MATERIAL SAFETY DATA SHEET (MSDS)

MONO ETHYLEN GLYCOL

1. PRODUCT IDENTIFICATION:

Synonyms: 1,2-Ethanediol; 1,2-Dihydroxyethane; Ethylene di hydrate; Glycol alcohol;
CAS No.: 107-21-1
Molecular Weight: 62.07
Chemical Formula: $C_2H_6O_2$

COMPANY IDENTIFICATION:

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Post Code: 1577836331
Tel: +982188524300 (10 Lines)
Fax: +982188170565

Factory: Arghavan 3 Ave., No.2 Industrial Zone, Arak-Iran
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Tel: +988633573306 (10 Lines)
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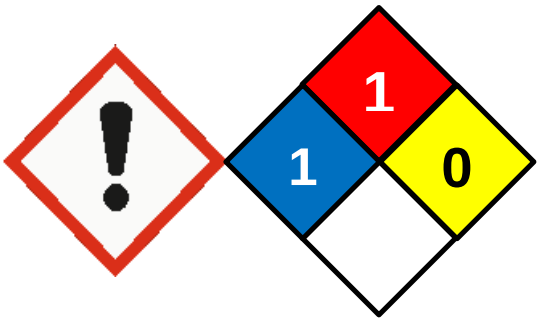
2. HAZARDS IDENTIFICATION:

OSHA/GHS:	Target Organ Effect, Harmful by ingestion., Irritant, Teratogen	Category 4
Target Organs	Liver, Cardiovascular system., Eyes, Kidney, Central nervous systemCentral nervous system, Kidney, Eyes, Cardiovascular system., Liver	
GHS Classification	Acute toxicity, Oral	Category 4
	Eye irritation	Category 2B

LABEL ELEMENTS

Hazard symbols:



Signal word: Warning

Hazard statements:

H302	Harmful if swallowed.
H320	Causes eye irritation.

Precautionary statements:

Response:

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

Potential health Effects:

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.
Ingestion	Toxic if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS:

Components	CAS-No.	Percent
Mono ethylene glycol	107-21-1	99-100%

4. FIRST AID MEASURES:

General advice	Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.
Eye contact	Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.
Skin contact	Wash off with soap and plenty of water. Consult a physician.
Inhalation	If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.
Ingestion	If swallowed, never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE FIGHTING MEASURES:

FLAMMABLE PROPERTIES:

Conditions of flammability	Not flammable or combustible.
Suitable extinguishing media	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Protective equipment and precautions for firefighters	Wear self contained breathing apparatus for firefighting if necessary.
Hazardous combustion products	Hazardous decomposition products formed under fire conditions. - Carbon oxides

6. ACCIDENTAL RELEASE MEASURES:

Personal precautions	Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation.
Environmental precautions	Do not let product enter drains.
Methods and materials for containment and cleaning up	Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE:

Safe handling advice	Avoid contact with skin and eyes. Avoid inhalation of vapor or mist.
Storage/Transport pressure	Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/ PERSONAL PROTECTION:

PERSONAL PROTECTIVE EQUIPMENT:

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

EXPOSURE GUIDELINES:

Components	Exposure limit(s)
Mono ethylene glycol	ACGIH TLV (8-hour) 100 mg/m3 OSHA PEL (Permissible Exposure Limit) 50 ppm 125 mg/m3

9. PHYSICAL AND CHEMICAL PROPERTIES:

Appearance	liquid
Color	Colorless
Form	liquid
Odor	No data available
Odor Threshold	No data available
Flash point	111 °C (232 °F) - closed cup
Flammability	Upper explosion limit: 15.3 %(V) Lower explosion limit: 3.2 %(V)
Boiling point/boiling range	196 - 198 °C (385 - 388 °F)
Melting point/range	-13 °C (9 °F)
Auto-ignition temperature	400 °C (752 °F)
Decomposition temperature	No data available
Vapor pressure	0.11 hPa (0.08 mmHg) at 20 °C (68 °F) 0.13 hPa (0.10 mmHg) at 20 °C (68 °F)
Vapor density	2.14 (Air = 1)
Density	1.113 g/mL at 25 °C (77 °F)
Relative density	No data available
Water solubility	completely miscible soluble
Viscosity	No data available
Viscosity, dynamic	No data available
pH	No data available
Evaporation rate	1
Partition coefficient: n-octanol/water	log Pow: -1.36

10. STABILITY AND REACTIVITY

Stability:
Stable under recommended storage conditions.

Hazardous Decomposition Products:
Other decomposition products - no data available
Hazardous decomposition products formed under fire conditions. - Carbon oxides

Possibility of hazardous reactions:
No data available.

Conditions to Avoid:
No data available.

Materials to avoid
Strong acids, Strong oxidizing agents, Strong bases, Aldehydes, Aluminum

11. TOXICOLOGICAL INFORMATION:

Inhalation rat LC50: no data available; oral rat LD50: 4700 mg/kg; Skin rabbit LD50: 10626 mg/kg. Investigated as a mutagen.

12. ECOLOGICAL INFORMATION:

Toxicity:

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 18,500 mg/l - 96 h LC50 - Leuciscus idus (Golden orfe) - > 10,000 mg/l - 48 h NOEC - Pimephales promelas (fathead minnow) - 32,000 mg/l - 7 d NOEC - Pimephales promelas (fathead minnow) - 39,140 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 74,000 mg/l - 24 h NOEC - Daphnia - 24,000 mg/l - 48 h LC50 - Daphnia magna (Water flea) - 41,000 mg/l - 48 h

13. DISPOSAL CONSIDERATIONS:

Product:
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. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging:
Dispose of as unused product.

14. TRANSPORT INFORMATION:

DOT	UN 3082, mono ethylene glycol, 9, III Proper shipping name: Environmentally hazardous substances, liquid, n.o.s. (Ethylene glycol) Reportable Quantity (RQ): 5000 lbs Marine pollutant: No Poison Inhalation Hazard: No
IATA	Not dangerous goods
IMDG	Not dangerous goods

15. OTERE INFORMATION:

NFPA Ratings: Health: 1 Flammability: 1 Reactivity: 0