

## Chemical Safety Data Sheet MSDS / SDS

## Pentaerithrityl tetranitrate SDS

Revision Date:2024-04-25 Revision Number:1

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

Product name: Pentaerithrityl tetranitrate

CAS: 78-11-5

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

Relevant identified uses: For R&amp;D use only. Not for medicinal, household or other use.

Uses advised against: none

**Company Identification**

Company: Chemicalbook.in

Address: 5 vasavi Layout Basaveswara Nilayam Pragathi Nagar Hyderabad, India -500090

Telephone: +91 9550333722

**SECTION 2: Hazards identification****Classification of the substance or mixture**

Explosives, Unstable explosive

## GHS label elements, including precautionary statements

Pictogram(s)



Signal word

Danger

Hazard statement(s)

H200 Unstable explosive

Precautionary statement(s)

Prevention

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

P250 Do not subject to grinding/shock/friction/...

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

Response

P370+P372+P380+P373 In case of fire: Explosion risk. Evacuate area. DO NOT fight fire when fire reaches explosives.

Storage

P401 Store in accordance with...

Disposal

P503 Refer to manufacturer/supplier... for information on disposal/recovery/recycling.

Other hazards which do not result in classification

no data available

## SECTION 3: Composition/information on ingredients

Substance

Chemical name: Pentaerithryl tetranitrate

Common names and synonyms: Pentaerithryl tetranitrate

CAS number: 78-11-5  
EC number: 201-084-3  
Concentration: 100%

#### **SECTION 4: First aid measures**

##### **Description of necessary first-aid measures**

###### **If inhaled**

Fresh air, rest. Refer for medical attention.

###### **Following skin contact**

Remove contaminated clothes. Rinse skin with plenty of water or shower.

###### **Following eye contact**

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

###### **Following ingestion**

Rinse mouth. Refer for medical attention .

##### **Most important symptoms/effects, acute and delayed**

Excerpt from ERG Guide 112 [Explosives\* - Division 1.1, 1.2, 1.3 or 1.5]: Fire may produce irritating, corrosive and/or toxic gases. (ERG, 2016)

Excerpt from ERG Guide 112 [Explosives\* - Division 1.1, 1.2, 1.3 or 1.5]: Fire may produce irritating, corrosive and/or toxic gases. (ERG, 2016)

SYMPTOMS: Symptoms of exposure to this compound may include a decrease in blood pressure, dyspnea, convulsions, cyanosis, headache, dizziness, postural hypotension, weakness, nausea, vomiting, pallor, sweating, collapse, rashes, coma, respiratory paralysis and formation of methemoglobin. ACUTE/CHRONIC HAZARDS: When heated to decomposition this compound emits highly toxic fumes. (NTP, 1992)

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

Initial attention should be directed toward improving oxygen delivery with assisted ventilation, if necessary, and 100% oxygen while intravenous methylene blue is prepared. Institute cardiac monitoring, especially in patients with coronary artery or pulmonary disease. Hypotension should respond to Trendelenburg's position and intravenous fluids. Otherwise, dopamine may be needed. ... Use ... lavage for obtunded patients who ingest methemoglobin forming agents and present within 2-4 hours of

ingestion. ... Exchange transfusion and/or the transfusion of packed red blood cells may be useful for methylene blue failures or for patients with known G6PD or NADPH methemoglobin reductase deficiencies. The inherent risks of the large blood volumes required in adults limit the applicability of this method. The usual dose of methylene blue is 1-2 mg/kg (25-50 mg/sq m) of a 1% solution (10 mg/ml) intravenously over 5 minutes. ... The same dose may be repeated within 1 hour if symptoms of hypoxia fail to subside. The administration of ascorbic acid (100-500 mg twice daily either orally or intravenously) is harmless but probably has a minor effect on increasing methemoglobin reduction. Methemoglobin forming agents

## SECTION 5: Firefighting measures

### Suitable extinguishing media

If material on fire or involved in fire: use water in flooding quantities as fog. Cool all affected containers with flooding quantities of water. Do not use water, dry chemical, or foam. Do not extinguish fire unless flow can be stopped. Pentaerythrite tetranitrate mixture, desensitized, solid, n.o.s.

### Specific hazards arising from the chemical

Excerpt from ERG Guide 112 [Explosives\* - Division 1.1, 1.2, 1.3 or 1.5]: MAY EXPLODE AND THROW FRAGMENTS 1600 METERS (1 MILE) OR MORE IF FIRE REACHES CARGO. For information on "Compatibility Group" letters, refer to Glossary section. (ERG, 2016)  
Excerpt from ERG Guide 112 [Explosives\* - Division 1.1, 1.2, 1.3 or 1.5]: MAY EXPLODE AND THROW FRAGMENTS 1600 METERS (1 MILE) OR MORE IF FIRE REACHES CARGO. For information on "Compatibility Group" letters, refer to Glossary section. (ERG, 2016)  
Flash point data for this compound are not available. It is probably combustible. (NTP, 1992)

### Special protective actions for fire-fighters

In case of fire in the surroundings, use appropriate extinguishing media. Combat fire from a sheltered position.

