

MATERIAL SAFETY DATA SHEET

MSDS No. 02-17
According to Regulation (EC) no.1907/2006



1,2 – PROPYLENE OXIDE

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Label Class 3
Flammable liquids

F+



Highly Flammable

T



Toxic

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

1.1. Identification of the substance/preparation

Trade Name	1,2-Propylene oxide
Chemical Name	1,2-Propylene oxide
Common Synonyms	1,2-Epoxypropane, methyloxirane, methyl ethylene oxide
Chemical Formula	C ₃ H ₆ O
Molecular Weight	58.1

1.2. Uses of the substance/preparation

Intermediate in organic synthesis

1.3. Company/undertaking identification

OLTCHIM SA

Adress	1, Uzinei Street, 240050 Ramnicu Valcea, Romania
Phone	+40 / 250 / 701200
Fax	+40 / 250 / 735446
e-mail	oltchim@oltchim.ro

1.4. Emergency telephone number +40 / 250/738141

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2. HAZARD IDENTIFICATION**EC Classification according to Directive 67/548/CEE, Annex I: F+; R12, Carc. Cat. 2; R45 Muta. Cat. 2; R46, Xn; R20/21/22, Xi; R36/37/38**

Extremely flammable.

May cause cancer.

May cause heritable genetic damage.

Health effects: Propylene oxide should be handled as a CARCINOGEN-WITH EXTREME CAUTION. Contact with eyes can cause severe burns leading to permanent damage. Skin contact can cause severe irritations or burns. Breathing exposure irritates the nose, throat and lungs and/or lead to pneumonia. Affects central nervous system. Overexposure can cause headache and make you feel dizzy, lightheaded and even pass out. Poor coordination can also occur.

Environmental effects: Propylene oxide is very soluble in water and is expected to be very mobile in soils. It is not expected to absorb to suspended solids or sediments in water. When release into the soil and surface water, propylene oxide quickly hydrolyzes. Propylene oxide is biodegradable and is not expected to bioaccumulate.

Emergency overview: Propylene oxide is a hazardous material and must be handled carefully and properly. The liquid and vapor are extremely flammable. Vapor may cause flash fire. The vapour is heavier than air, spreads along the ground and distant ignition is possible. Will float and can be reignited on surface water. Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire.

Propylene oxide may polymerize violently in closed containers under high temperatures or prolonged storage.

The substance may polymerize violently under the influence of bases, acids and metal chlorides with fire or explosion hazard.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous components /constituents	Concentration % ,wt.	CAS No.	EC No.	Annex I Index	Hazard Symbol	Risk phrases
1,2-Propylene oxide	99.8	75-56-9	200-879-2	603-055-00-4	F+, T	R 12 R 45 R 20/21/22 R 36/37/38

4. FIRST - AID MEASURES

Seek medical attention immediately in all cases of exposure!

Inhalation: Respiratory irritation signs and symptoms may include a temporary burning sensation of the nose and throat, coughing, and/or difficulty breathing. Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, qualified medical personnel may administer oxygen. Get medical attention immediately.

Skin contact: Immediately remove contaminated clothing and shoes. Under a safety shower, flush skin thoroughly with large amounts of running water for at least 15 minutes. Wash with soap or detergent. Do not attempt to neutralize with chemical agents. Get medical attention immediately. Discard or decontaminate clothing and shoes before reuse.

Eye contact: Wash the eyes immediately with large amount of water lifting the upper and lower lids, until no evidence of chemical remains at least 15-20 minutes. Do not attempt to neutralize with chemical agents. If irritation persists after washing get medical attention. Continue flushing for an additional 15 minutes if medical attention is not immediately available. Contact lenses should not worn with this product.

Ingestion: : If person is conscious and can swallow, immediately give two glasses of water, but do not induce vomiting. If vomiting occurs, give fluids again. Have physician determine if condition of person will permit induction of vomiting or evacuation of stomach. Do not give anything by mouth to an unconscious or convulsing person.

Note to Physician: Aspiration of this product during induced emesis may result in severe lung injury. If evacuation of stomach is necessary, use method least likely to cause aspiration, such as gastric lavage after endotracheal intubation

5. FIRE - FIGHTING MEASURES

Suitable extinguishing media: Dry chemical, alcohol resistant foam, carbon dioxide and water spray. Use water spray to cool fire-exposed containers.

Unsuitable extinguishing media: None

Exposure hazards: Extremely flammable materials may release vapors that travel long distances, ignite and flash back. Do not expose to heat, sparks, static or other sources of ignition. When handling, use non-sparking tool, ground and bond all containers. Explosive air-vapor mixtures may form. Containers may explode in a fire. Reacts violently with chlorine, ammonia, strong oxidants, acids causing fire and explosion hazard.

