

**Product name:** Diethanolamine

**Issue Date:** 11/10/2016

**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.

---

## 1. PRODUCT AND COMPANY IDENTIFICATION

---

**Product name:** Diethanolamine

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

**Identified uses:** Chemical intermediate. Gas treating. We recommend that you use this product in a manner consistent with the listed use. If your intended use is not consistent with the stated use, please contact your sales or technical service representative.

**COMPANY IDENTIFICATION**

SADARA CHEMICAL COMPANY  
P.O. BOX 11811  
JUBAIL INDUSTRIAL CITY 31961  
KINGDOM OF SAUDI ARABIA

**Customer Information Number:**

+966 13 345 8888

cig@sadara.com

**Fax:**

+966 13 868 8097

**EMERGENCY TELEPHONE NUMBER**

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

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

---

## 2. HAZARDS IDENTIFICATION

---

**Hazard classification**

Harmful if swallowed.

Irritating to skin.

Risk of serious damage to eyes.

Harmful: danger of serious damage to health by prolonged exposure if swallowed.

**Other hazards**

No data available

---

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

---

This product is a substance.

CASRN / EC-No. / Index-No.	Concentration	Component	Classification
CASRN 111-42-2 EC-No. 203-868-0 Index-No. 603-071-00-1	>= 95.0 - <= 100.0 %	N,N-Diethanolamine	Xn - R22 - R48/22 Xi - R38 - R41

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

---

## 4. FIRST AID MEASURES

---

### 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.

**Eye contact:** Immediately flush eyes with water; remove contact lenses, if present, after the first 5 minutes, then continue flushing eyes for at least 15 minutes. Obtain medical attention without delay, 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:** 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.

---

## 5. FIREFIGHTING MEASURES

---

**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.  
Combustion products may include and are not limited to: Nitrogen oxides. Carbon dioxide.

**Unusual Fire and Explosion Hazards:** Container may rupture from gas generation in a fire situation. 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. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Burning liquids may be extinguished by dilution with water. Do not use direct water stream. May spread fire. Move container from fire area if this is possible without hazard. 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). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

---

## **6. ACCIDENTAL RELEASE MEASURES**

---

**Personal precautions, protective equipment and emergency procedures:** Isolate area. Refer to section 7, Handling, for additional precautionary measures. Keep unnecessary and unprotected personnel from entering the 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: Absorb with materials such as: Non-combustible material. Sand. Clay. Vermiculite. Zorb-all®. Collect in suitable and properly labeled containers. Do NOT use absorbent materials such as: Cellulose. Sawdust. Large spills: Contain spilled material if possible. Pump into suitable and properly labeled containers. See Section 13, Disposal Considerations, for additional information.

---

## **7. HANDLING AND STORAGE**

---

**Precautions for safe handling:** Avoid contact with eyes. Avoid contact with skin and clothing. Do not swallow. Wash thoroughly after handling. Do not use sodium nitrite or other nitrosating agents in formulations containing this product. Suspected cancer-causing nitrosamines could be formed. 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:** Store in a dry place. Avoid moisture. Do not store in: Aluminum. Copper. Copper alloys. Avoid freezing. This product is typically stored, loaded, and shipped in a liquid state. Please refer to Section 9 (Physical and Chemical Properties) of this (M)SDS for the Freezing Point &/or Melting Point for this product.

**Storage stability:**                   **Storage Period:**  
**Storage temperature:**  
 34 - 49 °C

**Metal drums.**  
 24 Month  
**Bulk**  
 6 Month

---

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

---

### Control parameters

Exposure limits are listed below, if they exist.

Component	Regulation	Type of listing	Value/Notation
N,N-Diethanolamine	ACGIH	TWA Inhalable fraction and vapor	1 mg/m <sup>3</sup>
	ACGIH	TWA Inhalable fraction and vapor	SKIN
	Dow IHG	TWA	0.2 mg/m <sup>3</sup>
	Dow IHG	TWA	SKIN

### Exposure controls

**Engineering controls:** Use local exhaust ventilation, or other engineering controls to maintain airborne levels below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, general ventilation should be sufficient for most operations. 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.