## SECTION 6: Accidental release measures

### Personal precautions, protective equipment and emergency procedures

Evacuate danger area! Consult an expert! Personal protection: particulate filter respirator adapted to the airborne concentration of the substance. Remove all ignition sources. Cover the spilled material with water. Carefully collect remainder. Then store and dispose of according to local regulations. Do NOT wash away into sewer.

### Environmental precautions

Evacuate danger area! Consult an expert! Personal protection: particulate filter respirator adapted to the airborne concentration of the substance. Remove all ignition sources. Cover the spilled material with water. Carefully collect remainder. Then store and

dispose of according to local regulations. Do NOT wash away into sewer.

#### **Methods and materials for containment and cleaning up**

SRP: Wastewater from contaminant suppression, cleaning of protective clothing/equipment, or contaminated sites should be contained and evaluated for subject chemical or decomposition product concentrations. Concentrations shall be lower than applicable environmental discharge or disposal criteria. Alternatively, pretreatment and/or discharge to a permitted wastewater treatment facility is acceptable only after review by the governing authority and assurance that "pass through" violations will not occur. Due consideration shall be given to remediation worker exposure (inhalation, dermal and ingestion) as well as fate during treatment, transfer and disposal. If it is not practicable to manage the chemical in this fashion, it must be evaluated in accordance with EPA 40 CFR Part 261, specifically Subpart B, in order to determine the appropriate local, state and federal requirements for disposal.

### **SECTION 7: Handling and storage**

#### **Precautions for safe handling**

NO open flames, NO sparks and NO smoking. Do NOT expose to friction or shock. Closed system, dust explosion-proof electrical equipment and lighting. Prevent deposition of dust. 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.

#### **Conditions for safe storage, including any incompatibilities**

Fireproof. Separated from strong oxidants. Store in an area without drain or sewer access. Fireproof. Separated from strong oxidants. Store in an area without drain or sewer access.

### **SECTION 8: Exposure controls/personal protection**

#### **Control parameters**

#### **Occupational Exposure limit values**

no data available

#### **Biological limit values**

no data available

### 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.

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

#### Eye/face protection

Wear safety goggles or eye protection in combination with breathing protection.

#### Skin protection

Protective gloves.

#### Respiratory protection

Use ventilation (not if powder), local exhaust or breathing protection.

#### Thermal hazards

no data available

## SECTION 9: Physical and chemical properties and safety characteristics

Physical state:	Pentaerythrite tetranitrate is a white crystals. Density 1.75 g / cm <sup>3</sup> . Melting point 138-140°C. Detonates at 210°C. An extremely dangerous explosive, particularly when dry. Especially sensitive to shock and heat. Primary hazard is blast of an instantaneous explosion, not flying projectiles or fragments.
Colour:	Tetragonal holohedra from acetone + alcohol
Odour:	Faint, mild odor
Melting point/freezing point:	139°C
Boiling point or initial boiling point and boiling range:	Explodes at 205-215 deg C
Flammability:	Gives off irritating or toxic fumes (or gases) in a fire.

Lower and upper explosion limit/flammability limit:	no data available
Flash point:	no data available
Auto-ignition temperature:	160 dec C
Decomposition temperature:	no data available
pH:	no data available
Kinematic viscosity:	no data available
Solubility:	less than 1 mg/mL at 72° F (NTP, 1992)
Partition coefficient n-octanol/water:	log Kow = 2.38 (est)
Vapour pressure:	1.36X10 <sup>-7</sup> mm Hg at 25 deg C
Density and/or relative density:	1.773
Relative vapour density:	no data available
Particle characteristics:	no data available

## SECTION 10: Stability and reactivity

### Reactivity

Heating may cause violent combustion or explosion. May decompose explosively on shock, friction or concussion.

### Chemical stability

Although PETN safely withstands storage for 18 mo at 65 deg C, continued storage has marked effects of instability; the presence of as little as 0.01% free acid or alkali in PETN markedly accelerates its deterioration. It is the least stable of the standard military

bursting charge explosives.

### **Possibility of hazardous reactions**

PENTAERYTHRITE TETRANITRATE is a high explosive. An oxidizing agent. May begin a vigorous reaction that culminates in a detonation if mixed with reducing agents, including hydrides, sulfides and nitrides. Emits highly toxic nitrogen oxide fumes on decomposition.

### **Conditions to avoid**

no data available

### **Incompatible materials**

Avoid all contact with other chemicals. Avoid contact with other explosives, pyrotechnics, solvents, adhesives, paints, cleaners and unauthorized metals, plastics, packing equipment and materials. Avoid contamination with acids, alkalis, amines, phosphorus, and reducing agents.

### **Hazardous decomposition products**

On decomposition it emits highly toxic fumes of /nitric oxide/.

