

SECTION 1: Identification

1.1 GHS Product identifier

Product name 1-methyl-1-nitroso-urea

1.2 Other means of identification

Product number -

Other names N-Nitroso-N-methylurea; 1-Methyl-1-nitroso-urea; Urea, N-methyl-N-nitroso-

1.3 Recommended use of the chemical and restrictions on use

Identified uses N-Nitroso-n-methylurea was used in the past for the laboratory synthesis of diazomethane, but it has been largely replaced by other reagents. N-Nitroso-n-methylurea has been studied in mutagenicity and genetics studies and for use as a cancer chemotherapy agent (alone or in combination with cyclophosphamide).

Uses advised against no data available

SECTION 2: Hazard identification

2.1 Classification of the substance or mixture

Flammable solids, Category 2

Acute toxicity - Category 3, Oral

Carcinogenicity, Category 1B

Reproductive toxicity, Category 1B

2.2 GHS label elements, including precautionary statements

Pictogram(s)



Signal word

Danger

Hazard statement(s)

H228 Flammable solid

H301 Toxic if swallowed

H350 May cause cancer

H360 May damage fertility or the unborn child

Precautionary statement(s)

Prevention

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P240 Ground and bond container and receiving equipment.

P241 Use explosion-proof [electrical/ventilating/lighting/...] equipment.

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

P264 Wash ... thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.

P203 Obtain, read and follow all safety instructions before use.

Response

P370+P378 In case of fire: Use ... to extinguish.

P301+P316 IF SWALLOWED: Get emergency medical help immediately.

P321 Specific treatment (see ... on this label).

P330 Rinse mouth.

P318 IF exposed or concerned, get medical advice.

Storage

P405 Store locked up.

Disposal

P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

2.3 Other hazards which do not result in classification

no data available

SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical name	Common names and synonyms	CAS number	EC number	Concentration
1-methyl-1-nitroso-urea	1-methyl-1-nitroso-urea	684-93-5	211-678-4	100%

SECTION 4: First-aid measures

4.1 Description of necessary first-aid measures

If inhaled

Move the victim into fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration and consult a doctor

immediately. Do not use mouth to mouth resuscitation if the victim ingested or inhaled the chemical.

Following skin contact

Take off contaminated clothing immediately. Wash off with soap and plenty of water. Consult a doctor.

Following eye contact

Rinse with pure water for at least 15 minutes. Consult a doctor.

Following ingestion

Rinse mouth with water. Do not induce vomiting. Never give anything by mouth to an unconscious person. Call a doctor or Poison Control Center immediately.

4.2 Most important symptoms/effects, acute and delayed

SYMPTOMS: Exposure to this compound may cause nausea, vomiting, epigastric pain, diarrhea and leukopenia. It may also cause skin rashes. Eye contact may cause damage to the retina, degeneration of pigment epithelium and destruction of the rods and outer nuclear layer leading to thinning of the whole retina and migration of pigment. Retinal atrophy and cataracts have also been reported. It may cause acetonuria. ACUTE/CHRONIC HAZARDS: This compound is toxic on skin contact or ingestion. It causes skin irritation. When heated to decomposition it emits toxic fumes of NOx. Decomposition products may be explosive. (NTP, 1992)

4.3 Indication of immediate medical attention and special treatment needed, if necessary

For immediate first aid: Ensure that adequate decontamination has been carried out. If victim is not breathing, start artificial respiration, preferably with a demand-valve resuscitator, bag-valve-mask device, or pocket mask as trained. Perform CPR if necessary. Immediately flush contaminated eyes with gently flowing water. Do not induce vomiting. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration. Keep victim quiet and maintain normal body temperature. Obtain medical attention. Nitrates, nitrites, and related compounds

SECTION 5: Fire-fighting measures

5.1 Suitable extinguishing media

Fires involving this material can be controlled with a dry chemical, carbon dioxide or Halon extinguisher. A water spray may also be used. (NTP, 1992)

5.2 Specific hazards arising from the chemical

Flash point data for this chemical are not available; however, it is probably combustible. (NTP, 1992)

5.3 Special protective actions for fire-fighters

Wear self-contained breathing apparatus for firefighting if necessary.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Avoid dust formation. Avoid breathing mist, gas or vapours. Avoid contacting with skin and eye. Use personal protective equipment. Wear chemical impermeable gloves. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.

