is not listed.

Prop 65 - Developmental toxicity Substance is not listed.

Prop 65 - Developmental toxicity, female Substance is not listed.

Prop 65 - Developmental toxicity, male Substance is not listed.

Information about limitation of use: For use only by technically qualified individuals.

Other regulations, limitations and prohibitive regulations

Substances of very high concern (SVHC) according to REACH, Article 57

Substance is not listed.

REACH - Pre-registered substances Substance is listed.

Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing SDS: Health, Safety and Environmental Department.

Abbreviations and acronyms:

RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)

ICAO: International Civil Aviation Organization

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International

Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

GHS: Globally Harmonized System of Classification and Labelling of Chemicals

EINECS: European Inventory of Existing Commercial Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

HMIS: Hazardous Materials Identification System (USA)

WHMIS: Workplace Hazardous Materials Information System (Canada)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

USA



SAFETY DATA SHEET

1. IDENTIFICATION

Product name: 1,2,4-Triazole
Product code: T0340
Company: TOKYO CHEMICAL INDUSTRY CO., LTD.
Address: 4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Responsible department: Global Business Department
Telephone: +81-3-5640-8872
Fax: +81-3-5640-8902
e-mail: globalbusiness@TCIchemicals.com
Revision number: 8

2. HAZARDS IDENTIFICATION

GHS classification

PHYSICAL HAZARDS

Not classified

HEALTH HAZARDS

Acute toxicity (Oral) Category 4
Skin corrosion/irritation Category 3
Serious eye damage/eye irritation Category 2A
Reproductive toxicity Category 2

ENVIRONMENTAL HAZARDS

Not classified

GHS label elements, including precautionary statements

Pictograms or hazard symbols



Signal word
Hazard statements

Warning
Harmful if swallowed
Causes mild skin irritation
Causes serious eye irritation
Suspected of damaging fertility or the unborn child

Precautionary statements:

[Prevention]

Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Do not eat, drink or smoke when using this product.
Wash hands thoroughly after handling.

[Response]

Wear protective gloves/eye protection/face protection.
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
Rinse mouth.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists: Get medical advice/attention.
If skin irritation occurs: Get medical advice/attention.
IF exposed or concerned: Get medical advice/attention.

[Storage]

Store locked up.

[Disposal]

Dispose of contents/container through a waste management company authorized by the local government.

Other hazards which do not result in classification

Dust explosion possible if in powder or granular form, mixed with air.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/mixture:	Substance
Components:	1,2,4-Triazole
Percent:	>99.0%(GC)
CAS Number:	288-88-0
Synonyms:	Pyrrrodiazole
Chemical Formula:	C ₂ H ₃ N ₃
Notice Through Official Gazettes Reference Number	
ENCS:	(5)-5776
ISHL:	8-(3)-743

4. FIRST-AID MEASURES

Inhalation:	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical advice/attention.
Skin contact:	Remove/Take off immediately all contaminated clothing. Gently wash with plenty of soap and water. Get medical advice/attention.
Eye contact:	Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Get medical advice/attention.
Ingestion:	Get medical advice/attention. Rinse mouth.
Most important symptoms/effects, acute and delayed:	Redness, Pain, Tremor, Excitatory, Dyspnea
Protection of first-aiders:	A rescuer should wear personal protective equipment, such as rubber gloves and air-tight goggles.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media:	Dry chemical, foam, water spray, carbon dioxide.
Specific hazards arising from the chemical:	Take care as it may decompose upon combustion or in high temperatures to generate poisonous fume.
Precautions for firefighters:	Fire-extinguishing work is done from the windward and the suitable fire-extinguishing method according to the surrounding situation is used. Uninvolved persons should evacuate to a safe place. In case of fire in the surroundings: Remove movable containers if safe to do so.
Special protective equipment for firefighters:	When extinguishing fire, be sure to wear personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:	Use extra personal protective equipment (P3 filter respirator for toxic particles). Keep people away from and upwind of spill/leak. Entry to non-involved personnel should be controlled around the leakage area by roping off, etc.
Environmental precautions:	Prevent product from entering drains.
Methods and materials for containment and cleaning up:	Sweep dust to collect it into an airtight container, taking care not to disperse it. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

7. HANDLING AND STORAGE

Precautions for safe handling

Technical measures:	Handling is performed in a well ventilated place. Wear suitable protective equipment. Prevent dispersion of dust. Wash hands and face thoroughly after handling. Use a closed system if possible. Use a local exhaust if dust or aerosol will be generated.
Advice on safe handling:	Avoid all contact!

Conditions for safe storage, including any incompatibilities

Storage conditions:	Keep container tightly closed. Store in a cool and dark place. Store locked up. Store away from incompatible materials such as oxidizing agents.
Packaging material:	Comply with laws.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls:	Install a closed system or local exhaust. Also install safety shower and eye bath.
Control parameters:	Not set up
Personal protective equipment	
Respiratory protection:	Dust respirator, self-contained breathing apparatus(SCBA), supplied air respirator, etc. Use respirators approved under appropriate government standards and follow local and national regulations.
Hand protection:	Impervious gloves.
Eye protection:	Safety goggles. A face-shield, if the situation requires.
Skin and body protection:	Impervious protective clothing. Protective boots, if the situation requires.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state (20°C):	Solid
Form:	Crystal- Powder
Colour:	White - Slightly pale yellow
Odour:	Characteristic
pH:	8 (20 °C)
Melting point/freezing point:	121°C
Boiling point/range:	260°C
Flash point:	No data available
Flammability or explosive limits:	
Lower:	No data available
Upper:	No data available
Relative density:	No data available
Solubility(ies):	
[Water]	Very soluble (125g/100mL, 20°C)
[Other solvents]	
Very soluble:	Alcohols
Soluble:	Ethyl acetate
Slightly soluble:	Chloroform, Xylene
Very slightly soluble:	Ether, Benzene
Log Pow:	-0.6
Autoignition temperature:	490°C

10. STABILITY AND REACTIVITY

Chemical stability:	Stable under proper conditions.
Possibility of hazardous reactions:	Dust explosion possible if in powder or granular form, mixed with air.
Conditions to avoid:	Static discharge
Incompatible materials:	Oxidizing agents, Strong acids
Hazardous decomposition products:	Carbon monoxide, Carbon dioxide, Nitrogen oxides (NOx)

11. TOXICOLOGICAL INFORMATION

Acute Toxicity:	orl-rat LD50:1375 mg/kg skn-rat LD50:3129 mg/kg skn-rbt LDLo:2000 mg/kg
Skin corrosion/irritation:	skn-rbt 0.5 g MLD
Serious eye damage/irritation:	eye-rbt 50 mg SEV
Germ cell mutagenicity:	No data available
Carcinogenicity:	
IARC =	No data available
NTP =	No data available
Reproductive toxicity:	No data available
RTECS Number:	XZ3806000

12. ECOLOGICAL INFORMATION

Ecotoxicity:	
Fish:	No data available
Crustacea:	No data available
Algae:	No data available
Persistence / degradability:	No data available
Bioaccumulative potential(BCF):	3
Mobility in soil	
Log Pow:	-0.6
Soil adsorption (Koc):	5
Henry's Law constant(PaM³/mol):	0.15

13. DISPOSAL CONSIDERATIONS

Recycle to process, if possible. Consult your local regional authorities. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. Observe all federal, state and local regulations when disposing of the substance.

14. TRANSPORT INFORMATION

Hazards Class:	Does not correspond to the classification standard of the United Nations
UN-No:	Not listed

15. JAPANESE REGULATORY INFORMATION

- Not applicable

16. OTHER INFORMATION

The reference company name of written contents

Company:	TOKYO CHEMICAL INDUSTRY CO., LTD.
Address:	4-10-2, Nihonbashi-honcho, Chuo-ku, Tokyo 103-0023, Japan
Department:	Global Business Department
Telephone:	+81-3-5640-8872
Fax:	+81-3-5640-8902

This SDS was prepared sincerely on the basis of the information we could obtained, however, any warranty shall not be given regarding the data contained and the assessment of hazards and toxicity. Prior to use, please investigate not only the hazards and toxicity information but also the laws and regulations of the organization, area and country where the products are to be used, which shall be given the first priority. The products are supposed to be used promptly after purchase in consideration of safety. Some new information or amendments may be added afterwards. If the products are to be used far behind the expected time of use or you have any questions, please feel free to contact us. The stated cautions are for normal handling only. In case of special handling, sufficient care should be taken, in addition to the safety measures suitable for the situation. All chemical products should be treated with the recognition of "having unknown hazards and toxicity", which differ greatly depending on the conditions and handling when in use and/or the conditions and duration of storage. The products must be handled only by those who are familiar with specialized knowledge and have experience or under the guidance of those specialists throughout use from opening to storage and disposal. Safe usage conditions shall be set up on each user's own responsibility.



TCI AMERICA

SAFETY DATA SHEET

Revision number: 2
Revision date: 10/06/2014

1. IDENTIFICATION

Product name: 1H,1H,2H,2H-Tridecafluoro-1-n-octanol
Product code: T2528

Product use: For laboratory research purposes.
Restrictions on use: Not for drug or household use.

Company:
TCI America
9211 N. Harborside Street
Portland, OR 97203 U.S.A.
Telephone:
+1-800-423-8616 / +1-503-283-1681
Fax:
+1-888-520-1075 / +1-503-283-1987
e-mail:
sales-US@TCIchemicals.com
www.TCIchemicals.com

Emergency telephone number:
Chemical Emergencies:
TCI America (8:00am - 5:00pm) PST
+1-503-286-7624
Transportation Emergencies:
Chemtrec 24-Hour
+1-800-424-9300 (U.S.A.)
+1-703-527-3887 (International)
Responsible department:
TCI America
Environmental Health Safety and Security
+1- 503-286-7624

2. HAZARD(S) IDENTIFICATION

OSHA Haz Com: CFR 1910.1200: Flammable Liquids [Category 4]

Signal word: Warning!

Hazard Statement(s): Combustible liquid

Pictogram(s) or Symbol(s): None

Precautionary Statement(s):

[Prevention]	Keep away from heat, sparks, open flames or other hot surfaces. - No smoking. Wear protective gloves, eye protection and face protection.
[Response]	In case of fire: Use dry chemical, CO ₂ , water spray or alcohol-resistant foam to extinguish.
[Storage]	Store in well-ventilated place. Keep cool.
[Disposal]	Dispose of contents and container in accordance with US EPA guidelines for the classification and determination of hazardous waste listed in 40 CFR 261.3. (See Section 13)

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/Mixture: Substance
Components: 1H,1H,2H,2H-Tridecafluoro-1-n-octanol
Percent: >98.0%(GC)
CAS Number: 647-42-7
Molecular Weight: 364.11
Chemical Formula: C₈H₅F₁₃O
Synonyms: 2-(Perfluorohexyl)ethanol

4. FIRST-AID MEASURES

Inhalation: Call emergency medical service. Move victim to fresh air. Give artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult. Keep victim warm and quiet. Treat symptomatically and supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

4. FIRST-AID MEASURES

Skin contact:	Call a poison center or doctor if you feel unwell. In case of contact with substance, immediately flush skin with running water for at least 20 minutes. Treat symptomatically and supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
Eye contact:	In case of contact with substance, immediately flush eyes with running water for at least 20 minutes. If eye irritation persists get medical advice/attention. Move victim to fresh air. Check for and remove any contact lenses. Keep victim warm and quiet. Treat symptomatically and supportively. Effects of exposure to substance may be delayed. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
Ingestion:	If swallowed, seek medical advice immediately and show the container or label. Loosen tight clothing such as a collar, tie, belt or waistband. If a person vomits place them in the recovery position so that vomit will not reenter the mouth and throat. Rinse mouth. Keep victim warm and quiet. Treat symptomatically and supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
Symptoms/effects:	
Acute:	No data available
Delayed:	No data available
Immediate medical attention:	If breathing has stopped, perform artificial respiration. Use first aid treatment according to the nature of the injury. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: Dry chemical, CO₂, water spray, or alcohol-resistant foam. Consult with local fire authorities before attempting large scale fire fighting operations.

Specific hazards arising from the chemical

Hazardous combustion products: These products include: Carbon oxides Halogenated compounds
Other specific hazards: WARNING: Highly toxic HF gas is produced during combustion.

Special precautions for fire-fighters:

CAUTION: All these products have a very low flash point: Use of water spray when fighting fire may be inefficient. Use water spray or fog; do not use straight streams. Do not use straight streams. Runoff to sewer may create fire or explosion hazard. Containers may explode when heated. Move containers from fire area if you can do it without risk.

Special protective equipment for fire-fighters:

Wear positive pressure self-contained breathing apparatus (SCBA). Structural fire fighters' protective clothing provides limited protection in fire situations ONLY; it may not be effective in spill situations. Wear chemical protective clothing which is specifically recommended by the manufacturer. It may provide little or no thermal protection.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Use spark-proof tools and explosion-proof equipment. Remove all sources of ignition. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing (Section 8). Warn unnecessary personnel to move away. Stop leak if you can do it without risk. Ensure adequate ventilation. Isolate the hazard area and deny entry to unnecessary and unprotected personnel.
Personal protective equipment:	Splash goggles. Lab coat. Vapor respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent. Wear protective gloves (nitrile).
Emergency procedures:	Isolate area until gas has dispersed. In case of a spill and/or a leak, always shut off any sources of ignition, ventilate the area, and exercise caution. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Warn personnel to move away. Prevent entry into sewers, basements or confined areas; dike if needed.

Methods and materials for containment and cleaning up:

ELIMINATE all ignition sources (no smoking, flares, sparks, or flames in immediate area). All equipment used when handling the product must be grounded. Stop leak if without risk. Ventilate the area. Absorb with an inert material and put the spilled material in an appropriate waste disposal container. Use clean non-sparking tools to collect absorbed material.

Environmental precautions:

Prevent further leakage or spillage if safe to do so. Water runoff can cause environmental damage. Prevent entry into sewers, basements or confined areas; dike if needed.

7. HANDLING AND STORAGE

Precautions for safe handling:	Do NOT breath gas, fumes, vapor, or spray. Avoid contact with skin and eyes. Keep away from heat and sources of ignition. Use explosion-proof equipment. Use only non-sparking hand tool when handling this product. Ground all equipment containing material. Take measures to prevent build up of electrostatic charge. Good general ventilation should be sufficient to control airborne levels. Keep container dry. Handle and open container with care. Wear suitable protective clothing, gloves and eye/face protection. When using do not eat, drink, or smoke. Keep away from sources of ignition.
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7. HANDLING AND STORAGE

Conditions for safe storage: Keep only in the original container in a cool well-ventilated place. Keep away from sources of ignition. Store and use away from heat, sparks, open flame, or any other ignition source. Keep away from incompatibles. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Avoid prolonged storage periods.

Storage incompatibilities: Combustible substances, Store away from oxidizing agents

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure limits: No data available

Appropriate engineering controls:
Good general ventilation should be sufficient to control airborne levels. Ventilation is normally required when handling or using this product. Eyewash fountains should be provided in areas where there is any possibility that workers could be exposed to the substance. Follow safe industrial engineering/laboratory practices when handling any chemical.

Personal protective equipment

Respiratory protection: Vapor respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent.
Hand protection: Wear protective gloves.
Eye protection: Splash goggles.
Skin and body protection: Lab coat.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state (20°C):	Liquid		
Form:	Clear		
Color:	Colorless - Very pale yellow		
Odor:	No data available		
Odor threshold:	No data available		
Melting point/freezing point:	No data available	pH:	No data available
Boiling point/range:	87°C (189°F)/2.7kPa	Vapor pressure:	No data available
Decomposition temperature:	No data available	Vapor density:	No data available
Relative density:	1.69	Dynamic Viscosity:	No data available
Kinematic Viscosity:	No data available	Evaporation rate:	No data available
Partition coefficient:	No data available	(Butyl Acetate = 1)	
n-octanol/water (log P_{ow})		Autoignition temperature:	No data available
Flash point:	91°C (196°F)	Flammability or explosive limits:	
Flammability (solid, gas):	No data available	Lower:	No data available
		Upper:	No data available
Solubility(ies):			

10. STABILITY AND REACTIVITY

Reactivity: Not Available.
Chemical Stability: Stable under recommended storage conditions. (See Section 7)
Possibility of Hazardous Reactions: In use, may form flammable/explosive vapor-air mixture.
Conditions to avoid: Avoid excessive heat and light.
Incompatible materials: Oxidizing agents
Hazardous Decomposition Products: No data available

11. TOXICOLOGICAL INFORMATION

Acute Toxicity:
No data available

Skin corrosion/irritation:
No data available

Serious eye damage/irritation:
No data available

Respiratory or skin sensitization:
No data available

Germ cell mutagenicity:
No data available

Carcinogenicity:
No data available

IARC: No data available

NTP: No data available

OSHA: No data available

Reproductive toxicity:
No data available

Routes of Exposure: Inhalation, Eye contact, Ingestion.

Symptoms related to exposure:

No specific information is available in our data base regarding the toxic effects of this material for humans. However, exposure to any chemical should be kept to a minimum. Always follow safe industrial hygiene practices and wear proper protective equipment when handling this compound.

Potential Health Effects:

No specific information available; skin and eye contact may result in irritation. May be harmful if inhaled or ingested.

