TED PELLA, INC.
Microscopy Products for Science and Industry

Material Safety Data Sheet
Product No. 18450, 18451, 18456 Osmium Tetroxide Crystals
Issue Date (08-10-06)
Review Date (06-01-12)

Section 1: Product and Company Identification

Product Name: Osmium Tetroxide Crystals
Synonym: Osmium (VIII) Oxide, Osmic Acid, Osmic Anhydrate, Osmium Tetroxide.
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)
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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 (20816-12-0)	99.9	0.002	0.002	0.0006	No	No	No

IDLH: 1 mg/M^3 as Os (1 PPM = 10.40 mg/M^3)

Section 3: Hazard Identification

Emergency overview
Appearance: Colorless yellow solid.
Immediate effects: This substance can be absorbed into the body by inhalation of its vapors, by inhalation of its aerosol and by ingestion. A harmful contamination of air can be reached very quickly on evaporation of this substance at 20 degrees C.
Potential health effects
Primary Routes of entry: Eyes: Likely. Inhalation: Likely. Skin: Likely. Ingestion: Likely.
Signs and Symptoms of Overexposure: ND
Eyes: Redness, pain, blurred vision, loss of vision, severe deep burns. If eyes are exposed to vapor over short period of time, night vision will be affected for about one evening. One will notice colored halos around light.
Skin: Possible skin discoloration (green or black), redness, skin burns, pain, and blisters.
Ingestion: Abdominal cramps, burning sensation, shock or collapse.
Inhalation: Burning sensation, cough, headache, wheezing, shortness of breath, visual disturbances, and symptoms may be delayed.
Chronic Exposure: Potential Kidney damage.
Subchronic (Target organs effects): Eyes, skin, and respiratory system.
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: First rinse with plenty of water for 15 minutes (remove contact lenses if easily possible), then contact physician immediately.
Skin Contact: First rinse with plenty of water for 15 minutes, then remove contaminated clothes and rinse again. Refer for medical attention.
Inhalation: Fresh air, rest. Half-upright position. Artificial respiration if indicated, refer to medical attention immediately.
Ingestion: Rinse mouth, give nothing to drink. Rest. Refer to medical attention immediately.
Note to physician
Treatment: ND
Medical Conditions generally Aggravated by Exposure: Repeated or prolonged contact with skin may cause dermatitis. The substance may cause effect on the
kidney.

Section 5: Fire Fighting Measures
Flash Point: NA
Flammable Limits: NA
Auto-ignition point: NA
Fire Extinguishing Media: In case of a fire in the surrounding area, all extinguishing agents allowed.
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. Risk of fire and explosion when mixed with combustible substances. No contact with flammable substances. Not combustible but enhances combustion of other substances.
Hazardous combustion products: NA
DOT Class: Toxic

Section 6: Accidental Release Measures
Steps to be Taken in Case Material is Released or Spilled: Evacuate area immediately! Consult an expert. Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting then remove to safe place. Do not absorb in saw-dust or other combustible material. Do not let this chemical enter the environment (extra personal protective equipment with full protective equipment and self-contained breathing apparatus is a must).
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: If eyes are exposed to vapor over short period of time, night vision will be affected for about one evening. One will notice colored halos around light. Store with sufficient packaging to avoid accidental breakage.
Handling Precautions: Avoid contact with skin and clothing. Avoid breathing dust or solution spray. Avoid exposure to vapor. Keep container closed when not in used. Use only with adequate personal protection. Use with local exhaust ventilation. Wash thoroughly after handing. Use only in closed systems. Use NIOSH approved respiratory protection.
Storage Precautions: Do not store directly on ground. Do not store near combustible materials. Keep away from heat, flame, and other sources of ignition. Store in a dry place.
Storage temperature: Store sealed vials in a dry, cool area (refrigerator).
Storage Pressure: NA

Section 8: Exposure Controls / Personal Protection
Engineering Controls
Ventilation required: Local exhaust required in handling area to insure concentration of material below

TLV/TWA levels. Other: Use Fume Hood.

