

OSMIUM TETRAOXIDE

GHS Safety Data Sheet

Version No:3

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Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

OSMIUM TETRAOXIDE

OTHER NAMES

O4-Os, OsO4, "osmic acid anhydride", "osmium oxide", "perosmic oxide", "osmium tetraoxide"

PROPER SHIPPING NAME

OSMIUM TETROXIDE

PRODUCT USE

Considered toxic by all exposure routes.

Operators should be trained in procedures for safe use of this material.

Microscopic staining, photography, oxidation catalyst in organic synthesis.

SUPPLIER

Company: S D FINE- CHEM LIMITED

Address:

315- 317, T.V. INDUSTRIAL ESTATE,

248, WORLI,

MUMBAI- 400030.INDIA.

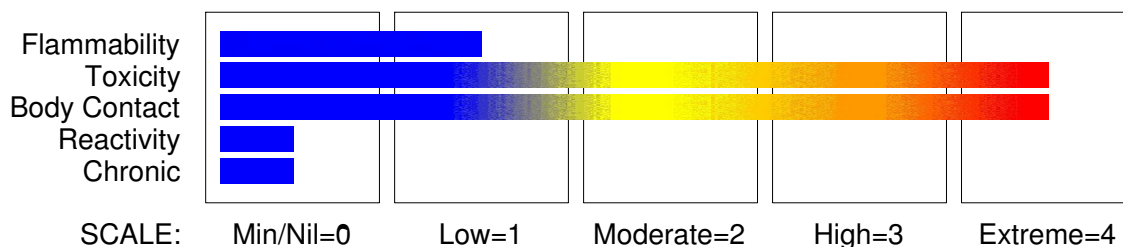
technical@sdfine.com

Telephone: 91- 22- 24959898

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Fax: 91- 22- 24937232

HAZARD RATINGS



Section 2 - HAZARDS IDENTIFICATION

GHS Classification

Acute Toxicity (Dermal) Category 1

continued...

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Section 2 - HAZARDS IDENTIFICATION

Acute Toxicity (Inhalation) Category 2
Acute Toxicity (Oral) Category 2
Skin Corrosion/Irritation Category 1C



EMERGENCY OVERVIEW

HAZARD

DANGER

Determined by using GHS criteria:

H310 H300 H330 H314

Fatal in contact with skin

Fatal if swallowed

Fatal if inhaled

Causes severe skin burns and eye damage

PRECAUTIONARY STATEMENTS

Prevention

Do not breathe dust/fume/gas/mist/vapours/spray.

Do not get in eyes, on skin, or on clothing.

Wash thoroughly after handling.

Do not eat, drink or smoke when using this product.

Use only outdoors or in a well-ventilated area.

Wear protective gloves/protective clothing/eye protection/face protection.

Wear respiratory protection.

Response

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

IF ON SKIN: Gently wash with plenty of soap and water.

IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Immediately call a POISON CENTER or doctor/physician.

Specific treatment is urgent (see MSDS).

Rinse mouth.

Remove/Take off immediately all contaminated clothing.

Wash contaminated clothing before reuse.

Storage

Store in a well-ventilated place. Keep container tightly closed.

Store locked up.

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Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
osmium tetroxide	20816-12-0	>99

Section 4 - FIRST AID MEASURES

SWALLOWED

DO NOT delay.

- IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY.
- For advice, contact a Poisons Information Centre or a doctor.
- Urgent hospital treatment is likely to be needed.
- In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition.
- If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the MSDS should be provided. Further action will be the responsibility of the medical specialist.
- If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the MSDS.
- Where medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:
- INDUCE vomiting with fingers down the back of the throat, ONLY IF CONSCIOUS. Lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.

NOTE: Wear a protective glove when inducing vomiting by mechanical means.

EYE

DO NOT delay.

Immediately transport to hospital or doctor.

If this product comes in contact with the eyes:

- Immediately hold eyelids apart and flush the eye continuously with running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.
- Transport to hospital or doctor without delay.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

If skin or hair contact occurs:

- Immediately flush body and clothes with large amounts of water, using safety shower if available.
 - Quickly remove all contaminated clothing, including footwear.
 - Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre.
 - Transport to hospital, or doctor.
- DO NOT delay.

INHALED

DO NOT delay.

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Section 4 - FIRST AID MEASURES

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor, without delay.

NOTES TO PHYSICIAN

Treat symptomatically.

Exposure to OsO₄ produces acute tracheobronchitis [Ellenhorn & Barceloux]

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

- Water spray or fog.
- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

FIRE FIGHTING

Pollutant.