Target organ(s): No data available

12. ECOLOGICAL INFORMATION

Ecotoxicity

Fish:	No data available
Crustacea:	No data available
Algae:	No data available

Persistence and degradability:	No data available
Bioaccumulative potential (BCF):	No data available
Mobility in soil:	No data available
Partition coefficient: n-octanol/water (log P_{ow})	No data available
Soil adsorption (Koc):	No data available
Henry's Law: constant (PaM³/mol)	No data available

13. DISPOSAL CONSIDERATIONS

Disposal of product: Recycle to process if possible. It is the generator's responsibility to comply with Federal, State and Local rules and regulations. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. This section is intended to provide assistance but does not replace these laws, nor does compliance in accordance with this section ensure regulatory compliance according to the law. US EPA guidelines for Identification and Listing of Hazardous Waste are listed in 40 CFR Parts 261. The product should not be allowed to enter the environment, drains, water ways, or the soil.

Disposal of container: Dispose of as unused product. Do not re-use empty containers.
Other considerations: Observe all federal, state and local regulations when disposing of the substance.

14. TRANSPORT INFORMATION

DOT (US) Non-hazardous for transportation.

IATA Non-hazardous for transportation.

IMDG Non-hazardous for transportation.

15. REGULATORY INFORMATION**Toxic Substance Control Act (TSCA 8b.):**

This product is ON the EPA Toxic Substances Control Act (TSCA) inventory.

US Federal Regulations**CERCLA Hazardous substance and Reportable Quantity:**

SARA 313: Not Listed
SARA 302: Not Listed

State Regulations**State Right-to-Know**

Massachusetts Not Listed
New Jersey Not Listed
Pennsylvania Not Listed
California Proposition 65: Not Listed

Other Information**NFPA Rating:**

Health: 2
Flammability: 2
Instability: 0

HMIS Classification:

Health: 2
Flammability: 2
Physical: 0

International Inventories

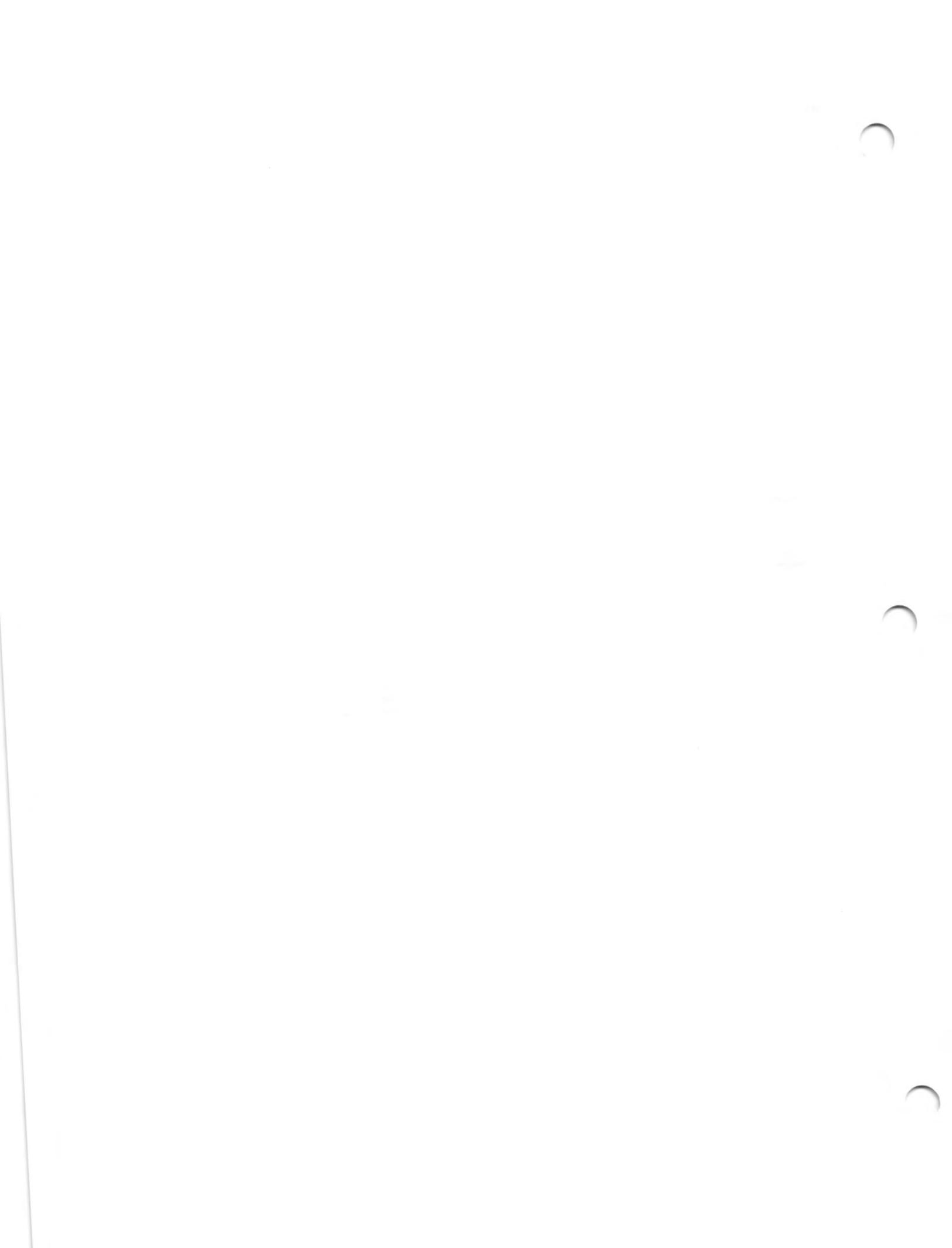
WHMIS hazard class: No data available.
EC-No: 211-477-1

16. OTHER INFORMATION

Revision date: 10/06/2014

Revision number: 2

TCI chemicals are for research purposes only and are NOT intended for use as drugs, food additives, households, or pesticides. The information herein is believed to be correct, but does not claim to be all inclusive and should be used only as a guide. Neither the above named supplier nor any of its affiliates or subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All chemical reagents must be handled with the recognition that their chemical, physiological, toxicological, and hazardous properties have not been fully investigated or determined. All chemical reagents should be handled only by individuals who are familiar with their potential hazards and who have been fully trained in proper safety, laboratory, and chemical handling procedures. Although certain hazards are described herein, we can not guarantee that these are the only hazards which exist. Our SDS are based only on data available at the time of shipping and are subject to change without notice as new information is obtained. Avoid long storage periods since the product is subject to degradation with age and may become more dangerous or hazardous. It is the responsibility of the user to request updated SDS for products that are stored for extended periods. Disposal of unused product must be undertaken by qualified personnel who are knowledgeable in all applicable regulations and follow all pertinent safety precautions including the use of appropriate protective equipment (e.g. protective goggles, protective clothing, breathing equipment, face mask, fume hood). For proper handling and disposal, always comply with federal, state and local regulations.



Identification

Product identifier

Product name: Triethylene glycol

Stock number: A10772, L13313

CAS Number:

112-27-6

EC number:

203-953-2

Relevant identified uses of the substance or mixture and uses advised against.

Identified use: SU24 Scientific research and development

Details of the supplier of the safety data sheet

Manufacturer/Supplier:

Alfa Aesar

Thermo Fisher Scientific Chemicals, Inc.

30 Bond Street

Ward Hill, MA 01835-8099

Tel: 800-343-0660

Fax: 800-322-4757

Email: tech@alfa.com

www.alfa.com

Information Department: Health, Safety and Environmental Department

Emergency telephone number:

During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660. After normal business hours, call Carechem 24 at (866) 928-0789.

2 Hazard(s) identification

Classification of the substance or mixture in accordance with 29 CFR 1910 (OSHA HCS)

The substance is not classified according to the Globally Harmonized System (GHS).

Hazards not otherwise classified No information known.

Label elements

GHS label elements Not applicable

Hazard pictograms Not applicable

Signal word Not applicable

Hazard statements Not applicable

WHMIS classification Not controlled

Classification system

HMIS ratings (scale 0-4)

(Hazardous Materials Identification System)

HEALTH 1 Health (acute effects) = 1

FLAME 1 Flammability = 1

REACTIVITY 1 Physical Hazard = 1

Other hazards

Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

3 Composition/information on ingredients

Chemical characterization: Substances

CAS# Description:

112-27-6 Triethylene glycol

Identification number(s):

EC number: 203-953-2

4 First-aid measures

Description of first aid measures

After inhalation

Supply fresh air. If required, provide artificial respiration. Keep patient warm.

Seek immediate medical advice.

After skin contact

Immediately wash with water and soap and rinse thoroughly.

Seek immediate medical advice.

After eye contact Rinse opened eye for several minutes under running water. Then consult a doctor.

After swallowing Seek medical treatment.

Information for doctor

Most important symptoms and effects, both acute and delayed No further relevant information available.

Indication of any immediate medical attention and special treatment needed No further relevant information available.

5 Fire-fighting measures

Extinguishing media

Suitable extinguishing agents Carbon dioxide, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

Special hazards arising from the substance or mixture

If this product is involved in a fire, the following can be released:

Carbon monoxide and carbon dioxide

Advice for firefighters

Protective equipment:

Wear self-contained respirator.

Wear fully protective impervious suit.

6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

Wear protective equipment. Keep unprotected persons away.

Ensure adequate ventilation

Environmental precautions: Do not allow material to be released to the environment without proper governmental permits.

Methods and material for containment and cleaning up: Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

Prevention of secondary hazards: No special measures required.

Product name: Triethylene glycol

(Contd. of page 1)

Reference to other sections
See Section 7 for information on safe handling
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

Handling
Precautions for safe handling
Keep container tightly sealed.
Store in cool, dry place in tightly closed containers.
Information about protection against explosions and fires: No information known.
Conditions for safe storage, including any incompatibilities
Storage
Requirements to be met by storerooms and receptacles: No special requirements.
Information about storage in one common storage facility:
Store away from oxidizing agents.
Store away from water/moisture.
Further information about storage conditions:
This product is hygroscopic.
Store under dry inert gas.
Keep container tightly sealed.
Store in cool, dry conditions in well sealed containers.
Protect from humidity and water.
Specific end use(s) No further relevant information available.

8 Exposure controls/personal protection

Additional information about design of technical systems:
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.
Control parameters
Components with limit values that require monitoring at the workplace:
The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.
Additional information: No data
Exposure controls
Personal protective equipment
General protective and hygienic measures
The usual precautionary measures for handling chemicals should be followed.
Keep away from foodstuffs, beverages and feed.
Remove all soiled and contaminated clothing immediately.
Wash hands before breaks and at the end of work.
Maintain an ergonomically appropriate working environment.
Breathing equipment: Use suitable respirator when high concentrations are present.
Protection of hands:
Impervious gloves
Check protective gloves prior to each use for their proper condition.
The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.
Penetration time of glove material (in minutes) Not determined
Eye protection: Safety glasses
Body protection: Protective work clothing.

9 Physical and chemical properties

Information on basic physical and chemical properties
General Information
Appearance:
Form: Liquid
Color: Colorless
Odor: Nearly odorless
Odor threshold: Not determined.
pH-value: Not determined.
Change in condition
Melting point/Melting range: -7 °C (19 °F)
Boiling point/Boiling range: 284-288 °C (543-550 °F)
Sublimation temperature / start: Not determined
Flash point: 165 °C (329 °F)
Flammability (solid, gaseous) Not determined.
Ignition temperature: 355 °C (671 °F)
Decomposition temperature: Not determined
Auto igniting: Not determined.
Danger of explosion: Not determined.
Explosion limits:
Lower: 0.9 Vol %
Upper: 9.2 Vol %
Vapor pressure at 20 °C (68 °F): 0.001 hPa
Density at 20 °C (68 °F): 1.125 g/cm³ (9.388 lbs/gal)
Relative density Not determined.
Vapor density Not determined.
Evaporation rate Not determined.
Solubility in / Miscibility with
Water: Fully miscible
Partition coefficient (n-octanol/water): Not determined.
Viscosity:
dynamic: Not determined.
kinematic: Not determined.
Other information No further relevant information available.

10 Stability and reactivity

Reactivity No information known.

(Contd. on

Product name: Triethylene glycol

(Contd. of page 2)

Chemical stability Stable under recommended storage conditions.
Thermal decomposition / conditions to be avoided: Decomposition will not occur if used and stored according to specifications.
Possibility of hazardous reactions No dangerous reactions known
Conditions to avoid No further relevant information available.
Incompatible materials:
 Water/moisture
 Oxidizing agents
Hazardous decomposition products: Carbon monoxide and carbon dioxide

11 Toxicological information

Information on toxicological effects
Acute toxicity: The Registry of Toxic Effects of Chemical Substances (RTECS) contains acute toxicity data for components in this product.
LD/LC50 values that are relevant for classification:
 Oral | LD50 | 17000 mg/kg (rat)
Skin irritation or corrosion: May cause irritation
Eye irritation or corrosion: May cause irritation
Sensitization: No sensitizing effects known.
Germ cell mutagenicity: The Registry of Toxic Effects of Chemical Substances (RTECS) contains mutation data for this substance.
Carcinogenicity: No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.
Reproductive toxicity: The Registry of Toxic Effects of Chemical Substances (RTECS) contains reproductive data for this substance.
Specific target organ system toxicity - repeated exposure: No effects known.
Specific target organ system toxicity - single exposure: No effects known.
Aspiration hazard: No effects known.
Other information (about experimental toxicology): May cause respiratory irritation.
Subacute to chronic toxicity: No effects known.
Additional toxicological information: To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

12 Ecological information

Toxicity
Aquatic toxicity: No further relevant information available.
Persistence and degradability No further relevant information available.
Bioaccumulative potential No further relevant information available.
Mobility in soil No further relevant information available.
Additional ecological information:
General notes:
 Do not allow material to be released to the environment without proper governmental permits.
 Do not allow undiluted product or large quantities to reach ground water, water course or sewage system.
 Avoid transfer into the environment.
Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.
Other adverse effects No further relevant information available.

13 Disposal considerations

Waste treatment methods
Recommendation Consult state, local or national regulations to ensure proper disposal.
Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.
Recommended cleansing agent: Water, if necessary with cleansing agents.

14 Transport information

UN-Number DOT, ADN, IMDG, IATA	Not applicable
UN proper shipping name DOT, ADN, IMDG, IATA	Not applicable
Transport hazard class(es) DOT, ADR, ADN, IMDG, IATA Class	Not applicable
Packing group DOT, IMDG, IATA	Not applicable
Environmental hazards:	Not applicable.
Special precautions for user	Not applicable.
Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	Not applicable.
Transport/Additional information:	
DOT Marine Pollutant (DOT):	No
UN "Model Regulation":	-

15 Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture
GHS label elements Not applicable
Hazard pictograms Not applicable
Signal word Not applicable
Hazard statements Not applicable
National regulations
 All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.
 All components of this product are listed on the Canadian Domestic Substances List (DSL).
SARA Section 313 (specific toxic chemical listings) Substance is not listed.
California Proposition 65
Prop 65 - Chemicals known to cause cancer Substance is not listed.
Prop 65 - Developmental toxicity Substance is not listed.
Prop 65 - Developmental toxicity, female Substance is not listed.
Prop 65 - Developmental toxicity, male Substance is not listed.

(Contd. on page 4)
USA

Product name: **Triethylene glycol**

(Contd. of page 3)

Information about limitation of use: For use only by technically qualified individuals.

Other regulations, limitations and prohibitive regulations

Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006. Substance is not listed.

The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing on market and use must be observed.

Substance is not listed.

Annex XIV of the REACH Regulations (requiring Authorisation for use) Substance is not listed.

Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing SDS: Global Marketing Department

Date of preparation / last revision 11/23/2015 / -

Abbreviations and acronyms:

RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)

ICAO: International Civil Aviation Organization

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

EINECS: European Inventory of Existing Commercial Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

HMIS: Hazardous Materials Identification System (USA)

WHMIS: Workplace Hazardous Materials Information System (Canada)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

vPvB: very Persistent and very Bioaccumulative

ACGIH: American Conference of Governmental Industrial Hygienists (USA)

OSHA: Occupational Safety and Health Administration (USA)

NTP: National Toxicology Program (USA)

IARC: International Agency for Research on Cancer

EPA: Environmental Protection Agency (USA)

1. 化学物質等及び会社情報**1.1 製品識別名**

化学品の名称 : Tungstic acid

カタログ番号 : 223328

ブランド : Aldrich

1.2 他の特定手段

データなし

1.3 物質または混合物の用途、および使用を差し控える用途

研究開発での使用のみ。薬事、家庭用その他の用途には用いない。

1.4 安全データシート作成者の詳細

会社名 : Sigma-Aldrich Japan G.K.
Tennoz Central Tower, 2-2-24 Higashi-Shinagawa
SHINAGAWA-KU 140-0002
JAPAN
シグマ アルドリッチ ジャパン合同会社
東京都品川区東品川 2-2-24
担当部門 : コンプライアンス

電話番号 : +81 3 5796 7310

FAX : +81 3 5796 7315

1.5 緊急連絡電話番号

緊急連絡先 : (03) 6758-3625

2. 危険有害性の要約**2.1 GHS分類**

GHS分類基準に該当しない。

2.3 他の危険有害性 - なし

3. 組成及び成分情報**3.1 化学物質**化学特性(示性式、構造式 : H_2O_4W
等)

分子量 : 249.85 g/mol

化学名	濃度
Dihydrogen wolframate	
CAS番号	7783-03-1
	<= 100 %

EC番号	231-975-2	
------	-----------	--

4. 応急処置

4.1 必要な応急手当

一般的アドバイス

医師に相談する。この安全データシートを担当医に見せる。

吸入した場合

吸い込んだ場合、新鮮な空気の場所に移す。呼吸していない場合には、人工呼吸を施す。医師に相談する。

皮膚に付着した場合

石けんと多量の水で洗い流す。医師に相談する。

眼に入った場合

多量の水で15分以上よく洗浄し、医師の診察を受けること。

飲み込んだ場合

意識がない場合、口から絶対に何も与えないこと。口を水ですすぐ。医師に相談する。

4.2 急性症状及び遅発性症状の最も重要な徴候症状

化学的、物理的および毒性学的性質の研究は不十分と考えられる。

4.3 緊急治療及び必要とされる特別処置の指示

データなし

5. 火災時の措置

5.1 消火剤

消火剤

現場の状況と周辺環境に応じて適切な消火手段を用いる。

5.2 特有の危険有害性

酸化タングステン

5.3 消防士へのアドバイス

消火活動時には必要に応じて 自給式呼吸装置を装着する。

5.4 詳細情報

製品自体は燃焼しない。

6. 漏出時の措置

6.1 人体に対する注意事項、保護具及び緊急時措置

保護具を使用する。粉塵の発生を避ける。蒸気、ミスト、またはガスの呼吸を避ける。十分な換気を確保する。粉塵を吸い込まないよう留意。

6.2 環境に対する注意事項

物質が排水施設に流れ込まないようにする。

6.3 封じ込め及び浄化の方法及び機材

粉塵を発生させないように留意して回収し、廃棄する。掃いてシャベルですくい取る。廃棄に備え適切な容器に入れて蓋をしておく。

6.4 参照すべき他の項目

廃棄はセクション13を参照。

7. 取扱い及び保管上の注意

7.1 安全な取扱いのための予防措置

皮膚や眼への接触を避けること。粉塵やエアゾルを発生させない。粉塵が発生する場所では、換気を適切に行う。

7.2 配合禁忌等を踏まえた保管条件

冷所に保管。容器を密閉し、乾燥した換気の良い場所に保管する。

7.3 特定の最終用途

データなし

8. ばく露防止及び保護措置

8.1 管理濃度

許容濃度

許容濃度が設定されている物質を含有していない。

8.2 曝露防止

適切な技術的管理

十分な衛生的作業を行い安全規定に従って取扱う。休憩前や終業時には手を洗う。

保護具

眼／顔面の保護

EN166に適合するサイドシールド付き安全ゴーグル NIOSH (US) またはEN 166 (EU) などの適切な政府機関の規格で試験され、認められた眼の保護具を使用する。

皮膚及び身体の保護具

手袋を着用して取扱う。使用前に、必ず手袋を検査する。(手袋外面に触れずに)適切に手袋を脱ぎ、本製品の皮膚への付着を避ける。適用法令およびGLPに従い、使用後に汚染手袋を廃棄する。手を洗い、乾燥させる。

選ばれた防護手袋は、EU指令89/686/EECの仕様と、それから派生する規格EN374を満たすものでなければならない。

身体の保護

不浸透性衣服、特定の作業場に存在する危険物質の濃度および量に応じて、保護装置のタイプを選択しなければならない。

呼吸用保護具

不快物質への暴露には、P95型 (US) 又はP1型 (EU EN 143) 呼吸用粒子保護具を使用する。より高度な保護には、OV/AG/P99型 (US) 又はABEK-P2型 (EU EN 143) 呼吸用保護具カートリッジを使用する。NIOSH (US) またはCEN (EU) などの適切な政府機関の規格で試験され、認められた呼吸用保護具および部品を使用する。

9. 物理的及び化学的性質

9.1 基礎物理および化学特性の情報

- | | |
|---------------|--------------------------|
| a) 外観 | 形状: 粉末 |
| b) 臭い | データなし |
| c) 臭いのしきい(閾)値 | データなし |
| d) pH | 4.0 at 100 g/l at 20 ° C |
| e) 融点・凝固点 | > 100 ° C |
| f) 沸点、初留点及び沸騰 | データなし |

範囲

g) 引火点	データなし
h) 蒸発速度	データなし
i) 燃焼性 (固体、気体)	データなし
j) 引火上限/下限または爆発限界	データなし
k) 蒸気圧	データなし
l) 蒸気密度	データなし
m) 比重 (密度)	5.5 g/mL at 25 ° C
n) 水溶性	不溶
o) n-オクタノール/水分配係数	データなし
p) 自然発火温度	データなし
q) 分解温度	データなし
r) 粘度 (粘性率)	データなし

10. 安定性及び反応性

10.1 反応性

データなし

10.2 化学的安定性

データなし

10.3 危険有害反応可能性

データなし

10.4 避けるべき条件

データなし

10.5 混触危険物質

強酸化剤

10.6 危険有害な分解生成物

その他の分解生成物 - データなし

11. 有毒性情報

11.1 毒性情報

急性毒性

データなし

皮膚腐食性及び皮膚刺激性

データなし

眼に対する重篤な損傷性又は眼刺激性

眼 - ウサギ - 軽度の眼刺激 - 24 h

呼吸器感作性又は皮膚感作性

データなし

生殖細胞変異原性

データなし

発がん性

生殖毒性

データなし

特定標的臓器毒性, 単回ばく露

データなし

特定標的臓器毒性, 反復ばく露

データなし

吸引性呼吸器有害性

データなし

潜在した健康への影響

吸入

吸入すると有害のおそれ。呼吸器官に刺激を引き起こすことがある。

摂取

飲み込むと有害のおそれ。

皮膚

皮膚から吸収すると有害となることがある。皮膚の刺激を引き起こすことがある。

眼

眼の刺激を引き起こす。

暴露による兆候および症状

化学的、物理的および毒性学的性質の研究は不十分と考えられる。

追加情報

RTECS: データなし

12. 環境影響情報

12.1 生態毒性

データなし

12.2 残留性・分解性

データなし

12.3 生体蓄積性

データなし

12.4 土壌中の移動性

データなし

12.5 PBT および vPvB の評価結果

データなし

12.6 他の有害影響

データなし

13. 廃棄上の注意

13.1 廃棄物処理方法

製品

免許を有する廃棄物処理業者に、余剰物で再使用不可の溶液として処理を依頼する。

汚染容器及び包装

製品入り容器と同様に処分する。

14. 輸送上の注意

14.1 国連番号

ADR/RID (陸上規制) : -

IMDG (海上規制) : -

IATA (航空規制) : -

14.2 国連輸送名

ADR/RID (陸 非危険物
上規制) :
IMDG (海上 非危険物
規制) :
IATA (航空 非危険物
規制) :

14.3 輸送危険有害性クラス

ADR/RID (陸上規制) : - IMDG (海上規制) : - IATA (航空規制) : -

14.4 容器等級

ADR/RID (陸上規制) : - IMDG (海上規制) : - IATA (航空規制) : -

14.5 環境危険有害性

ADR/RID (陸上規制) : 非該当 IMDG (海上規制) 海洋汚染物質 (該当・非該当) : 非該当 IATA (航空規制) : 非該当

14.6 特別の安全対策

データなし

15. 適用法令

15.1 物質または混合物に固有の安全、健康および環境に関する規則/法律

国内適用法令

消防法: :危険物、指定可燃物に該当しない。

毒物及び劇物取締法: 非該当
労働安全衛生法

特定化学物質障害予防規則: 非該当

有機溶剤中毒予防規則: 非該当

製造の許可を受けるべき有害物: 非該当

名称等を表示すべき危険物及び有害物: 非該当

変異原性の認められた化学物質 (既存化学物質) : 非該当

変異原性の認められた化学物質 (新規届出化学物質) : 非該当

製造等が禁止される有害物: 非該当

健康障害防止指針公表物質: 非該当

鉛中毒予防規則: 非該当

四アルキル鉛中毒予防規則: 非該当

化学物質排出把握管理 非該当

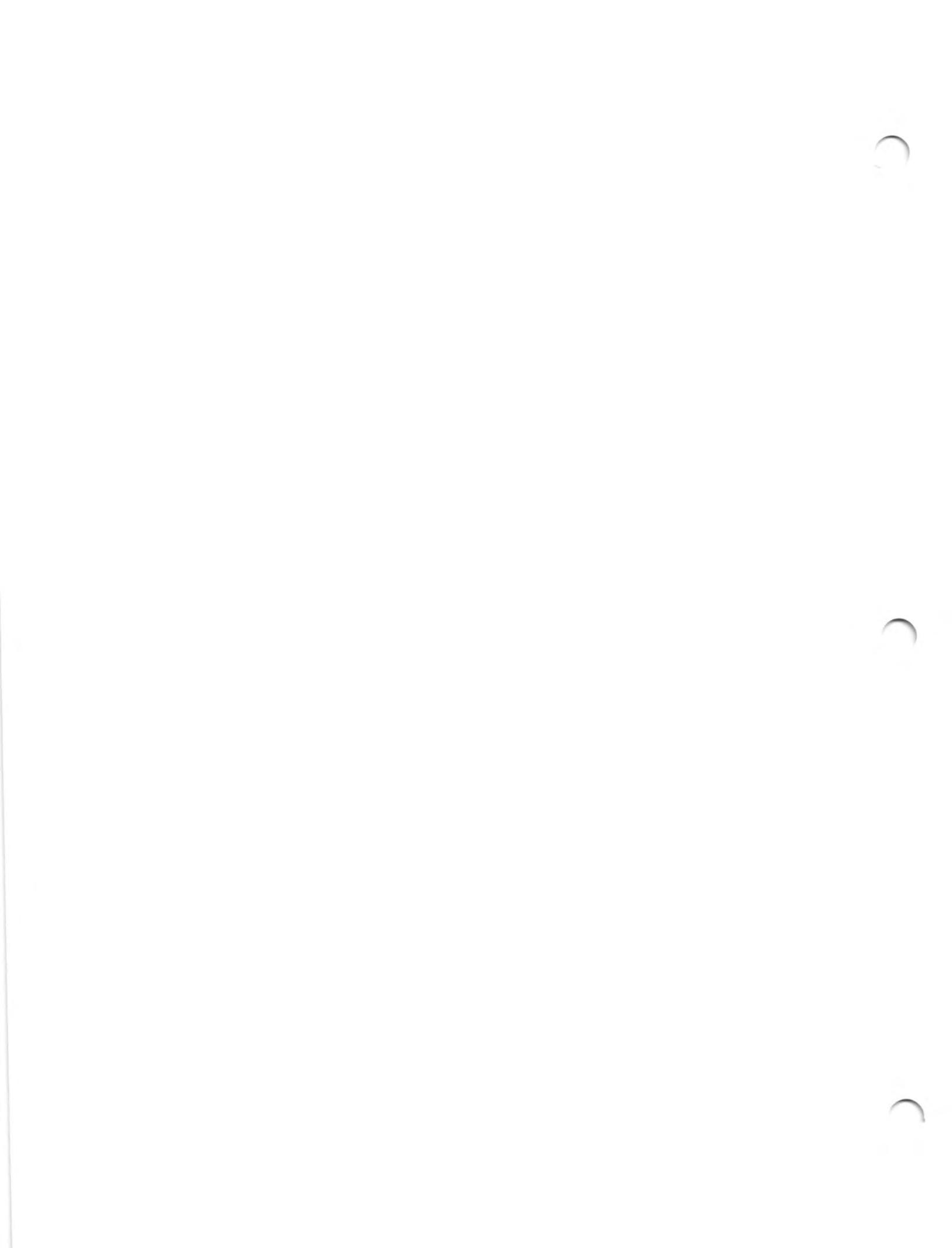
促進法:

化審法: 特定化学物質、監視化学物質、優先評価化学物質に該当しない。

16. その他の情報

詳細情報

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Safety Data Sheet

Issue Date: Feb. 23, 2016

n.ap. = not applicable. n.av. = not available.

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

TRADE NAME : **ANON BF**
 MANUFACTURER : NOF CORPORATION AMAGASAKI PLANT
 56, OHAMACHO 1-CHOME, AMAGASAKI, HYOGO 660-0095, JAPAN
 TEL; +81-6-6419-7483 FAX; +81-6-6416-8135
 E-mail Address : g_amg_kmsds@nof.co.jp
 RESPONSIBLE AND EMERGENCY PHONE :
 NOF AMERICA CORPORATION (New York Office) [Vendor]
 Tel.+1-914-681-9790 Fax.+1-914-681-9791
 E-mail Address : g_cdo_kmsds@nof.co.jp

2. HAZARDS IDENTIFICATION**GHS CLASSIFICATION.****PHYSICAL HAZARDS:**

Flammable liquids: Not classified.

HEALTH HAZARDS.

ACUTE TOXICITY (ORAL) : Category 4.
 ACUTE TOXICITY (DERMAL) : Not classified.
 ACUTE TOXICITY (INHALATION:GAS) : n.ap.
 (INHALATION:VAPOUR) : Classification not possible.
 (INHALATION:DUST,MIST) : Classification not possible.
 SKIN CORROSION/IRRITATION : Classification not possible.
 SERIOUS EYE DAMAGE / EYE IRRITATION : Category 2A.
 RESPIRATORY SENSITIZATION : Classification not possible.
 SKIN SENSITIZATION : Classification not possible.
 GERM CELL MUTAGENICITY : Not classified.
 CARCINOGENICITY : Classification not possible.
 REPRODUCTIVE TOXICITY : Category 2.
 SPECIFIC TARGET ORGAN SYSTEMIC TOXICITY (SINGLE EXPOSURE)
 : Category 2 (Respiratory system, Digestive tract).
 SPECIFIC TARGET ORGAN SYSTEMIC TOXICITY (REPEATED EXPOSURE)
 : Classification not possible.
 ASPIRATION HAZARD : Classification not possible.

ENVIRONMENTAL HAZARDS.

HAZARDOUS TO THE AQUATIC ENVIRONMENT. (ACUTE) : Category 2.
 HAZARDOUS TO THE AQUATIC ENVIRONMENT. (CHRONIC) : Classification not possible.
 HAZARDOUS TO AHT OZONE LAYER : Classification not possible.

LABEL.**SYMBOL:****SIGNAL WORD:** WARNING**HAZARD STATEMENT.**

Harmful if swallowed.
 Causes serious eye damage.
 May damage fertility or the unborn child.
 May cause damage to organs.
 Toxic to aquatic life

PRECAUTIONARY STATEMENT.

PREVENTION: Wear protective gas mask/gloves/goggles/clothing when handling.

Wash hands thoroughly after handling.
 Obtain special instructions before use.
 Do not handle until all safety precautions have been read and understood.
 Do not breathe fume/gas/mist/vapours/spray.
 Do not eat, drink or smoke when using this product.
 Avoid release to the environment.

- RESPONSE** : If in eyes, rinse cautiously with water for above 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 If eye irritation persists, get medical advice/attention.
 If swallowed, call a poison center or doctor/physician if you feel unwell.
 If exposed or concerned: Get medical advice/attention.
 Collect spillage.
- STORAGE** : Store locked up.
 Store in a well-ventilated place.
- DISPOSAL** : Dispose of contents/container in accordance with local/ regional/ national/ international regulation.
- DIRECTION FOR USE** : See instructions on this SDS.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Components

Component:	CAS No:	wt%:
Betaines, coco alkyldimethyl	68424-94-2	ca. 25
Water	7732-18-5	balance

4. FIRST AID MEASURES

- INHALATION** : Remove victim to fresh air and keep at rest in a position comfortable for breathing.
 As the need arises, give artificial respiration and inhalation of oxygen.
- SKIN** : Wash with plenty of water. As the need arises, seek medical advice.
- EYE** : Flush eyes immediately with large amounts of water for at least 15 minutes.
 If irritation persists, get medical attention.
- INGESTION** : Do not induce vomiting. If the victim is conscious and not convulsing, give water or milk to drink, and get immediate medical attention.
- Protection for first-aides: Refer to section 8.

5. FIRE-FIGHTING MEASURES

FLAMMABLE PROPERTIES

- Flash point : None.
 Flammable Limits : Not determined.

EXTINGUISHING MEDIA : Carbon dioxide, foam and dry powder.

FIRE & EXPLOSION HAZARDOUS : Not flammable. But if combusted after removal of water, generates toxic gases (e.g. nitrogen oxide).

FIRE-FIGHTING EQUIPMENT : Wear positive pressure self-contained breathing apparatus.
 Wear full protective clothing.

6. ACCIDENTAL RELEASE MEASURES

Wear protections (e.g. protective gloves, goggles and gas respirator) during work.

Prevent the spilled material entering into a river or sewers.

Small Spill and Leak: After absorb with sawdust, earth, sand, waste, etc. wash away the remainder with water in order not to spill into a river or a canal.

Large Spill and Leak: Because of prevention of more flow to neighborhood, prevent flow by surrounding with the earth and sand, etc. and recover in a drum, etc.

Caution: Leaving the product spill on the floor may cause a slip.
Must not walk thoughtlessly on the spilled material.

7. HANDLING AND STORAGE

HANDLING : Establish a washing equipment for eyes and body near the handling area.
Ventilate a work area enough.
Wear adequate protections (e.g., protective gloves and goggles, etc).
Wash thoroughly hands, face, etc., and gargle after handling.

STORAGE : Store in cool and well ventilated place and keep container closed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE CONTROLS : Local exhaust ventilation may be necessary.
EXPOSURE LIMIT : Not established.

PERSONAL PROTECTION
Respiratory protection: It is not always necessary in a normal handling.
Hand protection : Protective gloves.
Eye protection : Protective goggles.
Skin protection : Protective clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Light yellow liquid.
Odor : Slight distinct odor.
Congeval point : ca. -5 °C.
Specific gravity : 1.05 (20°C)
Viscosity : 10cP (20°C)
Solubility in water : Soluble.

