SAFETY DATA SHEETS

According to Globally Harmonized System of Classification and Labelling of Chemicals (GHS) - Sixth revised edition

Version: 1.0

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1.Identification

1.1GHS Product identifier

Product name	2-nitrotoluene

1.2Other means of identification

Product number	-
Other names	mononitrotoluene

1.3Recommended use of the chemical and restrictions on use

Identified uses	For industry use only. CBI
Uses advised against	no data available

2.Hazard identification

2.1Classification of the substance or mixture

Acute toxicity - Oral, Category 4

Germ cell mutagenicity, Category 1B

Carcinogenicity, Category 1B

Hazardous to the aquatic environment, long-term (Chronic) - Category Chronic 2

Reproductive toxicity, Category 2

2.2GHS label elements, including precautionary statements

Pictogram(s)	

Signal word	Danger
Hazard statement(s)	H302 Harmful if swallowed H340 May cause genetic defects H350 May cause cancer H411 Toxic to aquatic life with long lasting effects
Precautionary statement(s)	
Prevention	P264 Wash ... thoroughly after handling. P270 Do not eat, drink or smoke when using this product. P201 Obtain special instructions before use. P202 Do not handle until all safety precautions have been read and understood. P280 Wear protective gloves/protective clothing/eye protection/face protection. P273 Avoid release to the environment.
Response	P301+P312 IF SWALLOWED: Call a POISON CENTER/doctor/…if you feel unwell. P330 Rinse mouth. P308+P313 IF exposed or concerned: Get medical advice/ attention. P391 Collect spillage.
Storage	P405 Store locked up.
Disposal	P501 Dispose of contents/container to ...

2.3Other hazards which do not result in classification

none

3.Composition/information on ingredients

3.1Substances

Chemical name	Common names and synonyms	CAS number	EC number	Concentration
2-nitrotoluene	2-nitrotoluene	88-72-2	none	100%

4.First-aid measures

4.1Description of necessary first-aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.

In case of skin contact

Wear protective gloves when administering first aid. Rinse and then wash skin with water and soap. Refer for medical attention .

In case of eye contact

First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

If swallowed

Rinse mouth. Refer for medical attention .

4.2Most important symptoms/effects, acute and delayed

INHALATION, INGESTION, OR SKIN: Headache, flushing of face, dizziness, dyspnea (difficult breathing), cyanosis, nausea, vomiting, muscular weakness, increased pulse and respiratory rate, irritability, and convulsions. SKIN: Irritation. (USCG, 1999)

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

Immediate first aid: Ensure that adequate decontamination has been carried out. If patient is not breathing, start artificial respiration, preferably with a demand-valve resuscitator, bag-valve-mask device, or pocket mask, as trained. Perform CPR as 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 patient quiet and maintain normal body temperature. Obtain medical attention. /Aromatic hydrocarbons and related compounds/

5.Fire-fighting measures

5.1Extinguishing media

Suitable extinguishing media

Water spray, fog, foam, CO2.

5.2Specific hazards arising from the chemical

Special Hazards of Combustion Products: Toxic fumes may be generated. Behavior in Fire: Generates toxic fumes. (USCG, 1999)

5.3Special protective actions for fire-fighters

Wear self-contained breathing apparatus for firefighting if necessary.

6.Accidental release measures

6.1Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. For personal protection see section 8.

6.2Environmental precautions

Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

6.3Methods and materials for containment and cleaning up

Ventilate area of spill or leak. For small quantities of liq nitrotoluene, absorb on paper towels. For small quantities of solid nitrotoluene, sweep onto paper or other suitable material. Remove to safe place (such as fume hood) & burn. Large quantities of liq nitrotoluene can be collected & atomized in suitable combustion chamber equipped with appropriate effluent gas cleaning device. Large quantities of solid nitrotoluene can be reclaimed; ... If not practical, dissolve in flammable solvent (such as alcohol) & atomize in suitable combustion chamber equipped with appropriate effluent gas cleaning device. /Nitrotoluene/

7.Handling and storage

7.1Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Avoid exposure - obtain special instructions before use.Provide appropriate exhaust ventilation at places where dust is formed. For precautions see section 2.2.

