

SAFETY DATA SHEET

Section 1: Identification

1.1 Product identifier:

QUANTUM Specialty Ethanolamines™ Monoethanolamine N.F. Grade

Other means of identification:

55912

1.2 Recommended use:

Chemical raw material for industrial and professional uses.

Restrictions on use: None identified. Keep out of reach of children.

1.3 Details of the supplier of the Safety Data Sheet:

INEOS Oxide
Block 5501
21255 A Louisiana Hwy. 1 South
Plaquemine, LA
70764
(866) 865-4767
www.ineosoxide.com

1.4 Emergency Phone No.

CHEMTREC 1-800-424-9300, 24-hours

Section 2: Hazard Identification

2.1 Classification of the substance:

Flammable liquid, Cat. 4; H227
Skin Corrosion, Cat. 1B; H314
Eye damage, Cat. 1; H318
Acute toxicity, Cat. 4; H302+H312+H332
Specific Target Organ Toxicity (single exposure), Cat. 3; H335

2.2 Label elements:



Danger.
Combustible liquid.
Causes severe skin burns and eye damage.
Harmful if swallowed, in contact with skin or if inhaled.
May cause respiratory irritation.

Prevention

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Do not breathe fume, gas, mist, vapors or spray.
Use only outdoors or in a well-ventilated area.
Wash hands and exposed skin thoroughly after handling.
Do not eat, drink or smoke when using this product.
Wear protective gloves, protective clothing and eye protection or face protection.

Response

IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower
Wash contaminated clothing before reuse. Call a POISON CENTER or doctor if you feel unwell.
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
Immediately call a POISON CENTER or doctor.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
In case of fire: Use water fog or fine spray, alcohol-resistant foam or dry chemical for extinction.

Storage

Store in a well-ventilated place. Keep container tightly closed.
Store locked up.

Disposal

Dispose of contents and container in accordance with local, regional, national and international regulations.

2.3 Other hazards:

Breathing vapors and mists may cause severe damage to the respiratory tract.

SAFETY DATA SHEET

Section 3: Composition/Information on Ingredients

3.1 Substances:

<u>Chemical Name</u>	<u>CAS No.</u>	<u>EC #</u>	<u>Wt.%</u>	<u>GHS Classifications</u>
2-aminoethanol (MEA)	141-43-5	205-483-3	99.3 - 99.9	Flam. Liq. 4; H227 Skin Corr. 1B; H314 Eye dam. 1; H318 Acute tox. 4; H302+H312+H332 STOT SE 3; H335

Section 4: First-Aid Measures

4.1 First-aid measures:

Inhalation: Remove source of contamination or move victim to fresh air and keep at rest in a position comfortable for breathing. If breathing is difficult, trained personnel should administer emergency oxygen. DO NOT allow victim to move about unnecessarily. Symptoms of pulmonary edema can be delayed up to 48 hours after exposure. Immediately call a POISON CENTER or doctor.

Skin Contact: Rinse skin immediately with plenty of water or shower. As quickly as possible, remove contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Completely decontaminate clothing, shoes and leather goods before re-use or discard. Immediately obtain medical attention.
Avoid direct contact with the victim. First aid responders should wear chemical protective clothing.

Eye Contact: Immediately rinse eyes cautiously with water for several minutes. Neutral saline solution may be used as soon as it is available. Do not interrupt flushing. Take care not to rinse contaminated water into the unaffected eye or onto face. Immediately obtain medical attention.
Avoid direct contact with the victim. First aid responders should wear chemical protective gloves.

Ingestion: Never give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Do not induce vomiting. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Have victim rinse mouth with water. Quickly transport victim to an emergency care facility. Immediately obtain medical advice or contact a Poison Control Center.

4.2 Most important symptoms and effects, acute and delayed:

Inhalation: Symptoms of exposure may include coughing, wheezing, shortness of breath, difficult breathing, headache, nausea, vomiting and chest pain. Breathing spray or mist may lead to pulmonary edema; symptoms of pulmonary edema include chest pain and shortness of breath and can be delayed up to 24 or 48 hours after exposure.

