

### SECTION 1: Identification

#### 1.1. Identification

Product form	: Substance
Trade name	: Osmium tetroxide
CAS-No.	: 20816-12-0
Product code	: 0223B
Formula	: O4Os
Synonyms	: Osmium oxide (OsO4), (T-4)- / Osmium tetraoxide / Osmium oxide / Osmic acid / Osmium oxide, (T-4)- / Osmium oxide (OsO4) / Osmium(VIII) oxide

#### 1.2. Recommended use and restrictions on use

Recommended use	: Scientific research and development, Use as laboratory reagent, Manufacture of substances
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#### 1.3. Supplier

##### Supplier

Polysciences  
400 Valley Road  
Warrington, PA 18976 - United States  
T +1 215 343 6484 - F +1 215 343 0214  
[info@polysciences.com](mailto:info@polysciences.com) - [www.polysciences.com](http://www.polysciences.com)

#### 1.4. Emergency telephone number

Emergency number	: 24-hour emergency phone number ChemTel 1-800-255-3924
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### SECTION 2: Hazard(s) identification

#### 2.1. Classification of the substance or mixture

##### GHS US classification

Oxidizing solids Category 3	May intensify fire; oxidizer
Acute toxicity (oral) Category 3	Toxic if swallowed
Acute toxicity (dermal) Category 1	Fatal in contact with skin
Acute toxicity (inhalation) Category 2	Fatal if inhaled
Acute toxicity (inhalation:dust,mist) Category 2	Fatal if inhaled
Skin corrosion/irritation Category 1B	Causes severe skin burns and eye damage
Serious eye damage/eye irritation Category 1	Causes serious eye damage

#### 2.2. GHS Label elements, including precautionary statements

##### GHS US labeling

Hazard pictograms (GHS US)



Signal word (GHS US)

: Danger

Hazard statements (GHS US)

: May intensify fire; oxidizer  
Toxic if swallowed  
Fatal in contact with skin or if inhaled  
Causes severe skin burns and eye damage  
Causes serious eye damage

Precautionary statements (GHS US)

: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking  
Keep/Store away from clothing and other combustible materials  
Take any precaution to avoid mixing with combustibles  
Do not breathe dust/fume/gas/mist/vapors/spray.  
Do not get in eyes, on skin, or on clothing.  
Wash hands, forearms and face thoroughly after handling.

#### 2.3. Other hazards which do not result in classification

No additional information available

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### 2.4. Unknown acute toxicity (GHS US)

Not applicable

## SECTION 3: Composition/Information on ingredients

### 3.1. Substances

Substance type : Substance

Name	Product identifier	%	GHS US classification
Osmium tetroxide (Main constituent)	(CAS-No.) 20816-12-0	≤ 100	Ox. Sol. 3, H272 Acute Tox. 3 (Oral), H301 Acute Tox. 1 (Dermal), H310 Acute Tox. 2 (Inhalation), H330 Acute Tox. 2 (Inhalation:dust,mist), H330 Skin Corr. 1B, H314 Eye Dam. 1, H318

Full text of hazard classes and H-statements : see section 16

### 3.2. Mixtures

Not applicable

## SECTION 4: First-aid measures

### 4.1. Description of first aid measures

- First-aid measures general : Call a physician immediately.
- First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing. Call a physician immediately. Call a doctor.
- First-aid measures after skin contact : Remove/Take off immediately all contaminated clothing. Call a physician immediately. Rinse skin with water/shower.
- First-aid measures after eye contact : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician immediately.
- First-aid measures after ingestion : Rinse mouth. Call a physician immediately. Do not induce vomiting.

### 4.2. Most important symptoms and effects (acute and delayed)

- Symptoms/effects after skin contact : Burns.
- Symptoms/effects after eye contact : Serious damage to eyes.
- Symptoms/effects after ingestion : Burns.

### 4.3. Immediate medical attention and special treatment, if necessary

Treat symptomatically.

## SECTION 5: Fire-fighting measures

### 5.1. Suitable (and unsuitable) extinguishing media

- Suitable extinguishing media : Water spray. Dry powder. Foam.

### 5.2. Specific hazards arising from the chemical

- Hazardous decomposition products in case of fire : Toxic fumes may be released.

### 5.3. Special protective equipment and precautions for fire-fighters

- Protection during firefighting : Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.

## SECTION 6: Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

#### 6.1.1. For non-emergency personnel

- Emergency procedures : Only qualified personnel equipped with suitable protective equipment may intervene. Do not breathe dust/fume/gas/mist/vapors/spray.

#### 6.1.2. For emergency responders

- Protective equipment : Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".

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### 6.2. Environmental precautions

Avoid release to the environment.

### 6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Mechanically recover the product.  
Other information : Dispose of materials or solid residues at an authorized site.

### 6.4. Reference to other sections

For further information refer to section 13.

