SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Trimethylamine N-oxide
Product Number : 317594
Brand : Aldrich
CAS-No. : 1184-78-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO  63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-
527-3887 CHEMTREC (International) 24
Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 4), H332

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word Warning
Hazard statement(s)  
H302 + H332  Harmful if swallowed or if inhaled.

Precautionary statement(s)  
P261  Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.  
P264  Wash skin thoroughly after handling.  
P270  Do not eat, drink or smoke when using this product.  
P271  Use only outdoors or in a well-ventilated area.  
P301 + P312 + P330  IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.  
P304 + P340 + P312  IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.  
P501  Dispose of contents/ container to an approved waste disposal plant.

2.3  Hazards not otherwise classified (HNOC) or not covered by GHS  - none

SECTION 3: Composition/information on ingredients

3.1  Substances
Synonyms  :  TMANO

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triox</td>
<td>Acute Tox. 4; H302, H332</td>
<td>&lt;= 100 %</td>
</tr>
</tbody>
</table>

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1  Description of first-aid measures

General advice  
Show this material safety data sheet to the doctor in attendance.

If inhaled  
After inhalation: fresh air. If breathing stops: mouth-to-mouth breathing or artificial respiration. Oxygen if necessary. Immediately call in physician.

In case of skin contact  
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact  
After eye contact: rinse out with plenty of water. Remove contact lenses.
If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media
   Suitable extinguishing media
   Water Foam Carbon dioxide (CO2) Dry powder
   Unsuitable extinguishing media
   For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
   Carbon oxides
   Nitrogen oxides (NOx)
   Combustible.
   Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters
   In the event of fire, wear self-contained breathing apparatus.

5.4 Further information
   Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
   Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
   For personal protection see section 8.

6.2 Environmental precautions
   Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
   Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections
   For disposal see section 13.
SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture.

Hygiene measures
Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Dry.
Hygroscopic.

Storage class
Storage class (TRGS 510): 11: Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
Handle with impervious gloves.
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested: KCL 741 Dermatril® L
Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested: KCL 741 Dermatril® L

**Body Protection**
protective clothing

**Respiratory protection**
Recommended Filter type: Filter type P2
The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

**Control of environmental exposure**
Do not let product enter drains.

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**SECTION 9: Physical and chemical properties**

9.1 **Information on basic physical and chemical properties**

a) Appearance  Form: powder
Color: white
b) Odor  No data available
c) Odor Threshold  No data available
d) pH  No data available
e) Melting point/freezing point  Melting point/range: 220 - 222 °C (428 - 432 °F) - lit.
g) Flash point  No data available
h) Evaporation rate  No data available
i) Flammability (solid, gas)  No data available
j) Upper/lower flammability or explosive limits  No data available
k) Vapor pressure  0.24 hPa at 20 °C (68 °F) - Regulation (EC) No. 440/2008, Annex, A.4
l) Vapor density  No data available
m) Density  No data available
Relative density  No data available

Aldrich - 317594
n) **Water solubility**  
793 g/l at 24.5 °C (76.1 °F) - OECD Test Guideline 105

o) **Partition coefficient: n-octanol/water**  
log Pow: -2.79 at 24.5 °C (76.1 °F) - OECD Test Guideline 107 - Bioaccumulation is not expected.

p) **Autoignition temperature**  
No data available

q) **Decomposition temperature**  
No data available

r) **Viscosity**  
No data available

s) **Explosive properties**  
No data available

t) **Oxidizing properties**  
none

9.2 **Other safety information**  
No data available

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**SECTION 10: Stability and reactivity**

10.1 **Reactivity**  
The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

10.2 **Chemical stability**  
The product is chemically stable under standard ambient conditions (room temperature).

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

10.4 **Conditions to avoid**  
Avoid moisture.  
no information available

10.5 **Incompatible materials**  
Strong oxidizing agents

10.6 **Hazardous decomposition products**  
In the event of fire: see section 5

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**SECTION 11: Toxicological information**

11.1 **Information on toxicological effects**

**Acute toxicity**
- LD50 Oral - Rat - male and female - 766 mg/kg  
  (OECD Test Guideline 401)
- LC50 Inhalation - Rat - male - 4 h - 8.58 mg/l - vapor

**Remarks:** (ECHA)  
Inhalation: Irritating to respiratory system.
LD50 Dermal - Rat - male and female - > 5,000 mg/kg (OECD Test Guideline 402)

**Skin corrosion/irritation**
Skin - reconstructed human epidermis (RhE)
Result: No skin irritation - 3 - 60 min (OECD Test Guideline 431)

**Serious eye damage/eye irritation**
Eyes - Bovine cornea
Result: No eye irritation - 4 h (OECD Test Guideline 437)

**Respiratory or skin sensitization**
KeratinoSens assay - In vitro study
Result: negative (OECD Test Guideline 442D)
Direct Peptide Reactivity Assay (DPRA) - In vitro study
Result: negative (OECD Test Guideline 442C)

**Germ cell mutagenicity**
Test Type: In vitro mammalian cell gene mutation test
Test system: mouse lymphoma cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative
Test Type: Mutagenicity (mammal cell test): chromosome aberration.
Test system: Human lymphocytes
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative
Test Type: Ames test
Test system: Escherichia coli/Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

**Carcinogenicity**
IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA’s list of regulated carcinogens.

**Reproductive toxicity**
No data available

**Specific target organ toxicity - single exposure**
No data available

**Specific target organ toxicity - repeated exposure**
No data available
Aspiration hazard
No data available

11.2 Additional Information
Repeated dose toxicity - Rat - male and female - Oral - 42 Days - NOAEL (No observed adverse effect level) - 40 mg/kg

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

SECTION 12: Ecological information

12.1 Toxicity
Toxicity to fish
semi-static test LC50 - Oryzias latipes - > 100 mg/l - 96 h (OECD Test Guideline 203)

Toxicity to daphnia and other aquatic invertebrates
static test EC50 - Daphnia magna (Water flea) - 139.95 mg/l - 48 h Remarks: (ECHA)

Toxicity to algae
static test ErC50 - Desmodesmus subspicatus (green algae) - 150 mg/l - 72 h (DIN 38412)

12.2 Persistence and degradability
Biodegradability aerobic - Exposure time 14 d Result: 92% - Readily biodegradable. (OECD Test Guideline 301C)

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties
No data available

12.7 Other adverse effects
No data available
**SECTION 13: Disposal considerations**

13.1 Waste treatment methods

- **Product**
  Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

**SECTION 14: Transport information**

- **DOT (US)**
  Not dangerous goods

- **IMDG**
  Not dangerous goods

- **IATA**
  Not dangerous goods

- **Further information**
  Not classified as dangerous in the meaning of transport regulations.

**SECTION 15: Regulatory information**

- **SARA 302 Components**
  This material does not contain any components with a section 302 EHS TPQ.

- **SARA 313 Components**
  This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

- **SARA 311/312 Hazards**
  Acute Health Hazard

- **Massachusetts Right To Know Components**
  No components are subject to the Massachusetts Right to Know Act.

**SECTION 16: Other information**

- **Further information**
  The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See