Skin Contact: Direct contact with the liquid causes severe irritation or chemical burns. Symptoms include local discomfort or pain, redness and swelling, chemical burns, blister formation and possible tissue destruction.

Eye Contact: Direct contact with liquid or vapor can cause a burning sensation in the eyes, severe eye irritation or chemical burns. Serious damage, even blindness, may result if treatment is delayed.

Ingestion: Swallowing can cause severe irritation and burns to the lips, tongue, throat and digestive tract, abdominal and chest pain, nausea and vomiting. It may cause a shock-like state, fall in blood pressure, slow pulse, convulsions and coma.

4.3 Immediate medical attention and special treatment:

Special instructions: Immediately call a POISON CENTER or doctor if swallowed, if inhaled or if in eyes.

Medical conditions aggravated by exposure: None known.

SAFETY DATA SHEET

Section 5: Fire-fighting Measures

5.1 Suitable extinguishing media:

Water fog or fine spray, alcohol-resistant foam or dry chemical. Use water spray to cool fire-exposed containers.

Unsuitable extinguishing media: High pressure water streams may scatter hot liquid. Violent steam generation or eruption may occur upon application of direct water stream to hot product.

5.2 Specific hazards arising from the chemical:

Corrosive and combustible liquid. Product can burn if heated (Flash point = 86 - 94°C (186 - 201°F)).

Can form explosive mixtures with air at, or above, 86° C. Hazardous decomposition may occur above 200°C. During a fire, smoke may contain vaporized MEA in addition to unidentified toxic and/or irritating compounds. Combustion products may include toxic nitrogen oxide, hydrogen cyanide, formaldehyde carbon monoxide, carbon dioxide and ammonia gases. Vapor is heavier than air and can accumulate in confined spaces and low areas. Heat from a fire can cause a rapid build-up of pressure inside containers, which may cause explosive rupture.

5.3 Special protective equipment and precautions for fire-fighters:

Evacuate the area and fight fire from a safe distance or a protected location. Ethanolamine and its decomposition products such as nitrogen oxides and hydrogen cyanide are hazardous to health. Do not enter without specialized protective equipment suitable for the situation. Approach the fire from upwind to avoid hazardous vapors. Burning liquids may be extinguished by dilution with water. Water spray may be used to flush spills away from ignition sources.

Avoid all contact with this material during fire-fighting operations. Wear chemical resistant clothing (chemical splash suit) and positive-pressure self-contained breathing apparatus.

Contain water run-off if possible.

Section 6: Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures:

Isolate the area; keep all unprotected people away from the spill area. Ventilate the area. Wear protective gloves/protective clothing/eye protection/face protection (See Section 8). Prevent inhalation exposures, skin and possible eye contact.

Ensure clean-up is conducted by trained personnel only. Do not touch or walk through the spilled material. Extinguish or remove all ignition sources. Spilled material may pose a slipping hazard.

6.2 Environmental precautions:

Prevent material from contaminating soil and from entering sewers or waterways.

6.3 Methods and material for containment and cleaning up:

Isolate the spill area. Stop the spill if it is safe to do so. Contain the spill with earth, sand or other suitable non-combustible absorbent. Keep materials which can burn away from spilled product. Do not absorb with sawdust, woodchips or other cellulose materials.

Clean up spills immediately. Scoop up spilled product and any contaminated absorbents into appropriate, labeled containers. Contaminated absorbent may pose the same hazards as the spilled product. Flush the area with water and collect wash-water for proper disposal.

Section 7: Handling and Storage

7.1 Precautions for safe handling:

Wear personal protective gloves, clothing and other equipment required for the workplace.

Do not breathe fume/gas/mist/vapors/spray.

Avoid generating airborne fumes/vapors/mist from this product.

Handle this product with adequate ventilation.

Wash hands and exposed skin thoroughly, immediately after exposure to product and at the end of the work-shift.

Do not eat or drink when using this product.