6.2 Environmental precautions

Prevent further spillage or leakage if it is safe to do so. Do not let the chemical enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

PRECAUTIONS FOR "CARCINOGENS": A high-efficiency particulate arrestor (HEPA) or charcoal filters can be used to minimize amt of carcinogen in exhausted air ventilated safety cabinets, lab hoods, glove boxes or animal rooms ... Filter housing that is designed so that used filters can be transferred into plastic bag without contaminating maintenance staff is avail commercially. Filters should be placed in plastic bags immediately after removal ... The plastic bag should be sealed immediately ... The sealed bag should be labelled properly ... Waste liquids ... should be placed or collected in proper containers for disposal. The lid should be secured & the bottles properly labelled. Once filled, bottles should be placed in plastic bag, so that outer surface ... is not contaminated ... The plastic bag should also be sealed & labelled. ... Broken glassware ... should be decontaminated by solvent extraction, by chemical destruction, or in specially designed incinerators. Chemical Carcinogens

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Handling in a well ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Use non-sparking tools. Prevent fire caused by electrostatic discharge steam.

7.2 Conditions for safe storage, including any incompatibilities

PRECAUTIONS FOR "CARCINOGENS": Storage site should be as close as practical to lab in which carcinogens are to be used, so that only small quantities required for ... expt need to be carried. Carcinogens should be kept in only one section of cupboard, an explosion-proof refrigerator or freezer (depending on chemicophysical properties ...) that bears appropriate label. An inventory ... should be kept, showing quantity of carcinogen & date it was acquired ... Facilities for dispensing ... should be contiguous to storage area. Chemical Carcinogens

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure limit values

no data available

Biological limit values

no data available

8.2 Appropriate engineering controls

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

8.3 Individual protection measures, such as personal protective equipment (PPE)

Eye/face protection

Wear tightly fitting safety goggles with side-shields conforming to EN 166(EU) or NIOSH (US).

Skin protection

Wear fire/flammable resistant and impervious clothing. Handle with gloves. Gloves must be inspected prior to use. Wash and dry hands. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Respiratory protection

If the exposure limits are exceeded, irritation or other symptoms are experienced, use a full-face respirator.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties and safety characteristics

Physical state	PHYSICAL DESCRIPTION: Pale yellow crystals or light yellow moist powder. (NTP, 1992)
Colour	PALE YELLOW CRYSTALS
Odour	no data available
Melting point/freezing point	124Å°C
Boiling point or initial boiling point and boiling range	164.3Å°Cat 760 mmHg
Flammability	no data available
Lower and upper explosion limit/flammability limit	no data available
Flash point	53.1Å°C
Auto-ignition temperature	no data available
Decomposition temperature	no data available
pH	no data available
Kinematic viscosity	no data available
Solubility	less than 1 mg/mL at 64Å° F (NTP, 1992)
Partition coefficient n-octanol/water	log Kow = -0.03
Vapour pressure	Non-volatile (NTP, 1992)
Density and/or relative density	1.46 g/cm3
Relative vapour density	no data available
Particle characteristics	no data available

SECTION 10: Stability and reactivity

10.1 Reactivity

Sensitive to humidity and light when pure. Insoluble in water. Slowly decomposes in water. Alkaline hydrolysis produces a highly toxic, irritating and explosive gas.

10.2 Chemical stability

Decomposes to diazomethane in alkaline soln; stability in aq soln is ph-dependent (at 20 deg c)

10.3 Possibility of hazardous reactions

N-NITROSO-N-METHYLUREA is incompatible with strong acids and bases. Also incompatible with water and nucleophilic reagents. Alkaline hydrolysis produces a highly toxic, irritating and explosive gas. Can detonate with (potassium hydroxide + methylene chloride) (NTP, 1992).

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

no data available

10.6 Hazardous decomposition products

Melting point: 124 deg c (decomp)

SECTION 11: Toxicological information

Acute toxicity

- Oral: LD50 Rat oral 110 mg/kg
- Inhalation: no data available
- Dermal: no data available

Skin corrosion/irritation

no data available

Serious eye damage/irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

The Human Health Assessment Group in EPA's Office of Health and Environmental Assessment has evaluated N-nitroso-N-methylurea for carcinogenicity. According to their analysis, the weight-of-evidence for N-nitroso-N-methylurea is group B2, which is based on sufficient evidence in animals. No data are available for humans. As a group B2 chemical, N-nitroso-N-methylurea is considered probably carcinogenic to humans.

Reproductive toxicity

No information is available on the reproductive or developmental effects of N-nitroso-n-methylurea in humans. Animal studies have reported tumors of the nervous system and kidneys in the offspring of rats treated with N-nitroso-n-methylurea during their pregnancy.

