Safety Data Sheet
acc. to OSHA HCS

Printing date 05/05/2023 *Reviewed on 05/05/2023*

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1 Identification

· **Product identifier**

· **Trade name: Osmium tetroxide**
4 % solution for electron microscopy

· **Article number:** 31253
· **Application of the substance / the mixture:** Laboratory chemicals

· **Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
SERVA Electrophoresis GmbH
Carl-Benz-Str. 7
D-69115 Heidelberg
Tel.: +49 6221 13840-0
FAX: +49 6221 13840-10
msds.info@serva.de

· **Information department:** Product Safety department Tel.: +49 6221 13840-35
· **Emergency telephone number:**
Medical Emergency Information in case of poisoning:
Poison Information Center Mainz - Phone: +49 (0) 6131 19240
(advisory service in German or English language)

2 Hazard(s) identification

· **Classification of the substance or mixture**

GHS06

Acute Toxicity - Dermal 2	H310 Fatal in contact with skin.

GHS05

Eye Damage 1	H318 Causes serious eye damage.

GHS07

Acute Toxicity - Oral 4	H302 Harmful if swallowed.
Acute Toxicity - Inhalation 4	H332 Harmful if inhaled.
Skin Irritation 2	H315 Causes skin irritation.
Specific Target Organ Toxicity - Single Exposure 3	H335 May cause respiratory irritation.

· **Label elements**
· **GHS label elements**
The product is classified and labeled according to the Globally Harmonized System (GHS).
· **Hazard pictograms:** GHS05, GHS06, GHS07
· **Signal word:** Danger

· **Hazard-determining components of labeling:**
osmium tetraoxide
· **Hazard statements:**
Harmful if swallowed or if inhaled.
Fatal in contact with skin.
Causes skin irritation.

(Contd. on page 2)

Safety Data Sheet
acc. to OSHA HCS

Printing date 05/05/2023 *Reviewed on 05/05/2023*

Trade name: Osmium tetroxide
4 % solution for electron microscopy

(Contd. of page 1)

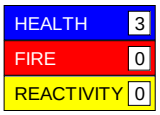
Causes serious eye damage.
May cause respiratory irritation.

· **Precautionary statements**
Wear protective gloves/protective clothing/eye protection/face protection.
If swallowed: Call a poison center/doctor if you feel unwell.
If on skin: Wash with plenty of soap and water.
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Take off immediately all contaminated clothing and wash it before reuse.

· **Classification system:**
· **NFPA ratings (scale 0 - 4)**

Health = 3
Fire = 0
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**



Health = 3
Fire = 0
Reactivity = 0

· **Other hazards**
· **Results of PBT and vPvB assessment:**
· **PBT:** *PBT - assessment not available.*
· **vPvB:** *vPvB - assessment not available.*

3 Composition/information on ingredients

· **Chemical characterization: Mixtures**
· **Description:** *aqueous solution*

· **Empirical formula:**		
7732-18-5	*water, distilled, conductivity or of similar purity*	H_2O
20816-12-0	*osmium tetraoxide*	$Os\,O_4$

· **Dangerous components:**		
20816-12-0	*osmium tetraoxide*	*2.5-7%*

· **Additional information:**
the product contains no further substances which shall be indicated according to REACH-Regulation (Regulation (EC) No. 1907/2006).
For the wording of the listed hazard phrases refer to section 16.

4 First-aid measures

· **Description of first aid measures**
· **General information:**
Immediately remove any clothing soiled by the product.
Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.
· **After inhalation:** *Supply fresh air and to be sure call for a doctor.*
· **After skin contact:**
Immediate wash with copious amounts of water and soap; rinse thoroughly; seek medical advice.
· **After eye contact:**
Rinse opened eye for several minutes under running water. Remove present contact lenses, if easy to do, and continue rinsing. Consult ophthalmologist immediately.

