

**1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING****1.1 Product Identifier**

Chemical Name N-Methylmorpholine N-Oxide

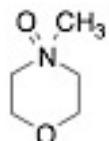
Catalogue # M321055

**1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advised Against**

Product Uses To be used only for scientific research and development. Not for use in humans or animals.

**1.3 Details of the Supplier of the Safety Data Sheet**

Company Toronto Research Chemicals  
2 Brisbane Road  
Toronto, ON M3J 2J8  
CANADA  
Telephone +14166659696  
FAX +14166654439  
Email orders.trc@lqcgrou.com

**1.4 Emergency Telephone Number**

Emergency# +1(416) 665-9696 between 0800-1700 (GMT-5)

**2. HAZARDS IDENTIFICATION****2.1/2.2 Classification of the Substance or Mixture and Label Elements****GHS Hazards Classification (According to EU Regulation 1272/2008 and US OSHA 1910.1200)**

Flammable Solid (Category 2)

Oxidising Solids (Category 2)

Reproductive Toxicity (Category 2)

**GHS Hazards Identification (According to EU Regulation 1272/2008 and US OSHA 1910.1200)**

Signal Word Danger

**GHS Hazard Statements**

H229 Flammable solid.

H272 May intensify fire; oxidiser.

H361 Suspected of damaging fertility or the unborn child.

**GHS Precautionary Statements**

P261 Avoid breathing dust/fume/gas/mist/vapours/spray

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P308/P313 IF exposed or concerned: Get medical advice/attention.

**2.3 Unclassified Hazards/Hazards Not Otherwise Classified**

No data available.

**3. COMPOSITION/INFORMATION ON INGREDIENTS****3.1 Substances**

Molecular Formula: C<sub>5</sub>H<sub>11</sub>NO<sub>2</sub>

Molecular Weight: 117.15

CAS Registry #: 7529-22-8

EC#: 231-391-8

Synonyms

### **3.2 Mixtures**

Not a mixture.

## **4. FIRST AID MEASURES**

### **4.1 Description of First Aid Measures**

#### **General Advice**

If medical attention is required, show this safety data sheet to the doctor.

#### **If Inhaled**

If inhaled, move person to fresh air. If not breathing, give artificial respiration and consult a physician.

#### **In Case of Skin Contact**

Wash affected area with soap and water. Consult a physician if any exposure symptoms are observed.

#### **In Case of Eye Contact**

Immediately rinse eyes with plenty of water for at least 15 minutes. Consult a physician.

#### **If Swallowed**

Never give anything by mouth to an unconscious person. Rinse mouth with water. Do NOT induce vomiting unless advised to do so by a physician or Poison Control Center. Seek medical attention.

### **4.2 Most Important Symptoms and Effects, Both Acute and Delayed**

The most important known symptoms and effects are described in the labeling (see section 2.2) and/or section 11.

### **4.3 Indication of any Immediate Medical Attention and Special Treatment Needed**

No data available.

## **5. FIREFIGHTING MEASURES**

### **5.1 Extinguishing Media**

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

### **5.2 Special Hazards Arising from the Substance or Mixture**

Carbon oxides, Nitrogen oxides

### **5.3 Advice for Firefighters**

Wear self contained breathing apparatus for fire fighting if necessary. Use personal protection equipment.

### **5.4 Further Information**

No data available.

## **6. ACCIDENTAL RELEASE MEASURES**

### **6.1 Personal Precautions, Protective Equipment and Emergency Procedures**

Use recommended personal protective equipment (see Section 8). Adequate ventilation must be provided to ensure vapours or mists are not inhaled. Vapours are heavier than air and may accumulate in low areas. All sources of ignition, including sources of static discharge, must be removed from area.

### **6.2 Environmental Precautions**

Material should not be allowed to enter the environment. Prevent further spillage or discharge into drains, if safe to do so.

### **6.3 Methods and Materials for Containment and Cleaning Up**

Contain the spill and then collect using non-combustible absorbent material (such as clay, diatomaceous earth, vermiculite or other appropriate material). Place material in a suitable, sealable container and then dispose according to local/national regulations and guidance (see Section 13).

### **6.4 Reference to Other Sections**

For protective equipment, refer to Section 8. For disposal, see Section 13.

## **7. HANDLING AND STORAGE**

### **7.1 Precautions for Safe Handling**

Avoid contact with skin and eyes. Ventilation and proper handling are to be used to prevent the formation of vapours and mists. Remove all sources of ignition and take precautionary measures to prevent the buildup of electrostatic discharge (ground and bond

containers as appropriate). No smoking, eating or drinking around this material. Wash hands after use.