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY : Stable under normal storage and handling conditions, but ion exchanges easily occur by contact with acid/alkaline.
HAZARDOUS DECOMPOSITION PRODUCTS : Carbon monoxide and nitrogen oxides.

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

[As Lauryl dimethyl betaine. (Principal component)]
LD50 300-2,000mg/kg, (Oral, Rat)
LD50 1,300mg/kg, (Dermal, Rat)

LOCAL EFFECT

Skin corrosion : n.ap.
Skin irritation : CPT method. (Rabbit) ; 2.0%, 48hr, Weak irritation.
Eye irritation : Draize method. (Rabbit) ; 1%, MILD.

MUTAGENICITY

[As Lauryl dimethyl betaine. (Principal component)]
<Repairing of B.subtillis H-17,H-45 N test> Negative.

CARCINOGENICITY

Not listed on IARC, ACGIH and NTP.

REPRODUCTIVE TOXICITY

[As Lauryl dimethyl betaine. (Principal component)]
Repeated oral administration test (Rat; 10, 60, 300mg/kg/day) : Allongement of gestation length and decrease of the number of birth / birth rate was observed in the group of 300 mg/kg/day

feeding.

Specific Target Organ Toxicity(Single Exposure)

[As Lauryl dimethyl betaine. (Principal component)]

OECD 423 (Rat; 300, 2,000mg/kg) : Mortal in all cases of 2,000mg/kg feeding group, suffering irregular respiration and gastrointestinal tract disturbance. No effect was observed in 300mg/kg feeding group.

Specific Target Organ Toxicity(Repeated Exposure)

[As Lauryl dimethyl betaine. (Principal component)]

Repeated oral administration test (Rat; 10, 60, 300mg/kg/day) : Several symptom (necrosis of tubular epithelium and epithelial hyperplasia of renal pelvis, etc.) were observed, but they all obviously tended to recover within 2 weeks. NOEL was 10 mg/kg/day.

12. ECOLOGICAL INFORMATION

PERSISTENT/BIODEGRADABLE

[As Lauryl dimethyl betaine. (Principal component)]

Activated sludge: 30ppm. Concentration: 100ppm. 4weeks. Degradation: 96%(BOD).

[Similar product]

Activated sludge: 30ppm. Concentration: 100ppm. 4weeks. Degradation: Below 17%(BOD), below 45%(DOC).

AQUATIC TOXICITY

[As Lauryl dimethyl betaine. (Principal component)]

EC₅₀(96) < 10ppm. (Gold fish)

0.88mg/L(Oryzias latipes)

EC₅₀(48) 2.0mg/L(Daphnia magna)

EC₅₀(72) 3.8mg/L(Selenastrum)

13. DISPOSAL CONSIDERATIONS

May be burned in an adequate incinerator in accordance with all applicable regulations.

Any disposal practice must be in compliance with local, state, and federal laws and regulations (contact local or state environmental agency for specific rules).

14. TRANSPORT INFORMATION

IMDG : Not hazardous material.

UN No. : None.

15. REGULATORY INFORMATION

	TSCA	EC No
Betaines, coco alkyldimethyl	On list	270-329-4
Water	On list	231-791-2

16. OTHER INFORMATION

The statements in this bulletin were made to the best of our knowledge and as accurate as possible. They are given for information only. They don't constitute a contractual guarantee of a product's properties.

Product name: EPOMIN SP-003

1. Chemical product and company identification

Product name: EPOMIN SP-003

Name of the supplier: NIPPON SHOKUBAI CO., LTD.
Address: Kogin Bldg., 4-1-1 Koraihashi, Chuo-ku, Osaka 541-0043 Japan
Charge section: Responsible Care Division
 (TEL:81-6-6223-9166, FAX:81-6-6202-1766, E-MAIL:MSDS_NSCL@shokubai.co.jp)
Emergency telephone number: Kawasaki Plant Environmental & Safety Department
 (TEL:81-44-288-7366, FAX:81-44-288-8492)
Recommended use: Cosmetics/Toiletry

2. Hazards identification

GHS classification	[Category]
Flammable liquids	Not classified
Acute toxicity, oral	Category 4
Acute toxicity, dermal	Category 4
Acute toxicity, inhalation:vapour	Not classified
Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2
Sensitization, respiratory	Category 1
Sensitization, skin	Category 1
Reproductive toxicity	Category 1
Hazardous to the aquatic environment, acute hazard	Not classified

GHS label elements

Pictograms:



Signal word:

Hazard statement:

Danger
 Harmful if swallowed
 Harmful in contact with skin
 Causes skin irritation
 Causes serious eye irritation
 May cause allergy or asthma symptoms or breathing difficulties if inhaled
 May cause allergic skin reaction
 May damage fertility or the unborn child

Precautionary statements:

Prevention Obtain special instructions before use.
 Do not handle until all safety precautions have been read and understood.
 Avoid breathing dust/fume/gas/mist/vapours/spray.
 Wash thoroughly hands and face after handling.
 Do not eat, drink or smoke when using this product.
 Contaminated work clothing should not be allowed out of the workplace.
 Wear protective gloves/protective clothing/eye protection/face protection.

Product name: EPOMIN SP-003

Use personal protective equipment as required.
 In case of inadequate ventilation wear respiratory protection.

Response Call a POISON CENTER or doctor/physician if you feel unwell.
 Rinse mouth.
 Take off contaminated clothing and wash before reuse.
 Wash contaminated clothing before reuse.
 IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
 IF ON SKIN: Wash with plenty of soap and water.
 IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.
 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 IF exposed or concerned: Get medical advice/attention.
 If skin irritation occurs: Get medical advice/attention.
 If skin irritation or rash occurs: Get medical advice/attention.
 If eye irritation persists : Get medical advice/attention.
 If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician.

Storage Store locked up.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulation.

Specific hazards : The product can be charged with static electricity.

3. Composition/information on ingredients

Substance or mixture: Substance

Chemical name	Content wt. %	CAS number
Polyethyleneimine	98-100	106899-94-9
Diethylenetriamine	0-2	111-40-0

4. First-aid measures

Inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
 Immediately call a POISON CENTER or doctor/physician.

Skin contact: Immediately wipe away the attached material with cloths and the like rapidly.
 Wash with plenty of soap and water.
 If skin irritation or rash occurs: Get medical advice/attention.

Eye contact: Wash the eyes with clean water for at least several minutes (desirably 15 minutes or longer), (Remove the contact lenses if possible.) and get medical attention by an eye specialist immediately. During washing, fully open the eyelid with fingers and wash in such a way as to let water reach to every corner of the eyeball and eyelid.

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Document number: KPI-1115-00-08

Date prepared: 1996/03/19

Date revised: 2013/12/24

Product name: EPOMIN SP-003

Ingestion: Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

5. Fire-fighting measures

Extinguishing media: Chemical powder extinguisher, aqueous liquid foam (alcohol resistance foam) fire extinguishing media, carbon dioxide, sand, atomized water.

Unsuitable extinguishing media: No data available

Specific hazards: At the time of fire, poisonous gases can be generated.

Specific extinguishing methods: Keep upwind of fire. Wear full fire fighting turn-out gear (full Bunker gear) and respiratory protection (SCBA). Cool container with water spray.
Fight fire with normal precautions from a reasonable distance. In case of fire in the surroundings, move the content/container to the safety place. If it is not possible to move, cool the content/container with water spray.

Precautions for fire-fighters: During fire fighting work, wear proper protective equipment.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures: Promptly remove possible ignition sources from the vicinity.
Use personal protection recommended in Section 8. Isolate the hazard area and deny entry to unnecessary and unprotected personnel.

Environmental precautions: Do not flush to sewer or allow to enter waterways.
Surround this product with sandbags and earth/sand and cover it with an antistatic sheet to prevent diffusion (of smell).

Methods and materials for containment and cleaning up: Absorb this product with inactive materials (example: dry sand, earth) and recover it into a waste material container by using a spark-resistant tool. In the case of large amount, stop leakage with earth/sand to begin with, and, then, recover it.

7. Handling and storage

Handling

Technical measures: During handling, be sure to wear proper protective equipment (refer to the section 8).
This product can be charged with static electricity. Take countermeasures for static electricity removal (grounding, others). Wear antistatic clothes and antistatic shoes to prevent human body electrification.
Use explosion-proof electrical/ventilating/lighting equipment.
Use only non-sparking tools.
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Do not handle the containers harshly in such a way as to make them tumbled, dropped, given a shock, or dragged.

Local/total ventilation: Use the ventilation equipment described in Section 8.
Prevent vapor buildup by providing adequate ventilation during and after use.

Precautions: Not especially.

Product name: EPOMIN SP-003

Precautions for safe handling: Not especially.

Storage conditions: Keep away from heat.
Keep away from sources of ignition - No smoking.
Protect from sunlight. Store in a well-ventilated place.

Packaging material: Stainless steel, polyethylene, glass
Store in tightly closed container.

8. Exposure controls and personal protection

Engineering controls: Install eye and body washing facilities near the handling place.
Use closed equipment/machinery or use local ventilation equipment.

Permissible concentration

Chemical name	ACGIH		U. S. -OSHA	
	TLV-TWA	TLV-STEL	PEL-TWA	PEL-STEL
Polyethyleneimine	Not established	Not established	Not established	Not established
Diethylenetriamine	1ppm	Not established	Not established	Not established

Personal protective equipment

Respiratory protection: Not necessary under normal handling conditions.

Hand protection: Organic solvent impermeable protective gloves (Antistatic ones are desirable.)
Rubber or polyethylene gloves

Eye protection: Protective glasses, goggle, protective face shield

Skin and body protection: Organic solvent impermeable protective clothes, protective shoes (Antistatic ones are desirable.)
When liquid is being splashed, wear rubber or vinyl apron and rubber boots.

9. Physical and chemical properties

[Chemical product]

Physical state: Liquid

Form: Liquid (viscosity : 200-500 mPa·s (25°C)))

Color: Light yellow clear

Odor: Mild ammoniac odor

Odor threshold: No data

pH: 10-12(5%aq.)

Melting point/freezing point: <=-20(°C)

Boiling point, initial boiling point and boiling range: No data

Flashpoint: 188(°C)Cleveland Open Cup

Auto-ignition temperature: None

Product name: EPOMIN SP-003

Upper/lower flammability or explosive limits:	No data
Vapor pressure:	No data
Evaporation rate:	No data
Specific gravity:	1.05(25°C)
Solubility:	water : Completely soluble ethanol : Soluble (Lower alcohol:Soluble) methanol : Soluble toluene : Practically insoluble
n-Octanol/water partition coefficient:	No data
Decomposition temperature:	240 (°C) (DSC/N2)

10. Stability and reactivity

Stability:	No self-reactivity, pyrophoric property, and explosion property. Stable under normal handling conditions.
Hazardous reactions:	No oxidizing property and self-reactivity. It does not react with water but, when mixed, it generates heat of dilution.
Conditions to avoid:	Heating by direct fire. Iron, copper (to avoid corrosion)
Incompatible materials:	No data available.
Hazardous decomposition products:	Combustion causes hazardous NO _x generation.

11. Toxicological information

[Chemical product]

Acute toxicity, oral:	LD50: 1.2 ml/kg[mouse] (Data of the similar product(EPOMIN SP-006))
Acute toxicity, dermal:	LD50: 1618 mg/kg[rat]
Acute toxicity, inhalation:	No data
Skin corrosion/irritation:	Moderate irritating based on the classification criteria (Commission Directive 91/325/EEC). [rabbit]
Eye damage/irritation:	No data
Sensitization, respiratory:	No data
Sensitization, skin:	No data
Reproductive cell mutagenicity:	Ames Test:Positive
Carcinogenicity:	IARC:Unlisted NTP:Unlisted EU:Unlisted OSHA:Unlisted
Reproductive toxicity:	No data
Specific target organ toxicity (Single exposure):	No data
Specific target organ toxicity (Repeated exposure):	No data
Aspiration hazard:	No data

[Ingredient]

Diethylenetriamine

Acute toxicity, oral:	LD50: 1080-2330 mg/kg[rat] LD50: 819 mg/kg[rat]
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Product name: EPOMIN SP-003

Acute toxicity, dermal:	LD50: 672-1090 mg/kg[rabbit]
Acute toxicity, inhalation:	LC50: 170 ppm[rat]
Skin corrosion/irritation:	Corrosive [rabbit]
Eye damage/irritation:	Corrosive [rabbit]
Sensitization, respiratory:	May cause allergic or asthmatic symptoms or breathing difficulties if inhaled
Sensitization, skin:	Positive Maximization method [guinea pig] EU R43
Reproductive cell mutagenicity:	in vivo somatic cell mutagenicity tests: Negative
Reproductive toxicity:	The results of rat developmental toxicity studies (OECD TG 421) suggest adverse effects on reproductive/developmental functions at dose levels not toxic to parent animals.

12. Ecological information

[Chemical product]

Ecotoxicity	
Acute hazard (Fish):	LC50(96hr): 133.1 mg/L[Golden orfe]
Acute hazard (Crustacea):	No data
Acute hazard (Algae or other aquatic plants):	No data
Persistence and degradability:	No data
Bioaccumulative potential:	Consider to be less bioaccumulative to the aqualic life.
Mobility in soil:	Can be mobilized to waters and soil judging from the physical and chemical properties.

[Ingredient]

Diethylenetriamine

Ecotoxicity	
Acute hazard (Fish):	LC50(96hr): 248 mg/L[Leuciscus idus] LC50(96hr): 1014 mg/L[Poecilia reticulata] LC50(96hr): 248 mg/L[Poecilia reticulata]
Acute hazard (Crustacea):	EC50(48hr): 17 mg/L[Daphnia magna] EC50(48hr): 16 mg/L[Daphnia magna]
Acute hazard (Algae or other aquatic plants):	EC50(96hr): 345.6 mg/L[Pseudokirchneriella subcapitata] EC50(72hr): 1164 mg/L[Pseudokirchneriella subcapitata] EC50(96hr): 592 mg/L[Desmodesmus subspicatus]
Long-term hazard (Fish):	NOEC(28day): 10 mg/L[Gasterosteus aculeatus]
Long-term hazard (Crustacea):	NOEC(21day): 5.6 mg/L[Daphnia magna]
Long-term hazard (Algae or other aquatic plants):	NOEC(72hr): 10.2 mg/L[Pseudokirchneriella subcapitata]
Persistence and degradability:	:(BOD:0%)
Bioaccumulative potential:	0.3 - 1.7 BCF method: OECD 305C

13. Disposal considerations

Disposal methods: When waste materials and waste water are to be treated, collect them into specified containers and entrust the disposal to a disposal contractor having an industrial waste disposal contractor permit.

Product name: EPOMIN SP-003

Do not use the used containers for other purposes like filling other substances. Be sure to dispose of them after treating the content according to the above description. In case of recycling the container, return the container as it is after fitting a stopper without filling anything into it.

14. Transport information

IMDG	UN classification :	Not applicable
	UN number :	Not applicable
	Proper shipping name :	Not applicable
	Packing group :	Not applicable
Marine pollutant:		Not applicable
Special precautions:		Transport the material in accordance with the regulations in your country or region. Load the containers in such a way as not to fall down, tumble, or being damaged. Cover the loaded cargo to prevent direct sunlight.

15. Regulatory information

EU - REACH (1907/2006) :	Not applicable
U. S. - CERCLA/SARA :	Not applicable
U. S. - OSHA :	Not applicable
U. S. - TSCA (Toxic Substances Control Act) :	Section 4 - Chemical Test Rules (40 CFR 799) (Diethylenetriamine) Section 4 - Chemicals Whose Testing Requirements Have Sunset (Diethylenetriamine) Section 8(d) - 716.120(a) - Health and Safety Reporting - List of Substances (Diethylenetriamine)

Inventory

Japan (ENCS) :	Listed
Korea (KECL) :	Listed
Australia (AICS) :	Not listed
Canada (DSL) :	Not listed
China (IECSC) :	Listed
EU (EINECS) :	Not listed
New Zealand (NZIoC) :	Not listed
USA (TSCA) :	Listed
Philippines (PICCS) :	Not listed

Registration

EU (REACH) :	Pre-registered
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Restriction at export (Japan) :	Not applicable
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16. Other information

SAFETY DATA SHEET

Document number: KPI-1115-00-08

Date prepared: 1996/03/19

Date revised: 2013/12/24

Product name: EPOMIN SP-003

Disclaimer

•The described information has been prepared based on the latest materials, information, and other data available at the time of preparation; however, it does not intend to guarantee anything like contents, physical/chemical properties, and danger/hazards. Also, the cautions have been prepared for ordinary handling; therefore, for special handling, it is the obligation of each user of the product to take proper measures suitable for each handling condition. Take enough care for such matters.

•Concerning the GHS Classification described in Section 2, the health and environmental hazards are based on "Classification of chemicals based on GHS JIS Z7252:2009" and the physical hazards are based on "Globally Harmonized System of Classification and Labelling of Chemicals(GHS) third revised edition". The hazards not described there correspond to "Out of categories" or "Classification not possible".

•Regulatory information with regard to this substance in your country or region should be examined by your own responsibility.