- Alert Fire Brigade and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water courses.
- Fight fire from a safe distance, with adequate cover.
- Extinguishers should be used only by trained personnel.
- Use water delivered as a fine spray to control fire and cool adjacent area.
- Avoid spraying water onto liquid pools.
- DO NOT approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- If fire gets out of control withdraw personnel and warn against entry.
- Equipment should be thoroughly decontaminated after use.

FIRE/EXPLOSION HAZARD

Highly Toxic.

Pollutant.

DO NOT handle directly. Wear gloves and use scoop / tongs / tools.

Non combustible.

Supports combustion.

Contact with readily oxidisable organic material may cause ignition /fire.

FIRE INCOMPATIBILITY

Avoid contact with.

combustible materials particularly finely divided combustible materials, organic materials / compounds and powdered metals.
as ignition may result.

Personal Protective Equipment

Gas tight chemical resistant suit.

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Section 6 - ACCIDENTAL RELEASE MEASURES

EMERGENCY PROCEDURES

MINOR SPILLS

Clear area of personnel. and Restrict access to area.

DO NOT touch the spill material.

- Clean up all spills immediately.
- No smoking, naked lights, ignition sources.
- Avoid all contact with any organic matter including fuel, solvents, sawdust, paper or cloth and other incompatible materials, as ignition may result.
- Avoid breathing dust or vapours and all contact with skin and eyes.
- Control personal contact by using protective equipment.
- Contain and absorb spill with dry sand, earth, inert material or vermiculite.
- DO NOT use sawdust as fire may result.
- Scoop up solid residues and seal in labelled drums for disposal.
- Neutralise/decontaminate area.

MAJOR SPILLS

Clear area of personnel. and Restrict access to area.

DO NOT touch the spill material.

- Clean up all spills immediately.
- No smoking, naked lights, ignition sources.
- Avoid all contact with any organic matter including fuel, solvents, sawdust, paper or cloth and other incompatible materials, as ignition may result.
- Avoid breathing dust or vapours and all contact with skin and eyes.
- Control personal contact by using protective equipment.
- Contain and absorb spill with dry sand, earth, inert material or vermiculite.
- DO NOT use sawdust as fire may result.
- Scoop up solid residues and seal in labelled drums for disposal.
- Neutralise/decontaminate area.

Personal Protective Equipment advice is contained in Section 8 of the MSDS.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

Keep containers securely sealed when not in use.

Handle and open container with care.

DO NOT handle directly. Wear gloves and use scoop / tongs / tools.

- Avoid personal contact and inhalation of dust, mist or vapours.
- Provide adequate ventilation.
- Always wear protective equipment and wash off any spillage from clothing.
- Keep material away from light, heat, flammables or combustibles.
- Keep cool, dry and away from incompatible materials.
- Avoid physical damage to containers.
- DO NOT repack or return unused portions to original containers. Withdraw only sufficient amounts for immediate use.
- Contamination can lead to decomposition leading to possible intense heat and fire.
- When handling NEVER smoke, eat or drink.
- Always wash hands with soap and water after handling.

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Section 7 - HANDLING AND STORAGE

- Use only good occupational work practice.
- Observe manufacturer's storing and handling directions.

SUITABLE CONTAINER

Packaging as recommended by manufacturer.

DO NOT repack

Caution: Safeguards must be in place BEFORE opening containers.

STORAGE INCOMPATIBILITY

Segregate from.

combustible materials, organic materials / compounds and powdered metals.

STORAGE REQUIREMENTS

- Store in original containers.
 - Keep containers securely sealed as supplied.
 - Store in a cool, well ventilated area.
 - Keep dry.
 - Store under cover and away from sunlight.
 - Store away from flammable or combustible materials, debris and waste. Contact may cause fire or violent reaction.
 - Store away from incompatible materials and foodstuff containers.
 - DO NOT stack on wooden floors or pallets.
 - Protect containers from physical damage.
 - Check regularly for leaks.
 - Observe manufacturer's storage and handling recommendations.
- Store in secure poison area.
Store below 4 deg.C (refrigerate, DO NOT freeze).

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



X X + X X +

+: May be stored together

O: May be stored together with specific preventions

X: Must not be stored together

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

The following materials had no OELs on our records

- osmium tetroxide:

CAS:20816- 12- 0

EMERGENCY EXPOSURE LIMITS

Material

Original IDLH Value (mg/m3)

Revised IDLH Value (mg/m3)

Revised IDLH Value (ppm)

1

1 [Unch]

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

ODOUR SAFETY FACTOR (OSF)

OSF=0.11 (OSMIUM TETROXIDE)

Exposed individuals are NOT reasonably expected to be warned, by smell, that the Exposure Standard is being exceeded.

