TED PELLA, INC.
Microscopy Products for Science and Industry

Safety Data Sheet
Product No. 18450, 18451, 18456 Osmium Tetroxide Crystals
Issue Date (06-09-14)
Review Date (02-06-15)

Section 1: Product and Company Identification

Product Name: Osmium Tetroxide Crystals
Synonym: Osmic Acid, Osmium (VIII) Oxide, Osmic acid anhydride
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:
GHS Classification:

Acute toxicity, Inhalation	(Category 1)
Acute toxicity, Dermal	(Category 2)
Acute toxicity, Oral	(Category 2)
Skin corrosion	(Category 1B)
Serious eye damage	(Category 1)
Respiratory sensitization	(Category 1)

Hazard statement(s):

H300 + H310	Fatal if swallowed or in contact with skin
H314	Causes severe skin burns and eye damage.
H330	Fatal if inhaled.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Precautionary statement(s):

P260	Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
P264	Wash hands thoroughly after handling.
P280	Wear protective gloves, protective clothing, eye protection, face protection.

P284	Wear respiratory protection.
P302 + P350	IF ON SKIN: Gently wash with plenty of soap and water.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER or doctor/ physician.

Signal Word: DANGER

Other hazards which do not result in classification: Lachrymator.

OSHA Hazards: Oxidizing, Target Organ Effect, Highly toxic by inhalation, Highly toxic by ingestion, Highly toxic by skin absorption, Respiratory sensitizer, Corrosive

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

European Union (EU) Regulatory Information:
Indication of danger: T +
Symbol of danger: Very Toxic
Risk #: 26/27/28-34
Risk phrase: Very toxic by inhalation, in contact with skin and if swallowed. Causes burns.
Safety #: 7/9-26-45
Safety phrase: Keep container tightly closed and in well-ventilated place. In case of contact with eyes, rinse immediately with water and seek medical advice. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

Results of PBT and vPvB assessment:
PBT: ND
vPvB: ND

Emergency overview
The 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 degree C. contact with combustible material may cause fire.
Appearance: Colorless yellow solid
Immediate effects: ND
Potential health effects
Target Organs: Eyes, Central nervous system, Male reproductive system, Kidney
Primary Routes of entry: Eyes, skin, ingestion, and inhalation
Signs and Symptoms of Overexposure:

Eye Hazards: Redness, pain, blurred vision, loss of vision, severe deep burns.
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 hazards: Possible skin discoloration (green or black), redness, skin burns, pain, blisters.
Ingestion Hazards: Abdominal cramps, burning sensation, shock or collapse.
Inhalation Hazards: burning sensation, cough, headache, wheezing, shortness of breath, visual disturbances, symptoms may be delayed.

Eyes: Causes serious eye damage.
Skin: Causes serious skin damage. Very Toxic in contact with the skin.
Ingestion: Very toxic if swallowed.
Inhalation: Very toxic if inhaled.
Chronic Exposure: ND
Chemical Listed As Carcinogen Or Potential Carcinogen: No
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/Osmium Oxide (20816-12-0) EC number: 244-058-7 Index number: 076-001-00-5	99.9	0.002	0.0002 ppm, 0.0016 mg/m3 TWA; 0.0006 ppm, 0.0047 mg/m3 STEL	No	No	No

IDLH: 1 mg/m3 as (Os)
Conversion: 1 ppm = 10.40 mg/m3
NIOSH: RTECS RN1140000

Section 4: First Aid Measures
If accidental overexposure is suspected
Eye(s) Contact: First rinse with plenty of water for 15 minutes. Contact a Physician immediately.
Skin Contact: Rinse with plenty of water for 15 minutes. Remove contaminated clothing and shoes and wash before reuse. Contact a Physician immediately.
Inhalation: Remove to fresh hair immediately. Rest, half-upright position. Artificial respiration if indicated. Contact a Physician immediately.
Ingestion: Rinse mouth provided victim is conscious. Never give anything by mouth to an unconscious person. Give nothing to drink. Rest. Contact a Physician immediately.
Note to physician
Treatment: ND

Medical Conditions generally Aggravated by Exposure: Avoid all contact with this chemical.
Potential kidney damage.

Section 5: Fire Fighting Measures
Flash Point: NA
Flammable Limits: NA
Auto-ignition point: NA
Fire Extinguishing Media: Suitable: Carbon dioxide, dry chemical powder, appropriate foam
Special Fire Fighting Procedures: Use NIOSH/MSHA approved self-contained breathing apparatus and full protective clothing.
Unusual Fire and Explosion Hazards: O4Os 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. Emits toxic fumes under fire conditions.
Hazardous combustion products: ND
DOT Class: Toxic, Corrosive.

