SAFETY DATA SHEET

ABZOL® JG

SDS Number: RS_000001540

Version	Revision Date:	Date of last issue: 2020/03/09	Print Date:
1.1	2020/03/17	Date of first issue: 2020/03/09	2020/03/17

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : ABZOL® JG

Manufacturer or supplier's details

Company name of supplier : アルベマール日本株式会社

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Tokyo , 107-0052
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一般財団法人海上災害防止センター (Maritime Disaster Prevention Center)
横浜本部事故対応電話 (Yokohama main office Phone: 045-224-4303)
西日本支所事故対応電話 (West Japan Branch Phone: 080-1020-9407)

Contact person product safety : DEPARTMENT OF PRODUCT SAFETY

E-mail address : PRODUCTSAFETY@ALBEMARLE.COM

Recommended use of the chemical and restrictions on use

Recommended use : Intermediate

Restrictions on use : Use only in closed systems.

2. HAZARDS IDENTIFICATION

GHS Classification

Skin irritation : Category 2

Eye irritation : Category 2

Carcinogenicity (Inhalation) : Category 2

Reproductive toxicity	:	Category 1B
Specific target organ toxicity - single exposure	:	Category 3 (Respiratory system, Central nervous system)
Specific target organ toxicity - repeated exposure	:	Category 2
Long-term (chronic) aquatic hazard	:	Category 3

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements :

H315 Causes skin irritation.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H336 May cause drowsiness or dizziness.
H351 Suspected of causing cancer if inhaled.
H360FD May damage fertility. May damage the unborn child.
H373 May cause damage to organs (Systemic toxicity) through prolonged or repeated exposure.
H412 Harmful to aquatic life with long lasting effects.

Precautionary statements :

Prevention:

P201 Obtain special instructions before use.
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:

P308 + P313 IF exposed or concerned: Get medical advice/ attention.

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.

Other hazards which do not result in classification

None known.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Components

Chemical name	CAS-No.	Concentration (% w/w)	ENCS/ISHL number
1-bromopropane	106-94-5	99	2-73
1,2-epoxybutane	106-88-7	>= 0.25 - < 1	2-229
nitroethane	79-24-3	>= 0.25 - < 1	2-192

4. FIRST AID MEASURES

General advice : First Aid responders should pay attention to self-protection and use the recommended protective clothing
Ensure that eyewash stations and safety showers are close to the workstation location.

If inhaled : Move to fresh air.
If breathing is difficult, give oxygen.
If breathing is irregular or stopped, administer artificial respiration.
Keep the victim calm and in a semi-upright position.
Consult a physician.

In case of skin contact : Wash off immediately with plenty of water for at least 15 minutes.
If symptoms persist, call a physician.

In case of eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.

If swallowed : Clean mouth with water and drink afterwards plenty of water.
Do NOT induce vomiting.

Most important symptoms and effects, both acute and delayed : Irritation
Drowsiness
Dizziness
See Section 2.

Notes to physician : Treat symptomatically.
For specialist advice physicians should contact the Poisons Information Service.

5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Carbon dioxide (CO2) Dry chemical Foam Water mist Keep containers and surroundings cool with water spray.
Unsuitable extinguishing media	:	No information available.
Specific hazards during fire-fighting	:	May release toxic, irritating and/or corrosive gases. In the event of fire and/or explosion do not breathe fumes.
Hazardous combustion products	:	Carbon oxides Nitrogen oxides (NOx) Bromine Hydrogen bromide
Specific extinguishing methods	:	Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Special protective equipment for firefighters	:	Wear full protective clothing and self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray. Remove all sources of ignition. Evacuate personnel to safe areas. Wear personal protective equipment. Refer to protective measures listed in sections 7 and 8.
Environmental precautions	:	Avoid release to the environment. Do not flush into surface water or sanitary sewer system. Do not allow contact with soil, surface or ground water. Prevent further leakage or spillage if safe to do so.
Methods and materials for containment and cleaning up	:	Take up small spills with dry chemical adsorbent. Large spills may be taken up with pump or vacuum and finished off with dry chemical absorbent. Pick up and transfer to properly labelled containers. Clean contaminated floors and objects thoroughly while observing environmental regulations. May require excavation of contaminated soil.