## **7.2 Conditions for Safe Storage, Including any Incompatibilities**

Ensure container is kept securely closed before and after use. Keep in a well ventilated area and do not store with strong oxidizers or other incompatible materials (see Section 10).

Storage conditions: 4°C, Hygroscopic

## **7.3 Specific End Uses**

For scientific research and development only. Not for use in humans or animals.

# **8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

## **8.1 Control Parameters**

Contains no components with established occupational exposure limits.

## **8.2 Exposure Controls**

### **Appropriate Engineering Controls**

A laboratory fumehood or other appropriate form of local exhaust ventilation should be used to avoid exposure.

### **Personal Protective Equipment**

All recommendations below are advisory in nature and a risk assessment should be performed by the employer/end user prior to use of this product. The type of protective equipment must be selected based on the amount and concentration of the dangerous material being used in the workplace.

### **Eye/Face Protection**

Safety goggles or face shield. All equipment should have been tested and approved under appropriate standards, such as NIOSH (US), CSA (Canada), or EN 166 (EU).

### **Skin Protection**

Gloves should be used when handling this material. Gloves are to be inspected prior to use. Contaminated gloves are to be removed using proper glove removal technique so that the outer surface of the glove does not contact bare skin. Dispose of contaminated gloves after use in compliance with good laboratory practices and local requirements.

Gloves used for incidental exposures (splash protection) should be designated as "chemical resistant" by EU standard EN 374 with the resistance codes corresponding to the anticipated use of the material. Unrated gloves are not recommended.

Suggested gloves: AnsellPro Sol-Vex nitrile gloves style 37-175, 15 mil thickness.

Penetration time has not been determined.

Gloves used for prolonged direct exposure (immersion) should be designated "chemical resistant" as per EN 734 with the resistance codes corresponding to the anticipated use of the material.

Suggested gloves: AnsellPro Viton/Butyl gloves style 38-612, 4/8 mil thickness.

Penetration time has not been determined.

These recommendations may not apply if the material is mixed with any other chemical, or dissolved into a solution. A risk assessment must be performed to ensure the gloves will still offer acceptable protection.

### **Body Protection**

Fire resistant (Nomex) lab coat or coveralls.

### **Respiratory Protection**

Recommended respirators are NIOSH-approved N100 or CEN-approved FFP3 particulate respirators. These are to be only used as a backup to local exhaust ventilation or other engineering controls. If the respirator is the only means of protection, a full-face supplied air respirator must be used.

# **9. PHYSICAL AND CHEMICAL PROPERTIES**

## **9.1 Information on Basic Physical and Chemical Properties**

### **A) Appearance**

Pale Yellow to Brown Solid

### **C) Odour Threshold**

No data available

### **E) Melting Point/Freezing Point**

90-93°C

### **G) Flash point**

No data available

### **I) Flammability (Solid/Gas)**

### **B) Odour**

No data available

### **D) pH**

No data available

### **F) Initial Boiling Point/Boiling Range**

No data available

### **H) Evaporation Rate**

No data available

### **J) Upper/Lower Flammability/Explosive Limits**

No data available	No data available
<b>K) Vapour Pressure</b>	<b>L) Vapour Density</b>
0.141 @ 20°C	No data available
<b>M) Relative Density</b>	<b>N) Solubility</b>
1.135 @ 20 °C	DMSO (Soluble), Methanol (Slightly)
<b>O) Partition Coefficient: n-octanol/water</b>	<b>P) Auto-Ignition Temperature</b>
-1.2 @ 25 °C	No data available
<b>Q) Decomposition Temperature</b>	<b>R) Viscosity</b>
No data available	No data available
<b>S) Explosive Properties</b>	<b>T) Oxidizing Properties</b>
No data available	No data available

## 9.2 Other Information

no data available

## 10. STABILITY AND REACTIVITY

### 10.1 Reactivity

No data available.

### 10.2 Chemical Stability

Stable under recommended storage conditions.

### 10.3 Possibility of Hazardous Reactions

No data available.

### 10.4 Conditions to Avoid

No data available.

### 10.5 Incompatible Materials

Strong oxidizing agents.

### 10.6 Hazardous Decomposition Products

**In the event of fire:** See section 5. **Other decomposition products:** No data available.

## 11. TOXICOLOGICAL INFORMATION

### 11.1 Information on Toxicological Effects

#### A) Acute Toxicity

Oral LD50: 4600 mg/kg (Rat)

Dermal LD50:> 8000 mg/kg ( Rabbit )

**Inhalation LC50:** No data available.

#### B) Skin Corrosion/Irritation

Moderate skin irritant.

