Arak Petrochemical Company

ISO 9001:2000
Certificate No.: CH98/8032

ISO 14001:2004
Certificate No.: CH03/0112

OHSAS 18001:1999
Certificate No.: CH05/0675

Address:
No. 3, Taban St.
Vali-e-Asr Ave.
Tehran - IRAN

Tel:
(+98 21)82122700

Fax:
(+98 21)88674126-27

Web-site:
arpc-ir.com

E-mail:
sales@arpc-ir.com

Monoethylene glycol (MEG)

Characteristic	Test Method	Unit	Value
PURITY	ASTM E – 202	WT. %	99.8 MIN.
DIETHYLENE GLYCOL	ASTM E – 202	WT. %	0.08 MAX.
WATER CONTENT	ASTM E – 203	WT. %	0.08 MAX.
ACIDITY AS ACETIC ACID	ASTM D – 1613	WT. PPM	10 MAX.
ASH	DC – 254A	gr/100ml	MAX. 0.005
CHLORIDES	EO - 635	WT. PPM	0.1 MAX.
IRON	ASTM E – 202	WT. PPM	0.1 MAX.
ALDEHYDE AS ACETALDEHYDE	DC – 163C	WT. PPM	10 MAX.
COLOR Pt-Co	ASTM D – 1209	Pt - Co	5 MAX.
SP. GR (20/20 °C)	ASTM D – 891	-	1.1151 - 1.1156
DISTILLATION @ 760 MM-Hg			
IBP	ASTM D – 1078	°C	196 MIN.
DP	ASTM D –1078	°C	199 MAX.
5-95 VOL % RANGE	ASTM D–1078	°C	1 MAX.
UV TRANSMITTANCE			
AT 220 nm	EO –577A	T %	70 MIN.
AT 275 nm	EO –577A	T %	95 MIN.
AT 350 nm	EO –577A	T %	99 MIN.

MONOETHYLENEGLYCOL obtained from the reaction of ethylene oxide and water. It is a clear, transparent and odorless liquid that can be mixed with water in any proportion.

o Application areas:

- **Polyester :**

Polyester fibers, threads, films and polyester resins are produced from the reaction between MONOETHYLENEGLYCOL with dibasic acids and their esters, such as terephtalic, oxalic, succinic, glutamic and adipic acids among others. The polyterephtalate fibers of MONOETHYLENEGLYCOL are widely used in the textile industry and known commercially as Tergal, Terilene, Dacron and Trevira among other names.

Due to their high mechanical resistance, excellent dielectric properties and low hygroscopicity, polyester films are used to produce photographic films, magnetic tapes and packaging.

MONOETHYLENEGLYCOL is used in the synthesis of polyethylene tereftalate (PET), which is frequently used in the packaging of foodstuff and carbonated beverages.

Arak Petrochemical Company

ISO 9001:2000
Certificate No.: CH98/8032

ISO 14001:2004
Certificate No.: CH03/0112

OHSAS 18001:1999
Certificate No.: CH05/0675

Address:
No. 3, Taban St.
Vali-e-Asr Ave.
Tehran - IRAN

Tel:
(+98 21)82122700

Fax:
(+98 21)88674126-27

Web-site:
arpc-ir.com

E-mail:
sales@arpc-ir.com

Monoethylene glycol (MEG)

- **Resins :**

MONOETHYLENEGLYCOL is used in the synthesis of unsaturated polyester resins, alkyd resins, rosin esters and polyurethane resins.

It acts as a coalescence and anti-freezing agent in emulsified resins. Used together with adipic acid and other glycols, rubber with a high chemical and abrasion resistance can be synthesized. Resins produced from oleic acid and MONOETHYLENEGLYCOL, known as alkyd resins, are used frequently in the industry of paints and varnishes.

- **Wetting and plasticizing agents :**

MONOETHYLENEGLYCOL can be used as wetting and plasticizing agent in the production of cellophane, glues and adhesives, textiles, printing ink, leather, cosmetics, paper and pharmaceutical products.

