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ISO 9001: 2015

MATERIAL SAFETY DATA SHEET

1. Identification

1.1 GHS Product identifier

Isobutyraldehyde, 98%

Code I 1571

2. Hazard identification

2.1 Classification of the substance or mixture

Flammable liquids, Category 2

Eye irritation, Category 2

2.2 GHS label elements, including precautionary statements

Pictogram(s)



Signal word

Danger

Hazard statement(s)

H225 Highly flammable liquid and vapour

H319 Causes serious eye irritation

Precautionary statement(s)

Prevention

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233 Keep container tightly closed.

P240 Ground and bond container and receiving equipment.

P241 Use explosion-proof [electrical/ventilating/lighting/...] equipment.

P242 Use non-sparking tools.

P243 Take action to prevent static discharges.

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

P264 Wash ... thoroughly after handling.

Response

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

P370+P378 In case of fire: Use ... to extinguish.

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.

Storage

P403+P235 Store in a well-ventilated place. Keep cool.

Disposal

P501 Dispose of contents/container to ...

2.3 Other hazards which do not result in classification

none

3. Composition/information on ingredients

3.1 Substances

Chemical name	Common names and synonyms	CAS number	EC number	Concentration
isobutyraldehyde	isobutyraldehyde	78-84-2	none	100%

4. First-aid measures

4.1 Description of necessary first-aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

Fresh air, rest. Refer for medical attention.

In case of skin contact

Rinse skin with plenty of water or shower. Remove contaminated clothes. Refer for medical attention .

In case of eye contact

First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

If swallowed

Rinse mouth. Do NOT induce vomiting. Give one or two glasses of water to drink. Refer for medical attention .

4.2Most important symptoms/effects, acute and delayed

Vapor is irritating to the eyes and mucous membranes. (USCG, 1999)

4.3Indication of immediate medical attention and special treatment needed, if necessary

Basic treatment: Establish a patent airway. Suction if necessary. Watch for signs of respiratory insufficiency and assist ventilations if necessary. Aggressive airway management may be necessary. Administer oxygen by nonrebreather mask at 10 to 15 L/min.

Anticipate seizures and treat if necessary Monitor for shock and treat if necessary Monitor for pulmonary edema and treat if necessary For eye contamination, flush eyes immediately with water. Irrigate each eye continuously with normal saline during transport Do not use emetics. For ingestion, rinse mouth and administer 5 ml/kg up to 200 ml of water for dilution if the patient can swallow, has a strong gag reflex, and does not drool. Administer activated charcoal /Aldehydes and related compounds/

5.Fire-fighting measures

5.1Extinguishing media

Suitable extinguishing media

Foam, dry chemical or carbon dioxide.

5.2Specific hazards arising from the chemical

Behavior in Fire: Vapors are heavier than air and may travel considerable distance to a source of ignition and flash back. Fires are difficult to control due to ease of reignition. (USCG, 1999)

5.3Special protective actions for fire-fighters

Wear self-contained breathing apparatus for firefighting if necessary.

6.Accidental release measures

6.1Personal 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.

6.2Environmental precautions

Evacuate danger area! Consult an expert! Remove all ignition sources. Personal protection: protective clothing, protective gloves, safety goggles and filter respirator for organic vapours of low boiling point adapted to the airborne concentration of the substance.

Do NOT let this chemical enter the environment. Do NOT wash away into sewer. Collect leaking liquid in sealable containers. Cover the spilled material with inert absorbent. Then store and dispose of according to local regulations.

6.3Methods and materials for containment and cleaning up

Pick up and arrange disposal. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7.Handling and storage

7.1Precautions 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.

7.2Conditions for safe storage, including any incompatibilities

Fireproof. Separated from strong oxidants, strong bases, strong acids and strong reducing agents. Well closed. Store in an area without drain or sewer access. MATERIALS WHICH ARE TOXIC AS STORED OR WHICH CAN DECOMPOSE INTO TOXIC COMPONENTS ... SHOULD BE STORED IN A COOL WELL VENTILATED PLACE, OUT OF THE DIRECT RAYS OF THE SUN, AWAY FROM AREAS OF HIGH FIRE HAZARD, AND SHOULD BE PERIODICALLY INSPECTED. INCOMPATIBLE MATERIALS SHOULD BE ISOLATED

8.Exposure controls/personal protection

8.1Control parameters

Occupational Exposure limit values

no data available

Biological limit values

no data available

8.2Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

8.3Individual protection measures, such as personal protective equipment (PPE)

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

Wear impervious clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace. 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.

Respiratory protection

Wear dust mask when handling large quantities.

Thermal hazards

no data available

9.Physical and chemical properties

Physical state clear liquid

Colour Transparent, colorless liquid

Odour	EXTREMELY SHARP
Melting point/ freezing point	-65\u00b0C(lit.)
Boiling point or initial boiling point and boiling range	65\u00b0C
Flammability	Highly flammable. Gives off irritating or toxic fumes (or gases) in a fire.
Lower and upper explosion limit / flammability limit	% BY VOL; LOWER 1.6, UPPER 10.6
Flash point	-25\u00b0C(lit.)
Auto-ignition temperature	196.11\u00b0C (USCG, 1999)
Decomposition temperature	no data available
pH	no data available
Kinematic viscosity	0.5382 cP @ 28.2\u00b0C
Solubility	In water:75 g/L (20 \u00b0C)
Partition coefficient n-octanol/water (log value)	1.2
Vapour pressure	66 mm Hg (4.4 \u00b0C)
Density and/or relative density	0.794
Relative vapour density	2.5 (vs air)
Particle characteristics	no data available

10.Stability and reactivity

10.1Reactivity

no data available

10.2Chemical stability

Oxidises slowly on exposure to air, forming isobutyric acid.