Keep away from flames and hot surfaces. – No smoking.

Contaminated work clothing should not be allowed out of the workplace.

Prevent handling with incompatible materials such as brass, strong acids and oxidizing agents.

Prevent release of this material to the environment; prevent spills and keep away from drains.

Never perform any welding, cutting, soldering, drilling or other hot work on an empty vessel, container or piping until all liquid and vapors have been cleared.

Inspect containers for leaks before handling. Prevent damage to containers. Keep containers closed when not in use.

Assume that empty containers contain residues which are hazardous.

SAFETY DATA SHEET

Section 7: Handling and Storage, continued

7.2 Conditions for safe storage:

Keep containers tightly closed when not in use. Store in a cool, dry and well-ventilated place. Store away from sunlight, heat and ignition sources. Keep storage area away from work areas. Store away from strong oxidants, strong acids and other incompatible materials (see Section 10). Do not store in containers made of carbon steel, aluminum, aluminum alloys, copper, brass or other copper alloys. Keep containers tightly closed. Store separated from food and feedstuffs.

Section 8: Exposure Controls / Personal Protection

8.1 Control parameters

Occupational Exposure Limits: Consult local authorities for acceptable exposure limits.

<u>Ingredient</u>	<u>ACGIH® TLV®</u>	<u>U.S. OSHA PEL</u>	<u>Ontario OEL (Canada)</u>
Monoethanolamine	3 ppm STEL 6 ppm	3 ppm STEL 6 ppm	Refer to ACGIH TLV
Other exposure guidelines: NIOSH IDLH (immediately dangerous to life or health) = 30 ppm			

8.2 Engineering controls

Exposure control measures: Facilities utilizing or storing this material should be equipped with general or local exhaust ventilation, eyewash facilities and a safety shower. Ventilation system should be made of corrosion-resistant material. Maintain air concentrations below occupational exposure standards using engineering controls. Personal Protective Equipment (PPE) should be used as back-up protection to engineering controls.

8.3 Individual protection measures (PPE)

Eye/Face protection: Wear chemical safety goggles. If splashing is possible wear a face shield. If concentrations in air exceed the exposure limits, wear full-face respiratory protection.

Skin protection: Wear impervious, chemical protective gloves. Wear clean, body-covering, protective coveralls to prevent skin exposure. If spill or splashing is possible, wear impervious body-covering clothing, apron and chemical protective boots. Recommended materials for protective clothing include butyl rubber, neoprene rubber, nitrile rubber. Resistance of specific materials can vary from product to product; evaluate resistance under conditions of use and maintain clothing carefully.

Protective clothing should be chosen based on activities being undertaken, potential for exposure and other relevant workplace hazards.

Respiratory protection: If concentrations in air exceed the occupational exposure limits, then wear respiratory protection. For concentrations up to 30 ppm, wear a chemical cartridge respirator with cartridges to protect against ethanolamine, or a powered air-purifying respirator with cartridges to protect against Ethanolamine, or a full-face self-contained breathing apparatus.

NIOSH IDLH (Immediately Dangerous to Life or Health) = 30 ppm.

In case of Emergency or planned entry into unknown concentrations or IDLH conditions: wear a positive pressure, full-facepiece self-contained breathing apparatus (SCBA); or a positive pressure, full-facepiece supplied air respirator (SAR) with an auxiliary positive pressure SCBA.

If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection. Consult with respirator manufacturer to determine respirator selection, use and limitations.

A respiratory protection program that meets the regulatory standard, such as Canadian Standards Association (CSA) Standard Z94.4 or OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements, must be followed whenever workplace conditions warrant a respirator's use.

