SAFETY DATA SHEET

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SECTION 1. IDENTIFICATION

Product Identifier: (3N) 99.9% Osmium Tetroxide Solution

Product Code: OS-OX4-03-SOL

CAS Number: 20816-12-0

Relevant identified uses of the substance: Scientific research and development

Supplier details:

American Elements
10884 Weyburn Ave.
Los Angeles, CA 90024
Tel: +1 310-208-0551
Fax: +1 310-208-0351
Emergency telephone number:
+1 800-424-9300

SECTION 2. HAZARDS IDENTIFICATION

OSHA Haz Com: CFR 1910.1200: Acute Toxicity - Inhalation [Category 4]
Eye Damage/Irritation [Category 1]
Specific Target Organ Toxicity (Single Exposure) [Category 1]
Specific Target Organ Toxicity (Repeated Exposure) [Category 1]
Specific Target Organ Toxicity (Repeated Exposure) [Category 2]
Skin Corrosion/Irritation [Category 1B]
Signal word: Danger!
Hazard Statement(s): Causes serious eye damage
Causes skin irritation
Fatal if inhaled
Harmful in contact with skin
Toxic if swallowed
Causes damage to: Liver Respiratory System Kidney Spleen Adrenal Gland
Causes damage to organs: Respiratory System through prolonged or repeated exposure.
May cause damage to organs: Liver Kidney Hematopoietic System Spleen Adrenal Gland through prolonged or repeated exposure.



Pictogram(s) or Symbol(s):

Precautionary Statement(s):
[Prevention] Do not eat, drink or smoke when using this product. Wash hands and face thoroughly after handling. Do
not breathe fume, mist, vapors or spray. Use only outdoors or in a well-ventilated area. In case of inadequate ventilation wear respiratory protection. Wear face protection (full length face shield). Wear protective gloves, protective clothing, eye protection and face protection.
[Response] If swallowed: Immediately call a poison center or doctor. Rinse mouth. If on skin: Wash with plenty of
water. Call a poison center or doctor if you feel unwell. Take off contaminated clothing and wash it before
reuse. If inhaled: Remove person to fresh air and keep comfortable for breathing. Immediately call a poison center or doctor. If skin irritation or rash occurs: Get medical advice/attention. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If exposed: Call a poison center or doctor. Get medical advice or attention if you feel unwell.
[Storage] Store locked up. Store in a well-ventilated place. Keep container tightly closed.
[Disposal] Dispose of contents and container in accordance with US EPA guidelines for the classification and
determination of hazardous waste listed in 40 CFR 261.3. (See Section 13)

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/Mixture: Mixture
Components: Osmium Tetroxide (4% in Water)
Percent: ....
Hazardous ingredient(s): Osmium Tetroxide (4%) CAS# 20816-12-0
Water (96%) CAS# 7732-18-5
CAS Number: 20816-12-0
Molecular Weight: 254.23
Chemical Formula: OsO4
Synonyms: Osmium(VIII) Oxide (4% in Water)

SECTION 4. FIRST AID MEASURES

Inhalation: Immediately call a poison center or doctor. Effects of exposure (inhalation) to substance may be delayed.
Inhalation of vapors or contact with substance will result in contamination and potential harmful effects. Move victim to fresh air. Give artificial respiration if victim is not breathing. Administer oxygen if breathing is
difficult. Keep victim warm and quiet. Treat symptomatically and supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
Skin contact: Immediately call a poison center or doctor. Effects of exposure (skin contact) to substance may be
delayed. Remove and wash contaminated clothing before re-use. Remove and isolate contaminated clothing and shoes. In case of contact with substance, immediately flush skin with running water for at least 20 minutes. Treat symptomatically and supportively. Ensure that medical personnel are aware of the
material(s) involved and take precautions to protect themselves.
Eye contact: IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. Eye contact
with vapors or substance may cause severe injury, burns, or death. Call emergency medical service. Move