7. HANDLING AND STORAGE

Handling

Advice on protection against fire and explosion	:	Use product only in closed system. Use explosion-proof equipment. To avoid ignition of vapours by static electricity discharge, all metal parts of the equipment must be grounded.
Advice on safe handling	:	Use product only in closed system. Provide sufficient air exchange and/or exhaust in work rooms. Local exhaust is needed at source of vapours. Do not breathe dust/ fume/ gas/ mist/ vapours/ spray. Wear protective gloves/ protective clothing/ eye protection/ face protection. For personal protection see section 8. Wash hands and face before breaks and immediately after handling the product. In general, emissions are controlled and prevented by implementing an appropriate management system, including regular informing and training workers.
Avoidance of contact	:	Incompatible with strong bases and oxidizing agents. Alkali metals Prolonged contact with free water may result in corrosion and diminished stabilizer levels.
Hygiene measures	:	Handle in accordance with good industrial hygiene and safety practice.

Storage

Conditions for safe storage	:	Keep containers tightly closed in a dry, cool and well-ventilated place. Store locked up. Local exhaust is needed at source of vapours. Mechanical ventilation is recommended. Keep away from sources of ignition - No smoking. Use explosion-proof equipment.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Threshold limit value and permissible exposure limits for each component in the work environment

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
1-bromopropane	106-94-5	OEL-M	0.5 ppm 2.5 mg/m3	JP OEL JSOH
	Further information: Group 2: Substances presumed to cause reproductive toxicity in humans, Group 2B: possibly carcinogenic to humans			
		TWA	0.1 ppm	ACGIH

nitroethane	79-24-3	TWA	100 ppm	ACGIH

Engineering measures : Use product only in closed system.
Provide sufficient air exchange and/or exhaust in work rooms.

Personal protective equipment

Respiratory protection : Respirator with a full face mask
Respirator with filter for organic vapour

Hand protection
Material : Wear suitable gloves resistant to chemical penetration.

Remarks : Neoprene gloves Rubber gloves.

Eye protection : Wear safety glasses with side shields or goggles.

Skin and body protection : If skin contact or contamination of clothing is likely, protective clothing should be worn.

Protective measures : Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : liquid (20 °C , 1,013 hPa)

Colour : colourless, light yellow

Odour : characteristic, pungent

Odour Threshold : No data available

pH : No data available

Melting point/freezing point : -110 °C
(1,013 hPa)

Boiling point/boiling range : 71 °C
(1,013 hPa)

Flash point : ca. 21 °C

According to the Annex VI of REACH, 1-bromopropane is classified as Flam. Liq. 2 (H225). This substance is also officially classified as Class 3 according to UN Recommendations on the Transport of Dangerous Goods. However, further standard testing showed no flash point.

Evaporation rate : No data available

Flammability (solid, gas)	:	Not applicable
Flammability (liquids)	:	The product is not flammable.
Burning number	:	No data available
Upper explosion limit / Upper flammability limit	:	8 %(V)
Lower explosion limit / Lower flammability limit	:	4 %(V)
Vapour pressure	:	147.72 hPa (20 °C)
Relative vapour density	:	4.24
Relative density	:	1.35 (20 °C)
Density	:	No data available
Solubility(ies)		
Water solubility	:	2.45 g/l (20 °C)
Solubility in other solvents	:	No data available
Partition coefficient: n-octanol/water	:	log Pow: 2.1
Auto-ignition temperature	:	None.
Decomposition temperature	:	Not applicable
Viscosity		
Viscosity, dynamic	:	0.52 mPa.s (20 °C)
Viscosity, kinematic	:	No data available
Explosive properties	:	No chemical groups associated to explosive properties.
Oxidizing properties	:	No chemical groups associated to oxidising properties.
Self-heating substances	:	The substance or mixture is not classified as self heating.
Surface tension	:	study scientifically unjustified
Sublimation point	:	Not applicable

10. STABILITY AND REACTIVITY

Reactivity	:	No dangerous reaction known under conditions of normal use.

Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	No dangerous reaction known under conditions of normal use.
Conditions to avoid	:	Material forms a flammable mixture with air over a narrow concentrations range (4-7%). Heat, flames and sparks.
Incompatible materials	:	Incompatible with strong bases and oxidizing agents. Alkali metals Prolonged contact with free water may result in corrosion and diminished stabilizer levels.
Hazardous decomposition products	:	Carbon oxides Nitrogen oxides (NOx) Bromine Hydrogen bromide

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Product:

Acute inhalation toxicity	:	Acute toxicity estimate: > 20 mg/l Exposure time: 4 h Test atmosphere: vapour Method: Calculation method

Components:

1-bromopropane:

Acute oral toxicity	:	LD50 (Rat, male and female): > 2,000 mg/kg Method: OECD Test Guideline 401
Acute inhalation toxicity	:	LC50 (Rat, male and female): 35 mg/l Exposure time: 4 h Test atmosphere: vapour Method: OECD Test Guideline 403
Acute dermal toxicity	:	LD50 (Rat, male and female): > 2,000 mg/kg Method: OECD Test Guideline 402 Remarks: No mortality observed at this dose.

1,2-epoxybutane:

Acute oral toxicity	:	LD50 (Rat, male and female): ca. 900 mg/kg
Acute inhalation toxicity	:	LC50 (Rat, male and female): > 6.3 mg/l

Exposure time: 4 h
Test atmosphere: vapour
Method: OECD Test Guideline 403
Remarks: An LC50/inhalation/4h/rat could not be determined because no mortality of rats was observed at the maximum achievable concentration.

Acute dermal toxicity : LD50 (Rabbit, male): 1,500 - 2,950 mg/kg

nitroethane:

Acute oral toxicity : LD50 (Rat, male and female): 1,083 - 1,428 mg/kg

Acute inhalation toxicity : LC50 (Rat, male and female): 6025 ppm
Exposure time: 4 h
Test atmosphere: vapour

Acute dermal toxicity : LD50 (Rabbit, male and female): > 2,000 mg/kg
Remarks: No mortality observed at this dose.

Skin corrosion/irritation

Components:

1-bromopropane:

Species : Rabbit
Method : According to a standard method
Result : No skin irritation

Result : Irritating to skin.
Remarks : According to Annex VI of REACH

1,2-epoxybutane:

Species : Rabbit
Method : Draize Test
Result : No skin irritation

Result : Irritating to skin.
Remarks : According to Annex VI of REACH

nitroethane:

Species : Rabbit
Result : No skin irritation

Serious eye damage/eye irritation

Components:

1-bromopropane:

Species : Rabbit

Result : Irritating to eyes.
Method : According to a standard method

1,2-epoxybutane:

Species : Rabbit
Result : No eye irritation
Method : According to a standard method

Result : Irritating to eyes.
Remarks : According to Annex VI of REACH

nitroethane:

Species : Rabbit
Result : Slightly irritating but not sufficient for classification.
Method : According to a standard method

Respiratory or skin sensitisation

Components:

1-bromopropane:

Test Type : Maximisation Test
Exposure routes : Skin contact
Species : Guinea pig
Method : OECD Test Guideline 406
Result : Did not cause sensitisation on laboratory animals.