SAFETY DATA SHEET

Section 9: Physical and Chemical Properties

9.1 Information on basic physical and chemical properties:

Appearance:	Liquid. Clear colorless, viscous.
Odor:	Slight ammonia odor.
Odor threshold:	Not available
pH:	12.1 (25% aqueous solution)
Melting point/freezing point:	10°C (50°F)
Initial boiling point and boiling range:	171°C (340°F)
Flash point:	86 - 94°C (186 - 201°F) PMCC; ASTM D93
Evaporation Rate:	< 1 (n-Butyl Acetate = 1)
Flammability:	Combustible liquid.
Upper/lower flammability or explosive limits:	Lower: 3% at 140°C Upper: 23.5% at 140°C
Explosive properties:	Not available
Oxidizing properties:	Not available
Vapor pressure:	53 Pa at 20°C
Vapor density:	2.1
Relative density:	1.01 @ 25°C (water = 1)
Solubility (ies):	Completely soluble in water.
Partition coefficient (n-octanol/water):	-1.31
Auto-ignition temperature:	410°C (770°F) [DIN 51794]
Decomposition temperature:	Not available
Viscosity:	18.95 mPas @ 25°C

Section 10: Stability and Reactivity

10.1 Reactivity:

Not reactive under normal conditions of use.

10.2 Chemical stability:

Stable under normal temperature and pressure.

10.3 Possibility of hazardous reactions:

Heating above 60°C in aluminum can result in corrosion and generation of flammable hydrogen gas.

Reacts with cellulose nitrate causing fire and explosion hazard.

Reacts violently with strong acids and strong oxidants.

Contact with nitrosating agents, under acidic conditions such as nitrous acid, nitrite or nitrogen oxides, can form nitrosamines some of which are potent carcinogens.

Absorbs moisture and can react with carbon dioxide in the air to form salts. It is decomposed by light and slowly oxidized by air, turning yellow and then brown. This reaction is accelerated by heat and the presence of metals.

Corrosive to copper, brass, bronze and other copper alloys, zinc and galvanized iron.

Ethanolamine is oxidized by air slowly with evolution of heat. This reaction may lead to spontaneous combustion if the substance is on an adsorbent or on a high surface area material (e.g. absorbent material or thermal insulation).

10.4 Conditions to avoid:

Avoid high temperatures and contact with sources of ignition. Avoid exposing product to air, light and moisture. Avoid direct sunlight. Avoid contact with nitrites, strong acids, chlorides, anhydrides, strong oxidizing agents, strong reducing agents, cellulose nitrate and halogenated hydrocarbons.

10.5 Incompatible materials:

Avoid contact with strong acids, strong oxidizing agents, acid anhydrides, acyl halides, alkyl halides.

Attacks copper, aluminum and their alloys, and rubber.

10.6 Hazardous decomposition products:

Decomposition products may include nitrogen oxides, ammonia, irritating aldehydes and ketones. Hazardous decomposition products depend upon temperature, air supply and the presence of other materials.

SAFETY DATA SHEET

Section 11: Toxicological Information

11.1 Likely routes of exposure:

Eye and Skin contact, Inhalation.

11.2 Acute toxicity data:

<u>Ingredient</u>	<u>LD₅₀ Oral</u>	<u>LD₅₀ Dermal</u>	<u>LC₅₀ Inhalation (4 hrs.)</u>
Monoethanolamine (MEA)	1 720 mg/kg (rat, female)	1 000 mg/kg (rabbit)	>1 210 mg/m ³ (mouse)

Skin corrosion / irritation:

MEA is classified as corrosive to skin based on pH and information from animal testing. Application of 0.5 mL undiluted or 45% ethanolamine in water, to intact skin under a patch for 4 hours, caused tissue damage (necrosis) in rabbits (scores at 24 hours: edema, 4/4; redness, 4/4).

Serious eye damage / irritation:

MEA is classified as corrosive to eyes based on pH and information from animal testing. Application of in excess of a 5% solution of ethanolamine caused corrosive injury in rabbits (scored over 5 where 5 is severe injury).

STOT (Specific Target Organ Toxicity) Single Exposure:

Corrosive damage to respiratory tract, eyes and skin. In animal studies, exposures to ethanolamine mist caused severe bronchitis, chemical pneumonitis and pulmonary edema (a life-threatening accumulation of fluid in the lungs), and injury to the liver and kidneys. Symptoms of pulmonary edema, which include shortness of breath and coughing, could be delayed for several hours after exposure and are aggravated by physical exertion.

