

**TECHNICAL DATA**  
Titanium Tetrachloride, TiCl<sub>4</sub>

**GENERAL DESCRIPTION**

Titanium Tetra Chloride is produced as an intermediary product in the production of Rutile grade titanium dioxide pigment. It is colorless to pale yellow liquid. Titanium Tetra Chloride reacts with water to expand to 1600 times its liquid volume on exposure creating smoke screen and thereby necessitate careful handling

**APPLICATIONS**

Starting material for the manufacture of TiO<sub>2</sub> Pigment, Titanium Metal Sponge and Titanium Compounds.

Catalyst for Polymerization of olefins, particularly ethylene

**PHYSICAL DATA**

Colour	Colourless to pale yellow liquid at room temperature
Molecular weight	189.73
Freezing Point	-25°C
Boiling Point	135.8°C
Critical Temperature	358°C
Specific Gravity at 20°C	1.72
Specific heat of Liquid 25°C	37.53 Cal/mol/°c
Dielectric constant at 20°C	2.79
Conductivity	Almost Zero

**CHARACTERISTICS**

Very pale yellow liquid which can darken on exposure to light or ultra-violet rays.

<b>Analysis.</b>		
TiCl <sub>4</sub>	greater than	99.5
Vanadium as V	less than	10ppm
Silicon as Si	less than	50ppm
Aluminium as Al	less than	20ppm
Iron as Fe	less than	5ppm
Residue- remaining- at 150°C	less than	0.1%

**MODE OF SUPPLY**

TiCl<sub>4</sub> will be supplied in 200 Lit Nominal capacity MS Barrels fabricated out of 18G (1.25 mm) nominal thickness CRCA sheets.

TiCl<sub>4</sub> will be filled to a maximum of 180 litres(306Kg Net weight)only in a Barrel.

Size of Barrel : Height 883+7 mm , internal dia- 572 ± 2 mm

**PACKAGING**

Carbon Steel or Glass containers. Plastic materials (with the exception of PTFE) are not suitable.

Any trace of rubber, jointing greases, or solvents will cause an immediate darkening in colour (making it yellower or even black)

Contact with water or matter containing water will cause an immediate hydrolysis and formation of either Titanium Oxychloride or titanium dioxide and hydrochloric acid. This occurs also in the presence atmospheric air. To the extent possible, this product should be handled in an atmosphere free of humidity (dried air or Nitrogen).

## **HAZARD INFORMATION**

Reacts violently with water. Forms toxic and corrosive dense white clouds in contact with atmospheric humidity. Harmful by inhalation, in contact with skin and if swallowed. Irritating to eyes, respiratory system and skin.

### **SAFETY INSTRUCTIONS FOR HANDLING**

## **PROPERTIES**

Titanium Tetrachloride is a corrosive liquid. When it is dissolved in water it becomes very strongly acidic due to excess Hydrogen Chloride (hydrochloric acid) formed by hydrolysis. Further when it comes in contact with the moisture in the air, it reacts to give off hydrogen chloride fumes, which is very toxic, and titanium hydrates. A titanium tetrachloride leak, for example, can be identified by the large amount of white smoke or fumes given off around the area of the leak. The hydrogen chloride or hydrochloric acid formed in the reaction is corrosive and strongly irritating to the mucous membranes, eyes and respiratory tract. It cannot catch fire. It reacts with organic chemicals and oils.

## **METHOD OF REMOVAL FROM SKIN**

Because titanium tetrachloride reacts violently with water to produce large amount of heat, use of water to remove it will cause thermal burns to the skins as well as chemical burns. Wiping with dry towels or cotton waste must be done to remove most of the material, Followed by washing with copious amount of water.

If clothing is contaminated with titanium tetra chloride, remove it before washing, since it could get heated up from a possible water titanium tetrachloride reaction causing thermal burns. If titanium tetra chloride is present on the skin after removal of clothing, treat as discussed earlier.

## **PROTECTION OF EYES**

A Splash of liquid titanium tetrachloride in eye can lead to permanent damage. Even the fumes can cause serious injury. After a splash of liquid or contact with

the eyes. The Doctor should remove any particle of titanium dioxide or titanium oxychloride and then treat as per practice.

### **TRANSPORTATION OF TITANIUM TETRACHLORIDE**

- A** Small Samples : This should be contained in thick plastic containers with a minimum thickness of 2 mm. It should have a tight lid which will not fall off even if container is tilted. This should not be opened in a crowded place and not transported in a hot atmosphere. Not advisable for prolonged storage.
- B** Drums containing 180 liters of  $TiCl_4$  : This should be tightly closed. The driver of the vehicle carrying the drum should be told about the hazardous nature of cargo. There should not be any possibility for rain water to get into the drum due to improper sealing.

### **WHAT TO DO IF THERE IS A MAJOR $TiCl_4$ LEAK**

- 1 Evacuate people from nearby area.
- 2 Ask people not to be panicky as it will be only smoke screen unless liquid  $TiCl_4$  falls on body.
- 3 People should be advised not to lock themselves behind closed doors

### **PROTECTIVE APPLIANCES.**

Rubber or PVC hand gloves should be worn by person who handle  $TiCl_4$  these hand gloves should be thoroughly checked for damages before use. A common cause of the burns to the hands are due to wearing of damaged hand gloves while handling  $TiCl_4$  and when washing the - hands without noticing the contact of the chemical. Wear tight chemical goggles to protect the eyes. A face shield also may be worn in addition to the goggle to protect the face. Use approved type breathing apparatus when work is to be done in an atmosphere containing Titanium Tetra Chloride fumes or where a sudden release of fumes are expected.