Personal Protection Equipment

Respiratory protection: Chemical cartridge respirator for acid gas and dust/mist/fume or self-contained breathing apparatus with full face shield.
Protective gloves: Rubber/Neoprene
Skin protection: Rubber/Neoprene (use compatible chemical resistant gloves)
Eye protection: ANSI approved safety glasses/goggles or full face piece with respirator.
Additional clothing and/or equipment: Lab coat/apron, flame and chemical resistant protective clothing, 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 yellow solid.
Odor (threshold): Sharp chlorine like odor.
Specific Gravity (H_2O=1): 5.10
Vapor Pressure (mm Hg): 1.5 kPa (11.25 mmHg) at 27 °C
Vapor Density (air=1): 8.8
Packing Density: Relative Density – 4.9
Percent Volatile by volume: NIF

Evaporation Rate (butyl acetate=1): NE
Boiling Point: 266 °F (130 °C)
Freezing point / melting point: 107.6 °F (42 °C)
pH: NA
Solubility in Water: 6% @ 77 °F
Molecular Weight: 254.2

Section 10: Stability and Reactivity

Stability: Stable
Conditions to Avoid: Combustible material, HCl and oxidized agents.
Materials to Avoid (Incompatibility): Combustible material, HCl and oxidized agents.
Hazardous Decomposition Products: Begins to sublime below boiling point. Contact with other materials may cause fire.
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 mins. 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 (OsO4) 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 man 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: Chemical additions, processing, or otherwise altering this material may make the waste management information presented above incomplete, inaccurate, or otherwise inappropriate. Osmium tetroxide is a listed EPA Hazardous Waste – P087.
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 vapor inhalation hazard by US DOT or IATA.
US DOT Information: Proper shipping name: Osmium Tetroxide.
Hazard Class: 6.1
Packaging group: I
UN Number: UN2471
IATA: Proper shipping name: Osmium Tetroxide.
Hazard Class: 6.1
Packing group: I
UN Number: UN2471
ERG Code (Emergency Response Guidance for Aircraft Incidents): 6L Explanation of Code: Drill number: 6 Toxic, Drill letter: L Other risk low or none.
IMO: Proper shipping name: Osmium Tetroxide.
Class: 6.1
UN Number: UN2471
Packing group: I
Marine Pollutant: Severe marine pollutant. PP
Canadian TDG: Proper shipping name: Osmium Tetroxide.

Section 15: Regulatory Information
United States Federal Regulations
MSDS complies with OSHA's Hazard Communication Rule 29, CFR 1910.1200.
SARA: Osmium tetroxide. CAS# 20816-12-0. De MINIMIS conc.: 1.0. % Rep. Threshold: not listed.
SARA Title III: Acute: Yes. Chronic: Yes. Flammability: No. Pressure: No Reactivity.
RCRA: Osmium tetroxide is a listed EPA Hazardous Waste – P087.
TSCA: Listed in inventory.
CERCLA: RQ = 1000 lbs (454 kg).
State Regulations
California Proposition 65: NA
International Regulations
Canada WHIMS: This product has been classified in accordance with the hazard criteria of CPR, and the MSDS contains all the information required by the CPR.
Europe EINECS Numbers: Osmium tetroxide (20816-12-0) EC# 244-058-7.
Indication of Danger: T+
Symbol of Danger: Toxic
Risk #: 39/23/24/25. Risk Phrases: Toxic; Danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed. Safety #: 1/2 -7/9-26-45. Safety Phrases: Keep locked up and out of reach of children, keep containers tightly closed and in a well ventilated place. In case of contact with eyes, rinse immediately with plenty of water and seek medical attention. In case of an accident or if you feel unwell, seek medical advice immediately. (Show label when possible).
Canadian WHMIS Symbols: ND

Section 16: Other Information
NFPA Hazard Rating: Health: **4**; Fire: **0**; Reactivity: **1**; Other: **TOX**
HMIS Rating: Health: **4**; Fire: **0**; Reactivity: **1**; Personal Protection**: J**
(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

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