(Contd. on page 3)

Safety Data Sheet
acc. to OSHA HCS

Trade name: Osmium tetroxide
4 % solution for electron microscopy

(Contd. of page 2)

· **After swallowing:**
Wash out mouth. Drink plenty of water and supply fresh air.
Do not induce vomiting; immediately call for medical help.
· **Most important symptoms and effects, both acute and delayed** No further relevant information available.
· **Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

5 Fire-fighting measures

· **Extinguishing media**
· **Suitable extinguishing agents:**
CO_2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
· **Special hazards arising from the substance or mixture**
In case of fire formation of toxic vapours and gases is possible.
· **Advice for firefighters**
· **Protective equipment:** Wear self-contained respiratory protective device.

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6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures**
Wear protective clothing.
Ensure adequate ventilation
· **Environmental precautions:** Do not allow to enter sewers/ surface or ground water.
· **Methods and material for containment and cleaning up**
Dispose contaminated material as waste according to item 13.
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
· **Protective Action Criteria for Chemicals**

· **PAC-1:**		
20816-12-0	osmium tetraoxide	6.00E-04 ppm

· **PAC-2:**		
20816-12-0	osmium tetraoxide	0.0084 ppm

· **PAC-3:**		
20816-12-0	osmium tetraoxide	4.0 ppm

· **Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

· **Precautions for safe handling:**
Ensure good ventilation/exhaustion at the workplace.
Open and handle receptacle with care.
· **Information about protection against explosions and fires:** Keep respiratory protective device available.

· **Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:** Store only in unopened original receptacles.
· **Information about storage in one common storage facility:** Not required.
· **Further information about storage conditions:**
Keep receptacle tightly sealed and store in dry conditions.
Store under lock and key and with access restricted to technical experts or their assistants only.

(Contd. on page 4)

Safety Data Sheet
acc. to OSHA HCS

Trade name: Osmium tetroxide
4 % solution for electron microscopy

(Contd. of page 3)

· **Specific end use(s):** No further relevant information available.

8 Exposure controls/personal protection

· **Control parameters**

· **Components with limit values that require monitoring at the workplace:**	
20816-12-0 osmium tetraoxide (2.5-7%)	
PEL	Long-term value: 0.002* mg/m³ *as Os
REL	Short-term value: 0.006 mg/m³, 0.0006 ppm Long-term value: 0.002 mg/m³, 0.0002 ppm
TLV	Short-term value: 0.0006 ppm Long-term value: 0.0002 ppm

· **Additional information:** The lists that were valid during the creation were used as basis.

· **Exposure controls**
· **Additional information about design of technical systems:** No further data; see item 7.
· **Personal protective equipment:**
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Store protective clothing separately.
Avoid contact with the eyes and skin.
· **Breathing equipment:**
Short term filter device:
Filter ABEK-P2
· **Protection of hands:**
Rubber gloves
Neoprene gloves
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Protective gloves
Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
· **Material of gloves:**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
· **Penetration time of glove material:**
The exact break trough time has to be found out by the manufacturer of the protective gloves and has to be observed.
· **For the permanent contact of a maximum of 15 minutes gloves made of the following materials are suitable:**
Chloroprene rubber, CR
Nitrile rubber, NBR
· **Eye protection:** Tightly sealed goggles
· **Body protection:** Protective work clothing

(Contd. on page 5)

Safety Data Sheet
acc. to OSHA HCS

Trade name: Osmium tetroxide
4 % solution for electron microscopy

(Contd. of page 4)

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9 Physical and chemical properties

· **Information on basic physical and chemical properties**	
· **General Information:**	
· **Color:**	Colorless
· **Odor:**	Odorless
· **Odor threshold:**	no information available
· **Melting point/Melting range:**	Undetermined.
· **Boiling point/Boiling range:**	no information available
· **Flammability (solid, gaseous):**	no information available
· **Explosion limits:**	
· **Lower:**	no information available
· **Upper:**	no information available
· **Flash point:**	no information available
· **Decomposition temperature:**	no information available
· **pH-value:**	no information available
· **Viscosity:**	
· **Kinematic viscosity:**	no information available
· **Dynamic viscosity:**	no information available
· **Solubility in / Miscibility with:**	
· **Water:**	Fully miscible.
· **Partition coefficient (n-octanol/water):**	no information available
· **Vapor pressure:**	no information available
· **Density:**	no information available
· **Relative density:**	no information available
· **Other information**	There are no more data available.
· **Appearance:**	
· **Form:**	Solution
· **Important information on protection of health and environment, and on safety:**	
· **Danger of explosion:**	Product does not present an explosion hazard.
· **VOC %:**	0.00 %
· **VOC content:**	0.00 %

