TED PELLA, INC.
Microscopy Products for Science and Industry

Material Safety Data Sheet
Product No. 18459, 18463, 18465 Osmium Tetroxide, 4% Aqueous
Issue Date (03-03-09)
Review Date (06-01-12)

Section 1: Product and Company Identification

Product Name: Osmium Tetroxide, 4% Aqueous
Synonym: Osmium Tetroxide, Osmic Acid Solution, Osmium (VIII) Oxide
Chemical Family: Platinum Group Metal Salts
Company Name
Ted Pella, Inc. P.O. Box 492477, Redding, CA 96049-2477
Domestic Phone (800) 237-3526 (Mon-Thu. 6:00AM to 4:30PM PST; Fri 6:00AM to 4:00PM PST)
International Phone (01) (530) 243-2200 (Mon-Thu. 6:00AM to 4:30PM PST; Fri 6:00AM to 4:00PM PST)
Chemtrec Emergency Number 1-800-424-9300 24 hrs a day.

Section 2: Composition / Information on Ingredients

Principle Hazardous Component(s) (chemical and common name(s)) (Cas. No)	**%**	**OSHA PEL mg/m3**	**ACGIH TLV mg/m3**	**ACGIH TLV-STEL ppm**	**NTP**	**IARC**	**OSHA regulated**
Osmium Tetroxide/Osmium Oxide (20816-12-0)	4	0.002	0.002	0.0006	No	No	No
Water (7732-18-5)	96	NE	NE	NE	No	No	No

Section 3: Hazard Identification

Emergency overview
Appearance: Colorless to pale yellow solution.
Immediate effects: This substance can be absorbed into the body by inhalation of its vapors, by inhalation of its aerosol and by ingestion. May cause sensitization by inhalation and skin contact.
Target Organs: Eyes and Central Nervous System.
Potential health effects
Primary Routes of entry: Eyes: Likely; Inhalation: Highly; Skin: Likely; Ingestion: Likely
Signs and Symptoms of Overexposure: ND
Eyes: Irritation, lacrimation, visual disturbance, conjunctivitis, headache, potential damage to cornea. If eyes are exposed to vapor over a short period of time, night vision will be affected for about one evening. One will notice colored halos around lights.

Skin: Dermatitis, possible skin discoloration (green or black). Toxic if absorbed through the skin.
Ingestion: Toxic if swallowed. Irritation, cough, dyspnea, death.
Inhalation: Toxic if inhaled. Coughing, shortness of breath, unconsciousness, could cause tracheitis, bronchitis, bronchial spasm which may lead to inflammatory lesions of the lung.
Chronic Exposure: Potential Kidney damage. Laboratory test have shown mutagenic effects. Reproductive hazard.
Chemical Listed As Carcinogen Or Potential Carcinogen: No
See Toxicological Information (Section11)

Potential environmental effects

See Ecological Information (Section 12)

Section 4: First Aid Measures

If accidental overexposure is suspected

Eye(s) Contact: Flush for 15 minutes with plenty of water. If discomfort occurs or persists, contact a physician.
Skin Contact: Flush area for 15 minutes with water and wash with soap and water. If discomfort occurs or persists, contact a physician. Remove contaminated clothing and shoes and wash before reuse.
Inhalation: If swallowed give large quantities of water and induce vomiting unless person is unconscious. Get medical attention immediately.
Ingestion: Remove to fresh air immediately. If discomfort occurs or persists, contact a physician. If breathing has stopped, perform artificial respiration.

Note to physician

Treatment: ND
Medical Conditions generally Aggravated by Exposure: Any respiratory condition such as asthma will be aggravated. Potential kidney damage.

Section 5: Fire Fighting Measures

Flash Point: NA
Flammable Limits: NA
Auto-ignition point: NA
Fire Extinguishing Media: Water spray, carbon dioxide, and dry chemical.
Special Fire Fighting Procedures: Use NIOSH/MSHA approved self-contained breathing apparatus and full protective clothing.
Unusual Fire and Explosion Hazards: Osmium tetroxide is a strong oxidizer and may react explosively with many organic compounds.
Hazardous combustion products: Emits toxic fumes under fire conditions.
DOT Class: Toxic, 6.1

Section 6: Accidental Release Measures

Steps to be Taken in Case Material is Released or Spilled: Clean up immediately using recommended personal protection. Remove material to a fume hood or other well ventilated area. Person protected with self-contained breathing apparatus with full face piece.