victim to fresh air. Check for and remove any contact lenses. Keep victim warm and quiet. Treat symptomatically and supportively. Effects of exposure to substance may be delayed. Ensure that medical
personnel are aware of the material(s) involved and take precautions to protect themselves.
Ingestion: Toxic if swallowed. Do not induce vomiting with out medical advice. Effects of exposure (ingestion) to
substance may be delayed. Call a physician or Poison Control Center immediately. Do not use mouth-to-mouth method if victim ingested the substance; give artificial respiration with the aid of a pocket
mask equipped with a one-way valve or other proper respiratory medical device. Loosen tight clothing such
as a collar, tie, belt or waistband. If a person vomits place them in the recovery position so that vomit will
not reenter the mouth and throat. Rinse mouth. Keep victim warm and quiet. Treat symptomatically and
supportively. Ensure that medical personnel are aware of the material(s) involved and take precautions to
protect themselves.
Symptoms/effects:
Acute: Pain. Redness. Skin burns. Blisters. Blurred vision. Abdominal cramps. Shock. Collapse. Muscular
spasms. Cough. Shortness of breath. Headache.
Delayed: No data available
Immediate medical attention: WARNING: It might be dangerous to the person providing aid to give mouth-to-mouth respiration, because
the inhaled material is toxic. WARNING: It might be hazardous to the person providing aid to give mouth-to-mouth respiration, because the inhaled material is corrosive. For severe burns, immediate medical attention is required. If breathing has stopped, perform artificial respiration. Use first aid treatment
according to the nature of the injury. Ensure that medical personnel are aware of the material(s) involved
and take precautions to protect themselves.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media: Dry chemical, CO2 or water spray. Consult with local fire authorities before attempting large scale fire
fighting operations.
Specific hazards arising from the chemical
Hazardous combustion products: These products include: Metallic oxides
Other specific hazards: Closed containers may explode from heat of a fire.
Special precautions for fire-fighters:
Use water spray or fog; do not use straight streams. Dike fire-control water for later disposal; do not scatter the material. Containers may explode when
heated. Move containers from fire area if you can do it without risk.
Special protective equipment for fire-fighters:
Wear positive pressure self-contained breathing apparatus (SCBA). Structural fire fighters' protective clothing provides limited protection in fire situations
ONLY; it may not be effective in spill situations. Wear chemical protective clothing which is specifically recommended by the manufacturer. It may
provide little or no thermal protection.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Avoid contact with skin, eyes, and clothing. Keep people away from and upwind of spill/leak. Do not touch
damaged containers or spilled material unless wearing appropriate protective clothing (Section 8). Warn
unnecessary personnel to move away. Stop leak if you can do it without risk. Ensure adequate ventilation.
Isolate the hazard area and deny entry to unnecessary and unprotected personnel.
Personal protective equipment: Wear eye protection (splash goggles) and face protection (full length face shield). Lab coat. Vapor
respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent. Wear protective gloves (nitrile).
Emergency procedures: Do not clean-up or dispose except under supervision of a specialist. In case of a spill and/or a leak, always
shut off any sources of ignition, ventilate the area, and excercise caution. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Warn personnel to move away. Prevent entry into sewers, basements or confined areas; dike if needed.
Methods and materials for containment and cleaning up:
ELIMINATE all ignition sources (no smoking, flares, sparks, or flames in immediate area). Stop leak if without risk. Ventilate the area. Absorb with an
inert material and put the spilled material in an appropriate waste disposal container. Use clean non-sparking tools to collect absorbed material.
Environmental precautions:
Keep away from living quarters. Prevent further leakage or spillage if safe to do so. Water runoff can cause environmental damage. Prevent entry into
sewers, basements or confined areas; dike if needed.

SECTION 7. HANDLING AND STORAGE

Precautions for safe handling: Do NOT breath gas, fumes, vapor, or spray. Manipulate under an adequate fume hood. Do not ingest.
Avoid contact with skin and eyes. Avoid contact with skin. Good general ventilation should be sufficient to
control airborne levels. Keep container dry. Handle and open container with care. Wear suitable protective
clothing, gloves and eye/face protection. When using do not eat, drink, or smoke. Keep away from sources
of ignition.
Conditions for safe storage: Store locked up. Keep containers tightly closed in a cool, well-ventilated place. Keep away from
incompatibles. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Avoid prolonged storage periods. Store in refrigerator.
Storage incompatibilities: Store away from oxidizing agents

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limits:
ACGIH TLV (TWA): 0.0002 ppm (Os)
ACGIH TLV (STEL): 0.0006 ppm (Os)

OSHA PEL (TWA): 0.002 mg (Os)/m3
ACGIH TLV (TWA): 0.0016 mg/m3 (Osmium Tetroxide)
Appropriate engineering controls:
Good general ventilation should be sufficient to control airborne levels. Ventilation is normally required when handling or using this product. Eyewash
fountains should be provided in areas where there is any possibility that workers could be exposed to the substance. Follow safe industrial
engineering/laboratory practices when handling any chemical.
Personal protective equipment
Respiratory protection: Vapor respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent.
Hand protection: Wear protective gloves.
Eye protection: Wear eye protection (splash goggles) and face protection (full length face shield).
Skin and body protection: Lab coat.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state (20°C): Liquid
Form: Clear
Color: Slightly pale yellow - Yellow
Odor: No data available
Odor threshold: No data available
Melting point/freezing point: No data available pH: No data available
Boiling point/range: No data available Vapor pressure: 8.5kPa/20°C
Decomposition temperature: No data available Vapor density: No data available
Relative density: 1.04 Dynamic Viscosity: No data available
Kinematic Viscosity: No data available
Partition coefficient:
n-octanol/water (log Pow)
No data available Evaporation rate:
(Butyl Acetate = 1)
No data available
Flash point: No data available Autoignition temperature: No data available
Flammability (solid, gas): No data available Flammability or explosive limits:
Lower: No data available
Upper: No data available
Solubility(ies):