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

Precautions for safe handling : Do not get in eyes, on skin, or on clothing. Wear personal protective equipment. Use only outdoors or in a well-ventilated area. Do not breathe dust/fume/gas/mist/vapors/spray.  
Hygiene measures : Wash contaminated clothing before reuse. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

### 7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store locked up. Store in a well-ventilated place. Keep container tightly closed. Keep cool. Store at room temp.  
Storage temperature : Room temperature

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

Osmium tetroxide (20816-12-0)	
<b>USA - ACGIH - Occupational Exposure Limits</b>	
Local name	Osmium tetroxide, as Os
ACGIH TWA (ppm)	0.0002 ppm
ACGIH STEL (ppm)	0.0006 ppm
Remark (ACGIH)	TLV® Basis: Eye, URT, & skin irr
<b>USA - OSHA - Occupational Exposure Limits</b>	
Local name	Osmium tetroxide (as Os)
OSHA PEL (TWA) (mg/m <sup>3</sup> )	0.002 mg/m <sup>3</sup>
<b>USA - IDLH - Occupational Exposure Limits</b>	
US IDLH (mg/m <sup>3</sup> )	1 mg/m <sup>3</sup>
<b>USA - NIOSH - Occupational Exposure Limits</b>	
NIOSH REL (TWA) (mg/m <sup>3</sup> )	0.002 mg/m <sup>3</sup>
NIOSH REL TWA [ppm]	0.0002 ppm
NIOSH REL (STEL) (mg/m <sup>3</sup> )	0.006 mg/m <sup>3</sup>
NIOSH REL STEL [ppm]	0.0006 ppm

### 8.2. Appropriate engineering controls

Appropriate engineering controls : Ensure good ventilation of the work station.  
Environmental exposure controls : Avoid release to the environment.

### 8.3. Individual protection measures/Personal protective equipment

#### Hand protection:

Protective gloves

#### Eye protection:

Safety glasses

#### Skin and body protection:

Wear suitable protective clothing

#### Respiratory protection:

[In case of inadequate ventilation] wear respiratory protection.

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### Personal protective equipment symbol(s):



## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

Physical state	: Solid
Appearance	: Colorless or yellow crystalline solid.
Color	: No data available
Odor	: No data available
Odor threshold	: No data available
pH	: No data available
Melting point	: No data available
Freezing point	: Not applicable
Boiling point	: No data available
Flash point	: Not applicable
Relative evaporation rate (butyl acetate=1)	: No data available
Flammability (solid, gas)	: Non flammable.
Vapor pressure	: 11 mm Hg (at 27 °C)
Relative vapor density at 20°C	: No data available
Relative density	: No data available
Molecular mass	: 254.2 g/mol
Solubility	: No data available
Partition coefficient n-octanol/water (Log Pow)	: No data available
Auto-ignition temperature	: Not applicable
Decomposition temperature	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosion limits	: Not applicable
Explosive properties	: No data available
Oxidizing properties	: No data available

### 9.2. Other information

No additional information available

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

The product is non-reactive under normal conditions of use, storage and transport.

### 10.2. Chemical stability

Stable under normal conditions.

### 10.3. Possibility of hazardous reactions

No dangerous reactions known under normal conditions of use.

### 10.4. Conditions to avoid

None under recommended storage and handling conditions (see section 7).

### 10.5. Incompatible materials

No additional information available

### 10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

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### SECTION 11: Toxicological information

#### 11.1. Information on toxicological effects

Acute toxicity (oral) : Toxic if swallowed.  
Acute toxicity (dermal) : Fatal in contact with skin.  
Acute toxicity (inhalation) : Fatal if inhaled. Fatal if inhaled.

ATE US (oral)	162 mg/kg body weight
ATE US (dermal)	5 mg/kg body weight
ATE US (gases)	100 ppmV/4h
ATE US (vapors)	0.416 mg/l/4h
ATE US (dust, mist)	0.05 mg/l/4h

Skin corrosion/irritation : Causes severe skin burns.  
Serious eye damage/irritation : Causes serious eye damage.  
Respiratory or skin sensitization : Not classified  
Germ cell mutagenicity : Not classified  
Carcinogenicity : Not classified  
Reproductive toxicity : Not classified  
  
STOT-single exposure : Not classified  
STOT-repeated exposure : Not classified  
Aspiration hazard : Not classified  
Viscosity, kinematic : No data available  
  
Symptoms/effects after skin contact : Burns.  
Symptoms/effects after eye contact : Serious damage to eyes.  
Symptoms/effects after ingestion : Burns.

### SECTION 12: Ecological information

#### 12.1. Toxicity

Ecology - general : Before neutralisation, the product may represent a danger to aquatic organisms.

#### 12.2. Persistence and degradability

No additional information available

#### 12.3. Bioaccumulative potential

No additional information available

#### 12.4. Mobility in soil

No additional information available

#### 12.5. Other adverse effects

No additional information available

### SECTION 13: Disposal considerations

#### 13.1. Disposal methods

Regional legislation (waste) : U.S. - RCRA (Resource Conservation & Recovery Act) - Hazardous Constituents - Appendix VIII to 40 CFR 261. U.S. - RCRA (Resource Conservation & Recovery Act) - P Series Wastes - Acutely Toxic Wastes.  
Waste treatment methods : Dispose of contents/container in accordance with licensed collector's sorting instructions.