10 Stability and reactivity

· **Reactivity:** No further relevant informations available
· **Chemical stability:**
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **Possibility of hazardous reactions:** No further relevant informations available.
· **Conditions to avoid:** No further relevant information available.
· **Incompatible materials:** No further relevant information available.
· **Hazardous decomposition products:** In case of fire: See Section 5

11 Toxicological information

· **Information on toxicological effects**
· **Acute toxicity:**
Harmful if swallowed or if inhaled.
Fatal in contact with skin.

· **LD/LC50 values that are relevant for classification:**		
20816-12-0 osmium tetraoxide		
Oral	LD50	15 mg/kg (rat)

(Contd. on page 6)

Safety Data Sheet
acc. to OSHA HCS

Trade name: Osmium tetroxide
4 % solution for electron microscopy

(Contd. of page 5)

· **on the skin:** Causes skin irritation.
· **on the eye:**
Causes serious eye damage.
Causes serious eye damage.
· **Specific target organ toxicity - single exposure:** May cause respiratory irritation.
· **Additional toxicological information:**

· **Carcinogenic categories**

· **IARC (International Agency for Research on Cancer)**
None of the ingredients is listed.

· **NTP (National Toxicology Program)**
None of the ingredients is listed.

· **OSHA-Ca (Occupational Safety & Health Administration)**
None of the ingredients is listed.

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12 Ecological information

· **Toxicity:**
· **Aquatic toxicity:** No further relevant information available.
· **Persistence and degradability:** No further relevant information available.
· **Bioaccumulative potential:** No further relevant information available.
· **Mobility in soil:** No further relevant information available.
· **Results of PBT and vPvB assessment:**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **Other adverse effects:**
· **Additional ecological information:**
· **General notes:**
Do not allow product to reach ground water, water course or sewage system.
Water hazard class 3 (Self-assessment): extremely hazardous for water

13 Disposal considerations

· **Waste treatment methods**
· **Recommendation:**
Disposal must be made according to official regulations.
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

· **Uncleaned packagings:**
· **Recommendation:**
Disposal of uncleaned packagings must be made according to official regulations in the same manner as the product.
· **Recommended cleansing agent:** Water, if necessary with cleansing agents.

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14 Transport information

· **UN-Number**	
· **DOT, ADR, IMDG, IATA**	UN3287
· **UN proper shipping name**	
· **DOT**	Toxic liquid, inorganic, n.o.s. (Osmium tetroxide solution)

(Contd. on page 7)

Safety Data Sheet
acc. to OSHA HCS

Printing date 05/05/2023 *Reviewed on 05/05/2023*

Trade name: Osmium tetroxide
4 % solution for electron microscopy

(Contd. of page 6)

