



Titanium Tetrachloride

General Information

Key Points

- titanium tetrachloride is a colourless liquid with a penetrating acidic odour
- it reacts violently with water, moisture in the air or on the skin to produce hydrochloric acid and heat
- it is used in industry to manufacture titanium metal and titanium compounds
- titanium tetrachloride is highly reactive and as such would not be expected to build up in the environment
- breathing titanium tetrachloride causes irritation of eyes, nose and throat, cough, chest tightness, headache, fever and confusion
- immediate burning of the mouth and throat, breathing difficulty, drooling, difficulty swallowing, stomach pain and vomiting can follow ingestion
- titanium tetrachloride is corrosive and can cause serious burns and ulcers when in contact with the skin
- eye contact causes pain, twitching of the eyelids, watering eyes, inflammation, sensitivity to light and burns
- it is very unlikely that the general population will be exposed to a level of titanium tetrachloride high enough to cause adverse health effects

Public Health Questions

What is titanium tetrachloride?

Titanium tetrachloride is a colourless liquid with a penetrating acidic odour. Titanium tetrachloride does not exist naturally in the environment but is man-made. It reacts violently with water, moisture in the air or on the skin to produce hydrochloric acid and heat.

What is titanium tetrachloride used for?

Titanium tetrachloride is used in industry to manufacture titanium metal and titanium compounds (e.g. titanium dioxide). It is also used to produce artificial pearls and iridescent glass. In the past it has been used by the textile industry to set dyes onto fabric and to produce smoke screens for the military.

How does titanium tetrachloride get into the environment?

Titanium tetrachloride may be released into the environment during its production, use, transport or disposal by industry. Titanium tetrachloride is highly reactive and as such would not be expected to build up in the environment.

How might I be exposed to titanium tetrachloride?

Exposure to titanium tetrachloride is most likely to occur in an occupational setting where it is used or produced, or following an accidental release. Safe levels are enforced to protect employees who may be exposed to titanium tetrachloride at work. Such levels are below those that are thought to cause harmful effects.

If I am exposed to titanium tetrachloride how might it affect my health?

Following exposure to any chemical, the adverse health effects you may encounter depend on several factors, including the amount to which you are exposed (dose), the way you are exposed, the duration of exposure, the form of the chemical and if you were exposed to any other chemicals.

Breathing in titanium tetrachloride causes irritation of eyes, nose and throat, cough, chest tightness, headache, fever and confusion. In serious cases damage to the airways, a fast heart rate and eye damage can occur. An accumulation of fluid in the lungs may occur and may take up to 36 hours to develop.

Ingestion causes immediate burning of the mouth and throat, breathing difficulty, drooling, difficulty swallowing, stomach pain and vomiting (there may be blood in the vomit). If liquid titanium tetrachloride or vomit containing titanium tetrachloride enters the airways it can damage the lungs. In serious cases there may be damage to heart, lungs, kidneys and blood.

Titanium tetrachloride is corrosive and can cause serious burns and ulcers when in contact with the skin. As well as forming hydrochloric acid, the reaction with water can be violent and

generate heat which may contribute to burns. Eye contact causes pain, twitching of the eyelids, watering eyes, inflammation, sensitivity to light and burns.

Can titanium tetrachloride cause cancer?

Titanium tetrachloride is not considered to be a cancer causing chemical.

Does titanium tetrachloride affect pregnancy or the unborn child?

There are limited data available on the direct effects of exposure to titanium tetrachloride during pregnancy. Therefore, it is not possible to draw any definitive conclusions. Effects on the unborn child are more likely to occur if the exposure to titanium tetrachloride causes the mother to become unwell.

How might titanium tetrachloride affect children?

If children breathe, ingest or touch titanium tetrachloride they will have similar effects to those seen in adults.

Are certain groups more vulnerable to the harmful effects of titanium tetrachloride?

People with breathing problems such as asthma may be more susceptible to the effects of inhaling titanium tetrachloride. This is because titanium tetrachloride can irritate the airways causing chest tightness, wheezing and breathlessness.

What should I do if I am exposed to titanium tetrachloride?

It is very unlikely that the general population will be exposed to a level of titanium tetrachloride high enough to cause adverse health effects. However, if you have any health concerns regarding exposure to titanium tetrachloride seek guidance from your GP or contact NHS 111.

Additional sources of information

UKTIS. Best Use of Medicines in Pregnancy <http://www.medicinesinpregnancy.org/>

NHS Choices- Acid and chemical burns <http://www.nhs.uk/conditions/acid-and-chemical-burns/pages/overview.aspx>

This document from the PHE Centre for Radiation, Chemical and Environmental Hazards reflects understanding and evaluation of the current scientific evidence as presented and referenced here.

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