Odour Safety Factor (OSF) is determined to fall into either Class C, D or E.

The Odour Safety Factor (OSF) is defined as:

OSF= Exposure Standard (TWA) ppm/ Odour Threshold Value (OTV) ppm

Classification into classes follows:

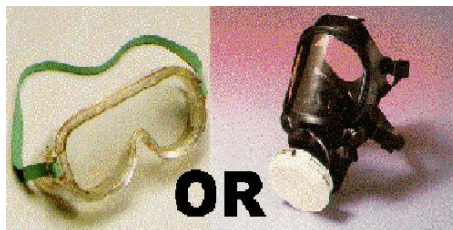
Class	OSF	Description
A	550	Over 90% of exposed individuals are aware by smell that the Exposure Standard (TLV- TWA for example) is being reached, even when distracted by working activities
B	26- 550	As " A" for 50- 90% of persons being distracted
C	1- 26	As " A" for less than 50% of persons being distracted
D	0.18- 1	10- 50% of persons aware of being tested perceive by smell that the Exposure Standard is being reached
E	<0.18	As " D" for less than 10% of persons aware of being tested

MATERIAL DATA

Odour Threshold: 0.0019 ppm

Irritation and other harmful effects do not appear to occur in humans exposed to osmium tetroxide at concentrations up to 0.001 mg/m³ (0.0001 ppm) for 6 hours. Vision disturbance has been reported at concentrations from 0.1 to 0. 6 mg/m³. Exposures at or below the TLV-TWA and STEL are thought to protect workers from both acute and chronic effects.

PERSONAL PROTECTION



EYE

- Chemical goggles.
- Full face shield may be required for supplementary but never for primary protection of eyes
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or

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OSMIUM TETRAOXIDE

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

HANDS/FEET

DO NOT handle directly. Wear gloves and use scoop / tongs / tools.
Wear chemical protective gloves, eg. PVC.
Wear safety footwear.

OTHER

No special equipment needed when handling small quantities
OTHERWISE:.
· Full protective suit.
Ensure there is ready access to an emergency shower.
· Ensure that there is ready access to eye wash unit.
Equipment should be kept clean and in working-order.

RESPIRATOR

Protection Factor	Half- Face Respirator	Full- Face Respirator	Powered Air Respirator
10 x ES	P1 Air- line*	- -	PAPR- P1 -
50 x ES	Air- line**	P2	PAPR- P2
100 x ES	-	P3	-
		Air- line*	-
100+ x ES	-	Air- line**	PAPR- P3

* - Negative pressure demand ** - Continuous flow.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.

For further information consult your
Occupational Health and Safety Advisor.

ENGINEERING CONTROLS

Local exhaust ventilation usually required. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Supplied-air type respirator may be required in special circumstances. Correct fit is essential to ensure adequate protection.

An approved self contained breathing apparatus (SCBA) may be required in some situations. Provide adequate ventilation in warehouse or closed storage area. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:
solvent, vapours, degreasing etc.,
evaporating from tank (in still air).
aerosols, fumes from pouring operations,
intermittent container filling, low speed
conveyer transfers, welding, spray drift,

Air Speed:
0.25- 0.5 m/s (50- 100 f/min.)

0.5- 1 m/s (100- 200 f/min.)

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

plating acid fumes, pickling (released at low velocity into zone of active generation) direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion) grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).

1- 2.5 m/s (200- 500 f/min.)

2.5- 10 m/s (500- 2000 f/min.)

Within each range the appropriate value depends on:

Lower end of the range

- 1: Room air currents minimal or favourable to capture
- 2: Contaminants of low toxicity or of nuisance value only.
- 3: Intermittent, low production.
- 4: Large hood or large air mass in motion

Upper end of the range

- 1: Disturbing room air currents
- 2: Contaminants of high toxicity
- 3: High production, heavy use
- 4: Small hood- local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Colourless to pale yellow solid powder. Soluble in water (7.24%)
Pungent, irritating, chlorine-like odour. DO NOT inhale-vapour poisonous.
Soluble in alcohol and ether. Strong oxidising agent.
Minimum perceptible concentration is 0.02 mg/L of air.

PHYSICAL PROPERTIES

Solid.
Mixes with water.

