

**Product name: Monoethanolamine**

**Issue Date: 10/24/2016**

**Print Date: 11/10/2016**

Sadara Chemical Company encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

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## 1. PRODUCT AND COMPANY IDENTIFICATION

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**Product name:** Monoethanolamine

**Recommended use of the chemical and restrictions on use**

**Identified uses:** Gas treating. Chemical intermediate.

**COMPANY IDENTIFICATION**

SADARA CHEMICAL COMPANY  
P.O. BOX 11811  
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KINGDOM OF SAUDI ARABIA

**Customer Information Number:**

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cig@sadara.com

**Fax:**

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**EMERGENCY TELEPHONE NUMBER**

**24-Hour Emergency Contact:** +966 13 345 7222

**Local Emergency Contact:** +966 13 345 7222

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## 2. HAZARDS IDENTIFICATION

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**Hazard classification**

Harmful by inhalation, in contact with skin and if swallowed.

Causes burns.

**Other hazards**

No data available

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## 3. COMPOSITION/INFORMATION ON INGREDIENTS

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This product is a substance.

CASRN / EC-No. / Index-No.	Concentration	Component	Classification
<b>CASRN</b> 141-43-5 <b>EC-No.</b> 205-483-3 <b>Index-No.</b> 603-030-00-8	> 99.0 %	Monoethanolamine	C - R34 Xn - R20/21/22
<b>CASRN</b> 111-42-2 <b>EC-No.</b> 203-868-0 <b>Index-No.</b> 603-071-00-1	< 0.2 %	N,N-Diethanolamine	Xn - R22 - R48/22 Xi - R38 - R41

The full text of each R phrase is listed in section 16.

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## 4. FIRST AID MEASURES

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### Description of first aid measures

**General advice:** First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.

**Inhalation:** Move person to fresh air; if effects occur, consult a physician.

**Skin contact:** Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing. Seek medical attention if symptoms occur or irritation persists. Wash clothing before reuse. Suitable emergency safety shower facility should be immediately available.

**Eye contact:** Wash immediately and continuously with flowing water for at least 30 minutes. Remove contact lenses after the first 5 minutes and continue washing. Obtain prompt medical consultation, preferably from an ophthalmologist. Suitable emergency eye wash facility should be immediately available.

**Ingestion:** Do not induce vomiting. Give one cup (8 ounces or 240 ml) of water or milk if available and transport to a medical facility. Do not give anything by mouth unless the person is fully conscious.

**Most important symptoms and effects, both acute and delayed:** Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

### Indication of any immediate medical attention and special treatment needed

**Notes to physician:** Chemical eye burns may require extended irrigation. Obtain prompt consultation, preferably from an ophthalmologist. If burn is present, treat as any thermal burn, after decontamination. Due to irritant properties, swallowing may result in burns/ulceration of mouth, stomach and lower gastrointestinal tract with subsequent stricture. Aspiration of vomitus may cause lung injury. Suggest endotracheal/esophageal control if lavage is done. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

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## 5. FIREFIGHTING MEASURES

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**Suitable extinguishing media:** Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.

**Unsuitable extinguishing media:** Do not use direct water stream. May spread fire.

**Special hazards arising from the substance or mixture**

**Hazardous combustion products:** During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Nitrogen oxides. Carbon monoxide. Carbon dioxide.

**Unusual Fire and Explosion Hazards:** Violent steam generation or eruption may occur upon application of direct water stream to hot liquids.

**Advice for firefighters**

**Fire Fighting Procedures:** Keep people away. Isolate fire and deny unnecessary entry. Burning liquids may be extinguished by dilution with water. Do not use direct water stream. May spread fire. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage.

**Special protective equipment for firefighters:** Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.

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## 6. ACCIDENTAL RELEASE MEASURES

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**Personal precautions, protective equipment and emergency procedures:** Evacuate area. Refer to section 7, Handling, for additional precautionary measures. Keep upwind of spill. Ventilate area of leak or spill. Only trained and properly protected personnel must be involved in clean-up operations. No smoking in area. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

**Environmental precautions:** Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

**Methods and materials for containment and cleaning up:** Small spills: Dilute with water. Absorb with materials such as: Non-combustible material. Sand. Clay. Vermiculite. Zorb-all®. Collect in suitable and properly labeled containers. Large spills: Contain spilled material if possible. Pump into suitable and properly labeled containers. See Section 13, Disposal Considerations, for additional information.

