

# MATERIAL SAFETY DATA SHEET

## Osmium Tetroxide

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Date of Issue: December 2002

### STATEMENT OF HAZARDOUS NATURE

Hazardous according to criteria of Worksafe Australia

### COMPANY DETAILS

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### IDENTIFICATION SECTION

<b>Product Name</b>	Osmium Tetroxide
<b>Other Names</b>	Osmium (VIII) Oxide
<b>Product Code</b>	C010, C012
<b>U.N. Number</b>	UN2471
<b>Dangerous Goods Class and Subsidiary Risk</b>	6.1
<b>Hazchem Code</b>	2X
<b>Poison Schedule</b>	R26/27/28 Very toxic by inhalation, in contact with skin and if swallowed. R34 Causes burns S7/9 Keep container tightly closed and in a well ventilated place S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)
<b>Use</b>	Electron microscopy fixative

### Physical Description and Properties

<b>Appearance</b>	Pale yellow crystals, pungent, chlorine-like odour
<b>Boiling Point/Melting Point</b>	B.P. 131°C; M.P. 40°C
<b>Vapour Pressure</b>	11mm at 27°C
<b>Specific Gravity</b>	4.906gm/cc
<b>Flash Point</b>	Not applicable
<b>Flammability Limits</b>	Not determined
<b>Solubility in water</b>	5.7g/100mL in cold water 6.2g.100mL in hot water

### Other Properties

#### Ingredients

Chemical Name	CAS Number	Proportion
Osmium Tetroxide	20816-12-0	100%

## HEALTH HAZARD INFORMATION

### Health Effects:

- Swallowed:** Very toxic. Ingestion will lead to the destruction of the tissues of the mouth and throat, followed by stomach pain and vomiting
- Eye:** Osmium tetroxide has a corrosive action on the eyes and can produce severe conjunctivitis. Industrial cases of permanent blindness have been reported. Low concentrations of vapour are corrosive and affect the eyes, producing the effect of a halo around bright lights, together with blurring of vision. A painful scratchy sensation increasing in intensity for several hours after onset can also occur, but recovery is normally spontaneous and usually complete in 24-48 hours.
- Skin:** Very toxic. Skin contact can lead to dermatitis with painful skin irritation. The tetroxide is easily reduced to the black, hydrated dioxide by biological material and therefore, will leave a black stain in the skin.
- Inhaled:** Very toxic. Respiratory effect following acute or accidental exposure are dependent on the concentration and the exposure. Inhalation will irritate the respiratory tract. Headache, together with necrosis of the tracheal epithelium, bronchitis, pneumonia, emphysema and other lung damage have been reported.

### First Aid:

- Swallowed:** Rinse mouth with water and give water or milk to drink. Seek medical attention urgently.
- Eye:** Wash continuously with water or isotonic saline solution for 15 minutes. Seek medical attention urgently.
- Skin:** Remove contaminated clothing. Wash off with copious amounts of water. If burns occur, cover and seek medical attention.
- Inhaled:** Remove patient from exposure and allow to rest in fresh air. Seek medical attention urgently.

**Advice to Doctor** Contact a Poisons Information Centre.

## PRECAUTIONS FOR USE

- Exposure Standards:** TLV 0.002mg/m<sup>3</sup> (TWA), 0.006mg/ m<sup>3</sup> (STEL) as Osmium.
- Engineering Controls:** Ensure local exhaust extraction is adequate to maintain air concentrations below TLVs. Ideally, Osmium Tetroxide should be handled in an efficient fumehood, taking care to ensure eddies created by the operator do not result in fumes in the breathing zone.
- Personal Protection:** Avoid contact with skin and eyes. Wear gloves and chemical goggles with approved respiratory protection if the TLV is likely to be exceeded. Ampoules should be handled as follows:  
**To obtain solid:** The ampoule should be at room temperature or below. The contents should be shaken to one end of the tube. Score round the opposite end of the ampoules with a glass knife. Touch the ampoule just above the score mark with the fine point of a white-hot glass rod. The ampoule should crack round the score mark. Do not allow the part of the ampoule containing the product to become heated.  
**To produce solution:** Place ampoule below the solvent in a mortar. Crush carefully with a pestle. Dissolve the Osmium Tetroxide and filter through glass wool or a sintered glass funnel. Do not use paper. Store in sealed glass container.
- Flammability:** Although the material is not flammable, it will assist a fire, producing irritant fumes. It also presents an explosion hazard.

## SAFE HANDLING INFORMATION

- Storage and Transport:** UN2471 Class 6.1 Packing Group I. Proper Shipping Name: Osmium Tetroxide  
Store in closed container in a cool, dry, chemical store. Keep separate from incompatible materials, such as easily oxidisable or flammable compounds. Check container regularly for leaks. Any black stains on the outer packaging indicate one or more ampoules within have broken.
- Spills and Disposal:** Wearing gloves and eye protection, sweep up the spillage and store in a sealed container ready for disposal. Avoid mixing with flammable materials. Solutions should be absorbed in sand or other inert absorbent. Wash area thoroughly with water afterwards.  
The reaction with strong caustic potash can be used to deal with waste material. Dissolve any solids in water and add a 25% solution of potassium hydroxide. Add ethanol to precipitate a dark solid, which can be collected and dried on a filter under fume extraction. The filter damp solid can be disposed of in accordance with local and national regulations.
- Fire/Explosion Hazard:** Although the material is not flammable, it will assist a fire, producing irritant fumes. It also presents an explosion hazard. Wear self-contained breathing apparatus and personal protective equipment. Use any extinguisher suitable for the surrounding fire.

## OTHER INFORMATION

- Animal Toxicity Data:** TCLo (ihl-man) 0.133 mg/m<sup>3</sup>  
LCLo (ihl-rat) 40 ppm/4hours  
LD50 (ipr-rat) 14 mg/kg  
LD50 (oral-mouse) 162 mg/kg  
LCLo (ihl-mouse) 40 ppm/4 hours  
LD50 (ipr-mouse) 13.5 mg/kg  
LCLo (ihl-rabbit) 1316 mg/m<sup>3</sup>/30 minutes  
In vitro, osmium tetroxide reacts with the DNA through an irreversible binding to thymide, which apparently does not result in alteration of the DNA structure. The few data available on the long term effects following chronic exposure to osmium tetroxide do not indicate permanent damage

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