

Safety Data Sheet

Product No. 18459, 18463, 18465 Osmium Tetroxide, 4% Aqueous

Issue Date (06-15-15)

Review Date (09-25-15)

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: Hazard Identification

2.1 Classification of the substance or mixture

GHS Pictograms



GHS06 GHS05 GHS07

GHS Categories

GHS05 – Corrosive

GHS06 – Toxic

Acute tox, oral (5): H303

Acute tox, inhalation (3): H331

Specific target organ tox (2): H370

Reproductive tox (2): H361

GHS07 – Irritant

Serious eye damage/irritation (1): H318

Skin irritation (2): H315

2.2 Label elements

Hazard Pictograms



Signal Word: DANGER

Hazard statements

H303: May be harmful if swallowed

H315: Causes skin irritation

H318: Causes serious eye damage

H331: Toxic if inhaled

H370: Causes damage to organs

H361: Suspected of damaging fertility or the unborn child

Precautionary statements

P202: Do not handle until all safety precautions have been read and understood

P210: Keep away from heat/sparks/open flames/hot surfaces – No smoking

P264: Wash thoroughly after handling

P280: Wear protective gloves/protective clothing/eye protection/face protection

P308+313: IF exposed or concerned: Get medical advice/attention.

P402: Store in a dry place.

P404: Store in a closed container.

P501: Dispose of contents/container in accordance with local/national/international rules.

2.3 Other hazards

Health Effects:

NFPA Hazard Rating: Health: 4; Fire: 0; Reactivity: 1

HMIS® Hazard Rating: Health: 4; Fire: 0; Reactivity: 1

(0=least, 1=Slight, 2=Moderate, 3=High, 4=Extreme)

Results of PBT and vPvB assessment

PBT: NA

vPvB: NA

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 likely

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 (Section 11)

Potential environmental effects

See Ecological Information (Section 12)

Section 3: 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 Carcinogen	IARC Carcinogen	OSHA regulated Carcinogen
Osmium Tetroxide/Osmium Oxide (20816-12-0)	4	0.002	0.002	0.006	No	No	No
Water (7732-18-2)	96	NE	NE	NE	No	No	No

Section 4: First Aid Measures

If accidental overexposure is suspected

Eye(s) Contact: Flush for 15 minutes with plenty of water. Remove contact lenses if present and easy to do so. If discomfort occurs or persists, contact a physician.

Skin Contact: Immediately take off all contaminated clothing. Rinse thoroughly with water. Get medical advice if irritation develops or persists.

Ingestion: Rinse mouth. If swallowed give large quantities of water and induce vomiting unless person is unconscious. Get medical attention immediately.

Inhalation: 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 gear.

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

Personal precautions, protective equipment, and procedures

Keep unnecessary personnel away. Keep people away from and upwind of spill/leak.

Eliminate ignition sources (no smoking, flares, sparks, or flames in immediate area).

Wear appropriate protective equipment (SCBA) and clothing during clean-up. Avoid breathing dust. Ventilate area if easy to do so and wash the spill site after clean-up is complete. Contact local authorities if significant spills cannot be contained. For personal protection, see section 8 of this SDS.

Containment equipment and procedures

Large spills: Contain actively spilling material if safe and easy to do so. Avoid generating dust. Collect material and dispose of.

Small spills: Sweep and collect to waste receptacles.

Clean-up procedures

Collect all contaminated media or other cleanup materials into a waste receptacle. If cleaning surface is necessary, utilize vacuum cleaner, provided adequate ventilation is available.

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

Storage: Store sealed vials in a dry, cool area (refrigerator) with sufficient packaging to avoid accidental breakage. Do not store directly on ground. Do not store near combustible materials. Keep container upright. Store in a dry place.

Handling: Use compatible chemical-resistant gloves. Wash hands 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.

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 health 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 (Section 3)

Section 9 Physical and Chemical Properties

Appearance and Physical State: Colorless to pale yellow liquid.

Odor (threshold): Sharp chlorine like odor.

Chemical Type: Mixture

Specific Gravity (H₂O=1): 1.04

Vapor Pressure (mm Hg): 63.591mmHg

Vapor Density (air=1): NA

Percent Volatile by volume: ND

Evaporation Rate (butyl acetate=1): NE

Boiling Point: 100 °C

Melting point: 0 °C

pH: 6 – 7

Solubility in Water: 5g OsO₄/100 ml

Molecular Weight: 254.2

Chemical Formula: OsO₄ in H₂O.

Section 10: Stability and Reactivity

Stability: Stable.

Conditions to Avoid: Elevated temperature, open flame and ignitions sources. Contact with Hydrochloric acid will cause formation of poisonous chlorine gas.

Materials to Avoid (Incompatibility): Strong reducing materials, organic materials, hydrochloric acid (contact will produce poisonous chlorine gas), bases, finely powdered metals and chlorine gas.

Hazardous Decomposition Products: None

Hazardous Polymerization: Will not occur.

Section 11: Toxicological Information

Results of component toxicity test performed:

Acute studies

Oral-LD50: 162 mg/kg (mouse)

Intraperitoneal-LD50: 13500 UG/KG (mouse)

Intraperitoneal- LD50:14100 UG/KG (Rat)

Subchronic

Kidneys. Male reproductive system. Central nervous system. Eyes.

Reproductive effects

Species: Rat

Dose: 20336 UG/KG

Route of Application: Intratesticular

Exposure Time: (1D MALE)

Result: Paternal Effects: Spermatogenesis (including genetic material, sperm morphology, motility, and count), testes, epididymis, sperm duct.

Species: Mouse

Dose: 20336 UG/KG

Route of Application: Subcutaneous

Exposure Time: (30D MALE)

Result: Paternal Effects: Spermatogenesis (including genetic material, sperm morphology, motility, and count), testes, epididymis, sperm duct.

Mutagenicity (genetic effects)

Species: Hamster

Dose: 200 UMOL/L

Cell Type: Embryo

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/m³ for 6 hours. Repeated or prolonged contact with skin may cause dermatitis. The substance may cause effect on the kidney.

Carcinogenicity

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 Crustaceans. Do not allow large quantities to reach ground water, water courses or sewer systems.

Chemical Fate Information: NIF

Section 13 Disposal Considerations

RCRA 40 CFR 261 Classification: OsO₄ 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.

Chemical additions, processing or otherwise altering this material may make the waste management information presented above incomplete, inaccurate, or otherwise inappropriate.

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

SDS 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.

SDS Form 0013F1V4