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## 7. HANDLING AND STORAGE

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**Precautions for safe handling:** Keep away from heat, sparks and flame. Containers, even those that have been emptied, can contain vapors. Do not cut, drill, grind, weld, or perform similar operations on

or near empty containers. Do not get in eyes, on skin, on clothing. Do not swallow. Avoid breathing vapor. Wash thoroughly after handling. Keep container closed. Use with adequate ventilation. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.

**Conditions for safe storage:** Monoethanolamine can react with iron to form an unstable material that can decompose at temperatures above 130 °C in air. Use caution when thawing drummed material. If steam heating is necessary, use only low pressure steam and stainless steel coils. Store in a dry place. Do not store in: Zinc. Aluminum. Copper. Copper alloys. Galvanized containers.

**Storage stability:**

**Storage Period:**  
**Plastic drums.**  
 24 Month

**Bulk**  
 6 Month

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## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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### Control parameters

Exposure limits are listed below, if they exist.

Component	Regulation	Type of listing	Value/Notation
Monoethanolamine	ACGIH	TWA	3 ppm
	ACGIH	STEL	6 ppm
	2006/15/EC	TWA	2.5 mg/m3 1 ppm
	2006/15/EC	STEL	7.6 mg/m3 3 ppm
	2006/15/EC	TWA	SKIN
	2006/15/EC	STEL	SKIN
N,N-Diethanolamine	ACGIH	TWA Inhalable fraction and vapor	1 mg/m3
	ACGIH	TWA Inhalable fraction and vapor	SKIN
	Dow IHG	TWA	0.2 mg/m3
	Dow IHG	TWA	SKIN

### Exposure controls

**Engineering controls:** Use engineering controls to maintain airborne level below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use only with adequate ventilation. Local exhaust ventilation may be necessary for some operations.

### Individual protection measures

**Eye/face protection:** Use chemical goggles. Chemical goggles should be consistent with EN 166 or equivalent. If exposure causes eye discomfort, use a full-face respirator.

#### Skin protection

**Hand protection:** Use chemical resistant gloves classified under Standard EN374: Protective gloves against chemicals and micro-organisms. Examples of preferred glove barrier materials include: Polyethylene. Chlorinated polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Examples of acceptable glove barrier materials include: Viton. Butyl rubber. Neoprene. Natural rubber ("latex"). Polyvinyl chloride ("PVC" or "vinyl"). Nitrile/butadiene rubber ("nitrile" or "NBR"). Avoid gloves made of: Polyvinyl alcohol ("PVA"). When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended. When only brief contact is expected, a glove

with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended. Glove thickness alone is not a good indicator of the level of protection a glove provides against a chemical substance as this level of protection is also highly dependent on the specific composition of the material that the glove is fabricated from. The thickness of the glove must, depending on model and type of material, generally be more than 0.35 mm to offer sufficient protection for prolonged and frequent contact with the substance. As an exception to this general rule it is known that multilayer laminate gloves may offer prolonged protection at thicknesses less than 0.35 mm. Other glove materials with a thickness of less than 0.35 mm may offer sufficient protection when only brief contact is expected.

**NOTICE:** The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

**Other protection:** Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full body suit will depend on the task.

**Respiratory protection:** Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use an approved respirator. Selection of air-purifying or positive-pressure supplied-air will depend on the specific operation and the potential airborne concentration of the material. For emergency conditions, use an approved positive-pressure self-contained breathing apparatus.

Use the following CE approved air-purifying respirator: Organic vapor cartridge, type A (boiling point >65 °C)

See **SECTION 7: Handling and storage** and **SECTION 13: Disposal considerations** for measures to prevent excessive environmental exposure during use and waste disposal.

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

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### Appearance

Physical state	liquid
Color	colourless
Odor	ammoniacal
Odor Threshold	No test data available
pH	12.1 <i>Literature</i> (50% aq. sol.)
Melting point/range	No test data available
Freezing point	10.5 °C <i>Literature</i>
Boiling point (760 mmHg)	170.3 °C <i>Literature</i>
Flash point	<b>closed cup</b> 93 °C at 1 bar <i>Pensky-Martens Closed Cup ASTM D 93</i>
Evaporation Rate (Butyl Acetate = 1)	No data available
Flammability (solid, gas)	Not applicable to liquids
Lower explosion limit	3.0 % vol <i>Literature</i>
Upper explosion limit	23.5 % vol <i>Literature</i>
Vapor Pressure	0.5 hPa at 20 °C <i>Literature</i>
Relative Vapor Density (air = 1)	2.1 at 20 °C