#### Skin protection

**Hand protection:** Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur. Use chemical resistant gloves classified under Standard EN374: Protective gloves against chemicals and micro-organisms. If hands are cut or scratched, use gloves chemically resistant to this material even for brief exposures. Examples of preferred glove barrier materials include: Chlorinated polyethylene. Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Examples of acceptable glove barrier materials include: Butyl rubber. Natural rubber ("latex"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyvinyl alcohol ("PVA"). Polyvinyl chloride ("PVC" or "vinyl"). Viton. 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:** When prolonged or frequently repeated contact could occur, use protective clothing chemically resistant to this material. Selection of specific items such as faceshield, 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, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. For most conditions, no respiratory protection should be needed; however, if handling at elevated temperatures without sufficient ventilation, use an approved air-purifying respirator.

Use the following CE approved air-purifying respirator: Organic vapor cartridge with a particulate pre-filter, type AP2.

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

---

## 9. PHYSICAL AND CHEMICAL PROPERTIES

---

### Appearance

Physical state	Solid below freezing point
Color	Colorless above freezing point
Odor	ammoniacal
Odor Threshold	No test data available
pH	11.5 <i>Literature</i> (10% aqueous solution)
Melting point/range	No test data available
Freezing point	27 °C <i>Literature</i>
Boiling point (760 mmHg)	269.9 °C <i>Literature</i> Decomposes
Flash point	<b>closed cup</b> 191 °C <i>Pensky-Martens Closed Cup ASTM D 93</i>
Evaporation Rate (Butyl Acetate = 1)	No test data available
Flammability (solid, gas)	The product is not flammable.
Lower explosion limit	1.5 % vol <i>Literature</i>
Upper explosion limit	No test data available
Vapor Pressure	0.028 hPa at 25 °C <i>Literature</i>
Relative Vapor Density (air = 1)	3.6 <i>Literature</i>
Relative Density (water = 1)	1.1 at 30 °C <i>Literature</i>
Water solubility	1000 g/l at 20 °C <i>Literature</i> miscible
Partition coefficient: n-octanol/water	No data available
Auto-ignition temperature	355 °C <i>Literature</i>
Decomposition temperature	No test data available
Dynamic Viscosity	380 mPa.s at 30 °C <i>Literature</i>
Kinematic Viscosity	<i>Not reported</i> No test data available

<b>Explosive properties</b>	No data available
<b>Oxidizing properties</b>	No data available
<b>Liquid Density</b>	9.1113 lb/gln at 28 °C @ freezing pt.
<b>Solid Density</b>	1.1 g/cm3
<b>Molecular weight</b>	No test data available

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

---

## 10. STABILITY AND REACTIVITY

---

**Reactivity:** No data available

**Chemical stability:** No data available

**Possibility of hazardous reactions:** No data available

**Conditions to avoid:** No data available

**Incompatible materials:** No data available

**Hazardous decomposition products:** No data available

---

## 11. TOXICOLOGICAL INFORMATION

---

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

### Acute toxicity

#### Acute oral toxicity

Low toxicity if swallowed. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury. Swallowing may result in gastrointestinal irritation or ulceration.

LD50. Rat. male and female. 1.600 mg/kg OECD 401 or equivalent

#### Acute dermal toxicity

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

LD50. Rabbit. male. > 8.200 mg/kg

#### Acute inhalation toxicity

At room temperature, exposure to vapor is minimal due to low volatility. Vapor from heated material may cause respiratory irritation and other effects. For narcotic effects: No relevant data found.

LC0. Rat. male. 4 Hour. Aerosol. 3.35 mg/l

### Skin corrosion/irritation

Prolonged contact may cause skin irritation with local redness.