- **Coolant additives :**

MONOETHYLENEGLYCOL is used in industrial refrigeration circuits and internal combustion engine coolant systems with the purpose of raising the boiling point and reducing the freezing point of the solution used. For this application, an anticorrosive must be added to MONOETHYLENEGLYCOL to prevent the system from suffering water corrosion.
DIETHYLENEGLYCOL can be used in antifreeze formulations in proportions of up to 10% together with MONOETHYLENEGLYCOL. The various quantitative ratios between these components are suitable for specific applications in the field of industrial refrigeration.

- **Other uses :**

Ethyleneglycols can also be used in the formulation of printing ink, in the treatment of gases, in the formulation of fire-resistant hydraulic fluids, in the formulation of cutting oils, in the formulation of surface polishers, in the formulations of agrochemicals, in the extraction of solvents, in the manufacture of pigmented pastes and putty for walls, and in the synthesis of explosives.

o Storage conditions:

Under nitrogen blanket and at ambient temperature.

o Packing:

Bulk or in 220 Lit (net: 220 Kg) new drums, each 4 drums strapped on a pallet.

Monoethylene glycol (MEG)

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: MEG
Product Description: Monoethylene Glycol
CAS No.: 107-21-1
Product Formulation: $HOCH_2CH_2OH$
Common names: Monoethylene glycol, ethylene glycol, 1,2-Ethanediol, ethane-1,2-diol
Chemical Family: Glycols

2. HAZARDS IDENTIFICATION

INHALATION: excessive exposures may cause irritation to eyes, nose, thro at and lungs. Irritation to respiratory tract; central nervous system (brain) effects; discomfort, disagreeable odor, nausea. Repeated excessive exposures may cause liver effects or damage. kidney effects or damage. Chronic, adverse systemic effects.

SKIN CONTACT: skin absorption of material may produce systemic toxicity. Contains a material(s) which may cause irritation with prolonged or repeated contact.

Eye Contact: contact with the eye may cause irritation.

INGESTION: harmful or fatal if swallowed. Ingestion of this material may cause abdominal pain; central nervous system (brain) effects; difficulty in breathing; respiratory failure; and death. Ingestion of this material may cause damage to kidneys.

3. COMPOSITION

Chemical Name	Wt.%	CAS No.
Ethylene glycol	Min. 99.00	107-21-1

4. FIRST AID MEASURES

Eyes: flush with water for at least 15 minutes. If irritation persists, obtain medical assistance.

Skin: wash with soap and water until no odor remains. If redness or swelling develops, obtain medical assistance. Obtain medical attention. Immediately remove soaked clothing. Wash clothing

Arak Petrochemical Company

ISO 9001:2000
Certificate No.: CH98/8032

ISO 14001:2004
Certificate No.: CH03/0112

OHSAS 18001:1999
Certificate No.: CH05/0675

Address:
No. 3, Taban St.
Vali-e-Asr Ave.
Tehran - IRAN

Tel:
(+98 21)82122700

Fax:
(+98 21)88674126-27

Web-site:
arpc-ir.com

E-mail:
sales@arpc-ir.com

Arak Petrochemical Company

ISO 9001:2000
Certificate No.: CH98/8032

ISO 14001:2004
Certificate No.: CH03/0112

OHSAS 18001:1999
Certificate No.: CH05/0675

Address:
No. 3, Taban St.
Vali-e-Asr Ave.
Tehran - IRAN

Tel:
(+98 21)82122700

Fax:
(+98 21)88674126-27

Web-site:
arpc-ir.com

E-mail:
sales@arpc-ir.com

before reuse.

Ingestion: give liquids and induce vomiting unless victim is unconscious. Obtain emergency medical attention. Small amounts which accidentally enter mouth should be rinsed out until taste of it is gone.

Inhalation: move person to fresh air. If not breathing, give artificial respiration, obtain medical assistance.

5. FIRE-FIGHTING MEASURES

Flashpoint: 245 closed cup (°F); 111 closed cup (°C)
Lower Explosive Limit (LEL): 3.2 % volume
Upper Explosive Limit (UEL): estimated @ 15.3 % volume
Autoignition temp.: 748 °F; 398 °C
Extinguishing Media: water spray. alcohol resistant foam. dry chemical, carbon dioxide.
Fire Fighting Procedures: use water spray. Cool tank/ container. wear self-contained breathing apparatus. Wear structural firefighters protective clothing.
Extinguishing Media: water spray. alcohol resistant foam. dry chemical, carbon dioxide.

