

Material Safety Data Sheet

HAZARD WARNINGS	RISK PHRASES	PROTECTIVE CLOTHING
 	Corrosive to eyes and skin on contact. Toxic compound, do not ingest or inhale. Avoid all contact with this material. Refrigerate.	

Section I. Chemical Product and Company Identification

Chemical Name	Osmium Tetroxide (4% in Water)		
Catalog Number	O0308	Supplier	TCI America 9211 N. Harbortgate St. Portland OR 1-800-423-8616
Synonym	Not available.		
Chemical Formula	O ₄ Os (Osmium Tetroxide) H ₂ O (Water)	<div style="border: 2px dashed black; padding: 5px;"> In case of Emergency Call </div>	Chemtrec® (800) 424-9300 (U.S.) (703) 527-3887 (International)
CAS Number	20816-12-0 (Osmium Tetroxide) 7732-18-5 (Water)		

Section II. Composition and Information on Ingredients

Chemical Name	CAS Number	Percent (%)	TLV/PEL	Toxicology Data
Osmium Tetroxide (4% in Water)	20816-12-0 (Osmium Tetroxide) 7732-18-5 (Water)	4.0 % 96.0 %	Not available.	(Osmium Tetroxide) Rat LD ₅₀ (oral) 162 mg/kg Rat LD ₅₀ (intraperitoneal) 14100 ug/kg Mouse LD ₅₀ (intraperitoneal) 13500 ug/kg (Water) Rat LD ₅₀ (oral) >90 mL/kg Mouse LD ₅₀ (intraperitoneal) 190 gm/kg Mouse LD ₅₀ (intravenous) 25 gm/kg

Section III. Hazards Identification

Acute Health Effects	Corrosive to skin, eyes, and respiratory system. Liquid or spray mist may produce tissue damage, particularly in mucous membranes of the eyes, mouth and respiratory tract. Skin contact may produce burns. Eye contact can result in corneal damage or blindness. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Corrosive materials may cause serious injury if ingested. Toxic if ingested or inhaled. Avoid prolonged contact with this material. Overexposure may result in serious illness or death. Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.
Chronic Health Effects	CARCINOGENIC EFFECTS : Not available. MUTAGENIC EFFECTS : Not available. TERATOGENIC EFFECTS : Not available. DEVELOPMENTAL TOXICITY: REPRODUCTIVE EFFECTS (Osmium Tetroxide) Rat TDLo Intratesticular; 20336 ug/kg; male 1 day prior to mating TOXIC EFFECTS Paternal Effects - Spermatogenesis (including genetic material, sperm morphology, motility, and count) Paternal Effects - Testes, epididymis, sperm duct Mouse TDLo Subcutaneous; 20336 ug/kg; male 30 days prior to mating TOXIC EFFECTS Paternal Effects - Spermatogenesis (including genetic material, sperm morphology, motility, and count) Paternal Effects - Testes, epididymis, sperm duct Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section IV. First Aid Measures

Eye Contact	Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.
Skin Contact	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.
Inhalation	If the victim is not breathing, perform mouth-to-mouth resuscitation. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, oxygen can be administered. Seek medical attention if respiration problems do not improve.

Continued on Next Page

Emergency phone number (800) 424-9300

Ingestion

DO NOT INDUCE VOMITING. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive.

Section V. Fire and Explosion Data

Flammability	Not available.	Auto-Ignition	Not available.
Flash Points	Not available.	Flammable Limits	Not available.
Combustion Products	Not available.		
Fire Hazards	Not available.		
Explosion Hazards	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.		
Fire Fighting Media and Instructions	SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. DO NOT use water jet. Consult with local fire authorities before attempting large scale fire-fighting operations.		

Section VI. Accidental Release Measures

Spill Cleanup Instructions	Corrosive Material. Toxic Material. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. DO NOT get water inside container. DO NOT touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all sources of ignition. Consult federal, state, and/or local authorities for assistance on disposal.
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Section VII. Handling and Storage

Handling and Storage Information	CORROSIVE. TOXIC. REFRIGERATE. Keep locked up.. Keep container dry. Keep away from heat. Mechanical exhaust required. When not in use, tightly seal the container and store in a dry, cool place. Avoid excessive heat and light. DO NOT ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. Wear suitable protective clothing. If ingested, seek medical advice immediately and show the container or the label. Treat symptomatically and supportively. Always store away from incompatible compounds such as oxidizing agents, reducing agents, combustible materials, organic materials, metals, acids, alkalis (bases).
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Section VIII. Exposure Controls/Personal Protection

Engineering Controls	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash station and safety shower is proximal to the work-station location.
Personal Protection	Face shield. Lab coat. Vapor respirator. Boots. Gloves. A MSHA/NIOSH approved respirator must be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product. 
Exposure Limits	Not available.