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

May cause more severe response if skin is abraded (scratched or cut).

**Serious eye damage/eye irritation**

May cause severe eye irritation.  
May cause severe corneal injury.

**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)**

Evaluation of available data suggests that this material is not an STOT-SE toxicant.

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

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

Male reproductive organs.

Results from repeated exposure tests on diethanolamine in laboratory animals include anemia (rats) and effects on kidney (rats and mice) and liver (mice). Heart and nervous system effects were also observed in animals given exaggerated doses of diethanolamine. Changes in other organs, causes of which are nonspecific, were judged secondary to the poor health of the animals due to the extremely high doses of diethanolamine given.

**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. Did not cause birth defects in laboratory animals.

**Reproductive toxicity**

Repeated excessive exposures to high amounts may cause effects on testes and fertility in males.

**Mutagenicity**

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

**Aspiration Hazard**

Based on physical properties, not likely to be an aspiration hazard.

---

---

**12. ECOLOGICAL INFORMATION**

---

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).

May increase pH of aquatic systems to > pH 10 which may be toxic to aquatic organisms.

LC50. Pimephales promelas (fathead minnow). static test. 96 Hour. 1.460 mg/l. OECD Test Guideline 203 or Equivalent

**Acute toxicity to aquatic invertebrates**

EC50. Daphnia magna (Water flea). static test. 48 Hour. 55 mg/l. OECD Test Guideline 202 or Equivalent

**Acute toxicity to algae/aquatic plants**

ErC50. Pseudokirchneriella subcapitata (green algae). 96 Hour. Growth rate inhibition. 2.2 mg/l. OECD Test Guideline 201 or Equivalent

**Toxicity to bacteria**

EC50. Respiration inhibition. 3 Hour. > 1.000 mg/l. activated sludge test (OECD 209)

**Chronic aquatic toxicity**

**Chronic toxicity to aquatic invertebrates**

NOEC. Daphnia magna (Water flea). semi-static test. 21 d. 0.78 mg/l

LOEC. Daphnia magna (Water flea). semi-static test. 21 d. 1.56 mg/l

**Persistence and degradability**

**Biodegradability:** Material is readily biodegradable. Passes OECD test(s) for ready biodegradability. Material is ultimately biodegradable (reaches > 70% mineralization in OECD test(s) for inherent biodegradability).

10-day Window: Pass

**Biodegradation:** 93 %

**Exposure time:** 28 d

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

**Bioaccumulative potential**

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

**Partition coefficient: n-octanol/water(log Pow):** Pow: 2.18 at 25 °C OECD Test Guideline 107 or Equivalent

**Bioconcentration factor (BCF):** 3 Estimated.

**Mobility in soil**

Given its very low Henry's constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process.

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

**Partition coefficient(Koc):** 1 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.

---

## 13. DISPOSAL CONSIDERATIONS

---

**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.

---

## 14. TRANSPORT INFORMATION

---

**Classification for ROAD and Rail transport:**

Not regulated for transport

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

Not regulated for transport

**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):**

Not regulated for transport

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.

---

## 15. REGULATORY INFORMATION

---

**Label**

Classification and labeling have been performed according to regulations.

**Hazard symbol and Indication of danger**

Xn Harmful

**Chemical Name:** N,N-Diethanolamine  
203-868-0

**R-phrase(s)**

R22 Harmful if swallowed.

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.

**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.

S46 If swallowed, seek medical advice immediately and show this container or label.

---

## 16. OTHER INFORMATION

---

### Full text of the R-phrases given in Section 3

R22	Harmful if swallowed.
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: 2674 / S100 / Issue Date: 11/10/2016 / Version: 1.0

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

### Legend

ACGIH	USA. ACGIH Threshold Limit Values (TLV)
Dow IHG	Dow Industrial Hygiene Guideline
SKIN	Absorbed via skin
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 warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.