

Material Safety Data Sheet

Osmium Tetroxide, 2 wt% Solution in Water

Section 1 - Chemical Product and Company Identification

MSDS Name: Osmium Tetroxide, 2 wt% Solution in Water
Catalog Numbers: 19152, 19153, 19172, 19173, 19192, 19193
Synonyms: Osmic acid, Osmium tetroxide, Perosmic oxide.
Company Identification:
 Electron Microscopy Sciences
 321 Morris Road
 Fort Washington, PA 19034
 Tel: 215-646-1566 or 800-523-5874
 Fax: 215-646-8931

For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7732-18-5	Water	Balance	231-791-2
20816-12-0	Osmium tetroxide	2 WT%	244-058-7

Hazard Symbols: T+ C
Risk Phrases: 26/27/28 34

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: pale yellow. **Danger!** Corrosive. Aspiration hazard. Causes eye and skin burns. Causes digestive and respiratory tract burns. Can cause reproductive effects.

Target Organs: Kidneys.

Potential Health Effects

Eye: Causes eye burns. May result in corneal injury. May cause blindness.

Skin: Causes skin burns.

Ingestion: Aspiration hazard. Causes gastrointestinal tract burns. May cause kidney damage. Causes cough, sore throat, chest pain, and lightheadedness.

Inhalation: Causes chemical burns to the respiratory tract. May cause bronchopneumonia and possible death.

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Chronic: Prolonged or repeated skin contact may cause dermatitis. Prolonged or repeated exposure may cause adverse reproductive effects.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

Skin: Get medical aid immediately. Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Destroy contaminated shoes.

Ingestion: Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

Inhalation: Get medical aid immediately. Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. DO NOT use mouth-to-mouth respiration.

Notes to Physician: Treat symptomatically.

Section 5 - Firefighting Measures

General Information: Evacuate area and fight fire from a safe distance. As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Use water spray to keep fire-exposed containers cool. Oxidizer. Greatly increases the burning rate of combustible materials. Containers may explode in the heat of a fire. Contact with metals may evolve flammable hydrogen gas.

Extinguishing Media: Do NOT get water inside containers. For large fires, use dry chemical, carbon dioxide, alcohol-resistant foam, or water spray. For small fires, use dry chemical, carbon dioxide, water spray or regular foam. Cool containers with flooding quantities of water until well after fire is out.

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Reduce airborne dust and prevent scattering by moistening with water. Wear a self contained breathing apparatus and appropriate Personal protection. (See Exposure Controls, Personal Protection section). Sweep up, then place into a suitable container for disposal. Avoid generating dusty conditions. Remove all sources of ignition. Provide ventilation. Do not get water inside containers.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Minimize dust generation and accumulation. Keep container tightly closed. Do not get on skin or in eyes. Do not ingest or inhale.

Storage: Do not store near combustible materials. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Corrosives area. Do not store in metal containers.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Water	none listed	none listed	none listed
Osmium tetroxide	as Os: 0.0002 ppm; as Os: 0.0006 ppm STEL	as Os: 0.002 mg/m3 TWA; 0.0002 ppm TWA as Os: 1 mg/m3 IDLH	as Os: 0.002 mg/m3 TWA

OSHA Vacated PELs: Water: No OSHA Vacated PELs are listed for this chemical. Osmium tetroxide: as Os: 0.0002 ppm TWA; 0.002 mg/m3 TWA

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear a chemical apron. Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

Section 9 - Physical and Chemical Properties

Physical State: Solid

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Appearance: pale yellow
Odor: Chlorine-like odor
pH: Not available.
Vapor Pressure: 7 mm Hg @ 20C
Vapor Density: Not available.
Evaporation Rate: Negligible.
Viscosity: Not available.
Boiling Point: 130 deg C @ 760.00mmHg
Freezing/Melting Point:39.50 - 41.00 deg C
Decomposition Temperature: Not available.
Autoignition Temperature: Not available.
Flash Point: Not available.
NFPA Rating: Not published.
Explosion Limits, Lower: N/A
Upper: N/A
Solubility: 7.24g/100ml (25 c)
Specific Gravity/Density:4.9
Molecular Formula:O4Os
Molecular Weight:254.20

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, acids, metals, excess heat, bases.
Incompatibilities with Other Materials: Combustible materials, Hydrogen chloride, Reducing agents, Strong oxidizing agents.
Hazardous Decomposition Products: Carbon monoxide, irritating and toxic fumes and gases, carbon dioxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS# :

CAS# 7732-18-5: ZC0110000

CAS# 20816-12-0: RN1140000

LD50/LC50:

CAS# 7732-18-5:

Oral, rat: LD50 = >90 ml/kg;<BR.

