



DIETHYL THIOPHOSPHORYL CHLORIDE  
MATERIAL SAFETY DATA SHEET

SECTION 1 : CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

- **Product identifier** :
  - Chemical Name : O,O-Diethyl thiophosphoryl chloride
  - Molecular formula : C<sub>4</sub>H<sub>10</sub>ClO<sub>2</sub>PS
  - Chemical class : Organic liquid
  - Trade name : DETC
  - Synonyms : Ethyl PCT; O,O -diethylchlorothiophosphate; Diethyl phosphorochloridothioate
- **Name of manufacturer** :

**CORPORATE HEAD OFFICE :**

Excel Industries Limited  
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**MANUFACTURED AT :**

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- **Product use** : DETC is used extensively in the manufacture of organophosphorus pesticides, oil & gasoline additives, flame retardants, floatation agents

SECTION 2 : COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient name	CAS No.	%	EC / EINECS No.	Symbol	R / S Phrases
O,O-Diethyl thiophosphoryl chloride	2524-04-1	99%	219-755-4	C, T	R20, R21, R22, R34, R36/37

Note: See Section 16 for full text of R & S phrases mentioned above.

SECTION 3 : HAZARDS IDENTIFICATION

- **Potential hazards** : Corrosive, Toxic. May be fatal if inhaled or ingested in excessive quantities.
- **Potential health effects** : Irritant, Corrosive
- **Relevant route of exposure** :
  - Skin contact : Irritating to skin (redness, burning sensation, pain, blisters)
  - Eye Contact : Severe damage to eyes (redness, blurred vision, burns)
  - Inhalation : May cause headache, vomiting, diarrhea. Irritation of the nose, throat and respiratory tract. Repeated exposure for prolonged period can cause inhibition of blood cholinesterase. Symptoms may appear after several hours. May prove fatal in case of extreme exposure.
  - Ingestion : Abdominal cramps, burning sensation, diarrhoea, vomiting
- **R-phrases** : R20, R21, R22, R34, R36/37
- **S-phrases** : ----
- **NFPA Code** : H=4; F=1; R=1
- **Environmental effects** : May be hazardous to the environment.



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- Hazard symbols : C, T



SECTION 4 : FIRST AID MEASURES

- Eyes : Immediately flush eyes with plenty of water for 15 minutes. Remove contact lenses if easily possible. Seek medical attention immediately
- Skin : Remove contaminated clothing. Immediately wash contaminated skin with soap and large quantities of water. Seek medical attention.
- Inhalation : Remove exposed person to fresh air. Lay patient down. Keep warm & at rest. If breathing has ceased, start artificial respiration. Seek medical attention immediately.
- Ingestion : If the affected person is conscious, immediately give several glasses of water or milk but do not induce vomiting. Rinse mouth. The product is corrosive. If vomiting does occur, give fluids again. Never give anything by mouth to an unconscious person. Seek medical attention immediately.
- Note to Physician : Affected skin should be treated against effects from acids or acid fumes. In case lungs are affected watch for pulmonary oedema. DETC causes acetyl cholinesterase inhibition resulting in pinpoint pupils. In such case the following treatment may be applied.

**Cholinesterase Inhibition Treatment : Antidotes :-** Administer atropine sulphate in large doses, two to four mg. intravenously or intramuscularly, as soon as cyanosis is overcome. Repeat at 5 to 10 minute intervals until signs of atropinization appear. 2-PAM chloride is a pharmacological antidote and may be administered as an adjunct to, but not a substitute for atropine, which is symptomatic and often lifesaving antidote. DO NOT GIVE MORPHINE OR TRANQUILLIZERS. Cholinesterase inhibitors are affecting the central and peripheral nervous systems and producing cardiac and respiratory depression. At first sign of pulmonary edema, the patient should be given supplemental oxygen and treated symptomatically. Continued absorption of the poison may occur and relapse may occur after initial improvement; VERY CLOSE SUPERVISION OF THE PATIENT IS INDICATED FOR AT LEAST 48 HOURS.