Aspiration hazard:

Data are not available. Due to the corrosive nature of MEA, any aspiration during ingestion or vomiting could result in severe lung injury.

11.3 Chronic toxicity:

STOT (Specific Target Organ Toxicity) Repeated Exposure:

Data not available. The substance MEA may cause effects on the central nervous system. Exposure may cause drowsiness or weakness.

Respiratory and / or skin sensitization:

Rare cases of sensitization reactions have been reported in humans.

Skin contact caused an allergic skin reaction in workers who had dry, irritated skin from repeated exposures to metalworking fluids containing ethanolamine substances.

Respiratory sensitization has rarely been reported in workers exposed to airborne MEA.

Germ cell mutagenicity:

Negative results for mutagenic effects of MEA were obtained in an unconfirmed test using live mice and in most tests using cultured mammalian cells, bacteria and yeast.

Reproductive effects:

Limited data from animal studies does not indicate that MEA is a reproductive toxin.

Developmental effects:

Limited data from animal studies does not indicate that MEA is a developmental toxin.

Effects on or via lactation:

Data not available.

Carcinogenicity:

This product does not contain any component that is considered a human carcinogen by IARC (International Agency for Research on Cancer), ACGIH (American Conference of Governmental Industrial Hygienists, OSHA (Occupational Safety and Health Administration) or NTP (National Toxicology Program).

Interactions with other chemicals:

The use of ethanolamines and nitrites together as additives in metalworking fluids can lead to the formation of N-nitrosodiethanolamine, a possible carcinogen.

SAFETY DATA SHEET

Section 12: Ecological Information

12.1 Ecotoxicity:

72 Hr EC₅₀ *Scenedesmus subspicatus*: 15 mg/L
 96 Hr LC₅₀ *Brachydanio rerio*: 3 684 mg/L [static]
 96 Hr LC₅₀ *Pimephales promelas*: 227 mg/L [flow-through]
 96 Hr LC₅₀ *Oncorhynchus mykiss*: 114-196 mg/L [static]
 96 Hr LC₅₀ *Oncorhynchus mykiss*: >200 mg/L [flow-through]
 96 Hr LC₅₀ *Lepomis macrochirus*: 300-1 000 mg/L [static]
 48 Hr EC₅₀ *Daphnia magna*: 65 mg/L

12.2 Persistence and degradability:

Material is readily biodegradable.
 Passes OECD Test(s) for ready biodegradability.
 Biodegradation reached in CO₂ Evolution Test (Modified Sturm Test, OECD Test No. 301 B) after 28 days: 97%.
 Biodegradation reached in Modified OECD Screening Test (OECD Test No. 301 E) after 28 days: 94%.
 Biodegradation reached in Manometric Respirometry Test (OECD Test No. 301 F) after 28 days: >70%.
 Biodegradation under aerobic static laboratory conditions is high (BOD₂₀ or BOD₂₈/ThOD >40%).
 20-Day biochemical oxygen demand (BOD₂₀) is 1.50 p/p.
 Theoretical oxygen demand (ThOD) is calculated to be 2.36 p/p.
 Inhibitory concentration (IC₅₀) in OECD Activated Sludge Respiration Inhibition Test (OECD Test No. 209) is >1000 mg/L.

12.3 Bioaccumulative potential:

Bioconcentration potential is low (BCF less than 100 or Log P_{ow} less than 3).
 Log octanol/water partition coefficient (log P_{ow}) is -1.31.

12.4 Mobility in soil:

Volatilization of MEA from water is very slow (Henry's Law Constant (H) is estimated to be 2.45E-7 atm m³/mole).
 Potential for mobility in soil is very high (K_{oc} between 0 and 50).
 Log soil organic carbon partition coefficient (log K_{oc}) is estimated to be 0.70.