Product name: EPOMIN SP-006

1. Chemical product and company identification

 Product name: EPOMIN SP-006

 Name of the supplier: NIPPON SHOKUBAI CO., LTD.
 Address: Kogin Bldg., 4-1-1 Koraibashi, Chuo-ku, Osaka 541-0043 Japan
 Charge section: Responsible Care Division
 (TEL:81-6-6223-9166, FAX:81-6-6202-1766, E-MAIL:MSDS_NSCL@shokubai.co.jp)
 Emergency telephone number: Kawasaki Plant Environmental & Safety Department
 (TEL:81-44-288-7366, FAX:81-44-288-8492)
 Recommended use: Cosmetics/Toiletry, Metal plating

2. Hazards identification

GHS classification	[Category]
Flammable liquids	Not classified
Acute toxicity, oral	Category 4
Acute toxicity, dermal	Category 4
Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2
Hazardous to the aquatic environment, acute hazard	Category 2
Hazardous to the aquatic environment, long-term hazard	Category 2

GHS label elements

Pictograms:



Signal word:	Warning
Hazard statement:	Harmful if swallowed Harmful in contact with skin Causes skin irritation Causes serious eye irritation Toxic to aquatic life Toxic to aquatic life with long lasting effects

Precautionary statements:

Prevention	Wash thoroughly hands and face after handling. Do not eat, drink or smoke when using this product. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection.
Response	Call a POISON CENTER or doctor/physician if you feel unwell. Rinse mouth. Take off contaminated clothing and wash before reuse. Wash contaminated clothing before reuse. Collect spillage. IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell. IF ON SKIN: Wash with plenty of soap and water.

Product name: EPOMIN SP-006

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

If skin irritation occurs: Get medical advice/attention.

If eye irritation persists : Get medical advice/attention.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulation.

Specific hazards : The product can be charged with static electricity.

3. Composition/information on ingredients

Substance or mixture: Substance

Chemical name	Content wt. %	CAS number
Polyethyleneimine	98-100	106899-94-9

4. First-aid measures

Inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

Skin contact: Immediately call a POISON CENTER or doctor/physician. Immediately wipe away the attached material with cloths and the like rapidly. Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention.

Eye contact: Wash the eyes with clean water for at least several minutes (desirably 15 minutes or longer), (Remove the contact lenses if possible.) and get medical attention by an eye specialist immediately. During washing, fully open the eyelid with fingers and wash in such a way as to let water reach to every corner of the eyeball and eyelid.

Ingestion: Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

5. Fire-fighting measures

Extinguishing media: Chemical powder extinguisher, aqueous liquid foam (alcohol resistance foam) fire extinguishing media, carbon dioxide, sand, atomized water.

Unsuitable extinguishing media: No data available

Specific hazards: At the time of fire, poisonous gases can be generated.

Specific extinguishing methods: Keep upwind of fire. Wear full fire fighting turn-out gear (full Bunker gear) and respiratory protection (SCBA). Cool container with water spray. Fight fire with normal precautions from a reasonable distance. In case of fire in the surroundings, move the content/container to the safety place. If it is not possible to move, cool the content/container with water spray.

Precautions for fire-fighters: During fire fighting work, wear proper protective equipment.

Product name: EPOMIN SP-006

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures:	Promptly remove possible ignition sources from the vicinity. Use personal protection recommended in Section 8. Isolate the hazard area and deny entry to unnecessary and unprotected personnel.
Environmental precautions:	Do not flush to sewer or allow to enter waterways. Surround this product with sandbags and earth/sand and cover it with an antistatic sheet to prevent diffusion (of smell).
Methods and materials for containment and cleaning up:	Absorb this product with inactive materials (example: dry sand, earth) and recover it into a waste material container by using a spark-resistant tool. In the case of large amount, stop leakage with earth/sand to begin with, and, then, recover it.

7. Handling and storage

Handling	Technical measures:	During handling, be sure to wear proper protective equipment (refer to the section 8). This product can be charged with static electricity. Take countermeasures for static electricity removal (grounding, others). Wear antistatic clothes and antistatic shoes to prevent human body electrification. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Do not handle the containers harshly in such a way as to make them tumbled, dropped, given a shock, or dragged.
	Local/total ventilation:	Use the ventilation equipment described in Section 8. Prevent vapor buildup by providing adequate ventilation during and after use.
	Precautions: Precautions for safe handling:	Not especially. Not especially.
	Storage	Storage conditions: Packaging material:

8. Exposure controls and personal protection

Engineering controls:	Install eye and body washing facilities near the handling place. Use closed equipment/machinery or use local ventilation equipment.
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Document number: KPI-1116-00-09
 Date prepared: 1986/03/11
 Date revised: 2013/12/24

Product name: EPOMIN SP-006

Permissible concentration

Chemical name	ACGIH		U. S. -OSHA	
	TLV-TWA	TLV-STEL	PEL-TWA	PEL-STEL
Polyethyleneimine	Not established	Not established	Not established	Not established

Personal protective equipment

Respiratory protection: In case of inadequate ventilation wear respiratory protection.
 Hand protection: Organic solvent impermeable protective gloves (Antistatic ones are desirable.)
 Rubber or polyethylene gloves
 Eye protection: Protective glasses, goggle, protective face shield
 Skin and body protection: Organic solvent impermeable protective clothes, protective shoes (Antistatic ones are desirable.)
 When liquid is being splashed, wear rubber or vinyl apron and rubber boots.

9. Physical and chemical properties

[Chemical product]

Physical state: Liquid
 Form: Viscous liquid (Viscosity : 500-2500 mPa·s (25°C))
 Color: Light yellow clear
 Odor: Mild ammoniac odor
 Odor threshold: No data
 pH: 10-12(5%aq.)
 Melting point/freezing point: <=-20(°C)
 Boiling point, initial boiling point and boiling range: No data
 Flashpoint: 263(°C)Cleveland Open Cup
 Auto-ignition temperature: None
 Upper/lower flammability or explosive limits: No data
 Vapor pressure: No data
 Vapor density: No data
 Evaporation rate: No data
 Specific gravity: 1.05(25°C)
 Solubility: water : Completely soluble
 ethanol : Soluble (Lower alcohol:Soluble)
 methanol : Soluble
 toluene : Practically insoluble
 n-Octanol/water partition coefficient: <-1
 Decomposition temperature: 270(°C) (DSC/N2)

10. Stability and reactivity

Stability: No self-reactivity, pyrophoric property, and explosion property.

 Product name: EPOMIN SP-006

Hazardous reactions: Stable under normal handling conditions.
 No oxidizing property and self-reactivity. It does not react with water but, when mixed, it generates heat of dilution.

Conditions to avoid: Heating by direct fire. Iron, copper (to avoid corrosion)

Incompatible materials: No data available.

Hazardous decomposition products: Combustion causes hazardous NOx generation.

11. Toxicological information

[Chemical product]

Acute toxicity, oral:	LD50: 1.2 ml/kg[mouse]
Acute toxicity, dermal:	LD50: 1867 mg/kg[rat]
Acute toxicity, inhalation:	No data
Skin corrosion/irritation:	Moderate irritating based on the classification criteria (Commission Directive 91/325/EEC). [rabbit]
Eye damage/irritation:	No data
Sensitization, respiratory:	No data
Sensitization, skin:	No data
Reproductive cell mutagenicity:	Ames Test:Negative
Carcinogenicity:	IARC:Unlisted NTP:Unlisted EU:Unlisted OSHA:Unlisted
Reproductive toxicity:	No data
Specific target organ toxicity (Single exposure):	No data
Specific target organ toxicity (Repeated exposure):	No data
Aspiration hazard:	No data

12. Ecological information

[Chemical product]

Ecotoxicity	
Acute hazard (Fish):	LC50(96hr): 1-10 mg/L[ZEBRA Fish]
Acute hazard (Crustacea):	EC50(48hr): 10-100 mg/L[DAPHNIA Magna]
Acute hazard (Algae or other aquatic plants):	No data
Persistence and degradability:	Considered to be less biodegradable because of a polymer.
Bioaccumulative potential:	(Po/w: <-1) Consider to be less bioaccumulative to the aqualic life.
Mobility in soil:	Can be mobilized to waters and soil judging from the physical and chemical properties.

13. Disposal considerations

Disposal methods: When waste materials and waste water are to be treated, collect them into specified containers and entrust the disposal to a disposal contractor having an industrial waste disposal contractor permit.

Product name: EPOMIN SP-006

Do not use the used containers for other purposes like filling other substances. Be sure to dispose of them after treating the content according to the above description. In case of recycling the container, return the container as it is after fitting a stopper without filling anything into it.

14. Transport information

IMDG	UN classification :	Class9
	UN number :	3082
	Proper shipping name :	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N. O. S.
	Packing group :	III
Marine pollutant:		applicable
Special precautions:		Transport the material in accordance with the regulations in your country or region. Load the containers in such a way as not to fall down, tumble, or being damaged. Cover the loaded cargo to prevent direct sunlight.

15. Regulatory information

EU - REACH (1907/2006) :	Not applicable
U. S. - CERCLA/SARA :	Not applicable
U. S. - OSHA :	Not applicable
U. S. - TSCA (Toxic Substances Control Act) :	Not applicable
Inventory	
Japan (ENCS) :	Listed
Korea (KECL) :	Listed
Australia (AICS) :	Not listed
Canada (DSL) :	Not listed
China (IECSC) :	Listed
EU (EINECS) :	Not listed
New Zealand (NZIoC) :	Not listed
USA (TSCA) :	Listed
Philippines (PICCS) :	Not listed
Registration	
EU (REACH) :	Pre-registered
Restriction at export (Japan) :	Not applicable

16. Other information

SAFETY DATA SHEET

Document number: KPI-1116-00-09

Date prepared: 1986/03/11

Date revised: 2013/12/24

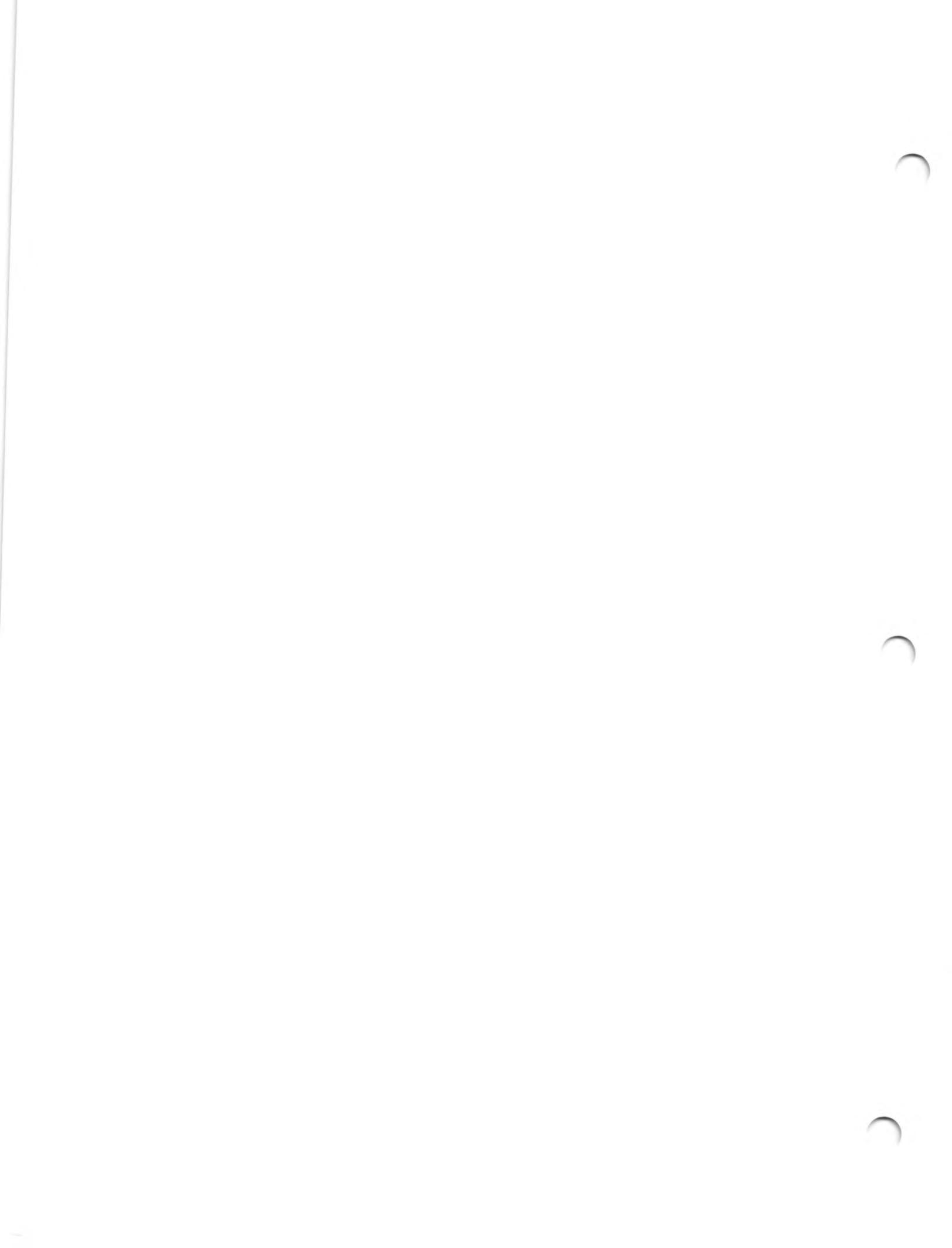
Product name: EPOMIN SP-006

Disclaimer

•The described information has been prepared based on the latest materials, information, and other data available at the time of preparation; however, it does not intend to guarantee anything like contents, physical/chemical properties, and danger/hazards. Also, the cautions have been prepared for ordinary handling; therefore, for special handling, it is the obligation of each user of the product to take proper measures suitable for each handling condition. Take enough care for such matters.

•Concerning the GHS Classification described in Section 2, the health and environmental hazards are based on "Classification of chemicals based on GHS JIS Z7252:2009" and the physical hazards are based on "Globally Harmonized System of Classification and Labelling of Chemicals(GHS) third revised edition". The hazards not described there correspond to "Out of categories" or "Classification not possible".

•Regulatory information with regard to this substance in your country or region should be examined by your own responsibility.



Product name: EPOMIN SP-012

1. Chemical product and company identification

Product name: EPOMIN SP-012

Name of the supplier: NIPPON SHOKUBAI CO., LTD.
Address: Kogin Bldg., 4-1-1 Koraihashi, Chuo-ku, Osaka 541-0043 Japan
Charge section: Responsible Care Division
(TEL:81-6-6223-9166, FAX:81-6-6202-1766, E-MAIL:MSDS_NSCL@shokubai.co.jp)
Emergency telephone number: Kawasaki Plant Environmental & Safety Department
(TEL:81-44-288-7366, FAX:81-44-288-8492)
Recommended use: Paint/Ink, Cosmetics/Toiletry, Dispersion

2. Hazards identification

GHS classification	[Category]
Flammable liquids	Not classified
Acute toxicity, oral	Category 4
Acute toxicity, dermal	Not classified
Skin corrosion/irritation	Not classified
Hazardous to the aquatic environment, acute hazard	Category 2
Hazardous to the aquatic environment, long-term hazard	Category 2

GHS label elements

Pictograms:



Signal word: Warning
Hazard statement: Harmful if swallowed
Toxic to aquatic life
Toxic to aquatic life with long lasting effects

Precautionary statements:

Prevention Wash thoroughly hands and face after handling.
Do not eat, drink or smoke when using this product.
Avoid release to the environment.
Response Rinse mouth.
Collect spillage.
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
Disposal Dispose of contents/container in accordance with local/regional/national/international regulation.

Specific hazards : The product can be charged with static electricity.

3. Composition/information on ingredients

Substance or mixture: Substance

Product name: EPOMIN SP-012

Chemical name	Content wt. %	CAS number
Polyethyleneimine	98-100	106899-94-9

4. First-aid measures

Inhalation:	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/physician.
Skin contact:	Immediately wipe away the attached material with cloths and the like rapidly. Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention.
Eye contact:	Wash the eyes with clean water for at least several minutes (desirably 15 minutes or longer), (Remove the contact lenses if possible.) and get medical attention by an eye specialist immediately. During washing, fully open the eyelid with fingers and wash in such a way as to let water reach to every corner of the eyeball and eyelid.
Ingestion:	Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

5. Fire-fighting measures

Extinguishing media:	Chemical powder extinguisher, aqueous liquid foam (alcohol resistance foam) fire extinguishing media, carbon dioxide, sand, atomized water.
Unsuitable extinguishing media:	No data available
Specific hazards:	At the time of fire, poisonous gases can be generated.
Specific extinguishing methods:	Keep upwind of fire. Wear full fire fighting turn-out gear (full Bunker gear) and respiratory protection (SCBA). Cool container with water spray. Fight fire with normal precautions from a reasonable distance. In case of fire in the surroundings, move the content/container to the safety place. If it is not possible to move, cool the content/container with water spray.
Precautions for fire-fighters:	During fire fighting work, wear proper protective equipment.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures:	Promptly remove possible ignition sources from the vicinity. Use personal protection recommended in Section 8. Isolate the hazard area and deny entry to unnecessary and unprotected personnel.
Environmental precautions:	Do not flush to sewer or allow to enter waterways. Surround this product with sandbags and earth/sand and cover it with an antistatic sheet to prevent diffusion (of smell).

Product name: EPOMIN SP-012

Methods and materials for
containment and cleaning up:

Absorb this product with inactive materials (example: dry sand, earth) and recover it into a waste material container by using a spark-resistant tool. In the case of large amount, stop leakage with earth/sand to begin with, and, then, recover it.