SECTION 10. STABILITY AND REACTIVITY

Reactivity: Not Available.
Chemical Stability: Heat sensitive.
Possibility of Hazardous Reactions: No hazardous reactivity has been reported.
Conditions to avoid: Avoid excessive heat and light.
Incompatible materials: Acids, Bases, Metals, Oxidizing agents, Reducing agents, Most metals., Powdered metals, Organic
materials
Hazardous Decomposition Products: No data available

SECTION 11. TOXICOLOGICAL INFORMATION

RTECS Number: RN1140000
RTECS Number:
ZC0110000 (Water)
Acute Toxicity:
No data available
Skin corrosion/irritation:
No data available
Serious eye damage/irritation:
No data available
Respiratory or skin sensitization:
No data available
Germ cell mutagenicity:
No data available
Carcinogenicity:
No data available
IARC: No data available NTP: No data available OSHA: No data available
Reproductive toxicity:
No data available
Routes of Exposure: Inhalation, Eye contact, Ingestion, Skin contact.
Symptoms related to exposure:
Overexposure may result in serious illness or death. Skin contact may result in inflammation; characterized by itching, scaling, reddening, or
occasionally blistering. Skin contact may result in redness, pain or dry skin. Eye contact can result in corneal damage or blindness.
Potential Health Effects:
Skin and eye contact may result in irritation.
Target organ(s):
Causes damage to: Liver Respiratory System Kidney Spleen Adrenal Gland
Causes damage to organs: Respiratory System through prolonged or repeated exposure.
May cause damage to organs: Liver Kidney Hematopoietic System Spleen Adrenal Gland through prolonged or repeated exposure.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity
Fish: No data available
Crustacea: No data available
Algae: No data available
Persistence and degradability: No data available
Bioaccumulative potential (BCF): No data available
Mobillity in soil: No data available
Partition coefficient:
n-octanol/water (log Pow)
No data available
Soil adsorption (Koc): No data available
Henry's Law:
constant (PaM3/mol)
No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal of product: Recycle to process if possible. It is the generator's responsibility to comply with Federal, State and Local
rules and regulations. 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. This section is intended to provide
assistance but does not replace these laws, nor does compliance in accordance with this section ensure
regulatory compliance according to the law. US EPA guidelines for Identification and Listing of Hazardous
Waste are listed in 40 CFR Parts 261. The product should not be allowed to enter the environment, drains,
water ways, or the soil.
Disposal of container: Dispose of as unused product. Do not re-use empty containers.
Other considerations: Observe all federal, state and local regulations when disposing of the substance.

SECTION 14. TRANSPORT INFORMATION

DOT (US)
UN number:
UN2471
Proper Shipping Name:
Osmium tetroxide
Class or Division:
6.1 Toxic material.
Packing Group:
I
IATA
UN number:
UN2471
Proper Shipping Name:
Osmium tetroxide
Class or Division:
6.1 Toxic material.
Packing Group:
I
IMDG
UN number:
UN2471
Proper Shipping Name:
Osmium tetroxide
Class or Division:
6.1 Toxic material.
Packing Group:
I
EmS number: F-A, S-A
Reportable Quantitiy: 1000 Pounds (454 Kilograms)

SECTION 15. REGULATORY INFORMATION

Toxic Substance Control Act (TSCA 8b.):
This product is ON the EPA Toxic Substances Control Act (TSCA) inventory.
US Federal Regulations
CERCLA Hazardous substance and Reportable Quantity:
SARA 313: Listed
SARA 302: Not Listed
State Regulations
State Right-to-Know
Massachusetts Listed
New Jersey Listed
Pennsylvania Listed
California Proposition 65: Not Listed
Other Information
NFPA Rating: HMIS Classification:
Health: 4 Health: 4
Flammability: 0 Flammability: 0
Instability: 0 Physical: 0
International Inventories
WHMIS hazard class: E: Corrosive material.
D2A: Materials causing other toxic effects. (Very Toxic)
Canada: DSL On DSL
EC-No: 244-058-7

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16. OTHER INFORMATION

Safety Data Sheet according to Regulation (EC) No. 1907/2006 (REACH). The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. American Elements shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. COPYRIGHT 1997-2022 AMERICAN ELEMENTS. LICENSED GRANTED TO MAKE UNLIMITED PAPER COPIES FOR INTERNAL USE ONLY.