7.2Conditions for safe storage, including any incompatibilities

Separated from food and feedstuffs. See Chemical Dangers. Well closed. Ventilation along the floor. Store in an area without drain or sewer access. Provision to contain effluent from fire extinguishing.Store in a cool. dry, well-ventilated location. Separate from acids, alkalies, oxidizing materials, and reducing agents.

8.Exposure controls/personal protection

8.1Control parameters

Occupational Exposure limit values

Recommended Exposure Limit: 10 Hour Time-Weighted Average: 2 ppm (11 mg/cu m). Skin designation.

Biological limit values

no data available

8.2Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

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

Eye/face protection

Safety glasses with side-shields conforming to EN166. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Wear impervious clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace. Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique(without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. 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

Wear dust mask when handling large quantities.

Thermal hazards

no data available

9.Physical and chemical properties

Physical state	light yellow to darker yellow-green liquid
Colour	Yellowish liquid at ordinary temperature
Odour	Weak, aromatic odor
Melting point/ freezing point	233° C(lit.)
Boiling point or initial boiling point and boiling range	222° C
Flammability	Class IIIB Combustible Liquid: Fl.P. at or above 93.33° C.Combustible.
Lower and upper explosion limit / flammability limit	Lower 1.47%; Upper 8.8%
Flash point	106° C(lit.)
Auto-ignition temperature	305° C
Decomposition temperature	no data available
pH	no data available
Kinematic viscosity	2.7 mPa (= cP)
Solubility	In water:0.44 g/L (20 °C)
Partition coefficient	log Kow = 2.30

n-octanol/water (log value)	
Vapour pressure	0.1 mm Hg at 20° C ; 0.25 mm Hg at 30° C; 1.6 mm Hg at 60° C
Density and/or relative density	1.163
Relative vapour density	4.72 (Relative to Air)
Particle characteristics	no data available

10.Stability and reactivity

10.1Reactivity

no data available

10.2Chemical stability

/Heat contributes/ ... to instability. /Nitrotoluene/

10.3Possibility of hazardous reactions

Comubstible when exposed to heat or open flame.O-NITROTOLUENE is toxic by inhalation, ingestion and skin aborption, targeting the blood, central nervous system, skin, and gastrointestinal tract. Symptoms include, anoxia, weakness or dizziness, nausea and vomiting. If it contacts the eye, the eye should be irrigated immediately. If it contacts the skin, the area should be washed with soap. If inhaled, respiratory support should be administered. Finally, if ingested, medical attention should be sought. It also reacts with sulfuric acid, sodium hydroxide, hydrogen, sodium, tetranitromethane, reducing agents and strong oxidizers. It is very heat sensitive.

10.4Conditions to avoid

no data available

10.5Incompatible materials

Decomposes on contact with strong oxidzers; strong acids; reducing agents; strong bases; ammonia, amines producing toxic fumes, causing fire and explosion hazard. Heat above 190°C may cause explosive decomposition. Attacks some plastics, rubbers, and coatings.

10.6Hazardous decomposition products

The substance decomposes ... /to/ form nitrogen oxides, carbon monoxide.

11.Toxicological information

Acute toxicity

- Oral: LD50 Mouse oral 2462 mg/kg bw
- Inhalation: LC50 Rat inhalation >1086 mg/L/ 8hr
- 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

Evaluation: There is inadequate evidence in humans for the carcinogenicity of nitrotoluenes. There is limited evidence in experimental animals for the carcinogenicity of 2-nitrotoluene. Overall evaluation: Nitrotoluenes are not classifiable as to their carcinogenicity to humans (Group 3).