1,2-epoxybutane:

Test Type : Maximisation Test
Exposure routes : Skin contact
Species : Guinea pig
Result : Did not cause sensitisation on laboratory animals.

nitroethane:

Test Type : Landsteiner & Jacobs test
Exposure routes : Skin contact
Species : Guinea pig
Result : Did not cause sensitisation on laboratory animals.

Germ cell mutagenicity

Components:

1-bromopropane:

Genotoxicity in vitro : Test Type: Microbial mutagenesis assay (Ames test)
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471

Result: negative

Test Type: In vitro mammalian cell gene mutation test
Test system: mouse lymphoma cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: positive

Genotoxicity in vivo : Test Type: Transgenic rodent somatic cell gene mutation assay
Species: Mouse (female)
Application Route: inhalation (vapour)
Method: OECD Test Guideline 488
Result: negative

Test Type: In vivo micronucleus test
Species: Rat (male and female)
Application Route: Intraperitoneal injection
Method: OECD Test Guideline 474
Result: negative

Germ cell mutagenicity - Assessment : Not classified due to data which are conclusive although insufficient for classification.

1,2-epoxybutane:

Genotoxicity in vitro : Test Type: Microbial mutagenesis assay (Ames test)
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: positive

Test Type: Chromosome aberration test in vitro
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Result: positive

Test Type: In vitro mammalian cell gene mutation test
Test system: mouse lymphoma cells
Metabolic activation: with and without metabolic activation
Result: positive

Genotoxicity in vivo : Test Type: Chromosome aberration test in vivo
Species: Mouse (male and female)
Application Route: inhalation (vapour)
Result: negative

Test Type: dominant lethal test
Species: Rat (male)
Application Route: inhalation (vapour)
Result: negative

Germ cell mutagenicity - Assessment	:	Not classified due to data which are conclusive although insufficient for classification.

nitroethane:

Genotoxicity in vitro	:	Test Type: Microbial mutagenesis assay (Ames test) Test system: Salmonella typhimurium Metabolic activation: with and without metabolic activation Result: negative Test Type: In vitro mammalian cell gene mutation test Test system: Chinese hamster ovary cells Metabolic activation: with and without metabolic activation Method: OECD Test Guideline 476 Result: negative
Genotoxicity in vivo	:	Test Type: In vivo micronucleus test Species: Mouse (male and female) Application Route: oral (gavage) Result: negative
Germ cell mutagenicity - Assessment	:	Not classified due to data which are conclusive although insufficient for classification.

Carcinogenicity

Components:

1-bromopropane:

Species	:	Rat, male and female
Application Route	:	inhalation (vapour)
Exposure time	:	2 Years
LOAEC	:	0.64 mg/l
Result	:	Tumors were noticed after prolonged inhalation toxicity testing on rats.
Target Organs	:	Pancreas, Skin, intestinal tract
Species	:	Mouse, male and female
Application Route	:	inhalation (vapour)
Exposure time	:	2 Years
LOAEC	:	0.32 mg/l
Result	:	Tumors were noticed after prolonged inhalation toxicity testing on rats.
Target Organs	:	Lungs
Carcinogenicity - Assessment	:	Limited evidence of carcinogenicity in inhalation studies with animals.

1,2-epoxybutane:

Species	:	Rat, male and female
Application Route	:	inhalation (vapour)

Exposure time	:	2 Years
	:	200 ppm
Result	:	Tumors were noticed after prolonged inhalation toxicity testing on rats.
Species	:	Mouse, male and female
Application Route	:	inhalation (vapour)
Exposure time	:	2 Years
	:	50 ppm
Result	:	Tumors were noticed after prolonged inhalation toxicity testing on rats.
Carcinogenicity - Assessment	:	Limited evidence of carcinogenicity in inhalation studies with animals.

nitroethane:

Species	:	Rat, male and female
Application Route	:	inhalation (vapour)
Exposure time	:	2 Years
LOAEC	:	>= 200 ppm
Result	:	Animal testing did not show any carcinogenic effects.
Carcinogenicity - Assessment	:	Not classified due to data which are conclusive although insufficient for classification.