12.5 Other information:

Not dangerous for the ozone layer (According to EU Council Regulation No 1005/2009)
 For detailed Ecological data, write to the address in Section 1 or call INEOS Oxide's Customer Information Center at (866) 865-4767.

Section 13: Disposal Considerations

13.1 Disposal methods

Do NOT discard into any sewers, on the ground or into any body of water. Store material for disposal as indicated in Section 7 Handling and Storage.
 Dispose of in accordance with local/regional/national/ international regulations.
 For unused, uncontaminated product, the preferred options include sending to a licensed, permitted recycler, reclaimer incinerator or other thermal destruction device.

USA: Under RCRA, it is the responsibility of the user of the product to determine, at the time of disposal, whether the product meets RCRA criteria for hazardous waste.

Other information:

Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. INEOS Oxide HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN SDS SECTION 2.

As a service to its customers, INEOS Oxide can provide names of information resources to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and that manage used drums. Telephone INEOS Oxide's Customer Information Center at (866) 865-4767.

SAFETY DATA SHEET

Section 14: Transport Information

- 14.1 UN Number**
UN2491
- 14.2 UN proper shipping name**
ETHANOLAMINE
- 14.3 Transport hazard class(es)**
8
- 14.4 Packing group**
III
- 14.5 Environmental hazards**
Not available
- 14.6 Special precautions for user**
ERG 153
- 14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code:**
Ethanolamine: Category Y
- 14.8 U.S. Hazardous Materials Regulation (DOT 49CFR):**
UN2491, ETHANOLAMINE, Class 8, PG III
Reportable Quantity for U.S. Shipments: 100 lbs (45.4 kg) RQ

For regulatory information regarding transportation, if required, consult product shipping papers, or your INEOS Oxide representative.

Section 15: Regulatory Information

15.1 Safety, health and environmental regulations:

USA:

OSHA: This material is considered a hazardous chemical by the OSHA Hazard Communication Standard 29 CFR 1910.1200 (2012).

Toxic Substances Control Act (TSCA) Section 8(b): Listed on the TSCA Inventory.

Additional USA regulatory lists:

Clean Air Act – Monoethanolamine.

California Safe Drinking Water and Toxic Enforcement Act, Proposition 65: Diethanolamine (Concentration <0.05%; CAS No. 111-42-2) is on the list of chemicals known to the State to cause cancer.

State Right To Know (Diethanolamine Concentration <0.05%): Massachusetts. New Jersey. Pennsylvania.

Canada:

WHMIS 1988 classification: B3 – Combustible Liquid; E – Corrosive

DSL status: Listed on the DSL (Domestic Substances List).

NPRI Substances: Not listed.

European Union:

European Inventories: Listed in EINECS # 205-483-3.

Other international inventories

Australia: Present on the Inventory of Chemical Substances (AICS).

China: Present on the Chinese inventory (IECSC), 01018.

Japan: Present on ENCS; Ethanolamine (2)-301.

Korea: Present on the Inventory of Existing and Evaluated Chemical Substances; Ethanolamine KE-20493.

Mexico: Present on the inventory (INSQ).

New Zealand: Present on the inventory (NZIoC) HSNO Approval: HSR002962.

Philippines: Present on the inventory (PICCS).

Taiwan: Present on the inventory (TCSI).

Turkey: Present on the inventory. EC# 205-483-3.

SAFETY DATA SHEET**Section 16: Other Information****Revision date:**

October 3, 2016

Revision summary:

Previous version May 2015

Revisions since previous version: Section 1, Added brand name QUANTUM Specialty Ethanolamines

References and sources for data:

CHEMINFO, CCOHS

GHS – Globally Harmonized System of Classification and Labelling of Chemicals, UNECE 2013

HSDB – Hazardous Substances Data Bank

IARC Monographs

RTECS® - Registry of Toxic Effects of Chemical Substances

INEOS, REACH submission data

National Toxicology Program (NTP) – Report on Carcinogens.

SDS prepared by:

LEHDER Environmental Services Ltd

519-336-4101

www.lehder.com**Additional information:**

The information provided on this SDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.