Section IX. Physical and Chemical Properties

Physical state @ 20°C	Liquid. (Light Yellow to Yellow Clear.)	Solubility	(Osmium Tetroxide) Soluble in benzene, alcohol, ether, ammonium hydroxide, phosphorus oxychloride, carbon tetrachloride.
Specific Gravity	1.04 (water=1)	Partition Coefficient	Not available.
Molecular Weight	254.23	Vapor Pressure	1.5 kPa (@ 27°C) (Osmium Tetroxide)
Boiling Point	130 (266°F) (Osmium Tetroxide) 100°C (212°F) (Water)	Vapor Density	8.8(Air = 1) (Osmium Tetroxide)
Melting Point	39.5°C (103.1°F)	Volatility	Not available.
Refractive Index	1.333 (Water)	Odor	Acrid, Chlorine Like.
Critical Temperature	Not available.	Taste	Not available.
Viscosity	Not available.		

Section X. Stability and Reactivity Data

Stability	This material is stable if stored under proper conditions. (See Section VII for instructions)
Conditions of Instability	Avoid excessive heat and light.
Incompatibilities	Reactive with oxidizing agents, strong reducing agents, combustible materials, organic materials, metals, acids, alkalis (bases), hydrochloric acid, cyanides, sulfides, amines, alcohols. Contact with hydrochloric acid will cause formation of poisonous chlorine gas.

Section XI. Toxicological Information

RTECS Number	RN1140000 (Osmium Tetroxide) ZC0110000 (Water)
Routes of Exposure	Eye Contact. Ingestion. Inhalation. Skin contact.
Toxicity Data	(Osmium Tetroxide) Rat LD ₅₀ (oral) 162 mg/kg Rat LD ₅₀ (intraperitoneal) 14100 ug/kg Mouse LD ₅₀ (intraperitoneal) 13500 ug/kg (Water) Rat LD ₅₀ (oral) >90 mL/kg Mouse LD ₅₀ (intraperitoneal) 190 gm/kg Mouse LD ₅₀ (intravenous) 25 gm/kg
Chronic Toxic Effects	CARCINOGENIC EFFECTS : Not available. MUTAGENIC EFFECTS : Not available. TERATOGENIC EFFECTS : Not available. DEVELOPMENTAL TOXICITY: REPRODUCTIVE EFFECTS (Osmium Tetroxide) Rat TDLo Intratesticular; 20336 ug/kg; male 1 day prior to mating TOXIC EFFECTS Paternal Effects - Spermatogenesis (including genetic material, sperm morphology, motility, and count) Paternal Effects - Testes, epididymis, sperm duct Mouse TDLo Subcutaneous; 20336 ug/kg; male 30 days prior to mating TOXIC EFFECTS Paternal Effects - Spermatogenesis (including genetic material, sperm morphology, motility, and count) Paternal Effects - Testes, epididymis, sperm duct Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.
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Section XII. Ecological Information

Ecotoxicity	Not available.
Environmental Fate	Not available.

Section XIII. Disposal Considerations

Waste Disposal	Recycle to process, if possible. Consult your local regional authorities. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. Observe all federal, state and local regulations when disposing of the substance.
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Section XIV. Transport Information

DOT Classification	DOT Class 6.1: Toxic material.		
PIN Number	UN2471		
Proper Shipping Name	Osmium tetroxide	MARINE POLLUTANT	RQ (R4) 1000 (454)
Packing Group (PG)	I		
DOT Pictograms			

Section XV. Other Regulatory Information and Pictograms

TSCA Chemical Inventory (EPA)	This compound is ON the EPA Toxic Substances Control Act (TSCA) inventory list.
WHMIS Classification (Canada)	CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS E: Corrosive liquid. On DSL.
EINECS Number (EEC)	244-058-7 (Osmium Tetroxide) 231-791-2 (Water)
EEC Risk Statements	R23/24/25- Toxic by inhalation, in contact with skin and if swallowed. R34- Causes burns.
Japanese Regulatory Data	Not available.

Section XVI. Other Information

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Notice to Reader

TCI laboratory chemicals are for research purposes only and are NOT intended for use as drugs, food additives, households, or pesticides. The information herein is believed to be correct, but does not claim to be all inclusive and should be used only as a guide. Neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All chemical reagents must be handled with the recognition that their chemical, physiological, toxicological, and hazardous properties have not been fully investigated or determined. All chemical reagents should be handled only by individuals who are familiar with their potential hazards and who have been fully trained in proper safety, laboratory, and chemical handling procedures. Although certain hazards are described herein, we can not guarantee that these are the only hazards which exist. Our MSDS sheets are based only on data available at the time of shipping and are subject to change without notice as new information is obtained. Avoid long storage periods since the product is subject to degradation with age and may become more dangerous or hazardous. It is the responsibility of the user to request updated MSDS sheets for products that are stored for extended periods. Disposal of unused product must be undertaken by qualified personnel who are knowledgeable in all applicable regulations and follow all pertinent safety precautions including the use of appropriate protective equipment (e.g. protective goggles, protective clothing, breathing equipment, facial mask, fume hood). For proper handling and disposal, always comply with federal, state, and local regulations.

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