7. Handling and storage

Handling

Technical measures:

During handling, be sure to wear proper protective equipment (refer to the section 8).
This product can be charged with static electricity. Take countermeasures for static electricity removal (grounding, others). Wear antistatic clothes and antistatic shoes to prevent human body electrification.
Use explosion-proof electrical/ventilating/lighting equipment.
Use only non-sparking tools.
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

Local/total ventilation:

Do not handle the containers harshly in such a way as to make them tumbled, dropped, given a shock, or dragged.
Use the ventilation equipment described in Section 8.
Prevent vapor buildup by providing adequate ventilation during and after use.

Precautions:

Not especially.

Precautions for safe
handling:

Not especially.

Storage

Storage conditions:

Keep away from heat.
Keep away from sources of ignition - No smoking.
Protect from sunlight. Store in a well-ventilated place.

Packaging material:

Stainless steel, polyethylene, glass
Store in tightly closed container.

8. Exposure controls and personal protection

Engineering controls:

Install eye and body washing facilities near the handling place.
Use closed equipment/machinery or use local ventilation equipment.

Permissible concentration

Chemical name	ACGIH		U. S. -OSHA	
	TLV-TWA	TLV-STEL	PEL-TWA	PEL-STEL
Polyethyleneimine	Not establis hed	Not establis hed	Not establis hed	Not establis hed

Personal protective equipment

Respiratory protection:

In case of inadequate ventilation wear respiratory protection.

Hand protection:

Organic solvent impermeable protective gloves (Antistatic ones are desirable.)

Rubber or polyethylene gloves

Eye protection:

Protective glasses, goggle, protective face shield

Product name: EPOMIN SP-012

Skin and body protection:	Organic solvent impermeable protective clothes, protective shoes (Antistatic ones are desirable.) When liquid is being splashed, wear rubber or vinyl apron and rubber boots.
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9. Physical and chemical properties

[Chemical product]

Physical state:	Liquid
Form:	Viscous liquid (Viscosity : 3500-7500 mPa·s (25°C))
Color:	Light yellow clear
Odor:	Mild ammoniac odor
Odor threshold:	No data
pH:	10-12(5%aq.)
Melting point/freezing point:	<=-20(°C)
Boiling point, initial boiling point and boiling range:	No data
Flashpoint:	262(°C)Cleveland Open Cup
Auto-ignition temperature:	None
Upper/lower flammability or explosive limits:	No data
Vapor pressure:	No data
Vapor density:	No data
Evaporation rate:	No data
Specific gravity:	1.05(25°C)
Solubility:	water : Completely soluble ethanol : Soluble (Lower alcohol:Soluble) methanol : Soluble toluene : Practically insoluble
n-Octanol/water partition coefficient:	<-1
Decomposition temperature:	290(°C) (DSC/N2)

10. Stability and reactivity

Stability:	No self-reactivity, pyrophoric property, and explosion property. Stable under normal handling conditions.
Hazardous reactions:	No oxidizing property and self-reactivity. It does not react with water but, when mixed, it generates heat of dilution.
Conditions to avoid:	Heating by direct fire. Iron, copper (to avoid corrosion)
Incompatible materials:	No data available.
Hazardous decomposition products:	Combustion causes hazardous NOx generation.

11. Toxicological information

[Chemical product]

Acute toxicity, oral:	LD50: 1.0 ml/kg[mouse]
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SAFETY DATA SHEET

Document number: KPI-1117-00-12

Date prepared: 1986/01/20

Date revised: 2013/12/24

Product name: EPOMIN SP-012

Acute toxicity, dermal:	LD50:> 2000 mg/kg[rat]
Acute toxicity, inhalation:	No data
Skin corrosion/irritation:	Mild irritating based on the classification criteria (OECD 404/1981 Maritime Technical Safety Bureau Ministry of Transport of Japan 1990) [rabbit]
Eye damage/irritation:	No data
Sensitization, respiratory:	No data
Sensitization, skin:	No data
Reproductive cell mutagenicity:	Ames Test:Negative
Carcinogenicity:	IARC:Unlisted NTP:Unlisted EU:Unlisted OSHA:Unlisted
Reproductive toxicity:	No data
Specific target organ toxicity (Single exposure):	No data
Specific target organ toxicity (Repeated exposure):	No data
Aspiration hazard:	No data

12. Ecological information

[Chemical product]

Ecotoxicity	
Acute hazard (Fish):	LC50(96hr): 1-10 mg/L[ZEBRA Fish]
Acute hazard (Crustacea):	EC50(48hr): 10-100 mg/L[DAPHNIA Magna]
Acute hazard (Algae or other aquatic plants):	No data
Persistence and degradability:	Considered to be less biodegradable because of a polymer.
Bioaccumulative potential:	(Po/w; <-1) Consider to be less bioaccumulative to the aqualic life.
Mobility in soil:	Can be mobilized to waters and soil judging from the physical and chemical properties.

13. Disposal considerations

Disposal methods: When waste materials and waste water are to be treated, collect them into specified containers and entrust the disposal to a disposal contractor having an industrial waste disposal contractor permit.
Do not use the used containers for other purposes like filling other substances. Be sure to dispose of them after treating the content according to the above description. In case of recycling the container, return the container as it is after fitting a stopper without filling anything into it.

14. Transport information

IMDG UN classification : Class9

Document number: KPI-1117-00-12
Date prepared: 1986/01/20
Date revised: 2013/12/24

Product name: EPOMIN SP-012

UN number : 3082
Proper shipping name : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N. O. S.
Packing group : III
Marine pollutant: applicable
Special precautions: Transport the material in accordance with the regulations in your country or region.
Load the containers in such a way as not to fall down, tumble, or being damaged.
Cover the loaded cargo to prevent direct sunlight.

15. Regulatory information

EU - REACH (1907/2006) : Not applicable
U. S. - CERCLA/SARA : Not applicable
U. S. - OSHA : Not applicable
U. S. - TSCA (Toxic Substances Control Act) : Not applicable
Inventory
Japan (ENCS) : Listed
Korea (KECL) : Listed
Australia (AICS) : Not listed
Canada (DSL) : Not listed
China (IECSC) : Listed
EU (EINECS) : Not listed
New Zealand (NZIoC) : Not listed
USA (TSCA) : Listed
Philippines (PICCS) : Not listed
Registration
EU (REACH) : Pre-registered
Restriction at export (Japan) : Not applicable

16. Other information

Disclaimer

- The described information has been prepared based on the latest materials, information, and other data available at the time of preparation; however, it does not intend to guarantee anything like contents, physical/chemical properties, and danger/hazards. Also, the cautions have been prepared for ordinary handling; therefore, for special handling, it is the obligation of each user of the product to take proper measures suitable for each handling condition. Take enough care for such matters.
- Concerning the GHS Classification described in Section 2, the health and environmental hazards are based on "Classification of chemicals based on GHS JIS Z7252:2009" and the physical hazards are based on "Globally Harmonized System of Classification and Labelling of Chemicals (GHS) third revised edition". The hazards not described there correspond to "Out of categories" or "Classification not possible".
- Regulatory information with regard to this substance in your country or region should be examined by your own responsibility.

SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION	
Product Name:	PAA-01
Synonyms:	Polyallylamine -01
General Use:	Chemicals for various applications
Manufacturer	
Company Name:	Nittobo Medical Co., Ltd.
Address:	2-4-1 Kojimachi, Chiyoda-Ku, Tokyo, Japan 102-0083
Telephone No.:	+81-3-4582-5460
Fax No.:	+81-3-3514-3769
Emergency phone No.:	+81-3-4582-5460

2. HAZARDOUS IDENTIFICATION	
GHS Classification:	Skin Corrosion/Irritation (Category 1) Eye Damage/Eye Irritation (Category 1) Aquatic Hazard (Acute) (Category 2)
GHS Label:	
Signal Word:	Danger
Hazard Statements:	Causes severe skin burns and eye damage Causes serious eye damage Toxic to aquatic life
Precautionary Statements:	P260 Do not breathe dust/fume/gas/mist/vapours/spray. P264 Wash thoroughly after handling. P273 Avoid release to the environment. P280 Wear protective gloves/protective clothing/eye protection/face protection. P301+P330+P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting. P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P310 IF exposed: Immediately call a POISON CENTER or doctor/physician. P321 Specific treatment (see on this label). P330 Rinse mouth. P363 Wash contaminated clothing before reuse. P405 Store locked up. P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<u>Component</u>	<u>Chemical Name</u>	<u>Wt%</u>	<u>CAS No.</u>	<u>TSCA No.</u>
A	Homopolymer of 2-propen-1-amine	15	30551-89-4	Not open
B	Water	85	7732-18-5	

4. FIRST AID MEASURES**Eye contact:**

Gently rinses the affected eyes with clean water for at least 15 minutes.

Arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.

A delay of only seconds may increase the injury.

Skin:

Remove contaminated clothing, shoes and socks from affected area as quickly as possible.

Continue to wash the affected area under running water until the feeling of stickiness or soapiness caused by the caustic chemical disappears.

If irritation persists, arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.

Inhalation:

Not applicable because of non-volatile aqueous solution.

Ingestion:

Rinse mouth with water. Arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.

Note to Physician

No specific information.

5. FIRE FIGHTING MEASURES**General Information:**

Keep personnel removed from and upwind of fire.

Firefighters should wear proper protective equipment.

Toxic gases (carbon monoxide, nitrogen oxides) will form upon combustion.

Extinguishing Media:

Use water spray, foam, and dry chemical or carbon dioxide.

6. ACCIDENTAL RELEASE MEASURES**General Information:**

Use proper personal protective equipment as indicated in Section 8.

Evacuate non-essential personnel.

Spills/Leaks:

Absorb spill with inert material (e.g., dry sand or earth), then place in a chemical waste containers.

Prevent spills from entering sewers, watercourses or areas.

Biological treatment is not effective.

7. HANDLING AND STRAGE**Handling:**

Avoid contact with skin or eyes.

To prevent contact, wear rubber gloves and protective eyeglasses or chemical safety goggles.

Make available in the work area emergency shower and eyes wash.

Storage:

Keep containers tightly closed when in not use.

To avoid corrosive, store in closed acid-resistant (e.g., polyethylene) containers.

Avoid long storage periods since the product degrades with age.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION**Engineering Controls:**

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

Personal Protective Equipment

Eyes: Wear protective eyeglasses or chemical safety goggles.

Skin: Wear appropriate rubber gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: For most conditions, no respiratory protection should be needed.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Brown liquid
Odour:	Characteristic odour
Boiling point:	100 °C (Water)
Freezing point:	about -6 °C
Sp. Gr. (at 25 °C):	about 1.02
pH-Value:	about 12
Viscosity (at 25 °C):	about 3 mPa.s
Vapor pressure:	Not determined
Vapor density:	Not determined
Evaporation rate:	Not determined
Solubility in water:	Very soluble
Auto-ignition:	Not occur
Flammability:	Not flammable under normal conditions
Oxidizing properties:	Not known
Flash point:	Not applicable
Flammable limit:	Not applicable

10. STABILITY AND REACTIVITY

Chemical Stability:

Stable at room temperature in closed containers under normal storage and handling conditions.

Conditions to Avoid:

Incompatible materials.

Incompatibilities with Other Materials:

Oxidizing agents, acids, metals, anionic materials.

Hazardous Polymerization

Not occur.

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY:

Oral LD₅₀ (mouse) 1,600 mg/kg (tested as the hydrochloride)

Other:

MUTAGENIC EFFECTS: Negative in the Ames test (tested as the hydrochloride).

SUB-CHRONIC TOXICITY, CHRONIC TOXICITY, CARCINOGENIC EFFECTS, EFFECTS ON THE REPRODUCTIVE SYSTEM, TERATOGENIC EFFECTS: Non available

12. ECOLOGICAL INFORMATION

ECOTOXICITY:

BIODEGRADABILITY: No data available.

BIOACCUMULATION: (carp) Not bioaccumulatable (tested as the hydrochloride).

FISH TOXICITY: (oryzias latipes) 48hr-TLm 0.42 ppm (tested as the hydrochloride).

13. DISPOSAL CONSIDERATION

Follow all regulations in your country.

This material may be burned in a chemical incinerator equipped with an after-burner and scrubber.

Do not dump into sewers, on the ground or into any body of water.

14. TRANSPORT INFORMATION

UN No.: 3267

Proper Shipping Name: CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S.

Class or Division: Class 8

Packing Group: III

Marine Pollutant: P

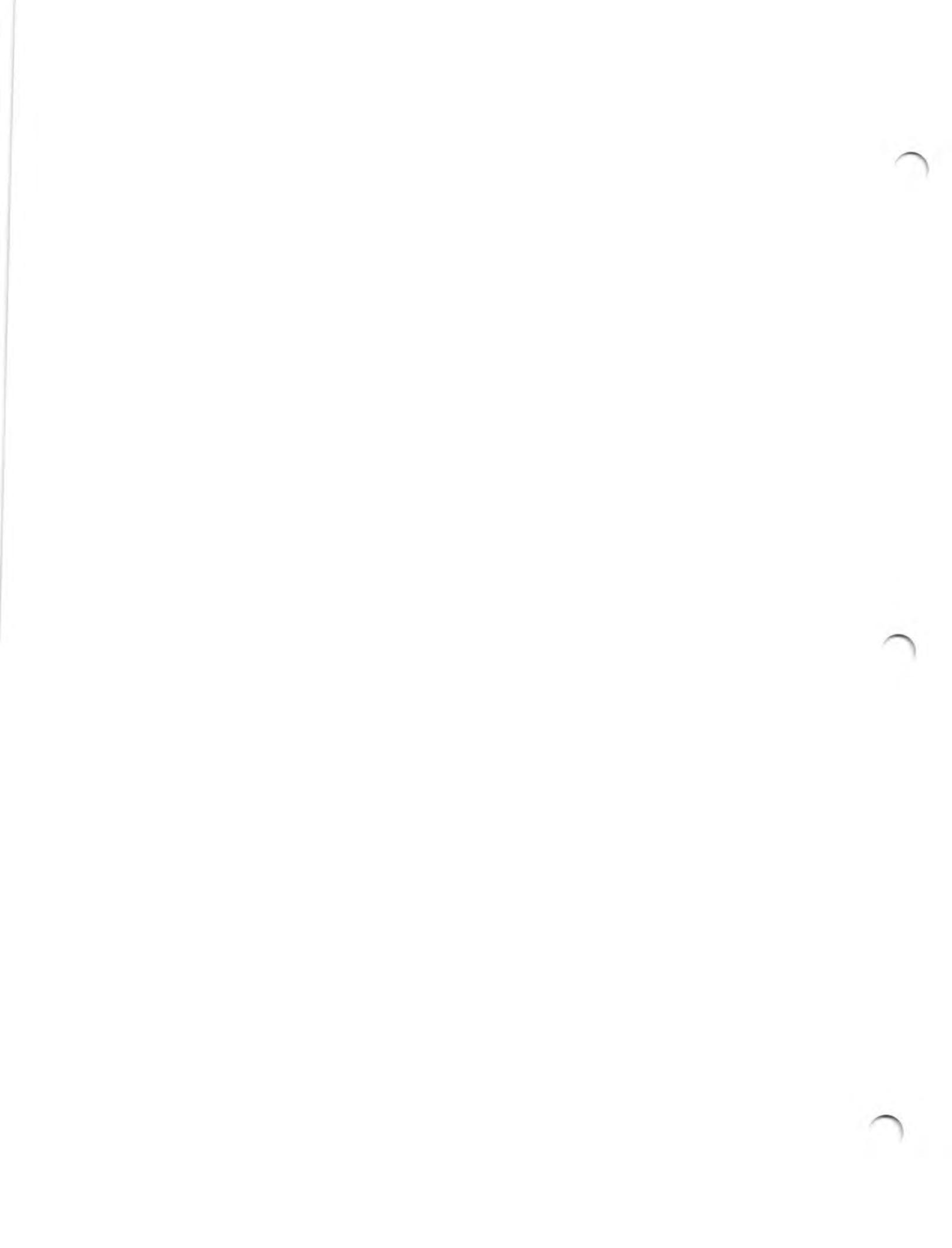
Follow all regulations in your country.

15. REGULATORY INFORMATION

Follow all regulations in your country.

16. Other information

The information herein is given in good faith, but no warranty, express or implied, is made.
All chemical materials may present unknown hazards and should be used in caution.
Final determination of suitability of any chemical materials is the sole responsibility of the user.



SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION	
Product Name:	PAA-1112
Synonyms:	
General Use:	Chemicals for various applications
Manufacturer	
Company Name:	Nittobo Medical Co., Ltd.
Address:	2-4-1 Kojimachi, Chiyoda-Ku, Tokyo, Japan 102-0083
Telephone No.:	+81-3-4582-5460
Fax No.:	+81-3-3514-3769
Emergency phone No.:	+81-3-4582-5460

2. HAZARDOUS IDENTIFICATION	
GHS	Skin Corrosion/Irritation (Category 1)
Classification:	Serious Eye Damage/Eye Irritation (Category 1)
GHS Label:	
Signal Word:	Danger
Hazard	Causes severe skin burns and eye damage
Statements:	Causes serious eye damage
Precautionary Statements:	P260 Do not breathe dust/fume/gas/mist/vapours/spray. P264 Wash thoroughly after handling. P273 Avoid release to the environment. P280 Wear protective gloves/protective clothing/eye protection/face protection. P301+P330+P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting. P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P310 IF exposed: Immediately call a POISON CENTER or doctor/physician. P321 Specific treatment (see on this label). P330 Rinse mouth. P363 Wash contaminated clothing before reuse.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<u>Component</u>	<u>Chemical Name</u>	<u>Wt%</u>	<u>CAS No.</u>	<u>TSCA No.</u>
A	Copolymer of 2-propen-1-amine with N,N-dimethyl-2-propen-1-amine	15	177606-24-5	
B	Water	85	7732-18-5	

4. FIRST AID MEASURES**Eye contact:**

Gently rinses the affected eyes with clean water for at least 15 minutes.

Arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.

A delay of only seconds may increase the injury.

Skin:

Remove contaminated clothing, shoes and socks from affected area as quickly as possible.

Continue to wash the affected area under running water until the feeling of stickiness or soapiness caused by the caustic chemical disappears.

If irritation persists, arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.

Inhalation:

Not applicable because of non-volatile aqueous solution.

Ingestion:

Rinse mouth with water. Arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.

Note to Physician

No specific information.

5. FIRE FIGHTING MEASURES**General Information:**

Keep personnel removed from and upwind of fire.

Firefighters should wear proper protective equipment.

Toxic gases (carbon monoxide, nitrogen oxides) will form upon combustion.

Extinguishing Media:

Use water spray, foam, and dry chemical or carbon dioxide.

6. ACCIDENTAL RELEASE MEASURES**General Information:**

Use proper personal protective equipment as indicated in Section 8.

Evacuate non-essential personnel.

Spills/Leaks:

Absorb spill with inert material (e.g., dry sand or earth), then place in a chemical waste containers.

Prevent spills from entering sewers, watercourses or areas.

Biological treatment is not effective.

7. HANDLING AND STRAGE**Handling:**

Avoid contact with skin or eyes.

To prevent contact, wear rubber gloves and protective eyeglasses or chemical safety goggles.

Make available in the work area emergency shower and eyes wash.

Storage:

Keep containers tightly closed when in not use.

To avoid corrosive, store in closed acid-resistant (e.g., polyethylene) containers.

Avoid long storage periods since the product degrades with age.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION**Engineering Controls:**

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

Personal Protective Equipment

Eyes: Wear protective eyeglasses or chemical safety goggles.

Skin: Wear appropriate rubber gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: For most conditions, no respiratory protection should be needed.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Yellow-Light brown liquid
Odour:	Characteristic odour
Boiling point:	100 °C (Water)
Freezing point:	about -4 °C
Sp. Gr. (at 25 °C):	about 1.02
pH-Value:	about 11.5
Viscosity (at 25 °C):	about 4mPa · s
Vapor pressure:	Not determined
Vapor density:	Not determined
Evaporation rate:	Not determined
Solubility in water:	Very soluble
Auto-ignition:	Not occur
Flammability:	Not flammable under normal conditions
Oxidizing properties:	Not known
Flash point:	Not applicable
Flammable limit:	Not applicable

10. STABILITY AND REACTIVITY

Chemical Stability:

Stable at room temperature in closed containers under normal storage and handling conditions.

Conditions to Avoid:

Incompatible materials.

Incompatibilities with Other Materials:

Oxidizing agents, acids, metals, anionic materials.

Hazardous Polymerization

Not occur.

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY:

Non available

Other:

MUTAGENIC EFFECTS: Negative in the Ames test.

SUB-CHRONIC TOXICITY, CHRONIC TOXICITY, CARCINOGENIC EFFECTS,
EFFECTS ON THE REPRODUCTIVE SYSTEM, TERATOGENIC EFFECTS: Non available

12. ECOLOGICAL INFORMATION

ECOTOXICITY:

BIODEGRADABILITY: No data available.

BIOACCUMULATION: No data available.

FISH TOXICITY: No data available.

13. DISPOSAL CONSIDERATION

Follow all regulations in your country.

This material may be burned in a chemical incinerator equipped with an after-burner and scrubber.

Do not dump into sewers, on the ground or into any body of water.

14. TRANSPORT INFORMATION

UN No.: 3267

Proper Shipping Name: CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S.

Class or Division: Class 8

Packing Group: III

Marine Pollutant: Not applicable

Follow all regulations in your country.

15. REGULATORY INFORMATION

Follow all regulations in your country.

16. Other information

The information herein is given in good faith, but no warranty, express or implied, is made.
All chemical materials may present unknown hazards and should be used in caution.
Final determination of suitability of any chemical materials is the sole responsibility of the user.

SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION	
Product Name:	PAS-21
Synonyms:	
General Use:	Chemicals for various applications
Manufacturer	
Company Name:	Nittobo Medical Co., Ltd.
Address:	2-4-1 Kojimachi, Chiyoda-Ku, Tokyo, Japan 102-0083
Telephone No.:	+81-3-4582-5460
Fax No.:	+81-3-3514-3769
Emergency phone No.:	+81-3-4582-5460

2. HAZARDOUS IDENTIFICATION	
GHS Classification:	Skin Corrosion/Irritation (Category 1) Eye Damage/Eye Irritation (Category 1)
GHS Label:	
Signal Word:	Danger
Hazard Statements:	Causes severe skin burns and eye damage Causes serious eye damage
Precautionary Statements:	P260 Do not breathe dust/fume/gas/mist/vapours/spray. P264 Wash thoroughly after handling. P280 Wear protective gloves/protective clothing/eye protection/face protection. P301+P330+P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting. P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P310 IF exposed: Immediately call a POISON CENTER or doctor/physician. P321 Specific treatment (see on this label). P363 Wash contaminated clothing before reuse. P405 Store locked up. P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<u>Component</u>	<u>Chemical Name</u>	<u>Wt%</u>	<u>CAS No.</u>	<u>TSCA No.</u>
A	Homopolymer of N-2-propenyl-2-propen-1-amine	15	62238-80-6	
B	Water	85	7732-18-5	

4. FIRST AID MEASURES**Eye contact:**

Gently rinses the affected eyes with clean water for at least 15 minutes.

Arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.

A delay of only seconds may increase the injury.

Skin:

Remove contaminated clothing, shoes and socks from affected area as quickly as possible.

Continue to wash the affected area under running water until the feeling of stickiness or soapiness caused by the caustic chemical disappears.

If irritation persists, arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.

Inhalation:

Not applicable because of non-volatile aqueous solution.

Ingestion:

Rinse mouth with water. Arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.

Note to Physician

No specific information.

5. FIRE FIGHTING MEASURES**General Information:**

Keep personnel removed from and upwind of fire.

Firefighters should wear proper protective equipment.

Toxic gases (carbon monoxide, nitrogen oxides) will form upon combustion.

Extinguishing Media:

Use water spray, foam, and dry chemical or carbon dioxide.

6. ACCIDENTAL RELEASE MEASURES**General Information:**

Use proper personal protective equipment as indicated in Section 8.

Evacuate non-essential personnel.

Spills/Leaks:

Absorb spill with inert material (e.g., dry sand or earth), then place in a chemical waste containers.

Prevent spills from entering sewers, watercourses or areas.

Biological treatment is not effective.

7. HANDLING AND STRAGE**Handling:**

Avoid contact with skin or eyes.

To prevent contact, wear rubber gloves and protective eyeglasses or chemical safety goggles.

Make available in the work area emergency shower and eyes wash.

Storage:

Keep containers tightly closed when in not use.

To avoid corrosive, store in closed acid-resistant (e.g., polyethylene) containers.

Avoid long storage periods since the product degrades with age.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION**Engineering Controls:**

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

Personal Protective Equipment

Eyes: Wear protective eyeglasses or chemical safety goggles.

Skin: Wear appropriate rubber gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: For most conditions, no respiratory protection should be needed.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Light Brown liquid
Odour:	Characteristic odour
Boiling point:	100 °C (Water)
Freezing point:	about -7 °C
Sp. Gr. (at 25 °C):	about 1.02
pH-Value:	about 12
Viscosity (at 25 °C):	about 6 mPa.s
Vapor pressure:	Not determined
Vapor density:	Not determined
Evaporation rate:	Not determined
Solubility in water:	Very soluble
Auto-ignition:	Not occur
Flammability:	Not flammable under normal conditions
Oxidizing properties:	Not known
Flash point:	Not applicable
Flammable limit:	Not applicable

10. STABILITY AND REACTIVITY

Chemical Stability:

Stable at room temperature in closed containers under normal storage and handling conditions.

Conditions to Avoid:

Incompatible materials.

Incompatibilities with Other Materials:

Oxidizing agents, acids, metals, anionic materials.

Hazardous Polymerization

Not occur.

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY:

Non available

Other:

MUTAGENIC EFFECTS: Negative in the Ames test (tested as the hydrochloride).

SUB-CHRONIC TOXICITY, CHRONIC TOXICITY, CARCINOGENIC EFFECTS, EFFECTS ON THE REPRODUCTIVE SYSTEM, TERATOGENIC EFFECTS: Non available

12. ECOLOGICAL INFORMATION

ECOTOXICITY:

BIODEGRADABILITY: No data available.

BIOACCUMULATION: No data available.

FISH TOXICITY: No data available.

13. DISPOSAL CONSIDERATION

Follow all regulations in your country.

This material may be burned in a chemical incinerator equipped with an after-burner and scrubber.

Do not dump into sewers, on the ground or into any body of water.

14. TRANSPORT INFORMATION

UN No.: 3267

Proper Shipping Name: CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S.

Class or Division: Class 8

Packing Group: III

Marine Pollutant: Not applicable

Follow all regulations in your country.

15. REGULATORY INFORMATION

Follow all regulations in your country.

16. Other information

The information herein is given in good faith, but no warranty, express or implied, is made.
All chemical materials may present unknown hazards and should be used in caution.
Final determination of suitability of any chemical materials is the sole responsibility of the user.



SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION	
Product Name:	PAS-880
Synonyms:	
General Use:	Chemicals for various applications
Manufacturer	
Company Name:	Nittobo Medical Co., Ltd.
Address:	2-4-1 Kojimachi, Chiyoda-Ku, Tokyo, Japan 102-0083
Telephone No.:	+81-3-4582-5460
Fax No.:	+81-3-3514-3769
Emergency phone No.:	+81-3-4582-5460

2. HAZARDOUS IDENTIFICATION	
GHS	
Classification:	Aquatic Hazard (Acute) (Category 2)
GHS Label:	No pictogram
Signal Word:	No signal word
Hazard	
Statements:	Toxic to aquatic life
Precautionary	P273 Avoid release to the environment.
Statements:	P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

3. COMPOSITION/INFORMATION ON INGREDIENTS				
<u>Component</u>	<u>Chemical Name</u>	<u>Wt%</u>	<u>CAS No.</u>	<u>TSCA No.</u>
A	Copolymer of N,N-dimethyl-N-2-propenyl-2-propen-1-aminium chloride with N-(3-chloro-2-hydroxypropyl)-N-2-propenyl-2-propene-1-amine	35	75665-34-8	
B	Water	65	7732-18-5	

4. FIRST AID MEASURES

Eye contact:

Gently rinses the affected eyes with clean water for at least 15 minutes.

Arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.

A delay of only seconds may increase the injury.

Skin:

Remove contaminated clothing, shoes and socks from affected area as quickly as possible.

Wash the affected area under running water.

If irritation persists, arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.

Inhalation:

Not applicable because of non-volatile aqueous solution.

Ingestion:

Rinse mouth with water. Arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.

Note to Physician

No specific information.

5. FIRE FIGHTING MEASURES

General Information:

Keep personnel removed from and upwind of fire.

Firefighters should wear proper protective equipment.

Toxic gases (carbon monoxide, hydrogen chloride, and nitrogen oxides) will form upon combustion.

Extinguishing Media:

Use water spray, foam, and dry chemical or carbon dioxide.

6. ACCIDENTAL RELEASE MEASURES

General Information:

Use proper personal protective equipment as indicated in Section 8.

Evacuate non-essential personnel.

Spills/Leaks:

Absorb spill with inert material (e.g., dry sand or earth), then place in a chemical waste containers.

Prevent spills from entering sewers, watercourses or areas.

Biological treatment is not effective.

7. HANDLING AND STRAGE

Handling:

Avoid contact with skin or eyes.

To prevent contact, wear rubber gloves and protective eyeglasses or chemical safety goggles.

Make available in the work area emergency shower and eyes wash.

Storage:

Keep containers tightly closed when in not use.

To avoid corrosive, store in closed acid-resistant (e.g., polyethylene) containers.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION**Engineering Controls:**

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

Personal Protective Equipment

Eyes: Wear protective eyeglasses or chemical safety goggles.

Skin: Wear appropriate rubber gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: For most conditions, no respiratory protection should be needed.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Yellow-Light brown liquid
Odour:	Characteristic odour
Boiling point:	100 °C (Water)
Freezing point:	about -8 °C
Sp. Gr. (at 25 °C):	about 1.08
pH-Value:	about 2-2.5
Viscosity (at 25 °C):	About 200 mPa.s
Vapor pressure:	Not determined
Vapor density:	Not determined
Evaporation rate:	Not determined
Solubility in water:	Very soluble
Auto-ignition:	Not occur
Flammability:	Not flammable under normal conditions
Oxidizing properties:	Not known
Flash point:	Not applicable
Flammable limit:	Not applicable

10. STABILITY AND REACTIVITY**Chemical Stability:**

Stable at room temperature in closed containers under normal storage and handling conditions.

Conditions to Avoid:

Incompatible materials.

Incompatibilities with Other Materials:

Oxidizing agents, metals, anionic materials.

Hazardous Polymerization

Not occur.

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY:

Oral LD₅₀ (mouse) 3,990 mg/kg

Other:

MUTAGENIC EFFECTS: Negative in the Ames test.

SUB-CHRONIC TOXICITY, CHRONIC TOXICITY, CARCINOGENIC EFFECTS, EFFECTS ON THE REPRODUCTIVE SYSTEM, TERATOGENIC EFFECTS: Non available

12. ECOLOGICAL INFORMATION

ECOTOXICITY:

BIODEGRADABILITY: No data available.

BIOACCUMULATION: No data available.

FISH TOXICITY: (oryzias latipes) 48hr-TLm 0.6 ppm

13. DISPOSAL CONSIDERATION

Follow all regulations in your country.

This material may be burned in a chemical incinerator equipped with an after-burner and scrubber.
Do not dump into sewers, on the ground or into any body of water.

14. TRANSPORT INFORMATION

UN No.: 3082

Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.

Class or Division: Class 9

Packing Group: III

Marine Pollutant: P

Follow all regulations in your country.

15. REGULATORY INFORMATION

Follow all regulations in your country.

16. Other information

The information herein is given in good faith, but no warranty, express or implied, is made.

All chemical materials may present unknown hazards and should be used in caution.

Final determination of suitability of any chemical materials is the sole responsibility of the user.

SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION	
Product Name:	PAS-92
Synonyms:	
General Use:	Chemicals for various applications
Manufacturer	
Company Name:	Nittobo Medical Co., Ltd.
Address:	2-4-1 Kojimachi, Chiyoda-Ku, Tokyo, Japan 102-0083
Telephone No.:	+81-3-4582-5460
Fax No.:	+81-3-3514-3769
Emergency Phone No.:	+81-3-4582-5460

2. HAZARDOUS IDENTIFICATION	
GHS Classification:	Skin Corrosion/Irritation (Category 1) Eye Damage/Eye Irritation (Category 1) Aquatic Hazard (Acute) (Category 2)
GHS Label:	
Signal Word:	Danger
Hazard Statements:	Causes severe skin burns and eye damage Causes serious eye damage Toxic to aquatic life
Precautionary Statements:	P260 Do not breathe dust/fume/gas/mist/vapours/spray. P264 Wash thoroughly after handling. P273 Avoid release to the environment. P280 Wear protective gloves/protective clothing/eye protection/face protection. P301+P330+P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting. P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P310 IF exposed: Immediately call a POISON CENTER or doctor/physician. P321 Specific treatment (see on this label). P363 Wash contaminated clothing before reuse. P405 Store locked up. P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

3. COMPOSITION/INFORMATION ON INGREDIENTS				
<u>Component</u>	<u>Chemical Name</u>	<u>Wt%</u>	<u>CAS No.</u>	<u>TSCA No.</u>
A	Copolymer of N-2-propenyl-2-propen-1-amine hydrochloride with sulfur dioxide	20	26678-66-0	
B	Water	80	7732-18-5	

4. FIRST AID MEASURES
<p>Eye contact: Gently rinses the affected eyes with clean water for at least 15 minutes. Arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible. A delay of only seconds may increase the injury.</p> <p>Skin: Remove contaminated clothing, shoes and socks from affected area as quickly as possible. Wash the affected area under running water. If irritation persists, arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.</p> <p>Inhalation: Not applicable because of non-volatile aqueous solution.</p> <p>Ingestion: Rinse mouth with water. Arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.</p> <p>Note to Physician No specific information.</p>

5. FIRE FIGHTING MEASURES
<p>General Information: Keep personnel removed from and upwind of fire. Firefighters should wear proper protective equipment. Toxic gases (carbon monoxide, hydrogen chloride, nitrogen oxides, and sulfur oxides) will form upon combustion.</p> <p>Extinguishing Media: Use water spray, foam, and dry chemical or carbon dioxide.</p>

6. ACCIDENTAL RELEASE MEASURES
<p>General Information: Use proper personal protective equipment as indicated in Section 8. Evacuate non-essential personnel.</p> <p>Spills/Leaks: Absorb spill with inert material (e.g., dry sand or earth), then place in a chemical waste containers. Prevent spills from entering sewers, watercourses or areas. Biological treatment is not effective.</p>

7. HANDLING AND STRAGE**Handling:**

Avoid contact with skin or eyes.

To prevent contact, wear rubber gloves and protective eyeglasses or chemical safety goggles.