Molecular Weight: 254.20
Melting Range (°C): 40
Solubility in water (g/L): Soluble.
pH (1% solution): Not available
Volatile Component (%vol): Volatile solid.
Relative Vapour Density (air=1): 8.8
Lower Explosive Limit (%): Not applicable
Autoignition Temp (°C): Not applicable
State: Divided solid

Boiling Range (°C): 130 sublimes
Specific Gravity (water=1): 4.90- 5.1
pH (as supplied): Not applicable
Vapour Pressure (kPa): 0.93 @ 20C.
Evaporation Rate: Vapour a danger
Flash Point (°C): Not applicable
Upper Explosive Limit (%): Not applicable
Decomposition Temp (°C): Not available
Viscosity: Not available

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Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
 - Product is considered stable.
 - Hazardous polymerisation will not occur.
-

Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

Severely toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 5 gram may be fatal or may produce serious damage to the health of the individual.

The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion.

EYE

The material can produce chemical burns to the eye following direct contact. Vapours or mists may be extremely irritating.

When applied to the eye(s) of animals, the material produces severe ocular lesions which are present twenty-four hours or more after instillation.

SKIN

Skin contact with the material may produce severely toxic effects; systemic effects may result following absorption and these may be fatal.

The material can produce chemical burns following direct contact with the skin.

Open cuts, abraded or irritated skin should not be exposed to this material.

Toxic effects may result from skin absorption.

INHALED

Evidence shows, or practical experience predicts, that the material produces irritation of the respiratory system in a substantial number of individuals following inhalation.

CHRONIC HEALTH EFFECTS

Considered toxic by all exposure routes. and may be fatal from a single acute exposure.

DO NOT get on skin, on clothing, in eye, or breath vapour

Chronic exposure to trace amounts may result in kidney and liver damage.

OsO₄ produces acute tracheobronchitis characterized by cough, sore throat, chest pain and lightheadedness.

TOXICITY AND IRRITATION

unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY

Inhalation (man) TCLo: 0.133 mg/m³

Inhalation (rat) LCLo: 40 ppm/4h **[CCINFO

IRRITATION

Nil Reported

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Section 11 - TOXICOLOGICAL INFORMATION

- Manufacturer]

Inhalation (rabbit) LCLo: 1316 mg/m³/30m

Oral (mouse) LD50: 162 mg/kg

Oral (rat) LD50: 14 mg/kg**

Hamster cell mutagen

Reproductive effector in rats

Section 12 - ECOLOGICAL INFORMATION

Marine Pollutant:Severe

This material and its container must be disposed of as hazardous waste.

Section 13 - DISPOSAL CONSIDERATIONS

DO NOT handle directly. Wear gloves and use scoop / tongs / tools.

Incinerate residue at an approved site.

Puncture containers to prevent re-use.

WASTE DISPOSAL PROCEDURES

- Collect and package recoverable quantities of osmium tetroxide in labelled container for recycling or disposal. Reaction mixtures of osmium tetroxide are reduced with an olefin to form an osmate ester. Bubble hydrogen sulfide through the solution. Remove the black precipitate by filtration. Package for disposal or recycle [Armour 1996].

SPILLAGE DISPOSAL

- Wear a face shield and goggles, protective clothing and nitrile rubber gloves to control personal contact from osmium tetroxide. Follow the waste disposal procedure for more information [Armour 1996].

Section 14 - TRANSPORTATION INFORMATION



Labels Required: TOXIC

HAZCHEM: None

UNDG:

Dangerous Goods

6.1

Subrisk:

None

Class:

UN Number:

2471

Packing Group:

I

Shipping Name:OSMIUM TETROXIDE

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Section 14 - TRANSPORTATION INFORMATION

Air Transport IATA:

ICAO/IATA Class:	6.1	ICAO/IATA Subrisk:	None
UN/ID Number:	2471	Packing Group:	I
Special provisions:	None		
Shipping Name: OSMIUM TETROXIDE			

Maritime Transport IMDG:

IMDG Class:	6.1	IMDG Subrisk:	None
UN Number:	2471	Packing Group:	I
EMS Number:	F- A, S- A	Special provisions:	None
Limited Quantities:	None	Marine Pollutant:	Severe
Shipping Name: OSMIUM TETROXIDE			

Section 15 - REGULATORY INFORMATION

REGULATIONS

No regulations applicable
No data available for osmium tetroxide as CAS: 20816-12-0.

Section 16 - OTHER INFORMATION

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Classification committee using available literature references.

The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

The above information is believed to be accurate and represent the best information currently available to us, but does not represent any warranty expressed or implied of the properties of the product. User should make their own investigation to determine the suitability of the information for their particular purpose.

Issue Date: 28-Jun-2018