#### C) Serious Eye Damage/Irritation

Moderate eye irritant.

#### D) Respiratory or Skin Sensitization

No data available

#### E) Germ Cell Mutagenicity

No data available

#### F) Carcinogenicity

No data available

#### G) Reproductive Toxicity/Teratogenicity

No data available

#### H) Single Target Organ Toxicity - Single Exposure

Moderate respiratory tract irritation.

#### I) Single Target Organ Toxicity - Repeated Exposure

No data available

#### J) Aspiration Hazard

No data available

#### K) Potential Health Effects and Routes of Exposure

##### Inhalation

May be harmful if inhaled. Causes respiratory tract irritation.

##### Ingestion

May be harmful if swallowed.

##### Skin

May be harmful if absorbed through skin. Causes skin irritation.

##### Eyes

Causes eye irritation.

## **L) Signs and Symptoms of Exposure**

The most important known symptoms and effects are described in the labeling (see section 2.2) and/or section 11.

To the best of our knowledge, the chemical, physical, and toxicological properties of this material have not been thoroughly investigated.

## **M) Additional Information**

RTECS: QE6237000

## **12. ECOLOGICAL INFORMATION**

### **12.1 Toxicity**

EC50 > 100 mg/L (72 hours, freshwater algae)  
Fish: LC50: 31200 mg/L (48 hours, *Oncorhynchus mykiss*)  
Crustacea: EC50 > 100 mg/L (48 hours, *Daphnia magna*)

### **12.2 Persistence and Degradability**

No data available.

### **12.3 Bioaccumulative Potential**

Partition coefficient  
4-methylmorpholine 4-oxide, monohydrate  
7529-22-8  
-1.2 @25°C

### **12.4 Mobility in Soil**

No data available.

### **12.5 Results of PBT and vPvB Assessment**

No data available.

### **12.6 Other Adverse Effects**

No data available.

## **13. DISPOSAL CONSIDERATIONS**

### **13.1 Waste Treatment Methods**

#### **A) Product**

Product may be burned in an incinerator equipped with afterburner and scrubber. Excess and expired materials are to be offered to a licensed hazardous material disposal company. Ensure that all Federal and Local regulations regarding the disposal and destruction of this material are followed.

#### **B) Contaminated Packaging**

Dispose of as above.

#### **C) Other Considerations**

Product is not to be disposed of in sanitary sewers, storm sewers, or landfills.

## **14. TRANSPORT INFORMATION**

### **14.1 UN Number**

DOT (US): UN3097 IATA: UN3097 IMDG: UN3097 ADR/RID: UN3097

### **14.2 UN Proper Shipping Name**

DOT (US)/IATA:  
Flammable solid, oxidising, n.o.s. (4-methylmorpholine 4-oxide, monohydrate)  
Forbidden BY IATA  
IMDG/ARD/RID:  
Flammable solid, oxidising, n.o.s. (4-methylmorpholine 4-oxide, monohydrate)

### **14.3 Transport Hazard Class(es)**

DOT (US): 4.1 (5.1) IATA: 4.1 (5.1) IMDG: 4.1 (5.1) ADR/RID: 4.1 (5.1)

### **14.4 Packing Group**

DOT (US): II IATA: N/A IMDG: II ADR/RID: II

### **14.5 Environmental Hazards**

DOT (US): None IATA: None IMDG: None ADR/RID: None

### **14.6 Special Precautions for User**

None

## **15. REGULATORY INFORMATION**

### **15.1 Safety, Health and Environmental Regulations/Legislation Specific for the Substance or Mixture**

#### **A) Canada**

**DSL/NDSL Status:** This product or a component of this product is registered on the Canadian DSL/NDSL.

#### **B) United States**

**TSCA Status:** This product or a component is listed on the US EPA TSCA.

#### **C) European Union**

**ECHA Status:** This product or a component is registered with the EU ECHA.

### **15.2 Chemical Safety Assessment**

No data available

## **16. OTHER INFORMATION**

### **16.1 Revision History**

Original Publication Date: 7/15/2013

### **16.2 List of Abbreviations**

LD50	Median lethal dose of a substance required to kill 50% of a test population.
LC50	Medial lethal concentration of a substance required to kill 50% of a test population.
LDLo	Lowest known lethal dose
TDLo	Lowest known toxic dose
IARC	International Agency for Research on Cancer
NTP	National Toxicology Program
RTECS	Registry of Toxic Effects of Chemical Substances

### **16.3 Further Information**

Copyright 2015. Toronto Research Chemicals Inc. Copies may be made for internal use only. The above information is believed to be correct to the best of our knowledge, but is to be only used as a guide. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated. Please take all due care when handling this product.