6. ACCIDENTAL RELEASE MEASURES

SAFEGUARDS (PERSONNEL): use appropriate personal protective equipment during clean-up . Evacuate personnel, thoroughly ventilate area, and use self-contained breathing apparatus.
Initial Containment: remove source of heat, sparks, flame, impact, friction or electricity. dike spill. Prevent material from entering sewers, water ways, or low areas.
Spill cleanup: recover free liquid for reuse or reclamation. Soak up with saw dust, sand, oil dry or other ab sorbent material.

7. HANDLING AND STORAGE

Keep in cool, dry place. Keep in well ventilated space. Storage has temperature limits. NFPA class IIIB storage. Consult NFPA and OSHA codes. Avoid prolonged breathing of mist or vapor. Avoid prolonged or repeated contact with skin. Wash thoroughly after handling.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Consult with a health/safety professional for specific selection ventilation ventilate as needed to comply with exposure limit. Local exhaust ventilation recommended. Mechanical ventilation recommended personal protective equipment.

Arak Petrochemical Company

ISO 9001:2000
Certificate No.: CH98/8032

ISO 14001:2004
Certificate No.: CH03/0112

OHSAS 18001:1999
Certificate No.: CH05/0675

Address:
No. 3, Taban St.
Vali-e-Asr Ave.
Tehran - IRAN

Tel:
(+98 21)82122700

Fax:
(+98 21)88674126-27

Web-site:
arpc-ir.com

E-mail:
sales@arpc-ir.com

Eye: splash proof chemical goggles recommended to protect against splash of product.
Gloves: protective gloves recommended when prolonged skin contact cannot be avoided. polyethylene; neoprene; nitrile; polyvinyl alcohol; natural rubber; butyl rubber.
Respirator: concentration-in-air determines protection needed. use only niosh certified respiratory protection. Respiratory protection usually not needed unless product is heated or misted. Half-mask air purifying respirator with organic vapor cartridges is acceptable to 10 times the exposure limit. Full-face air purifying respirator with organic vapor cartridges is acceptable to 50 times the exposure limit not to exceed the cartridge limit of 1000 ppm. Protection by air purifying respirators is limited. Use a positive pressure-demand full-face supplied air respirator or SCBA for exposures above 50x the exposure limit. if exposure is above IDLH (immediately dangerous to life & health) or there is the possibility of an uncontrolled release or exposure levels are unknown then use a positive pressure-demand full-face supplied air respirator with escape bottle or SCBA.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance And Odor: colorless liquid odor slightly sweet
PH: 6-8 @ 558g/l H_2O
Solubility In Water: complete
Solubility In Other solvents: alcohol -ether- acetone
Evaporation Rate: 1000x slower (ethyl ether=1)
VAPOR PRESSURE: 0.08 (mm Hg @ 20 °C)
BOILING POINT: 388 °F, 198 °C
MELTING POINT: -11.5 °C
MOLECULAR WEIGHT: 62.07
DENSITY/SPECIFIC GRAVITY: 1.1 (WATER=1)
VAPOR DENSITY: 2.1 (AIR=1)

10. STABILITY AND REACTIVITY

Stability: stable
Conditions To Avoid: extreme heat will ignite in air A748F. Do not store at temperatures above 120 °F (60 °C).
INCOMPATIBILITY: strong oxidizing chemicals. Reacts violently with chlorosulfonic acidoleum, sulfuric acid, strong bases.
Hazardous Decomposition Products: carbon monoxide and asphyxiants are produced by burning.
Hazardous Polymerization: will not occur.

Arak Petrochemical Company

ISO 9001:2000
Certificate No.: CH98/8032

ISO 14001:2004
Certificate No.: CH03/0112

OHSAS 18001:1999
Certificate No.: CH05/0675

Address:
No. 3, Taban St.
Vali-e-Asr Ave.
Tehran - IRAN

Tel:
(+98 21)82122700

Fax:
(+98 21)88674126-27

Web-site:
arpc-ir.com

E-mail:
sales@arpc-ir.com

11. TOXICOLOGICAL INFORMATION

FOR THE PRODUCT:

INHALATION: over exposure to mist or vapors may cause eye nose, throat & respiratory tract irritation, CNS (brain) effects, dizziness, drunkenness, incoordination, coma, respiratory failure, or death. Excessive exposures may cause brain, liver, and/or kidney effects and damage.