### SECTION 14: Transport information

#### Department of Transportation (DOT)

In accordance with DOT

Transport document description : UN2471 Osmium tetroxide, 6.1, I  
UN-No.(DOT) : UN2471

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Proper Shipping Name (DOT) : Osmium tetroxide  
Class (DOT) : 6.1 - Class 6.1 - Poisonous materials 49 CFR 173.132  
Packing group (DOT) : I - Great Danger  
Hazard labels (DOT) : 6.1 - Poison



Marine pollutant : Yes (IMDG only)



DOT Packaging Non Bulk (49 CFR 173.xxx) : 211  
DOT Packaging Bulk (49 CFR 173.xxx) : 242  
DOT Special Provisions (49 CFR 172.102) : A8 - For combination packaging, if glass inner packaging (including ampoules) are used, they must be packed with cushioning material in tightly closed metal receptacles before packing in outer packaging.  
IB7 - Authorized IBCs: Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N); Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2); Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2, 31HZ1 and 31HZ2); Wooden (11C, 11D and 11F). Additional Requirement: Liners of wooden IBCs must be sift- proof.  
IP1 - IBCs must be packed in closed freight containers or a closed transport vehicle.  
N33 - Aluminum drums are not authorized.  
N34 - Aluminum construction materials are not authorized for any part of a packaging which is normally in contact with the hazardous material.  
T6 - 4 178.274(d)(2) Normal..... 178.275(d)(2)  
TP33 - The portable tank instruction assigned for this substance applies for granular and powdered solids and for solids which are filled and discharged at temperatures above their melting point which are cooled and transported as a solid mass. Solid substances transported or offered for transport above their melting point are authorized for transportation in portable tanks conforming to the provisions of portable tank instruction T4 for solid substances of packing group III or T7 for solid substances of packing group II, unless a tank with more stringent requirements for minimum shell thickness, maximum allowable working pressure, pressure-relief devices or bottom outlets are assigned in which case the more stringent tank instruction and special provisions shall apply. Filling limits must be in accordance with portable tank special provision TP3. Solids meeting the definition of an elevated temperature material must be transported in accordance with the applicable requirements of this subchapter.  
DOT Packaging Exceptions (49 CFR 173.xxx) : None  
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : 5 kg  
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 50 kg  
DOT Vessel Stowage Location : B - (i) The material may be stowed "on deck" or "under deck" on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length; and (ii) "On deck only" on passenger vessels in which the number of passengers specified in paragraph (k)(2)(i) of this section is exceeded.  
DOT Vessel Stowage Other : 40 - Stow "clear of living quarters"  
Emergency Response Guide (ERG) Number : 154  
Other information : No supplementary information available.

### Transportation of Dangerous Goods

Not applicable

### Transport by sea

Transport document description (IMDG) : UN 2471 OSMIUM TETROXIDE, 6.1, I, MARINE POLLUTANT  
UN-No. (IMDG) : 2471  
Proper Shipping Name (IMDG) : OSMIUM TETROXIDE

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Class (IMDG) : 6.1 - Toxic substances  
Packing group (IMDG) : I - substances presenting high danger  
Limited quantities (IMDG) : 0  
Marine pollutant : Yes (IMDG only)



### Air transport

Transport document description (IATA) : UN 2471 Osmium tetroxide, 6.1, I  
UN-No. (IATA) : 2471  
Proper Shipping Name (IATA) : Osmium tetroxide  
Class (IATA) : 6.1 - Toxic Substances  
Packing group (IATA) : I - High danger

## SECTION 15: Regulatory information

### 15.1. US Federal regulations

#### Osmium tetroxide (20816-12-0)

Listed on the United States TSCA (Toxic Substances Control Act) inventory  
Subject to reporting requirements of United States SARA Section 313

CERCLA RQ	1000 lb
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### 15.2. International regulations

#### CANADA

#### Osmium tetroxide (20816-12-0)

Listed on the Canadian DSL (Domestic Substances List)

#### EU-Regulations

#### Osmium tetroxide (20816-12-0)

Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

#### National regulations

#### Osmium tetroxide (20816-12-0)

Listed introduction on Australian Industrial Chemicals Introduction Scheme (AICIS Inventory)  
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)  
Listed on KECL/KECI (Korean Existing Chemicals Inventory)  
Listed on NZIoC (New Zealand Inventory of Chemicals)  
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)  
Listed on INSQ (Mexican National Inventory of Chemical Substances)  
Listed on the TCSI (Taiwan Chemical Substance Inventory)

### 15.3. US State regulations

#### Osmium tetroxide (20816-12-0)

State or local regulations	U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List U.S. - Pennsylvania - RTK (Right to Know) List
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## SECTION 16: Other information

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