<b>Relative Density (water = 1)</b>	1.02 <i>Literature</i>
<b>Water solubility</b>	1000 g/l at 20 °C <i>Literature</i>
<b>Partition coefficient: n-octanol/water</b>	log Pow: -2.3 <i>Measured</i>
<b>Auto-ignition temperature</b>	410 °C <i>Literature</i>
<b>Decomposition temperature</b>	No test data available
<b>Dynamic Viscosity</b>	23.18 mPa.s at 20 °C <i>Literature</i>
<b>Kinematic Viscosity</b>	No test data available
<b>Explosive properties</b>	Not explosive
<b>Oxidizing properties</b>	No
<b>Liquid Density</b>	8.5376 lb/gln at 10.5 °C @ freezing pt.
<b>Molecular weight</b>	No test data available
<b>Particle size</b>	<i>Not reported</i> No test data available

NOTE: The physical data presented above are typical values and should not be construed as a specification.

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## 10. STABILITY AND REACTIVITY

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

**Chemical stability:** Stable under recommended storage conditions. See Storage, Section 7.  
Hygroscopic

**Possibility of hazardous reactions:** Polymerization will not occur.

**Conditions to avoid:** Exposure to elevated temperatures can cause product to decompose. Avoid moisture.

**Incompatible materials:** Avoid contact with: Strong acids. Strong oxidizers. Product may potentially react with various halogenated organic solvents, resulting in temperature and/or pressure increases  
Corrosive when wet. Heating above 60°C in the presence of aluminum can result in corrosion and generation of flammable hydrogen gas. Avoid unintended contact with: Halogenated hydrocarbons.

**Hazardous decomposition products:** Decomposition products depend upon temperature, air supply and the presence of other materials.

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## 11. TOXICOLOGICAL INFORMATION

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Toxicological information appears in this section when such data is available.

### Acute toxicity

#### Acute oral toxicity

Low toxicity if swallowed. Swallowing may result in gastrointestinal irritation or ulceration.  
Swallowing may result in burns of the mouth and throat.

LD50. Rat. 1,089 mg/kg

#### Acute dermal toxicity

Prolonged skin contact is unlikely to result in absorption of harmful amounts.

LD50. Rat. 2,504 mg/kg

**Acute inhalation toxicity**

Prolonged excessive exposure may cause adverse effects. Excessive exposure may cause irritation to upper respiratory tract (nose and throat).

LC50. Rat. 4 Hour. vapour. > 1.48 mg/l Estimated. No deaths occurred at this concentration.

**Skin corrosion/irritation**

Brief contact may cause skin burns. Symptoms may include pain, severe local redness and tissue damage.

**Serious eye damage/eye irritation**

May cause severe irritation with corneal injury which may result in permanent impairment of vision, even blindness. Chemical burns may occur.

Vapor may cause eye irritation experienced as mild discomfort and redness.

**Sensitization**

Did not cause allergic skin reactions when tested in guinea pigs.

For respiratory sensitization:

No relevant data found.

**Specific Target Organ Systemic Toxicity (Single Exposure)**

Material is corrosive. Material is not classified as a respiratory irritant; however, upper respiratory tract irritation or corrosivity may be expected.

**Specific Target Organ Systemic Toxicity (Repeated Exposure)**

In animals, effects have been reported on the following organs:

Kidney.

Liver.

**Carcinogenicity**

Findings from a chronic diethanolamine skin painting study by NTP include liver and kidney tumors in mice; no tumors were observed in rats. Mechanistic studies indicate that tumor formation is of questionable relevance to humans. A number of factors may have influenced the results and are being considered in their interpretation.

**Teratogenicity**

Has been toxic to the fetus in laboratory animals at doses toxic to the mother. However, the relevance of this to humans is unknown. Dose levels producing these effects were many times higher than any dose levels expected from exposure due to use.

**Reproductive toxicity**

In animal studies, did not interfere with reproduction.

**Mutagenicity**

In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

**Aspiration Hazard**

Based on available information, aspiration hazard could not be determined.

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## 12. ECOLOGICAL INFORMATION

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Ecotoxicological information appears in this section when such data is available.