Reproductive toxicity

Components:

1-bromopropane:

Effects on fertility	:	Test Type: Two-generation study Species: Rat, male and female Application Route: inhalation (gas) General Toxicity - Parent: NOAEL: 1,600 ppm General Toxicity F1: NOAEL: 100 ppm Fertility: LOAEC: 100 ppm Early Embryonic Development: LOAEC: 100 ppm Method: OPPTS 870.3800 Result: Clear evidence of adverse effects on sexual function and fertility, and/or on development, based on animal experiments
Effects on foetal development	:	Test Type: Pre-/postnatal development Species: Rat, female Application Route: inhalation (gas) General Toxicity Maternal: NOAEL: 100 ppm Developmental Toxicity: NOAEL: 100 ppm Method: OECD Test Guideline 414 Result: Clear evidence of adverse effects on sexual function and fertility, and/or on development, based on animal experiments

Reproductive toxicity - Assessment	:	Clear evidence of adverse effects on sexual function and fertility, based on animal experiments.

1,2-epoxybutane:

Effects on fertility	:	Species: Rat, male and female Application Route: inhalation (vapour) General Toxicity - Parent: LOAEC: 0.054 mg/l Fertility: LOAEC: 0.054 mg/l Result: No evidence of adverse effects on sexual function and fertility, or on development, based on animal experiments.
Effects on foetal development	:	Test Type: Pre-/postnatal development Species: Rat, female Application Route: oral (gavage) General Toxicity Maternal: LOAEC: > 1,000 ppm Developmental Toxicity: LOAEC: > 1,000 ppm Result: No evidence of adverse effects on sexual function and fertility, or on development, based on animal experiments.
Reproductive toxicity - Assessment	:	Not classified due to data which are conclusive although insufficient for classification.

nitroethane:

Effects on fertility	:	Species: Rat, male and female Application Route: inhalation (vapour) General Toxicity - Parent: LOAEC: 25 ppm Fertility: LOAEC: 50 ppm Method: OECD Test Guideline 422 Remarks: No evidence of adverse effects on sexual function and fertility, or on development, based on animal experiments.
Effects on foetal development	:	Test Type: Pre-/postnatal development Species: Rat, female Application Route: inhalation (vapour) General Toxicity Maternal: LOAEC: 600 ppm Developmental Toxicity: LOAEC: 600 ppm Method: OECD Test Guideline 414 Result: Some evidence of adverse effects on sexual function and fertility, and/or on development, based on animal experiments.
Reproductive toxicity - Assessment	:	Some evidence of adverse effects on sexual function and fertility, and/or on development, based on animal experiments.

STOT - single exposure

Components:

1-bromopropane:

Assessment : May cause respiratory irritation.

Assessment : May cause drowsiness or dizziness.

1,2-epoxybutane:

Assessment : May cause respiratory irritation.

nitroethane:

Assessment : The substance or mixture is not classified as specific target organ toxicant, single exposure.

STOT - repeated exposure

Components:

1-bromopropane:

Exposure routes : Inhalation
Target Organs : Liver, Central nervous system
Assessment : May cause damage to organs through prolonged or repeated exposure.

1,2-epoxybutane:

Assessment : The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

nitroethane:

Assessment : The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Repeated dose toxicity

Components:

1-bromopropane:

Species : Rat, male and female
NOAEC : >= 125 ppm
Application Route : inhalation (vapour)
Exposure time : 90 d
Target Organs : Liver, Reproductive organs

Remarks : Repeated exposures may cause depression of the central nervous system, liver, and kidney damage.

1,2-epoxybutane:

Application Route	:	inhalation (vapour)
Remarks	:	Information taken from reference works and the literature. No significant adverse effects were reported

nitroethane:

Species	:	Rat, male and female
LOAEL	:	100 mg/kg bw/day
Application Route	:	oral (gavage)
Exposure time	:	28 d
Method	:	According to a standard method
Remarks	:	Effects are of limited toxicological significance.