Waste Disposal Methods: Dispose of waste according to Federal, State and Local Regulations.

Section 7: Handling and Storage

Precautions to be Taken in Handling and Storage: Store sealed vials in a dry, cool area (refrigerator) with sufficient packaging to avoid accidental breakage. Use compatible chemical-resistant gloves. Wash hand thoroughly after handling. Avoid breathing dust or solution spray. Avoid contact with eyes. Avoid contact with skin and clothing. Have emergency SCBA or SAR. Use only with adequate ventilation. Wash hands before eating, drinking, or smoking. Do not store directly on ground. Do not store near combustible materials. Keep container upright. Store in a dry place. Other Precautions: 0.1 mg.m3 supplied air respirator with a full face piece, any self-contained breathing apparatus with a full face piece. Any chemical cartridge respirator with a high efficiency particulate filter with a full face piece and cartridges providing protection against osmic acid. Any air-purifying full face piece respirator (gas mask) with a chin style or front or back mounted canister providing protection against osmium tetroxide and having a high efficiency particulate filter. 1 mg/m3 any supplied air respirator with a full face piece and operated in a pressure-demand or other positive pressure mode. Emergency or planned entry in unknown concentration or immediately dangerous to life or heath conditions. Any self-contained breathing apparatus with full face piece and operated in a pressure-demand or other positive pressure mode. Any self-contained breathing apparatus. Escape: Any air-purifying full face piece respirator (gas mask) with a chin-style or front or back mounted canister providing protection against osmium tetroxide and having a high efficiency particulate filter. Any appropriate escape type self-contained breathing apparatus.

Storage temperature: 2-8 degrees C.

Storage Pressure: ND

Section 8: Exposure Controls / Personal Protection

Engineering Controls

Ventilation required: Local Exhaust: Yes; Mechanical: Yes; Other: Fume Hood.

Personal Protection Equipment

Respiratory protection: 0.1 mg/m3 supplied air respirator with a full face piece.

Protective gloves: Rubber/Neoprene (use compatible chemical-resistant gloves).

Skin protection: Lab coat/apron, flame and chemical resistant protective clothing.

Eye protection: ANSI approved safety glasses/goggles or full face piece with respirator.

Additional clothing and/or equipment: eye wash, safety shower, and hygiene facilities for washing.

Exposure Guidelines

See Composition/Information on Ingredients (Section2)

Section 9 Physical and Chemical Properties

Appearance and Physical State: Colorless to pale yellow solution.

Odor (threshold): Sharp chlorine like odor.

Chemical Type: Mixture

Specific Gravity (H_2O=1): 1.04

Vapor Pressure (mm Hg): 63.591
Vapor Density (air=1): NA
Percent Volatile by volume: ND

Evaporation Rate (butyl acetate=1): NE
Boiling Point: 100 °C
Freezing point / melting point: 0 °C
pH: 6 – 7
Solubility in Water: 5g OsO_4/100 ml
Molecular Weight: 254.2
Chemical Formula: OsO_4 in H_2O.

Section 10: Stability and Reactivity
Stability: Stable.
Conditions to Avoid: Elevated temperature. Contact with Hydrochloric acid will cause formation of poisonous chlorine gas.
Materials to Avoid (Incompatibility): Organic materials, hydrochloric acid, bases, and chlorine gas.
Hazardous Decomposition Products: None
Hazardous Polymerization: Will not occur.

Section 11: Toxicological Information
Results of component toxicity test performed: LC50 (Mouse, Rats): 40 ppm (400 mg/m^3). LD50 (Inhalation, Rabbits): 1316 mg/m^3). Exposure Time: 30 minutes. Results: Caused pulmonary edema and death after 4 days. LD50 (Oral, Mouse): 162 mg/kg. LD50 (Intraperitoneal, Mouse): 13.5 mg/kg bw. LD50 (Intraperitoneal, Rat): 1401 mg/kg bw. (ACG98)
Human experience: In low (not specified) levels of Osmium tetroxide (OsO_4) caused irritation in the eyes, skin, nose and respiratory system. In high (not specified) levels, it may be corrosive to the eyes and the skin and also may cause systemic effects, pneumonia and lethality. Tolerated concentration: 0.001 mg/m^3 for 6 hours. Repeated or prolonged contact with skin may cause dermatitis. The substance may cause effect on the kidney.
This product **does** not contain any compounds listed by NTP or IARC or regulated by OSHA as a carcinogen.