### Toxicity

#### Acute toxicity to fish

Material is toxic to aquatic organisms (LC50/EC50/IC50 between 1 and 10 mg/L in the most sensitive species).

LC50. *Cyprinus carpio* (Carp). semi-static test. 96 Hour. 349 mg/l

#### Acute toxicity to aquatic invertebrates

EC50. *Daphnia magna* (Water flea). static test. 48 Hour. 65 mg/l

#### Acute toxicity to algae/aquatic plants

ErC50. *Pseudokirchneriella subcapitata* (green algae). 72 Hour. Growth rate inhibition. 2.5 mg/l. OECD Test Guideline 201 or Equivalent

NOEC. *Pseudokirchneriella subcapitata* (green algae). 72 Hour. Growth rate inhibition. 1 mg/l. OECD Test Guideline 201

#### Toxicity to bacteria

EC50. activated sludge. > 1,000 mg/l

#### Chronic aquatic toxicity

##### Chronic toxicity to fish

LOEC. *Oryzias latipes* (Orange-red killifish). 30 d. Other. 3.6 mg/l

##### Chronic toxicity to aquatic invertebrates

NOEC. *Daphnia magna* (Water flea). 21 d. number of offspring. 0.85 mg/l

### Persistence and degradability

**Biodegradability:** Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.

10-day Window: Pass

**Biodegradation:** > 90 %

**Exposure time:** 21 d

**Method:** OECD Test Guideline 301A or Equivalent

### Bioaccumulative potential

**Bioaccumulation:** Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

**Partition coefficient: n-octanol/water(log Pow):** -2.3 at 25 °C Measured

### Mobility in soil

Potential for mobility in soil is very high (Koc between 0 and 50).

**Partition coefficient(Koc):** 1.17 Estimated.

### Results of PBT and vPvB assessment

This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

### Other adverse effects

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.



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### 13. DISPOSAL CONSIDERATIONS

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**Disposal methods:**

This product, when being disposed of in its unused and uncontaminated state should be treated as a hazardous waste according to EC Directive 2008/98/EC. Any disposal practices must be in compliance with all national and provincial laws and any municipal or local by-laws governing hazardous waste. For used, contaminated and residual materials additional evaluations may be required. Do not dump into any sewers, on the ground, or into any body of water.

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### 14. TRANSPORT INFORMATION

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**Classification for ROAD and Rail transport:**

Proper shipping name	ETHANOLAMINE
UN number	UN 2491
Class	8
Packing group	III

**Classification for SEA transport (IMO-IMDG):**

Proper shipping name	ETHANOLAMINE
UN number	UN 2491
Class	8
Packing group	III
Transport in bulk according to Annex I or II of MARPOL 73/78 and the IBC or IGC Code	Consult IMO regulations before transporting ocean bulk

**Classification for AIR transport (IATA/ICAO):**

Proper shipping name	Ethanolamine
UN number	UN 2491
Class	8
Packing group	III

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

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### 15. REGULATORY INFORMATION

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**Label**

Classification and labeling have been performed according to regulations.

**Hazard symbol and Indication of danger**

C Corrosive

**Chemical Name:** Monoethanolamine  
205-483-3**R-phrase(s)**R20/21/22 Harmful by inhalation, in contact with skin and if swallowed.  
R34 Causes burns.**S-phrase(s)**S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.  
S36/37/39 Wear suitable protective clothing, gloves and eye/face protection.  
S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

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**16. OTHER INFORMATION**

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**Full text of the R-phrases given in Section 3**R20/21/22 Harmful by inhalation, in contact with skin and if swallowed.  
R22 Harmful if swallowed.  
R34 Causes burns.  
R38 Irritating to skin.  
R41 Risk of serious damage to eyes.  
R48/22 Harmful: danger of serious damage to health by prolonged exposure if swallowed.**Revision**

Identification Number: 2702 / S100 / Issue Date: 10/24/2016 / Version: 1.0

Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

**Legend**

2006/15/EC	Europe. Indicative occupational exposure limit values
ACGIH	USA. ACGIH Threshold Limit Values (TLV)
Dow IHG	Dow Industrial Hygiene Guideline
SKIN	Absorbed via skin
STEL	Short-term exposure limit
TWA	Time weighted average

**Information Source and References**

This SDS is prepared by Product Regulatory Services and Hazard Communications Groups from information supplied by internal reference within our company.

Sadara Chemical Company urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no

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