Species	:	Rat, male and female
LOAEC	:	300 mg/m³
Application Route	:	inhalation (vapour)
Exposure time	:	90 d
Remarks	:	Effects are of limited toxicological significance.

Aspiration toxicity

Components:

1-bromopropane:

Not classified due to data which are conclusive although insufficient for classification.

1,2-epoxybutane:

Not classified due to lack of data.

nitroethane:

Not classified due to data which are conclusive although insufficient for classification.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

1-bromopropane:

Toxicity to fish	:	LC50 (Oncorhynchus mykiss (rainbow trout)): 24.3 mg/l Exposure time: 96 h Test Type: semi-static test Analytical monitoring: no Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 99.3 mg/l End point: Immobilization Exposure time: 48 h

Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 202

Toxicity to algae/aquatic plants : EC50 (Pseudokirchneriella subcapitata (green algae)): 72.3 mg/l
End point: Growth rate
Exposure time: 96 h
Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 201

NOEC (Pseudokirchneriella subcapitata (green algae)): 12.4 mg/l
End point: Growth rate
Exposure time: 96 h
Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 201

Toxicity to fish (Chronic toxicity) : Remarks: study scientifically unjustified

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : Remarks: study scientifically unjustified

Toxicity to microorganisms : EC50 (activated sludge): 270 mg/l
End point: Respiration inhibition
Exposure time: 5 min
Test Type: static test
Analytical monitoring: no
Method: OECD Test Guideline 209

Ecotoxicology Assessment

Acute aquatic toxicity : Harmful to aquatic life.

Chronic aquatic toxicity : Harmful to aquatic life with long lasting effects.

1,2-epoxybutane:

Toxicity to fish : LC50 (Leuciscus idus (Golden orfe)): > 100 mg/l
Exposure time: 96 h
Test Type: static test
Analytical monitoring: no
Method: DIN 38412

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 70 mg/l
End point: Immobilization
Exposure time: 48 h
Test Type: static test
Analytical monitoring: no

Method: OECD Test Guideline 202

Toxicity to algae/aquatic plants : EC50 (Desmodesmus subspicatus (green algae)): > 100 mg/l
Exposure time: 72 h
Test Type: static test
Analytical monitoring: no
Method: DIN 38412

EC10 (Desmodesmus subspicatus (green algae)): > 100 mg/l
Exposure time: 72 h
Test Type: static test
Analytical monitoring: no
Method: DIN 38412

Toxicity to microorganisms : EC50 (activated sludge): ca. 900 mg/l
End point: Respiration inhibition
Exposure time: 3 h
Test Type: static test
Analytical monitoring: no
Method: OECD Test Guideline 209

Ecotoxicology Assessment

Acute aquatic toxicity : Harmful to aquatic life.

Chronic aquatic toxicity : Not classified due to data which are conclusive although insufficient for classification.

nitroethane:

Toxicity to fish : LC50 (Danio rerio (zebra fish)): 880 mg/l
Exposure time: 96 h
Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): > 21.9 mg/l
End point: Immobilization
Exposure time: 48 h
Test Type: semi-static test
Analytical monitoring: yes
Method: OECD Test Guideline 202

Toxicity to algae/aquatic plants : EC50 (Pseudokirchneriella subcapitata (green algae)): 17.4 mg/l
End point: Growth rate
Exposure time: 72 h
Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 201

NOEC (Pseudokirchneriella subcapitata (green algae)): 7.11 mg/l

End point: Growth rate
Exposure time: 72 h
Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 201

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): 2.44 mg/l
End point: Reproduction
Exposure time: 21 d
Test Type: semi-static test
Analytical monitoring: yes
Method: OECD Test Guideline 211

Toxicity to microorganisms : EC50 (activated sludge): 310 mg/l
End point: Respiration inhibition
Exposure time: 30 min
Test Type: static test
Analytical monitoring: no
Test substance: Similar substance
Method: OECD Test Guideline 209

Ecotoxicology Assessment

Acute aquatic toxicity : Harmful to aquatic life.