SKIN & EYE: large acute exposure may cause systemic effects.

IRRITANT ON CONTACT:

INGESTION: toxic harmful or fatal if swallowed.

Acute poisoning (as little as 100 ml in humans) characterized by gi pain, nausea, vomiting, muscle tenderness, CNS depression, possible respiratory and renal failure, death. in lab animals by oral and inhalation exposure embryotoxicity & teratogenicity were reported.

ETHYLENE GLYCOL (COMPONENT):

INHALATION: overexposure to mist or vapors generated by heating may cause eye, nose, throat, & respiratory irritation, CNS (brain) effects & dizziness. Excessive prolonged exposures may cause kidney, liver, blood, brain effects or damage. Skin & eye: large acute exposure may cause systemic toxicity. Irritation contact. Oral: toxic harmful or fatal if swallowed. Acute poisoning (as little as 100 ml in humans has produced lethality) characterized by gi pain, nausea, vomiting, muscle spasms, convulsions and CNS depression, possible renal and respiratory failure, death. in lab animals by oral & inhalation exposure fetal toxicity and birth defects were reported.

---

12. ECOLOGICAL INFORMATION

Aquatic toxicity: TLm96 (concentration in water that kills 50% of exposed organisms) is in the range of 100 to 1000 ppm. LC50 (24 hrs.)
To goldfish: >5,000 mg/l
The toxicity threshold for scendesmus quadricauda (green algae) to ethylene glycol is >10,000 mg/l.

---

13. DISPOSAL CONSIDERATIONS

Follow federal, state and local regulations.
If uncontaminated. Do not flush to drain/ storm sewer. Contract to authorized disposal service.
Contain spill. For large spill, leak or release. Use personal protective equipment stated. Advice EPA; state agency if required. Absorb on inert material. Shovel, sweep or vacuum spill. Flush with water and remove contaminated articles.

R.P.C
Arak Petrochemical Company

ISO 9001:2000
Certificate No.: CH98/8032

ISO 14001:2004
Certificate No.: CH03/0112

OHSAS 18001:1999
Certificate No.: CH05/0675

Address:
No. 3, Taban St.
Vali-e-Asr Ave.
Tehran - IRAN

Tel:
(+98 21)82122700

Fax:
(+98 21)88674126-27

Web-site:
arpc-ir.com

E-mail:
sales@arpc-ir.com

14. TRANSPORT INFORMATION

Road and Rail Transport
Not classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for transport by Road and Rail; NON-DANGEROUS GOODS.

Marine Transport
Not classified as Dangerous Goods by the criteria of the International Maritime Dangerous Goods Code (IMDG Code) for transport by sea; NON-DANGEROUS GOODS.

Air Transport
Not classified as Dangerous Goods by the criteria of the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by air; NON-DANGEROUS GOODS.

---

15. REGULATORY INFORMATION

Classification:
This material is hazardous according to Safe Work Australia; HAZARDOUS CHEMICAL.
Classification of the chemical:
Acute Oral Toxicity - Category 4
Specific target organ toxicity (repeated exposure) - Category 2
Hazard Statement(s):
H302 Harmful if swallowed.
H373 May cause damage to organs through prolonged or repeated exposure.
Poisons Schedule (SUSMP): S6 Poison
This material is listed on the Australian Inventory of Chemical Substances (AICS).

---

16. OTHER INFORMATION

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

Caution

The information contained in this Material Safety Data Sheet (MSDS) is believed to be correct since it was obtained from sources we believe are reliable. However no representation, guarantees or warranties of any kind are made as to its accuracy, suitability for particular applications, hazards connected with the use of the material, or the results to be obtained from the use thereof. User assumes all risks and liability of any use, processing or handling of any material, variations in methods, conditions and equipment used to store, handle, or process the material and hazards connected with the use of the material are solely the responsibility of the user and remain at his sole discretion.