Protection of fire-fighters: Wear full protective clothing and self contained breathing apparatus with full face piece operated in positive pressure mode. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products. Discard or decontaminate any clothing and shoes that may contain chemical residues.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Restrict persons not wearing protective equipment from area of spill or leak until clean-up is complete. Remove all ignition sources. Ventilate area of leak or spill. Persons performing clean-up work should wear adequate personal protective equipment and a self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Keep unnecessary and unprotected personnel from entering. Slippery walking. Spread granular cover.

Environmental precautions: Prevent contamination of ground and surface water by isolating the hazard area. Contain and recover liquid when possible. Eliminate all ignition sources including internal combustion engines and power tools. Keep closed containers and dispose according to all applicable federal, state or local environment regulations.

Methods of cleaning up: Collect leaking liquid in sealable containers. Absorb remaining liquid in vermiculite, dry sand, earth or a similar non-combustible material and place in a chemical waste container. If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. It may necessary to contain and dispose of propylene oxide as a hazardous waste.

Special precautions: Do not use clay-based absorbents, as this material reacts with clay. Do not use combustible materials, such as saw dust. Do not flush to sewer!

7. HANDLING AND STORAGE

Handling: Special attention is required when propylene oxide is handled. Protect from physical damage. Containers should be bonded and grounded for transfer to avoid static sparks. Sources of ignition, such as open flames and smoking, are prohibited where propylene oxide is used, handled or stored in manner that could create a potential fire or explosion hazard. Use only non-sparking tools and equipment, especially when opening and closing containers of propylene oxide. Wherever propylene oxide is used, handled, manufactured or stored, use explosion proof electrical equipment and fittings. Do not use compressed air for filling, discharging or handling.

Storage: Store in tightly closed containers in a cool, well-ventilated area, away from sources of heat, and incompatibles. Outside or dedicated storage is preferred. At ambient temperature can be stored in mild steel tanks for as long as three months with negligible loss of product quality. Do not use copper, copper alloys or other acetylide-forming metals for storage or shipping containers. Refrigeration and insulation of storage tanks is necessary only when dictated by the user's process. Drums must be equipped with self-closing valves, pressure vacuum bungs and flame arresters. An gas inert atmosphere or pad of nitrogen or methane is required over propylene oxide for storage or shipment to prevent air from entering the system and forming explosive air-vapor mixtures. Propylene oxide may polymerize on prolonged storage and at elevated temperatures. Protect containers from physical damage. Sources of ignition such as smoking and open flames prohibited where propylene oxide is handled.

8 . EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure limits

Long-term limit (8-hourTWA reference period) : 5 ppm

Short-term exposure limit (15-minute reference period): -

Engineering control: A system of local and/or general exhaust is recommended to keep employee exposure as low as possible. Local exhaust ventilation is generally preferred because it can control the emission of the contaminant at its sources, preventing dispersions of it into the general work area. Ventilation equipment should be explosion- proof if explosive concentration of dust, vapor or fume are present.

Respiratory protection: Where the potential exists for exposures over 20 ppm, use a approved supplier-air respirator with a full face piece, hood or helmet in the continuous flow mode, or use a approved self-contained breathing apparatus with a full face piece operated in pressure-demand or other positive pressure mode.

Warning! Air purifying respirators do not protect workers in oxygen-deficient atmospheres.

Hand protection: Wear chemical protective gloves

Eye / Face protection: Use chemical safety goggles and/or full face shield where splashing is possible. Maintain eye wash and quick-drench facilities in work area.

Skin protection: : Chemical splash goggles and/or face shield must be worn when possibility exist for eye contact due to splashing or spraying liquid, airborne particles or vapor. Contact lenses must not be worn.

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

9. PHYSICAL AND CHEMICAL PROPERTIES

General informations

Appearance	Colorless liquid with
Odor	Ether-like odour

Important health, safety and environmental informations

pH of 100g/l solution	7
Boiling point	34.1°C at 1 atm. pressure
Flash point	-37.2°C
Flammability	Extremely flammable
Explosive properties	may form explosive vapor/air mixture explosive limits in air: 1.8-36%.
Oxidizing properties	no oxidizing properties

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Vapor pressure, at 20 °C	442 mmHg
Specific gravity (water=1)	0.8305 at 20 ⁰ C
Water solubility	405 g/l la 20 ⁰ C
Partition coefficient (log K _{ow})	0,03
Vapor relative density (air=1)	2,0 at 20 ⁰ C
Dynamic viscosity	0.32 mPas at 20 ⁰ C

Other informations

Melting point	-104 ⁰ C
Autoignition temperature	449 ⁰ C

10. STABILITY AND REACTIVITY

Chemical stability: Stable under ordinary conditions of use and storage

Conditions to avoid: Heat, flame, light,sources of ignition and incompatibles.