STOT-single exposure

no data available

STOT-repeated exposure

no data available

Aspiration hazard

no data available

SECTION 12: Ecological information

12.1 Toxicity

- Toxicity to fish: no data available
- Toxicity to daphnia and other aquatic invertebrates: no data available
- Toxicity to algae: no data available
- Toxicity to microorganisms: no data available

12.2 Persistence and degradability

no data available

12.3 Bioaccumulative potential

An estimated BCF of 0.56 was calculated for N-nitroso-N-methylurea(SRC), using a measured log Kow of -0.03(1) and a recommended regression-derived equation(2). According to a classification scheme(3), this BCF suggests that bioconcentration in aquatic organisms is low(SRC). Based upon the hydrolysis of N-nitroso-N-methylurea in aqueous environments(4), bioconcentration is not expected to be an important fate process(SRC).

12.4 Mobility in soil

The Koc of N-nitroso-N-methylurea is estimated as approximately 23(SRC), using a measured log Kow of -0.03(1) and a regression-derived equation(2,SRC). According to a recommended classification scheme(3), this estimated Koc value suggests that N-nitroso-N-methylurea is expected to have very high mobility in soil(SRC). Based upon the hydrolysis of N-nitroso-N-methylurea in aqueous environments(4), adsorption to soil and leaching are not expected to be important processes(SRC).

12.5 Other adverse effects

no data available

SECTION 13: Disposal considerations

13.1 Disposal methods

Product

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

Contaminated packaging

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

SECTION 14: Transport information

14.1 UN Number

ADR/RID: UN1325 (For reference only, please check.) IMDG: UN1325 (For reference only, please check.) IATA: UN1325 (For reference only, please check.)

14.2 UN Proper Shipping Name

ADR/RID: FLAMMABLE SOLID, ORGANIC, N.O.S. (For reference only, please check.) IMDG: FLAMMABLE SOLID, ORGANIC, N.O.S. (For reference only, please check.) IATA: FLAMMABLE SOLID, ORGANIC, N.O.S. (For reference only, please check.)

14.3 Transport hazard class(es)

ADR/RID: 4.1 (For reference only, please check.) IMDG: 4.1 (For reference only, please check.) IATA: 4.1 (For reference only, please check.)

14.4 Packing group, if applicable

ADR/RID: II (For reference only, please check.) IMDG: II (For reference only, please check.) IATA: II (For reference only, please check.)

14.5 Environmental hazards

ADR/RID: No IMDG: No IATA: No

14.6 Special precautions for user

no data available

14.7 Transport in bulk according to IMO instruments

no data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations specific for the product in question

Chemical name	Common names and synonyms	CAS number	EC number
1-methyl-1-nitrosourea	1-methyl-1-nitrosourea	684-93-5	211-678-4
European Inventory of Existing Commercial Chemical Substances (EINECS)			Listed.
EC Inventory			Listed.
United States Toxic Substances Control Act (TSCA) Inventory			Listed.
China Catalog of Hazardous chemicals 2015			Not Listed.
New Zealand Inventory of Chemicals (NZIoC)			Listed.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)			Not Listed.
Vietnam National Chemical Inventory			Not Listed.
Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)			Not Listed.
Korea Existing Chemicals List (KECL)			Not Listed.

SECTION 16: Other information

Information on revision

Creation Date July 15, 2019

Revision Date July 15, 2019

Abbreviations and acronyms

- CAS: Chemical Abstracts Service
- ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
- RID: Regulation concerning the International Carriage of Dangerous Goods by Rail
- IMDG: International Maritime Dangerous Goods
- IATA: International Air Transportation Association

- TWA: Time Weighted Average
- STEL: Short term exposure limit
- LC50: Lethal Concentration 50%
- LD50: Lethal Dose 50%
- EC50: Effective Concentration 50%

References

- IPCS - The International Chemical Safety Cards (ICSC), website: <http://www.ilo.org/dyn/icsc/showcard.home>
- HSDB - Hazardous Substances Data Bank, website: <https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm>
- IARC - International Agency for Research on Cancer, website: <http://www.iarc.fr/>
- eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en
- CAMEO Chemicals, website: <http://cameochemicals.noaa.gov/search/simple>
- ChemIDplus, website: <http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp>
- ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: <http://www.phmsa.dot.gov/hazmat/library/erg>
- Germany GESTIS-database on hazard substance, website: <http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp>
- ECHA - European Chemicals Agency, website: <https://echa.europa.eu/>