SECTION 5 : FIREFIGHTING MEASURES

- HAZCHEM code : 4WE
- Hazardous combustion products : Ethyl mercaptan, Diethyl sulphide, Sulfur dioxide, Carbon monoxide, Phosphorous pentoxide and Hydrogen sulphide
- Conditions under which flammability could occur : Heat / Flame
- Extinguishing media : Dry chemical or carbon dioxide for small fires. Water spray or foam for large fires
- Unsuitable fire extinguishing media : -----
- Sensitivity to explosion : Not applicable
- Fire fighting procedure : In case of fire, cool drums etc. by spraying with water. Do not allow firefighting water to enter water bodies.
- Special protective equipment for the fighters : Wear self-contained breathing apparatus and protective clothing. Equipment should be thoroughly decontaminated after use.



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SECTION 6 : ACCIDENTAL RELEASE MEASURES

- Personal precautions : Avoid contact with material. Avoid breathing vapours. Use personal protection recommended in Section 8.
- Environmental precautions : Prevent mixing with water bodies. Advice local authorities if it has entered water bodies.
- Procedures for dealing with release or spill (Major/Minor) : Make dyke using earth or available material. Absorb on sand, earth, absorbent granules and shovel into plastic drums for temporary on site storage. Dig up heavily contaminated soil. Collect in containers for disposal. Flush spill area with water. Dispose as per instructions mentioned in Section 13.
- Additional instructions : After clean up operations, decontaminate & launder all protective clothing and equipment before storing & reusing.

SECTION 7 : HANDLING AND STORAGE

**HANDLING :**

- **Safe handling practices and equipment :** Good industrial practice in housekeeping & personal hygiene should be followed. Avoid contact with eyes, skin and clothing. Use personal protective equipment. Wash hands before eating. Take bath after work.
- **Technical measures like containment, ventilation, spillage handling etc. :** Use in well ventilated area. Prevent concentration in hollows & sumps. Do not enter confined spaces until atmosphere has been checked.

**STORAGE :**

- **Appropriate storage practices/ requirements:** Store in cool, dry, well-ventilated area away from heat and ignition sources. It should never be heated above 50°C and also local heating above this temperature should be avoided. Avoid physical damage to containers. Check regularly for leaks.
- **Material of construction of containers:** Suitable storage materials are HMHDPE containers, polyethylene lined containers and bulk storage in PP-FRP tanks, SS 316 L or SS 316 or steel tanks with suitable corrosion proof lining.

SECTION 8 : EXPOSURE CONTROL / PERSONAL PROTECTION

- **Occupational exposure limit values / Biological limit values:**
  - UK Workplace Exposure Limits (WEL) - Hydrogen Chloride TWA - 1 ppm; STEL - 5 ppm
  - US OSHA (PEL) - Hydrogen Chloride - Peak 5 ppm ( 7 mg/m<sup>3</sup> )
- **Applicable control measures, including engineering controls:** Good industrial practice in housekeeping and personal hygiene should be followed. Ensure adequate ventilation of workplace. If risk of overexposure exists, wear approved respirator. Provide eyewash facility & safety shower.
- **Industrial Hygiene Controls:** Good personal hygiene practices should be followed. Avoid contact with eyes, skin and clothing. Wash hands before breaks and after work. Do not eat, drink, smoke in the workplace. Use personal protective equipment.
- **Personal protective equipment for each exposure route (type & MOC):**
  - Eyes : Safety goggles, Full face shield
  - Skin : PVC / Neoprene / Rubber gloves.
  - Clothing : Chemical resistant apron
  - Foot : Safety shoes / Gumboots
  - Respiratory protection : Wear respirator with appropriate filter



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SECTION 9 : PHYSICAL AND CHEMICAL PROPERTIES

- Physical state : Liquid
- Appearance : Colourless to light yellow fuming liquid
- Odour : Characteristic pungent and perceptible odour
- Vapor pressure & reference temperature : 1.4 mm at 50°C, 5.1 mm. at 70°C, 20 mm. at 95°C
- Boiling point : 96- 98°C at 25 mm. Hg.
- Freezing / Melting point : Well below 0°C
- Specific gravity : 1.188 @ 25°C
- Viscosity : 1.12 cps at 24°C
- pH : Acidic
- Solubility in water : Very slightly soluble
- Flash point (with method) : 92°C (Pensky-Martens closed cup)
- Upper explosive limit in air : Not available
- Lower explosive limit in air : Not available
- Auto ignition temperature : Not available