Chronic aquatic toxicity : Harmful to aquatic life with long lasting effects.

Persistence and degradability

Components:

1-bromopropane:

Biodegradability : aerobic
Inoculum: activated sludge
Theoretical oxygen demand
Result: Not biodegradable
Biodegradation: 19.2 %
Exposure time: 28 d
Method: OECD Test Guideline 301D

Stability in water : Degradation half life: 25 h (25 °C) pH: 4
Method: OECD Test Guideline 111

Degradation half life: 23 h (25 °C) pH: 7
Method: OECD Test Guideline 111

Degradation half life: 19 h (25 °C) pH: 9
Method: OECD Test Guideline 111

Photodegradation : Remarks: Not susceptible to photodegradation.

1,2-epoxybutane:

Biodegradability : aerobic
Inoculum: activated sludge
Concentration: 34 mg/l
CO2 evolution
Result: Readily biodegradable
Biodegradation: 80 - 90 %
Exposure time: 28 d
Method: According to a standard method

nitroethane:

Biodegradability : aerobic
Inoculum: activated sludge
Theoretical oxygen demand
Result: Not biodegradable
Biodegradation: < 0.1 %
Exposure time: 28 d
Method: OECD Test Guideline 301D

Stability in water : Degradation half life: > 365 d (25 °C) pH: 7
Method: QSAR

Photodegradation : Sensitiser: OH
Rate constant: < 1E-03 cm3/s
Method: QSAR

Bioaccumulative potential

Components:

1-bromopropane:

Bioaccumulation : Remarks: No bioaccumulation is to be expected (log Pow <= 4).

Partition coefficient: n-octanol/water : log Pow: ca. 2.1 (20 °C)
pH: 7
Method: OECD Test Guideline 107

1,2-epoxybutane:

Bioaccumulation : Remarks: No bioaccumulation is to be expected (log Pow <= 4).

Partition coefficient: n-octanol/water : log Pow: 0.68 (25 °C)

nitroethane:

Bioaccumulation : Remarks: No bioaccumulation is to be expected (log Pow <= 4).

Partition coefficient: n-octanol/water	:	log Pow: 1.45 (22.4 °C) pH: 7 Method: Regulation (EC) No. 440/2008, Annex, A.8

Mobility in soil

Components:

1-bromopropane:

Distribution among environmental compartments	:	Medium: Soil log Koc: 1.79 Method: OECD Test Guideline 106

1,2-epoxybutane:

Distribution among environmental compartments	:	log Koc: 0.652 Method: QSAR Remarks: Will be likely mobile in the environment.

nitroethane:

Distribution among environmental compartments	:	Remarks: Not expected to adsorb on soil.

Hazardous to the ozone layer

Not applicable

Other adverse effects

Components:

1-bromopropane:

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.

13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	Dispose of contents/ container to an approved facility in accordance with local, regional, national and international regulations.
Contaminated packaging	:	Refer to manufacturer/ supplier for information on recovery/ recycling.

14. TRANSPORT INFORMATION

International Regulations

UNRTDG

UN number	:	UN 2344
Proper shipping name	:	BROMOPROPANES
Class	:	3
Packing group	:	II
Labels	:	3

IATA-DGR

UN/ID No.	:	UN 2344
Proper shipping name	:	Bromopropanes
Class	:	3
Packing group	:	II
Labels	:	Flammable Liquids
Packing instruction (cargo aircraft)	:	364
Packing instruction (passenger aircraft)	:	353

IMDG-Code

UN number	:	UN 2344
Proper shipping name	:	BROMOPROPANES
Class	:	3
Packing group	:	II
Labels	:	3
EmS Code	:	F-E, S-D
Marine pollutant	:	no
Remarks	:	"IMDG-Code segregation group not applicable".