Materials to avoid: Reacts violently with anhydrous metal chlorides, chlorine, iron, strong acids (such as hydrochloric, sulfuric and nitric acids), strong bases and peroxides, ammonia, copper or copper alloys causing fire and explosion hazard. Propylene oxide will attack some forms of plastics rubber and coatings.

Hazardous decomposition products: Carbon monoxide and dioxide may form when heated to decomposition. Aldehydes, acids or ketones may also be formed. The substance may polymerize violently under the influence of bases, acids and metal chloride with fire or explosion hazard.

11. TOXICOLOGICAL INFORMATION

Animal toxicity data:

LD ₅₀ /Oral rat	380 mg/kg
LC ₅₀ /Inhalation rat	9.486 mg/l/4h
LD ₅₀ /Dermal rabbit	1245mg/kg

Acute toxicity

- **Inhalation** Vapors or mist, especially as generated from heating the material or as from exposure in poorly ventilated areas or confined spaces, may be irritating and cause discomfort in nose and throat, nasal discharge, and coughing. Prolonged over exposure may cause difficulty breathing. Inhalation may cause dizziness, drowsiness, euphoria, loss of coordination, disorientation, headache, nausea and vomiting. In poorly ventilated areas or confined spaces, unconsciousness and asphyxiation may result. Inhalation may result in adsorption of potentially harmful amounts of material.

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- **Skin contact:** Corrosive. Causes severe irritation with pain, severe excess redness and swelling with chemical burns, blister formation and possible tissue destruction. In addition to the potential skin irritation effects noted above, skin contact may result in other adverse health effects.
- **Eye contact:** Corrosive. Causes severe irritation experienced as pain, with excess blinking and tear production, as seen as extreme redness and swelling of the eye and chemical burns of the eye. Severe eye damage may cause blindness.
- **Ingestion:** Corrosive Causes abdominal discomfort, nausea, vomiting, diarrhea, weakness and collapse. Severe poisoning may cause death. Aspiration may occur during swallowing or vomiting, result in lung damage. May cause depression of central nervous system.

Chronic effect: Repeated inhalation may cause lung damage. Repeated skin contact may cause a persistent irritation or dermatitis. Prolonged and repeated exposure of animals to high concentrations of propylene oxide has caused liver injury.

CMR effects (Carcinogenity, Mutagenicity, toxicity for Reproduction):

Carcinogenity: Causes cancer in laboratory animals. Propylene oxide has caused cancer in the nasal passages, lungs, stomach and mammary glands of laboratory animals.

Mutagenicity: A mutagenic effect has been demonstrated in animal studies on mammals, justifying the assumption that exposure of humans to the substance produce hereditary damage.

Toxicity for Reproduction: Causes foetotoxicity at doses which are maternally toxic. Does not impair fertility.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Fish	<i>Onchorhynchus mykiss</i>	LC ₅₀ =52 g/l/96 hours
	<i>L.macrochirus</i>	LC ₅₀ =215mg/l/96 hours
Daphnia	<i>Daphnia magna</i>	EC ₅₀ =350mg/l/48 hours
Algae	<i>Selenastrum capricornutum</i>	IC ₅₀ =240mg/l/96 hours
Bacteria		EC ₁₀ =10mg/l/17 hours

Mobility: Propylene oxide may enter the environment from industrial discharges, plant discharges or spills. Propylene oxide is predicted to be moderately volatile from water; evaporation from wet soil may also be possible, the rate of evaporation may be diminished by leaching. The estimated Koc values of 3.6 and 30 indicate that propylene oxide is expected to be very mobile in soil. The relatively high vapor pressure suggests that it would evaporate rapidly from dry soil surface.

Persistence and degradability: When release into air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. The half life of propylene oxide in air is 30 days. The aqueous hydrolysis of propylene oxide occurs at an environmentally important rate. The half life of propylene oxide in water is 12 days. Hydrolysis in the moist soil conditions is likely to be important.

Bioaccumulative potential: No bioaccumulation is to be expected ($\log K_{ow} < 1$).

PBT assessment: Readily biodegradable, does not bioaccumulate significantly.

