TED PELLA, INC.
Microscopy Products for Science and Industry

Safety Data Sheet
Product No. 18466, Osmium Tetroxide, 2% aqueous
Issue Date (01-16-14)
Review Date (04-03-15)

Section 1: Product and Company Identification

Product Name: Osmium Tetroxide, 2% aqueous
Synonym:
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

GHS Pictograms:

GHS Categories:	**Hazard Statements:**
GHS08: Toxic	Acute Tox. 3 H301 Toxic if swallowed.
	Acute Tox. 3 H311 Toxic in contact with skin.
GHS05: Corrosion	Skin Corr. 1C H314 Causes severe skin burns and eye damage.
GHS07: IrritantEye	Irrit. 2A H319 Causes serious eye irritation

Signal Word: DANGER

Eye Hazards: Irritation, lacrimation, visual disturbance, conjuctivitis, headache, potential damage to cornea.
Skin Hazards: Dermatitus, possible skin discoloration (green or black), irritation. Toxic if absorbed through the skin.
Ingestion Hazards: Toxic if swallowed. Irritation, cough, dyspnea, death.
Inhalation Hazards: Toxic if inhaled. Coughing, shortness of breath, unconsciousness, could cause tracheitis, bronchitus, bronchial spasm which may lead to inflammatory lesions of the lung. May be irritating to the upper respiratory tract and mucous membranes.

Precautionary Statements:
Keep away from living quarters.
Wear suitable protective clothing, gloves and eye/face protection.

In case of accident or if you feel unwell, seek medical advice immediately.
This material and its container must be disposed of as hazardous waste.

Health Effects:
NFPA Hazard Rating: Health: 3; Fire: 0; Reactivity: 0
HMIS® Hazard Rating: Health: 3; Fire: 0; Reactivity: 0
(0=least, 1=Slight, 2=Moderate, 3=High, 4=Extreme)

Results of PBT and vPvB assessment: A Chemical Safety Assessment has not been carried out.
PBT: Not applicable
vPvB: Not applicable

Emergency overview:
Appearance: Light yellow liquid
Immediate effects: Toxic by inhalation, in contact with skin and if swallowed
Potential health effects
Primary Routes of entry: Inhalation, Eyes, Skin, Ingestion
Signs and Symptoms of Overexposure:
Eyes: Irritation, lacrimation, visual disturbance, conjunctivitis, headache, potential damage to cornea.
Skin: Dermatitis, possible skin discoloration (green or black), irritation. 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. May be irritating to the upper respiratory tract and mucous membranes.
Chronic Exposure: Laboratory tests have shown mutagenic effects. Reproductive hazard. Potential kidney damage.
Chemical Listed As Carcinogen Or Potential Carcinogen: Yes
See Toxicological Information (Section11)
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**	**NTP** Carcinogen	**IARC** Carcinogen	**OSHA regulated** Carcinogen
Osmium Tetroxide (20816-12-0)	$\leq$ 2.5	Long-term value: 0.002* mg/m³ *as Os	Short-term value: 0.0047 mg/m³, 0.0006 ppm Long-term value: 0.0016 mg/m³, 0.0002 ppm	No	No	No

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Section 4: First Aid Measures

If accidental overexposure is suspected

Immediately remove any clothing soiled by the product. Remove breathing apparatus only after contaminated clothing have been completely removed. In case of irregular breathing or respiratory arrest provide artificial respiration.

Eye(s) Contact: Flush for 15 minutes with plenty of water. If discomfort occurs or persists, contact a physician immediately.

Skin Contact: Flush area for 15 minutes with copious amounts of water. If discomfort occurs or persists, contact a physician immediately. Remove contaminated clothing and shoes and wash before reuse.

Inhalation: Remove to fresh air immediately. If victim is not breathing provide artificial respiration. If breathing is difficult give oxygen. Contact a physician immediately.

Ingestion: If swallowed wash mouth out with water provided the victim is concious. Never give anything by mouth to an unconcious person. Contact a physician immediately.

Note to physician

Treatment: No further relevant information available.

Medical Conditions generally Aggravated by Exposure: Any respiratory condition such as asthma will be aggravated.

Section 5: Fire Fighting Measures

Flash Point: Not applicable

Flammable Limits: Not flammable

Auto-ignition point: Product is not self-igniting.

Fire Extinguishing Media: CO_2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

Special Fire Fighting Procedures: Mouth respiratory protective device.

Unusual Fire and Explosion Hazards: OsO_4 is a strong oxidizer and may react explosively with many organic compounds. Emits toxic fumes under fire conditions .Hazardous combustion products: None

DOT Class: Toxic

Section 6: Accidental Release Measures

Steps to be taken in Case Material is Released or Spilled: Evacuate the area. 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. Ventilate and wash spill site after cleanup is complete.

Environmental precautions: Do not allow to enter sewers/ surface or ground water.

Waste Disposal Methods: Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust). Dispose contaminated material as waste according to item 13.