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

National Regulations

Refer to section 15 for specific national regulation.

Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

15. REGULATORY INFORMATION

Related Regulations

Fire Service Law

Not applicable to dangerous materials / designated flammables.

Chemical Substance Control Law

Priority Assessment Chemical Substance

Chemical name	Number
1-Bromopropane	228
1,2-Epoxybutane	21

Industrial Safety and Health Law

Harmful Substances Prohibited from Manufacture

Not applicable

Harmful Substances Required Permission for Manufacture

Not applicable

Substances Prevented From Impairment of Health

Not applicable

Circular concerning Information on Chemicals having Mutagenicity - Annex 2: Information on Existing Chemicals having Mutagenicity

Not applicable

Circular concerning Information on Chemicals having Mutagenicity - Annex 1: Information on Notified Substances having Mutagenicity

Not applicable

Substances Subject to be Notified Names

Article 57-2 (Enforcement Order Table 9)

Chemical name	Number	Concentration (%)
1-Bromopropane	503 の 2	>=90 - <=100
1,2-Butylene oxide	193	>=0.1 - <1

Substances Subject to be Indicated Names

Article 57 (Enforcement Order Article 18)

Chemical name	Number
1-Bromopropane	503 の 2

Ordinance on Prevention of Hazards Due to Specified Chemical Substances

Not applicable

Ordinance on Prevention of Lead Poisoning

Not applicable

Ordinance on Prevention of Tetraalkyl Lead Poisoning

Not applicable

Ordinance on Prevention of Organic Solvent Poisoning

Not applicable

Enforcement Order of the Industrial Safety and Health Law - Attached table 1 (Dangerous Substances)

Not applicable

Poisonous and Deleterious Substances Control Law

Not applicable

Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof

Class I Designated Chemical Substances

Chemical name	Number	Concentration (%)
1-Bromopropane	384	99

High Pressure Gas Safety Act

Not applicable

Explosive Control Law

Not applicable

Vessel Safety Law

Flammable liquids (Article 2 and 3 of rules on shipping and storage of dangerous goods and its Attached Table 1)

Aviation Law

Flammable liquid (Article 194 of The Enforcement Rules of Aviation Law and its Attached Table 1)

Marine Pollution and Sea Disaster Prevention etc Law

Bulk transportation : Not classified as noxious liquid substance

Pack transportation : Not classified as marine pollutant

Waste Disposal and Public Cleansing Law

Industrial waste

The components of this product are reported in the following inventories:

TCSI : On the inventory, or in compliance with the inventory

TSCA : All substances listed as active on the TSCA inventory

AICS : On the inventory, or in compliance with the inventory

DSL : All components of this product are on the Canadian DSL

ENCS : On the inventory, or in compliance with the inventory

ISHL : On the inventory, or in compliance with the inventory

KECI : On the inventory, or in compliance with the inventory

PICCS : On the inventory, or in compliance with the inventory

IECSC : On the inventory, or in compliance with the inventory

NZIoC : Not in compliance with the inventory

EINECS	:	On the inventory, or in compliance with the inventory

16. OTHER INFORMATION

Date format	:	yyyy/mm/dd

Full text of other abbreviations

ACGIH	:	USA. ACGIH Threshold Limit Values (TLV)
JP OEL JSOH	:	Japan. The Japan Society for Occupational Health. Recommendation of Occupational Exposure Limits
ACGIH / TWA	:	8-hour, time-weighted average
JP OEL JSOH / OEL-M	:	Occupational Exposure Limit-Mean

AICS - Australian Inventory of Chemical Substances; ANTT - National Agency for Transport by Land of Brazil; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; Nch - Chilean Norm; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NOM - Official Mexican Norm; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative; WHMIS - Workplace Hazardous Materials Information System

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.

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