SECTION 10 : STABILITY AND REACTIVITY

- Chemical stability : Generally stable under normal conditions of handling and storage.
- Conditions to avoid : Heat
- Incompatibility with other materials : Strong alkalis, amines and strong oxidizing compounds.
- Hazardous decomposition products : Exothermic decomposition has been observed at temperature above 120 °C releasing different flammable compounds such as Hydrogen Sulphide, Ethyl Chloride , Diethyl Sulfide & Ethyl Mercaptan.
- Hazardous polymerization : Will not occur under normal condition
- Effect of weather (Humidity/ oxygen/ CO<sub>2</sub>) : None

SECTION 11 : TOXICOLOGICAL INFORMATION

**Toxicology data:**

- Skin : Dermal LD50 (Rabbit) - 1439 mg/kg
- Ingestion : Oral LD50 (Rat) - 1340 mg/kg  
Oral LD50 (Rabbit) - 900 mg/kg  
Oral LD50 (G. Pig) - 810 mg/kg
- Inhalation : Inhalation LC50 (Rat) - 20 ppm / 4 h
- Irritancy : No data available
- Sensitization : No data available
- Carcinogenicity : No data available
- Reproductive toxicity : No data available
- Teratogenicity : No data available
- Mutagenicity : No data available
- Name of toxicologically synergistic products : No data available

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## SECTION 12 : ECOLOGICAL INFORMATION

**Ecotoxicity:**





- Fish : LC50 (Rainbow trout, 96h) : < 100 mg/l
- EC50 (Daphnia, 48h) : < 100 mg/l

- Mobility : No data available
- Persistence and degradability in soil/ water : No data available
- Bioaccumulation potential : Material is not known to bioaccumulate
- Other adverse effects (ODP, GWP, etc). : No data available

## SECTION 13 : DISPOSAL CONSIDERATION

- **Waste disposal information of product & contaminated packaging:** Spill and waste disposal procedures approved by state and local authorities must be observed. Labels should not be removed from containers until they have been cleaned and decontaminated. Decontaminate the container taking suitable precaution considering hazard before reuse or recycle and dispose off as per local rules.

## SECTION 14 : TRANSPORT INFORMATION

Regulatory information	UN No.	Proper shipping name	UN Class & Subs. Haz class	Packaging group	Label	Additional information
IMDG	2751	Diethyl thiophosphoryl chloride	8	II		
ADR/ RID	2751	Diethyl thiophosphoryl chloride	8	II		
US-DOT	2751	Diethyl thiophosphoryl chloride	8	II		
ICAO/ IATA	2751	Diethyl thiophosphoryl chloride	8	II		

## SECTION 15 : REGULATORY INFORMATION

- National laws/ Regional laws:-
  - USA -
    - USA - RTECS no. - TD 1780000
    - Toxic Substance Control Act (TSCA)
    - US EPA High Production Volume Project Chemical List.
  - Europe - EINECS no. 219-755-4
  - Canada :
    - Canada - WHIMS - Not regulated; Canadian Domestic Substance List



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SECTION 16 : OTHER INFORMATION

Full text of R & S phrases given below:-

- R20 - Harmful by inhalation
- R21- Harmful in contact with skin
- R22- Harmful if swallowed
- R34- Causes burns
- R36/37- Irritating to eyes and respiratory systems

**DISCLAIMER:** Information contained in this Material Safety Data Sheet is believed to be reliable but no representation, guarantee or warranties of any kind are made as to the accuracy, suitability for a particular application or results to be obtained from them. It is up to the user to ensure that the information contained in the Material Safety Data Sheet is relevant to the product manufactured/ handled or sold by him as the case may be. Excel Industries Limited makes no warranties, expressed or implied, in respect of the adequacy of this document for any particular purpose.