Reproductive toxicity

no data available

STOT-single exposure

no data available

STOT-repeated exposure

no data available

Aspiration hazard

no data available

12.Ecological information

12.1Toxicity

- Toxicity to fish: LC50; Species: Brachydanio rerio (Zebra fish); Concentration: 65 mg/L for 96 hr /Conditions of bioassay not specified in source examined
- Toxicity to daphnia and other aquatic invertebrates: EC50; Species: Daphnia magna (Water Flea) age 24 hr; Conditions: freshwater, static, 18-20°C, pH 8.0-8.3, dissolved oxygen 8.1-9.7 mg/L; Concentration: 13200 ug/L for 24 hr (95% confidence interval: 12000-14500 ug/L); Effect: intoxicaiton, immobilization />99% purity formulation
- Toxicity to algae: no data available
- Toxicity to microorganisms: no data available

12.2Persistence and degradability

AEROBIC: 2-Nitrotoluene, present at 100 mg/L, reached 0.5% of its theoretical BOD in 2 weeks using an activated sludge inoculum at 30 mg/L in the Japanese Ministry of Industry and Trade (MITI) test that employs a mixed inoculum obtained from freshwater, soil, and sludge(1). Other evidence supports complete aerobic degradation of 10 mg/L 2-nitrotoluene within 2 weeks when incubated in adapted aerobic composite river sediment and sewage sludges(3). When nitrotoluene-adapted activated sludges were used as an inoculum, however, 2-nitrotoluene (200 mg/L) was almost completely degraded (i.e. 98% removal) within 5 days when incubated at 20°C(3). The screening studies using unadapted sludges gave similar results as the MITI test, and 2-nitrotoluene is confirmed to be non biodegradable according to the standard MITI test. Using a mixed culture isolated from a contaminated soil (near an ammunition plant), 2-nitrotoluene (at initial concentrations of 3.5 mg/L) degraded completely in 8 days in aerobic batch and continuous reactor tests(4).

12.3Bioaccumulative potential

The BCF for 2-nitrotoluene has been measured to be 12.5-29.9 (at a concentration of 0.1 ppm) and 6.6-29.7 (at 0.01 ppm) in carp (Carprinus carpio)(1). An estimated BCF of 15 was calculated for 2-nitrotoluene(SRC), using a log Kow of 2.30(2) and a regression-derived equation(3). According to a classification scheme(4), these BCF values suggest the potential for bioconcentration in aquatic organisms is low(SRC).

12.4Mobility in soil

Using a structure estimation method based on molecular connectivity indices(1), the Koc of 2-nitrotoluene can be estimated to be 370(SRC). According to a classification scheme(2), this estimated Koc value suggests that 2-nitrotoluene is expected to have moderate mobility in soil. Field monitoring at a munition factory site in Melbourne Australia found that 2-nitrotoluene migrated large distances in the subsurface soils(3); 2-nitrotoluene is reported to have low soil Kd sorption coefficients in a variety of soils types(3) indicating it will leach.

12.5Other adverse effects

no data available

13.Disposal considerations

13.1Disposal 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.

14.Transport information

14.1UN Number

ADR/RID: UN1664	IMDG: UN1664	IATA: UN1664

14.2UN Proper Shipping Name

ADR/RID: NITROTOLUENES, LIQUID
IMDG: NITROTOLUENES, LIQUID
IATA: NITROTOLUENES, LIQUID

14.3Transport hazard class(es)

ADR/RID: 6.1	IMDG: 6.1	IATA: 6.1

14.4Packing group, if applicable

ADR/RID: II	IMDG: II	IATA: II

14.5Environmental hazards

ADR/RID: yes	IMDG: yes	IATA: yes

14.6Special precautions for user

no data available

14.7Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

no data available

15.Regulatory information

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

Chemical name	Common names and synonyms	CAS number	EC number
2-nitrotoluene	2-nitrotoluene	88-72-2	none
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			Listed.
New Zealand Inventory of Chemicals (NZIoC)			Listed.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)			Listed.
Vietnam National Chemical Inventory			Not Listed.
Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)			Listed.

16.Other information

Information on revision

Creation Date	Aug 12, 2017

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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/