Section 7: Handling and Storage

Precautions to be taken in Handling and Storage: Avoid breathing dust, vapor or solution spray. Avoid contact with eyes. Avoid contact with skin and clothing. Use only with adequate ventilation.

Storage:
Requirements to be met by storerooms and receptacles: Keep in a tightly sealed container at 2-8 degrees C.
Information about storage in one common storage facility: ND
Further information about storage conditions: Keep receptacle tightly sealed.
Specific end use(s) No further relevant information available.
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
General protective and hygienic measures: 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.
Respiratory protection: 0.1 mg/m3 supplied air respirator with a full face piece.
Protective gloves: Rubber/Neoprene (use compatible chemical-resistant gloves).
Material of gloves: Rubber/Neoprene (use compatible chemical-resistant gloves).
Penetration time of glove material: ND
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 (Section 3)

Section 9 Physical and Chemical Properties
Appearance and Physical State: Light yellow liquid
Odor: Chlorine-like
Odor (threshold): ND
Specific Gravity (H_2O=1): 1.04 g/cm3
Vapor Pressure (mm Hg): 63.591 mmHg
Vapor Density (air=1): NA
Percent Volatile by volume: ND

Evaporation Rate (butyl acetate=1): ND
Melting Point: 0°C
Boiling Point: 100 °C
Melting point: Undetermined
pH: 6-7
Solubility in Water: 5g OsO4/100 ml
Molecular Weight: 254.2

Section 10: Stability and Reactivity
Stability: Stable at normal conditions.
Conditions to Avoid: Elevated temperature. Contact with Hydrochloric Acid will cause formation of poisonous chlorine gas.
Materials to Avoid (Incompatibility): Strong reducing agents, organic materials, hydrochloric acid, bases, chlorine gas, and finely powdered metals. Contact with HCL will form poisonous chlorine gas. Hazardous Decomposition Products: No decomposition if used according to specifications.
Hazardous Polymerization: Will not occur.

Section 11: Toxicological Information
Results of component toxicity test performed:
Acute toxicity:
Acute Studies: Intraperitoneal: Rat: 14100 µg/kg: LD50
Oral: Mouse: 162 mg/kg: LD50
Intraperitoneal: Mouse: 13500 UG/KG: LD50
Subchronic (Target Organ Effects): Kidneys. Male reproductive system. Central nervous system. Eyes.
Reproductive Effects: Species: Rat: Dose: 20336 µg/kg:
Route of Application: intratesticular: Exposure Time: (1D MALE): Result: Paternal Effects: Spermatogenesis (including genetic material, sperm morphology, motility, and count). Effects: Testes, epididymis, sperm duct. Species: Mouse: Dose: 20336 µg/kg:
Route of Application: Subcutaneous: Exposure Time: (30D MALE): Result: Paternal Effects: Spermatogenesis (including genetic material, sperm morphology, motility, and count). Paternal Effects: Testes, epididymis, sperm duct.
Mutagenicity (Genetic Effects): Species: Hamster: Dose: 200 µMOL/L: Cell Type: Embryo: Mutation test: Unscheduled DNA synthesis
Human experience: ND
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:
Additional ecological information: Water hazard class 1 (Self-assessment): slightly hazardous for water. Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
Chemical Fate Information: ND

Section 13 Disposal Considerations
RCRA 40 CFR 261 Classification: Osmium Tetroxide, OsO4 is a listed EPA Hazardous Waste - P087
Must not be disposed of together with household garbage. Do not allow product to reach sewage system. Federal, State and local laws governing disposal of materials can differ. Ensure proper disposal compliance with proper authorities before disposal.

Section 14: Transportation Information
US DOT Information: Proper shipping name: Toxic liquid, inorganic, n.o.s. (Osmium tetroxide 2%, 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 2%, in aqueous solution)
Hazard Class: 6.1
Packing group: III
UN Number: UN3287
Marine Pollutant: Yes
Special precautions for user: Warning: Toxic substances
Canadian TDG: Toxic liquid, inorganic, n.o.s. (Osmium tetroxide 2%, 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 355 (extremely hazardous substances): Substance not listed.
SARA Title III: Section 313 (Specific toxic chemical listings): 20816-12-0 Osmium Tetroxide
RCRA: Must not be disposed of together with household garbage. Do not allow product to reach sewage system. Osmium Tetroxide, OsO4 is a listed EPA Hazardous Waste - P087
TSCA: All ingredients are listed.
CERCLA: ND
State Regulations
California Proposition 65: None of the ingredients is listed.
International Regulations
Canada WHMIS: ND
Europe EINECS Numbers: ND

Section 16: Other Information
Label Information: Toxic
Hazard-determining components of labeling: Osmium Tetroxide

European Risk and Safety Phrases: R: 23/24/25, Risk Statements: Toxic by inhalation, in contact with skin and if swallowed. S: 7/9-23-36/37-45, Safety Statements: 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: Toxic.

Canadian WHMIS Symbols: ND

Abbreviations used in this document

NE= Not established
NA= Not applicable
NIF= No Information Found
ND= No Data

Disclaimer