Section 12: Ecological Information
Ecological Information: This substance may be hazardous to the environment; special attention should be given to Crustacea.
Chemical Fate Information: NIF

Section 13 Disposal Considerations
RCRA 40 CFR 261 Classification: OsO_4 is a listed EPA Hazardous Waste - P087. Crystals and solutions may be dissolved and/or neutralized in an aqueous solution of sodium or potassium hydroxide (approx. 25%). Consult Federal EPA, State and local regulations for proper disposal/recycle/reclamation material may make the waste

management information presented above incomplete, inaccurate, or otherwise inappropriate.
Federal, State and local laws governing disposal of materials can differ. Ensure proper disposal compliance with proper authorities before disposal.

Section 14: Transportation Information
Note: Osmium Tetroxide is **NOT** classified as a poison inhalation hazard (PIH) by US DOT or IATA.
US DOT Information: Proper shipping name: Toxic liquid, inorganic, n.o.s. (Osmium tetroxide 4% in aqueous solution).
Hazard Class: 6.1
Packaging group: III
UN Number: UN3287
IATA: Proper shipping name: Toxic liquid, inorganic, n.o.s. (Osmium tetroxide 4% in aqueous solution).
Hazard Class: 6.1
Packing group: III
UN Number: UN3287
IMO: Proper shipping name: Toxic liquid, inorganic, n.o.s. (Osmium tetroxide 4% in aqueous solution).
Class: 6.1
UN Number: UN3287
Packing group: III
ERG Code (Emergency Response Guidance for Aircraft Incidents): 6L Explanation of Code: Drill number: 6 Toxic, Drill letter: L Other risk low or none.
Marine Pollutant: Severe marine pollutant. PP
Canadian TDG: Proper shipping name: Toxic liquid, inorganic, n.o.s. (Osmium tetroxide 4% in aqueous solution).

Section 15: Regulatory Information
United States Federal Regulations
MSDS complies with OSHA's Hazard Communication Rule 29, CFR 1910.1200.
SARA: Section 302: No
SARA Title III: Section 313: This product is subject to SARA Section 313 reporting requirements.
RCRA: Osmium Tetroxide/Osmium Oxide: RCRA Hazardous Waste: P-Series
TSCA: This chemical is TSCA listed, and is also classified with FDA as an IVD.
CERCLA: Osmium Tetroxide/Osmium Oxide (20816-12-0): RQ = 1000 lbs (454 kg).
State Regulations
California Proposition 65: No
International Regulations
Canada WHMIS: This product has been classified in accordance with the hazard criteria of CPR, and the MSDS contains all the information required by the CPR. DSL: Yes. NDSL: No.
Europe EINECS Numbers: Osmium Tetroxide/Osmium Oxide (20816-12-0): EINECS#: 244-058-7.

Section 16: Other Information

Label Information: Toxic

European Risk and Safety Phrases: Risk #: 23/24/25. Risk Phrases: Toxic by inhalation, in contact with skin and if swallowed. Safety #: 7/9-23-36/37-45. Safety Phrases: Keep container tightly closed and in well-ventilated place. Do not breathe vapor spray. Wear suitable protective clothing and gloves. In case of accident or if you feel unwell, seek medical advice immediately
(show the label where possible).

European symbols needed: T

Canadian WHMIS Symbols: ND

HMIS Hazard Rating: Health: **4**; Fire: **0**; Reactivity: **1** Personal Protection: **J**

NFPA Hazard Rating: Health: **4**; Fire: **0**; Reactivity: **1** Other: **TOX**
(0=least, 1=Slight, 2=Moderate, 3=High, 4=Extreme)

Abbreviations used in this document

NE= Not established

NA= Not applicable

NIF= No Information Found

ND= No Data

Disclaimer

Ted Pella, Inc. makes no warranty of any kind regarding the information furnished herein. Users should independently determine the suitability and completeness of information from all sources. While this data is presented in good faith and believed to be accurate, it should be considered only as a supplement to other information gathered by the user. It is the User's responsibility to assure the proper use and disposal of these materials as well as the safety and health of all personnel who may work with or otherwise come in contact with these materials.