10.3Possibility of hazardous reactions

A very dangerous fire hazard when exposed to heat, flame, or oxidizers. The vapour is heavier than air and may travel along the ground; distant ignition possible. ISOBUTYL ALDEHYDE can react vigorously with reducing agents, with oxidizing agents, strong bases and mineral acids. Can undergo exothermic self-condensation or polymerization reactions that are often catalyzed by acid. Generates flammable and/or toxic gases in combination with azo, diazo compounds, dithiocarbamates, nitrides, and strong reducing agents. Reacts slowly when exposed to air with air to give peroxides and other products. These reactions are activated by light, catalyzed by salts of transition metals, and are autocatalytic (catalyzed by their products). The addition of stabilizers (antioxidants) retards autoxidation.

10.4Conditions to avoid

no data available

10.5Incompatible materials

CAN REACT VIGOROUSLY WITH REDUCING MATERIALS.

10.6Hazardous decomposition products

no data available

11.Toxicological information

Acute toxicity

Oral: LD50 Rat oral 3.7 g/kg

Inhalation: LC50 Mouse inhalation 39,500 mg/cu m/2 hr

Dermal: 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

Reproductive toxicity

no data available

STOT-single exposure

no data available

STOT-repeated exposure

no data available

Aspiration hazard

no data available

12.Ecological information

12.1Toxicity

Toxicity to fish: no data available

Toxicity to daphnia and other aquatic invertebrates: no data available

Toxicity to algae: no data available
Toxicity to microorganisms: no data available
12.2 Persistence and degradability

AEROBIC: Using a sewage inocula and standard dilution water, isobutyraldehyde had a 5-day theoretical BOD of 66%(2). Isobutyraldehyde was found to be readily biodegradable in a screening study using activated sludge (more specific data were not reported)(2). In an anaerobic screening study simulating a biological treatment plant (digester sludge inocula), isobutyraldehyde experienced a 71% removal at retention times of 144-240 hr(3). In a screening study simulating an anaerobic lagoon (digester sludge inocula), isobutyraldehyde experienced a 76% removal at retention times of 240-2400 hr(3). Using a Warburg respirometer, an activated sludge seed, and a 24-hr incubation period, isobutyraldehyde had a theoretical BOD of 24.3% at an initial concn of 500 ppm(4). Isobutyraldehyde, present at 100 mg/l, reached 81% of its theoretical BOD in 2 weeks using an activated sludge inoculum at 30 mg/l and the Japanese MITI test(5).

12.3 Bioaccumulative potential

An estimated BCF of 1 was calculated for isobutyraldehyde(SRC), using a water solubility of 89,000 mg/l(1) and a regression-derived equation(2). According to a classification scheme(3), this BCF suggests the potential for bioconcentration in aquatic organisms is low(SRC).

12.4 Mobility in soil

The Koc of isobutyraldehyde is estimated as 8(SRC), using a water solubility of 8.9×10^4 (1) and a regression-derived equation(2). According to a classification scheme(3), this estimated Koc value suggests that isobutyraldehyde is expected to have very high mobility in soil(SRC).

12.5 Other adverse effects

no data available

13. Disposal considerations

13.1 Disposal methods

Product

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

Contaminated packaging

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

14. Transport information

14.1 UN Number

ADR/RID: UN2045

IMDG: UN2045

IATA: UN2045

14.2 UN Proper Shipping Name

ADR/RID: ISOBUTYRALDEHYDE (ISOBUTYL ALDEHYDE)

IMDG: ISOBUTYRALDEHYDE (ISOBUTYL ALDEHYDE)

IATA: ISOBUTYRALDEHYDE (ISOBUTYL ALDEHYDE)

14.3 Transport hazard class(es)

ADR/RID: 3

IMDG: 3

IATA: 3

14.4 Packing group, if applicable

ADR/RID: II

IMDG: II

IATA: II

14.5 Environmental hazards

ADR/RID: no

IMDG: no

IATA: no

14.6 Special precautions for user

no data available

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

no data available

15. Regulatory information

15.1 Safety, health and environmental regulations specific for the product in question

Chemical name	Common names and synonyms	CAS number	EC number
isobutyraldehyde	isobutyraldehyde	78-84-2	none
European Inventory of Existing Commercial Chemical Substances (EINECS)			Listed.
EC Inventory			Listed.
United States Toxic Substances Control Act (TSCA) Inventory			Listed.
China Catalog of Hazardous chemicals 2015			Listed.
New Zealand Inventory of Chemicals (NZIoC)			Listed.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)			Listed.
Vietnam National Chemical Inventory			Not Listed.
Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)			Listed.

Section 16: Other Information

This safety data sheet should be used in conjunction with technical sheets. It does not replace them. The information given is based on our knowledge of this product, at the time of publication. It is given in good faith. The attention of the user is drawn to the possible risks incurred by using the product for any other purpose other than that for which it was intended. This does not in any way excuse the user from knowing and applying all the regulations governing his activity. It is the sole responsibility of the user to take all

precautions required in handling the product. The aim of the mandatory regulations mentioned is to help the user to fulfill his obligations regarding the use of hazardous products.