· **ADR**	3287 TOXIC LIQUID, INORGANIC, N.O.S. (OSMIUM TETROXIDE SOLUTION)
· **IMDG, IATA**	TOXIC LIQUID, INORGANIC, N.O.S. (OSMIUM TETROXIDE SOLUTION)
· **Transport hazard class(es)**	
· **DOT**	
· **Class**	6.1 Toxic substances
· **Label**	6.1
· **ADR, IMDG, IATA**	
· **Class:**	6.1 Toxic substances
· **Label:**	6.1
· **Packing group**	
· **DOT, ADR, IMDG, IATA**	II
· **Environmental hazards**	
· **Marine pollutant:**	No
· **Special precautions for user**	Warning: Toxic substances
· **Hazard identification number (Kemler code):**	60
· **EMS Number:**	F-A,S-A
· **Stowage Category**	B
· **Stowage Code**	SW2 Clear of living quarters.
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **ADR**	
· **Excepted quantities (EQ)**	Code: E4 Maximum net quantity per inner packaging: 1 ml Maximum net quantity per outer packaging: 500 ml
· **IMDG**	
· **Limited quantities (LQ)**	100 ml
· **Excepted quantities (EQ)**	Code: E4 Maximum net quantity per inner packaging: 1 ml Maximum net quantity per outer packaging: 500 ml
· **UN "Model Regulation":**	UN 3287 TOXIC LIQUID, INORGANIC, N.O.S. (OSMIUM TETROXIDE SOLUTION), 6.1, II

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15 Regulatory information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture**
No further relevant information available.

(Contd. on page 8)

Safety Data Sheet
acc. to OSHA HCS

Trade name: Osmium tetroxide
4 % solution for electron microscopy

(Contd. of page 7)

· **Section 355 (extremely hazardous substances):**
None of the ingredients is listed.

· **Section 313 (Specific toxic chemical listings):**

20816-12-0	osmium tetraoxide

· **TSCA (Toxic Substances Control Act):**
All components have the value ACTIVE.

· **Hazardous Air Pollutants**
None of the ingredients is listed.

· **Proposition 65**
None of the ingredients is listed.

· **Chemicals known to cause cancer:**
None of the ingredients is listed.

· **Chemicals known to cause reproductive toxicity for females:**
None of the ingredients is listed.

· **Chemicals known to cause reproductive toxicity for males:**
None of the ingredients is listed.

· **Chemicals known to cause developmental toxicity:**
None of the ingredients is listed.

· **Cancerogenity categories**

· **EPA (Environmental Protection Agency)**
None of the ingredients is listed.

· **TLV (Threshold Limit Value)**
None of the ingredients is listed.

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**
None of the ingredients is listed.

· **GHS label elements**
The product is classified and labeled according to the Globally Harmonized System (GHS).
· **Hazard pictograms** GHS05, GHS06, GHS07
· **Signal word** Danger

· **Hazard-determining components of labeling:**
osmium tetraoxide
· **Hazard statements**
Harmful if swallowed or if inhaled.
Fatal in contact with skin.
Causes skin irritation.
Causes serious eye damage.
May cause respiratory irritation.
· **Precautionary statements**
Wear protective gloves/protective clothing/eye protection/face protection.
If swallowed: Call a poison center/doctor if you feel unwell.
If on skin: Wash with plenty of soap and water.
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Take off immediately all contaminated clothing and wash it before reuse.
· **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

(Contd. on page 9)

Safety Data Sheet
acc. to OSHA HCS

Trade name: Osmium tetroxide
4 % solution for electron microscopy

(Contd. of page 8)

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Department issuing SDS:** Product safety department
· **Contact:** +49 6221 13840-35
· **Date of preparation / last revision** 05/05/2023
· **Abbreviations and acronyms:**
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
ICAO: International Civil Aviation Organisation
PBT: persistent, bioaccumulative, toxic substance (REACH)
vPvB: very persistent, very bioaccumulative substance (REACH)
REACH: Regulation concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals
CLP: Regulation on classification, labelling and packaging of substances and mixtures
bw: body weight
ADR: Accord relatif au transport international des marchandises dangereuses par route (European Agreement Concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
VOC: Volatile Organic Compounds (USA, EU)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
NIOSH: National Institute for Occupational Safety
OSHA: Occupational Safety & Health
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
Acute Toxicity - Oral 4: Acute toxicity – Category 4
Acute Toxicity - Dermal 2: Acute toxicity – Category 2
Skin Irritation 2: Skin corrosion/irritation – Category 2
Eye Damage 1: Serious eye damage/eye irritation – Category 1
Specific Target Organ Toxicity - Single Exposure 3: Specific target organ toxicity (single exposure) – Category 3