Make available in the work area emergency shower and eyes wash.

Storage:

Keep containers tightly closed when in not use.

To avoid corrosive, store in closed acid-resistant (e.g., polyethylene) containers.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION**Engineering Controls:**

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

Personal Protective Equipment

Eyes: Wear protective eyeglasses or chemical safety goggles.

Skin: Wear appropriate rubber gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: For most conditions, no respiratory protection should be needed.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Pale Yellow liquid (become turbid at <math><20\text{ }^{\circ}\text{C}</math>)
Odour:	Characteristic odour
Boiling point:	100 $^{\circ}\text{C}$ (Water)
Freezing point:	about -6 $^{\circ}\text{C}$
Sp. Gr. (at 30 $^{\circ}\text{C}$):	about 1.08
pH-Value (5% aq.):	about 2
Viscosity (at 30 $^{\circ}\text{C}$):	about 4-7 mPa.s
Vapor pressure:	Not determined
Vapor density:	Not determined
Evaporation rate:	Not determined
Solubility in water:	Very soluble
Auto-ignition:	Not occur
Flammability:	Not flammable under normal conditions
Oxidizing properties:	Not known
Flash point:	Not applicable
Flammable limit:	Not applicable

10. STABILITY AND REACTIVITY

Chemical Stability:

Stable at room temperature in closed containers under normal storage and handling conditions.

Conditions to Avoid:

Incompatible materials.

Incompatibilities with Other Materials:

Oxidizing agents, bases, metals, anionic materials.

Hazardous Polymerization

Not occur.

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY:

Oral LD₅₀ (mouse) 1,950 mg/kg

Other:

MUTAGENIC EFFECTS: Negative in the Ames test.

SUB-CHRONIC TOXICITY, CHRONIC TOXICITY, CARCINOGENIC EFFECTS, EFFECTS ON THE REPRODUCTIVE SYSTEM, TERATOGENIC EFFECTS: Non available

12. ECOLOGICAL INFORMATION

ECOTOXICITY:

BIODEGRADABILITY: No data available.

BIOACCUMULATION: No data available.

FISH TOXICITY: (oryzias latipes) 48hr-TLm 1.08 pm

13. DISPOSAL CONSIDERATION

Follow all regulations in your country.

This material may be burned in a chemical incinerator equipped with an after-burner and scrubber.

Do not dump into sewers, on the ground or into any body of water.

14. TRANSPORT INFORMATION

UN No.: 3265

Proper Shipping Name: CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.

Class or Division: Class 8

Packing Group: III

Marine Pollutant: Not applicable

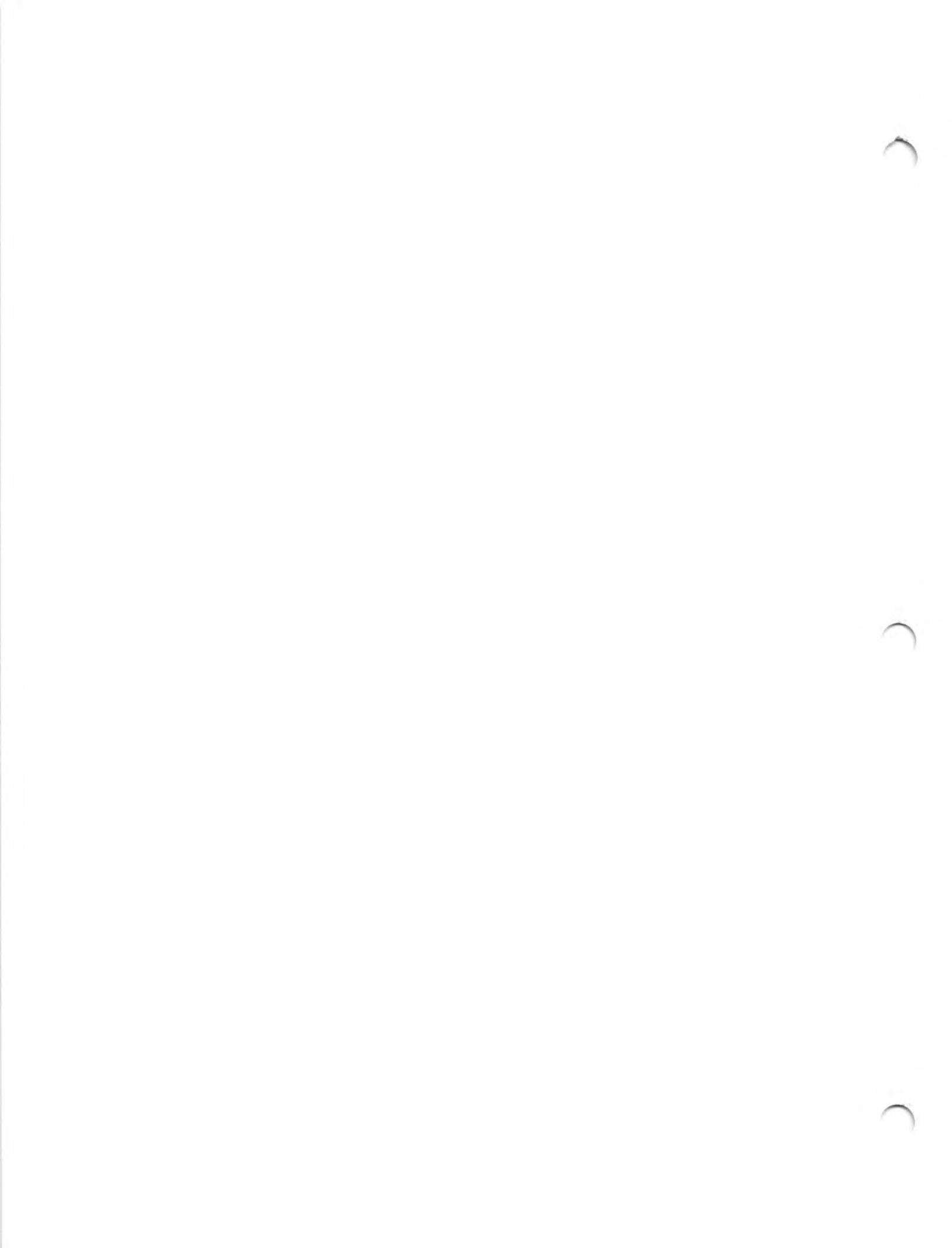
Follow all regulations in your country.

15. REGULATORY INFORMATION

Follow all regulations in your country.

16. Other information

The information herein is given in good faith, but no warranty, express or implied, is made.
All chemical materials may present unknown hazards and should be used in caution.
Final determination of suitability of any chemical materials is the sole responsibility of the user.



SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION	
Product Name:	PAS-H-1L
Synonyms:	
General Use:	Chemicals for various applications
Manufacturer	
Company Name:	Nittobo Medical Co., Ltd.
Address:	2-4-1 Kojimachi, Chiyoda-Ku, Tokyo, Japan 102-0083
Telephone No.:	+81-3-4582-5460
Fax No.:	+81-3-3514-3769
Emergency phone No.:	+81-3-4582-5460

2. HAZARDOUS IDENTIFICATION	
GHS Classification:	Skin Corrosion/Irritation (Category 1) Eye Damage/Eye Irritation (Category 1) Aquatic Hazard (Acute) (Category 2)
GHS Label:	
Signal Word:	Danger
Hazard Statements:	Causes severe skin burns and eye damage Causes serious eye damage Toxic to aquatic life
Precautionary Statements:	P260 Do not breathe dust/fume/gas/mist/vapours/spray. P264 Wash thoroughly after handling. P273 Avoid release to the environment. P280 Wear protective gloves/protective clothing/eye protection/face protection. P301+P330+P331 IF SWALLOWED: rinse mouth. DO NOT induce vomiting. P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P310 IF exposed: Immediately call a POISON CENTER or doctor/physician. P321 Specific treatment (see on this label). P363 Wash contaminated clothing before reuse. P405 Store locked up. P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

3. COMPOSITION/INFORMATION ON INGREDIENTS				
<u>Component</u>	<u>Chemical Name</u>	<u>Wt%</u>	<u>CAS No.</u>	<u>TSCA No.</u>
A	Homopolymer of N,N-dimethyl-N-2-propenyl-2-propen-1-aminium chloride	28	26062-79-3	26062-79-3
B	Water	72	7732-18-5	

4. FIRST AID MEASURES
<p>Eye contact: Gently rinses the affected eyes with clean water for at least 15 minutes. Arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible. A delay of only seconds may increase the injury.</p> <p>Skin: Remove contaminated clothing, shoes and socks from affected area as quickly as possible. Wash the affected area under running water. If irritation persists, arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.</p> <p>Inhalation: Not applicable because of non-volatile aqueous solution.</p> <p>Ingestion: Rinse mouth with water. Arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.</p> <p>Note to Physician No specific information.</p>

5. FIRE FIGHTING MEASURES
<p>General Information: Keep personnel removed from and upwind of fire. Firefighters should wear proper protective equipment. Toxic gases (carbon monoxide, hydrogen chloride, and nitrogen oxides) will form upon combustion.</p> <p>Extinguishing Media: Use water spray, foam, and dry chemical or carbon dioxide.</p>

6. ACCIDENTAL RELEASE MEASURES
<p>General Information: Use proper personal protective equipment as indicated in Section 8. Evacuate non-essential personnel.</p> <p>Spills/Leaks: Absorb spill with inert material (e.g., dry sand or earth), then place in a chemical waste containers. Prevent spills from entering sewers, watercourses or areas. Biological treatment is not effective.</p>

7. HANDLING AND STRAGE**Handling:**

Avoid contact with skin or eyes.

To prevent contact, wear rubber gloves and protective eyeglasses or chemical safety goggles.

Make available in the work area emergency shower and eyes wash.

Storage:

Keep containers tightly closed when in not use.

To avoid corrosive, store in closed acid-resistant (e.g., polyethylene) containers.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION**Engineering Controls:**

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

Personal Protective Equipment

Eyes: Wear protective eyeglasses or chemical safety goggles.

Skin: Wear appropriate rubber gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: For most conditions, no respiratory protection should be needed.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Colorless-Pale Yellow liquid
Odour:	Characteristic odour
Boiling point:	100 °C (Water)
Freezing point:	about -8 °C
Sp. Gr. (at 25 °C):	about 1.06
pH-Value:	about 2
Viscosity (at 25 °C):	about 15 mPa.s
Vapor pressure:	Not determined
Vapor density:	Not determined
Evaporation rate:	Not determined
Solubility in water:	Very soluble
Auto-ignition:	Not occur
Flammability:	Not flammable under normal conditions
Oxidizing properties:	Not known
Flash point:	Not applicable
Flammable limit:	Not applicable

10. STABILITY AND REACTIVITY

Chemical Stability:
Stable at room temperature in closed containers under normal storage and handling conditions.
Conditions to Avoid:
Incompatible materials.
Incompatibilities with Other Materials:
Oxidizing agents, metals, anionic materials.
Hazardous Polymerization
Not occur.

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY:
Oral LD₅₀ (rat) 2,000 mg/kg
Other:
MUTAGENIC EFFECTS: Negative in the Ames test.
SUB-CHRONIC TOXICITY, CHRONIC TOXICITY, CARCINOGENIC EFFECTS, EFFECTS ON THE REPRODUCTIVE SYSTEM, TERATOGENIC EFFECTS: Non available

12. ECOLOGICAL INFORMATION

ECOTOXICITY:
BIODEGRADABILITY: No data available.
BIOACCUMULATION: No data available.
FISH TOXICITY: (oryzias latipes) 48hr-TLm 0.73 ppm

13. DISPOSAL CONSIDERATION

Follow all regulations in your country.
This material may be burned in a chemical incinerator equipped with an after-burner and scrubber.
Do not dump into sewers, on the ground or into any body of water.

14. TRANSPORT INFORMATION

UN No.: 3265
Proper Shipping Name: CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.
Class or Division: Class 8
Packing Group: III
Marine Pollutant: P

Follow all regulations in your country.

15. REGULATORY INFORMATION

Follow all regulations in your country.

16. Other information

The information herein is given in good faith, but no warranty, express or implied, is made.
All chemical materials may present unknown hazards and should be used in caution.
Final determination of suitability of any chemical materials is the sole responsibility of the user.



SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION	
Product Name:	PAS-M-1L
Synonyms:	
General Use:	Chemicals for various applications
Manufacturer	
Company Name:	Nittobo Medical Co., Ltd.
Address:	2-4-1 Kojimachi, Chiyoda-Ku, Tokyo, Japan 102-0083
Telephone No.:	+81-3-4582-5460
Fax No.:	+81-3-3514-3769
Emergency phone No.:	+81-3-4582-5460

2. HAZARDOUS IDENTIFICATION	
GHS Classification:	Skin Corrosion/Irritation (Category 1) Eye Damage/Eye Irritation (Category 1)
GHS Label:	
Signal Word:	Danger
Hazard	Causes severe skin burns and eye damage
Statements:	Causes serious eye damage
Precautionary Statements:	P260 Do not breathe dust/fume/gas/mist/vapours/spray. P264 Wash thoroughly after handling. P280 Wear protective gloves/protective clothing/eye protection/face protection. P301+P330+P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting. P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P310 IF exposed: Immediately call a POISON CENTER or doctor/physician. P321 Specific treatment (see on this label). P363 Wash contaminated clothing before reuse. P405 Store locked up. P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<u>Component</u>	<u>Chemical Name</u>	<u>Wt%</u>	<u>CAS No.</u>	<u>TSCA No.</u>
A	Homopolymer of N-methyl-N-2-propenyl-2-propen-1-amine hydrochloride	25	29566-78-7	29566-78-7
B	Water	75	7732-18-5	

4. FIRST AID MEASURES**Eye contact:**

Gently rinses the affected eyes with clean water for at least 15 minutes.

Arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.

A delay of only seconds may increase the injury.

Skin:

Remove contaminated clothing, shoes and socks from affected area as quickly as possible.

Wash the affected area under running water.

If irritation persists, arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.

Inhalation:

Not applicable because of non-volatile aqueous solution.

Ingestion:

Rinse mouth with water. Arrange for transport to the nearest medical facility for examination and treatment by a physician as soon as possible.

Note to Physician

No specific information.

5. FIRE FIGHTING MEASURES**General Information:**

Keep personnel removed from and upwind of fire.

Firefighters should wear proper protective equipment.

Toxic gases (carbon monoxide, hydrogen chloride, and nitrogen oxides) will form upon combustion.

Extinguishing Media:

Use water spray, foam, and dry chemical or carbon dioxide.

6. ACCIDENTAL RELEASE MEASURES**General Information:**

Use proper personal protective equipment as indicated in Section 8.

Evacuate non-essential personnel.

Spills/Leaks:

Absorb spill with inert material (e.g., dry sand or earth), then place in a chemical waste containers.

Prevent spills from entering sewers, watercourses or areas.

Biological treatment is not effective.

7. HANDLING AND STRAGE**Handling:**

Avoid contact with skin or eyes.

To prevent contact, wear rubber gloves and protective eyeglasses or chemical safety goggles.

Make available in the work area emergency shower and eyes wash.

Storage:

Keep containers tightly closed when in not use.

To avoid corrosive, store in closed acid-resistant (e.g., polyethylene) containers.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION**Engineering Controls:**

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

Personal Protective Equipment

Eyes: Wear protective eyeglasses or chemical safety goggles.

Skin: Wear appropriate rubber gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: For most conditions, no respiratory protection should be needed.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Yellow liquid
Odour:	Characteristic odour
Boiling point:	100 °C (Water)
Freezing point:	about -5 °C
Sp. Gr. (at 25 °C):	about 1.05
pH-Value:	about 1.5
Viscosity (at 25 °C):	about 10 mPa.s
Vapor pressure:	Not determined
Vapor density:	Not determined
Evaporation rate:	Not determined
Solubility in water:	Very soluble
Auto-ignition:	Not occur
Flammability:	Not flammable under normal conditions
Oxidizing properties:	Not known
Flash point:	Not applicable
Flammable limit:	Not applicable

10. STABILITY AND REACTIVITY

Chemical Stability:

Stable at room temperature in closed containers under normal storage and handling conditions.

Conditions to Avoid:

Incompatible materials.

Incompatibilities with Other Materials:

Oxidizing agents, bases, metals, anionic materials.

Hazardous Polymerization

Not occur.

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY:

Non available

Other:

SUB-CHRONIC TOXICITY, CHRONIC TOXICITY, CARCINOGENIC EFFECTS, MUTAGENIC EFFECTS, EFFECTS ON THE REPRODUCTIVE SYSTEM, TERATOGENIC EFFECTS:

Non available

12. ECOLOGICAL INFORMATION

ECOTOXICITY:

BIODEGRADABILITY: No data available.

BIOACCUMULATION: No data available.

FISH TOXICITY: No data available.

13. DISPOSAL CONSIDERATION

Follow all regulations in your country.

This material may be burned in a chemical incinerator equipped with an after-burner and scrubber.

Do not dump into sewers, on the ground or into any body of water.

14. TRANSPORT INFORMATION

UN No.: 3265

Proper Shipping Name: CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.

Class or Division: Class 8

Packing Group: III

Marine Pollutant: Not applicable

Follow all regulations in your country.

15. REGULATORY INFORMATION

Follow all regulations in your country.

16. Other information

The information herein is given in good faith, but no warranty, express or implied, is made.
All chemical materials may present unknown hazards and should be used in caution.
Final determination of suitability of any chemical materials is the sole responsibility of the user.

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