Other adverse effects: Harmful effect on aquatic organisms. May cause long term adverse effects in aquatic environment. Toxic effect on fish and plankton. Forms toxic mixtures in water, dilution measures notwithstanding. No ecological problems are to be expected when the product is handled and used with due care and attention.

Do not allow to enter waters, waste water or soil!

13. DISPOSAL CONSIDERATIONS

Waste treatment: Whatever cannot be saved for recovery or recycling should be handled as hazardous waste. Dispose of contaminated product, container residues and spill clean up materials in accordance with federal, state and local requirements. The waste water with propylene oxide will be treated in biological treatment plant providing accommodation of activated sludge.

Packaging treatment: The empty containers are blown down with nitrogen, to eliminate any propylene oxide traces, rinsed with 3 ata steam and dried with air. The resulted effluent are treated in the same way as the wastes. The empty, cleaned and dried containers will be reused in conformity with regulations.

14. TRANSPORT INFORMATION

Propylene oxide is packaged in tank cars and tank trucks under nitrogen blanket at max. 20°C temperature. At long distance shipment the tanks will be provided with cooling coiled pipes at exterior. The tanks can be shipped on railway and road according to RID/ADR regulations. Product is shipped on sea according to IMDG regulations.

Transport Labeling



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RID/ADR

UN Number 1280

Proper shipping name **Propylene oxide**

Hazard class 3

UN Packing group I

Classification code F1

Danger panel 33/1280 (33 Hazard Identification No.)
(1280 UN Identification No)**IMDG/IMO**

UN No. 1280

Hazard class 3

Packing group I

Proper shipping name **Propylene oxide**

EmS F-E, S-D

Marin Poluant No

IATA/IT-ICAOProper shipping name **Propylene oxide**

UN Number 1280

Hazard class 3

UN Packing Group I

IATA Label **Flammable**

Packaging Note Passenger 306

Packaging Note Cargo 304

15. REGULATORY INFORMATION

Propylene oxide is classified and labeled under Directive 67/548/EC, Annex I. This product is listed on EINECS.

EC Classification Annex I Index No.: 603-055-00-4

F+; R12

Carc. Cat. 2; R45

Muta. Cat. 2; R46

Xn; R20/21/22

Xi; R36/37/38

Labelling

EC label name Propylene oxide

EC No. 200-879-2

Hazard Symbol F+, T**R Phrases****R 12** Extremely flammable**R 45** May cause cancer**R 46** May cause heritable genetic damage**R 20/21/22** Harmful by inhalation, in contact with skin and if swallowed**R36/37/38** Irritating to eyes/respiratory system/skin

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S Phrases**S 53**

Avoid exposure-obtain special instructions before use.

S 45

In case of accident or if you feel unwell,seek medical advice immediately (show the label whenever possible).

16. OTHER INFORMATION**List of relevant R-phrases (see chapter 3)****R 12** Extremely flammable**R 45** May cause cancer**R 46** May cause heritable genetic damage**R 20/21/22** Harmful by inhalation, in contact with skin and if swallowed**R36/37/38** Irritating to eyes/respiratory system/skin**Precautions to be taken in handling and storing:** Keep well ventilated the areas is stored and handled.**Work hygienic practices:** Avoid direct contact of substance with skin/eyes. Avoid the exposure of personnel with dermatological affections.**Interdictions: Do not drink or eat** in working area.**Do not smoke** in or near working area.**The use of open flame** in working areas is prohibited.**MSDS Revisions:** This Material Safety Data Sheet is made in accordance to Regulation (EC) no.1907/2006 REACH and will replace the previous version 5 dated February 05, 2008.**Revised information:**

TÜV mark for Quality-Environmental Integrated System was replaced with the new one, remitted by TÜV Management GmbH.

Sources of key data uses to compile the data sheet:

EC Directive 67/548/EC resp. 99/45/EC as amended in each case.

EC Directive 2001/58/EC as amended in each case.

EC Directive 2000/39/EC as amended in each case.

National Threshold Limit Values of corresponding countries as amended in each case.

Transport regulations according to ADR, RID, IMDG, IATA as amended in each case.

*This MSDS has been elaborated in accordance with Regulation (EC) No.1907/2006 REACH..**The information contained here in is based on the present state of our knowledge. It characterizes the product with regard to the appropriate safety precautions. It does not represent a guarantee of the properties of the product.**This MSDS cannot cover all possible situations which the user may experience during handling and processing. Each aspect of the user's operation should be examined to determine if, or where, additional precautions may be necessary. All health and safety information contained within this MSDS should be provided to the user's employees or customers.*