Section 6: Accidental Release Measures
Steps to be Taken in Case Material is Released or Spilled: Evacuate area immediately! Consult an expert. Use a NIOSH approved chemical cartridge respirator for acid gas and dust/mist/fume or self-contained breathing apparatus with full face shield for clean-up. Sweep spilled substance into containers and cap and move to fume hood. 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: Keep containers tightly closed. Wash thoroughly after handling. Avoid contact with eyes, skin and clothing. Avoid breathing dust or solution spray. Avoid exposure to vapor. Avoid prolonged or repeated exposure. Keep container closed when not in use. Use only with adequate personal protection. Use with local exhaust ventilation. Use only in closed systems. Use NIOSH approved respiratory protection.
Storage Precautions: Keep tightly closed. Do not store directly on ground. Do not store near combustible materials. Keep away from heat, sparks, flame, and other sources of Ignition. Store in a cool, dry place.
Work/Hygienic Practices: Wash thoroughly with soap and water after handling. Use good personal hygiene.
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: Store cool dry place.
Storage Pressure: NA

Section 8: Exposure Controls / Personal Protection
Engineering Controls
Ventilation required: Use a chemical fume hood. Local Exhaust: Required in handling area.
Mechanical: Desirable to insure concentration of material below TLV/TWA levels.
Personal Protection Equipment
Respiratory protection: NIOSH approved chemical cartridge respirator for acid gas and dust/mist/fume or self-contained breathing apparatus with full face shield.
Protective gloves: Rubber/Neoprene (use compatible chemical-resistant gloves).
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: Colorless yellow solid.
Odor (threshold): sharp chlorine like odor (ND)
Specific Gravity (H_2O=1): 4.9 g/cm3
Vapor Pressure (mm Hg): 7
Vapor Density (air=1): 8.8
Percent Volatile by volume: NL

Evaporation Rate (butyl acetate=1): NE
Boiling Point: 266.0 °F 130 °C
Freezing point / melting point: 107.6 °F 39.5-41.0 °C
pH: NA as solid.

Solubility in Water: 6% @ 77 °F
Molecular Weight: 254.2

Section 10: Stability and Reactivity
Stability: Stable under proper storage condition.
Conditions to Avoid: Combustible Material, HCI and Oxidized Agents.
Materials to Avoid (Incompatibility): Strong reducing agents, organic materials, finely powdered metals, combustible material, and oxidized agents. Contact with hydrochloric acid will cause a formation of poisonous chlorine gas.
Hazardous Decomposition Products: Begins to sublime below boiling point and releases a poisonous and irritating vapor. Contact with other materials may cause fire.
Hazardous Polymerization: Will not occur.

Section 11: Toxicological Information
Results of component toxicity test performed:
Chronic: Species: Rat Dose: 20336 UMOL/L, Route of Application: Intratesticular Exposure Time: (1D MALE), Result paternal effects: Spermatogenesis (including genetic material, sperm morphology, motility, and count). Paternal effects: Testes, epididymis, sperm duct
Species: Mouse Dose: 20336 UMOL/L, 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)
Chronic: Species: Hamster, Dose: 200 UMOL/L, Cell type: Embryo, Mutation test: Unscheduled DNA synthesis.
Conditions Aggravated By Exposure
Repeated or prolonged contact with skin may cause dermatitis. The substance may cause effect on the kidney.
Conditions Aggravated By Overexposure
Repeated or prolonged contact with skin may cause dermatitis. The substance may cause effect on the kidney.
Intraparitoneal, Rat: 14100 UG/KG, LD50
Oral, Mouse: 162 mg/kg, LD50
Intraparitoneal, Mouse: 13500 UG/KG, LD 50
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: Toxicity - Aquatic and Terrestrial plants: This substance may be hazardous to the environment; special attention should be given to crustacea.
Chemical Fate Information: ND

Section 13 Disposal Considerations

RCRA 40 CFR 261 Classification: OsO_4 is a listed EPA Hazardous Waste - P087
Consult Federal EPA, State and local regulations for proper disposal/recycle/reclamation.
NOTE: Chemical additions, processing, or otherwise altering this 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
US DOT Information: Proper shipping name: Osmium Tetroxide
Hazard Class: 6.1
Packing group: I
UN Number: UN2471
IATA: Proper shipping name: Osmium Tetroxide
Hazard Class: 6.1
Packing group: I
UN Number: un2741
IMO: Proper shipping name: Osmium Tetroxide
Hazard Class: 6.1
Packing group: I
UN Number: UN2471
Marine Pollutant: Yes, 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: Acute Health Hazard, Chronic Health Hazard
SARA Title III: Section 313 Form "R"/TRI Reportable Chemical. This compound is subject to the reporting requirements of SARA Section 313.
RCRA Number: P087
TSCA: This Chemical is TSCA listed and is also cGMP under FDA for IVD testing.
CERCLA: Osmium Tetroxide/Osmium Oxide (20816-12-0): RQ = 1000 lbs (454 Kg)
State Regulations
California Proposition 65: This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.
Massachusetts Right To Know Components: Osmic Acid CAS-No. 20816-12-0
Pennsylvania Right To Know Components: Osmic Acid CAS-No. 20816-12-0
New Jersey Right To Know Components: Osmic Acid CAS-No. 20816-12-0
International Regulations
A Chemical Safety Assessment has not been carried out.
Canada WHMIS: This product has been classified in accordance with the hazard criteria of CPR, and the SDS contains all the information required by the CPR.
DSL: Yes
NDSL: No

Europe EINECS Numbers: 244-058-7

Section 16: Other Information

Label Information: Oxidizer, Target Organ Effect, Highly toxic by inhalation, Highly toxic by ingestion, Highly toxic by skin absorption, Respiratory sensitizer, Corrosive.
European Risk and Safety Phrases: See Section 2
European symbols needed: Very Toxic, Oxidizing
Canadian WHMIS Symbols:

Abbreviations used in this document

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

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