## **SECTION 11: Toxicological information**

### **Acute toxicity**

Oral: no data available

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**

no data available

### **Reproductive toxicity**

no data available

### **STOT-single exposure**

The substance may cause effects on the cardiovascular system. This may result in lowering of blood pressure. Medical observation is indicated.

### **STOT-repeated exposure**

no data available

### **Aspiration hazard**

A harmful concentration of airborne particles can be reached quickly when dispersed.

## **SECTION 12: Ecological information**

### **Toxicity**

Toxicity to fish: LC50; Species: Pimephales promelas (Fathead minnow, weight 1 g, length 43 mm); Conditions: freshwater, static, 21 deg C, pH 7.1, hardness 35 mg/L CaCO<sub>3</sub>; Concentration: 27,000 mg/L for 96 hr (95% confidence interval: 9,500-76,000 mg/L) /formulated product

Toxicity to daphnia and other aquatic invertebrates: LC50; Species: Daphnia magna (Water flea, age <24 hr); Conditions: freshwater, static, 22 deg C; Concentration: 9,700 mg/L for 24 hr (95% confidence interval: 7,500-12,600 mg/L) /formulated product

Toxicity to algae: no data available

Toxicity to microorganisms: no data available

### **Persistence and degradability**

PURE CULTURE: Pure microbial cultures, one identified as *Agrobacterium radiobacter*, isolated under aerobic and nitrogen limiting conditions obtained from soil, river water, and sewage sludge were capable of metabolizing pentaerythritol tetranitrate(1). *Enterobacter cloacae* PB 2 isolated from a mixed microbial cultures obtained from soil under aerobic and nitrogen limited conditions was also capable of utilizing pentaerythritol tetranitrate as a sole nitrogen source(2). A proposed biodegradation pathway for pentaerythritol tetranitrate initiated using *Enterobacter cloacae* proceeds via xenobiotic reductase to the trinitrate and then pentaerythritol dinitrate(3).

### **Bioaccumulative potential**

An estimated BCF of 17 was calculated in fish for pentaerythritol tetranitrate(SRC), using an estimated log Kow of 2.4(1) and a regression-derived equation(2). According to a classification scheme(3), this BCF suggests the potential for bioconcentration in aquatic organisms is low(SRC).

### **Mobility in soil**

Using a structure estimation method based on molecular connectivity indices(1), the Koc of pentaerythritol tetranitrate can be estimated to be 650(SRC). According to a classification scheme(2), this estimated Koc value suggests that pentaerythritol tetranitrate is expected to have low mobility in soil.

### **Other adverse effects**

no data available

## **SECTION 13: Disposal considerations**

### **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

### UN Number

ADR/RID: UN0150 (For reference only, please check.)

IMDG: UN0150 (For reference only, please check.)

IATA: UN0150 (For reference only, please check.)

### UN Proper Shipping Name

ADR/RID: PENTAERYTHRITE TETRANITRATE (PENTAERYTHRITOL TETRANITRATE; PETN), WETTED with not less than 25% water, by mass, or PENTAERYTHRITE TETRANITRATE (PENTAERYTHRITOL TETRANITRATE; PETN), DESENSITIZED with not less than 15% phlegmatizer, by mass? (For reference only, please check.)

IMDG: PENTAERYTHRITE TETRANITRATE (PENTAERYTHRITOL TETRANITRATE; PETN), WETTED with not less than 25% water, by mass, or PENTAERYTHRITE TETRANITRATE (PENTAERYTHRITOL TETRANITRATE; PETN), DESENSITIZED with not less than 15% phlegmatizer, by mass? (For reference only, please check.)

IATA: PENTAERYTHRITE TETRANITRATE (PENTAERYTHRITOL TETRANITRATE; PETN), WETTED with not less than 25% water, by mass, or PENTAERYTHRITE TETRANITRATE (PENTAERYTHRITOL TETRANITRATE; PETN), DESENSITIZED with not less than 15% phlegmatizer, by mass? (For reference only, please check.)

### Transport hazard class(es)

ADR/RID: 1.1D (For reference only, please check.)

IMDG: 1.1D (For reference only, please check.)

IATA: 1.1D (For reference only, please check.)

### Packing group, if applicable

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

IMDG: (For reference only, please check.)

IATA: (For reference only, please check.)

### Environmental hazards

ADR/RID: No

IMDG: No

IATA: No

**Special precautions for user**

no data available

**Transport in bulk according to IMO instruments**

no data available

**SECTION 15: Regulatory information**

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

**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.

**(PICCS)**

Not Listed.

**Vietnam National Chemical Inventory**

Listed.

**IECSC)**

Not Listed.

## Korea Existing Chemicals List (KECL)

Listed.

### SECTION 16: Other information

#### 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](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/>

### **Other Information**

Other UN number is 150 PETN wetted with not less than 25% of water, hazard class 1.1D. The desensitized substance contains not less than 15% phlegmatizer.

Disclaimer: 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. We as supplier shall not be held liable for any