CAS# 20816-12-0:

Oral, mouse: LD50 = 162 mg/kg;

Oral, rat: LD50 = 7050 mg/kg;<BR.

Carcinogenicity:

CAS# 7732-18-5: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA. **CAS# 20816-**

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12-0: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.

Epidemiology: No information available.

Teratogenicity: No information available.

Reproductive Effects: Paternal Effects: Spermatogenesis and Testes/sperm duct/epididymis, intratesticular-rat TDL₀= 20336ug/kg.

Neurotoxicity: No information available.

Mutagenicity: Unscheduled DNA Synthesis: hamster embryo 200umol/L

Other Studies: Please refer to RTECS# RN1140000 for additional information.

Section 12 - Ecological Information

Ecotoxicity: No information available.

Environmental Fate: No information reported.

Physical/ Chemical: No information available.

Other: None.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: CAS# 20816-12-0: waste number P087.

RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
Shipping Name:	TOXIC LIQUID, ORGANIC, N.O.S. (CONTAINS: OSMIUM TETROXIDE)	TOXIC LIQUID, ORGANIC, N.O.S. (CONTAINS: OSMIUM TETROXIDE)			No information available.
Hazard Class:	6.1	6.1			
UN Number:	UN2810	UN2810			
Packing Group:	III	III			

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 7732-18-5 is listed on the TSCA inventory.

CAS# 20816-12-0 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

SARA

Section 302 (RQ)

CAS# 20816-12-0: final RQ = 1000 pounds (454 kg)

Section 302 (TPQ)

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 20816-12-0: acute, flammable.

Section 313

This material contains Osmium tetroxide (CAS# 20816-12-0, 4%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

This material does not contain any hazardous air pollutants. This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

CAS# 20816-12-0 is considered highly hazardous by OSHA.

STATE

CAS# 7732-18-5 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

CAS# 20816-12-0 can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T+ C

Risk Phrases:

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R 26/27/28 Very toxic by inhalation, in contact with skin and if swallowed. R 34 Causes burns.

Safety Phrases:

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S 7/9 Keep container tightly closed and in a well-ventilated place.

WGK (Water Danger/Protection)

CAS# 7732-18-5: No information available.

CAS# 20816-12-0: 2

Canada

CAS# 7732-18-5 is listed on Canada's DSL/NDSL List.

CAS# 20816-12-0 is listed on Canada's DSL/NDSL List.

WHMIS: Not available.

CAS# 7732-18-5 is not listed on Canada's Ingredient Disclosure List.

CAS# 20816-12-0 is not listed on Canada's Ingredient Disclosure List.

Exposure Limits

CAS# 20816-12-0: OEL-ARAB Republic of Egypt: TWA 0.0002 ppm (0.002 mg/m³) OEL-AUSTRALIA:TWA 0.0002 ppm (0.002 mg/m³);STEL 0.0006 ppm OEL-BELGIUM:TWA 0.0002 ppm (0.0016 mg/m³);STEL 0.0006 ppm OEL-DENMARK:TWA 0.0002 ppm (0.002 mg/m³) OEL-FINLAND:TWA 0.0002 mg/m³;STEL 0.002 mg/m³ OEL-FRANCE:TWA 0.0002 ppm (0.002 mg/m³) OEL-GERMANY:TWA 0.0002 ppm (0.002 mg/m³) OEL-HUNGARY:TWA 0.002 mg/m³;STEL 0.003 mg/m³ JAN9 OEL-THE NETHERLANDS:TWA 0.0002 ppm (0.002 mg/m³) OEL-THE PHILIPPINES:TWA 0.002 mg/m³ OEL-SWITZERLAND:TWA 0.0002 ppm (0.002 mg/m³);STEL 0.0004 ppm OEL-UNITED KINGDOM:TWA 0.0002 ppm (0.002 mg/m³);STEL 0.0006 ppm (0.006 mg/m³) OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGI TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

Section 16 - Additional Information

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall Electron Microscopy Sciences be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Electron Microscopy Sciences has been advised of the possibility of such damages.