**SECTION 1: Identification of the substance/mixture and of the company/undertaking**

- **1.1 Product identifier**
  - Trade name: Osmium tetroxide
  - Article number: 31251
  - CAS Number: 20816-12-0
  - EC number: 244-058-7
  - Index number: 076-001-00-5

- **1.2 Relevant identified uses of the substance or mixture and uses advised against**
  - No further relevant information available.

- **1.3 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

- **1.4 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)

**SECTION 2: Hazards identification**

- **2.1 Classification of the substance or mixture**
  - Classification according to Regulation (EC) No 1272/2008

  ![GHS06]

  - Acute Tox. 2  H300  Fatal if swallowed.
  - Acute Tox. 1  H310  Fatal in contact with skin.
  - Acute Tox. 2  H330  Fatal if inhaled.

  ![GHS05]

  - Skin Corr. 1B  H314  Causes severe skin burns and eye damage.

- **2.2 Label elements**
  - Labelling according to Regulation (EC) No 1272/2008
    - The substance is classified and labelled according to the CLP regulation.
  - Hazard pictograms GHS05, GHS06
  - Signal word Danger
  - Hazard statements
    - H300+H310+H330  Fatal if swallowed, in contact with skin or if inhaled.
    - H314  Causes severe skin burns and eye damage.
  - Precautionary statements
    - P260  Do not breathe dust.

(Contd. on page 2)
**SECTION 3: Composition/information on ingredients**

- **3.1 Chemical characterisation: Substances**
  - CAS No. Description:
    - 20816-12-0 osmium tetroxide
  - Identification number(s):
  - EC number: 244-058-7
  - Index number: 076-001-00-5
  - Description:
    - Empirical formula: Os O₄
    - MW: 254.2

**SECTION 4: First aid measures**

- **4.1 Description of first aid measures**
  - General information
    - Remove contaminated clothing.
    - Remove breathing apparatus only after contaminated clothing have been completely removed.
    - In case of irregular breathing or respiratory arrest provide artificial respiration.
  - 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.
  - After swallowing
    - Do not induce vomiting!
    - Drink copious amounts of water and provide fresh air. Call for doctor immediately.

- **4.2 Most important symptoms and effects, both acute and delayed**
  - Gastric or intestinal disorders.
  - Coughing
  - Breathing difficulty

- **4.3 Indication of any immediate medical attention and special treatment needed**
  - No further relevant information available.

**SECTION 5: Firefighting measures**

- **5.1 Extinguishing media**
  - Suitable extinguishing agents
    - CO₂, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

- **5.2 Special hazards arising from the substance or mixture**
  - During heating or in case of fire poisonous gases are produced.
Trade name: Osmium tetroxide

5.3 Advice for firefighters
- Protective equipment:
  Wear self-contained respiratory protective device.
  Wear fully protective suit.
- Additional information
  Collect contaminated fire fighting water separately. It must not enter the sewage system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
- Wear protective clothing.
- Ensure adequate ventilation
- Avoid formation of dust.
- Do not inhale dusts.
- Avoid contact with the eyes and skin.
- Additional information
  Collect contaminated fire fighting water separately. It must not enter the sewage system.
- Do not allow to enter sewers/surface or ground water.
- Dispose contaminated material as waste according to item 13.
- Pick up mechanically.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
- Ensure good ventilation/exhaustion at the workplace.
- Open and handle receptacle with care.
- Additional 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:
    No special requirements.
  - Information about storage in one common storage facility:
    Store away from flammable substances.
    Store away from oxidising agents.
  - Further information about storage conditions:
    Store under lock and key and with access restricted to technical experts or their assistants only.
    Keep receptacle tightly sealed and store in dry conditions.
- Specific end use(s)
  No further relevant information available.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters
- Components with limit values that require monitoring at the workplace:
  20816-12-0 osmium tetroxide (80-100%)
  WEL Short-term value: 0.006 mg/m³, 0.0006 ppm
  Long-term value: 0.002 mg/m³, 0.0002 ppm
  (as Os)
- Additional information:
  The lists that were valid during the creation were used as basis.
50.0.4

8.2 Exposure controls

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 P3.

Protection of hands:

Neoprene gloves
Protective gloves.
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
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.

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:

Safety glasses

Body protection:

Protective work clothing.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

General Information

Appearance:

Form: Crystalline
Colour: yellow to greenish
Odour: Pungent
Odour threshold: Not determined.

pH-value: no information available

Change in condition

Melting point/freezing point: 40 °C
Initial boiling point and boiling range: 130 °C

Flash point: no information available

Flammability (solid, gaseous) Product is not flammable.

Decomposition temperature: Not determined.

Self igniting: Not determined.

Explosive properties: Product does not present an explosion hazard.
Safety data sheet  
according to 1907/2006/EC, Article 31

Printing date 24.03.2020  
Version number 5  
Revision: 24.03.2020

Trade name: Osmium tetroxide

- Explosion limits:
  - Lower: Not determined.
  - Upper: Not determined.
- Vapour pressure at 20 °C: 10 hPa
- Density at 20 °C: 4.91 g/cm³
- Relative density: Not determined.
- Vapour density: Not applicable.
- Evaporation rate: Not applicable.
- Solubility in / Miscibility with Water at 20 °C: 65 g/l
- Partition coefficient: n-octanol/water: Not determined.
- Viscosity:
  - dynamic: Not applicable.
  - kinematic: Not applicable.
- 9.2 Other information: No further relevant information available.

*SECTION 10: Stability and reactivity*

- 10.1 Reactivity: No further relevant information available.
- 10.2 Chemical stability
- 10.3 Possibility of hazardous reactions
  Reacts with fats and oils
  Reacts with flammable substances
- 10.4 Conditions to avoid: high temperatures
- 10.5 Incompatible materials: No further relevant information available.
- 10.6 Hazardous decomposition products: In case of fire: See Section 5
- Additional information:
  sensitive to light
  sublimatable

*SECTION 11: Toxicological information*

- 11.1 Information on toxicological effects
- Acute toxicity
  Fatal if swallowed, in contact with skin or if inhaled.
- LD/LC50 values that are relevant for classification:
<table>
<thead>
<tr>
<th>Oral</th>
<th>LD50</th>
<th>15 mg/kg (rat)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalative</td>
<td>LC50/4h</td>
<td>0.42 mg/l (rat)</td>
</tr>
</tbody>
</table>
- Primary irritant effect:
- Skin corrosion/irritation
- Serious eye damage/irritation
- Respiratory or skin sensitisation: Based on available data, the classification criteria are not met.
- CMR effects (carcinogenicity, mutagenicity and toxicity for reproduction): Based on available data, the classification criteria are not met.
- Germ cell mutagenicity: Based on available data, the classification criteria are not met.
- Carcinogenicity: Based on available data, the classification criteria are not met.
- Reproductive toxicity: Based on available data, the classification criteria are not met.
- STOT-single exposure: Based on available data, the classification criteria are not met.
- STOT-repeated exposure: Based on available data, the classification criteria are not met.

(Contd. on page 6)
SECTION 12: Ecological information

- Aspiration hazard: Based on available data, the classification criteria are not met.

12.1 Toxicity
- Aquatic toxicity: No further relevant information available.

12.2 Persistence and degradability: No further relevant information available.

12.3 Bioaccumulative potential: No further relevant information available.

12.4 Mobility in soil: No further relevant information available.

Additional ecological information:
- General notes:
  Do not allow product to reach ground water, water course or sewage system.
  Water danger class 3 (German Regulation) (Assessment by list): extremely hazardous for water.

12.5 Results of PBT and vPvB assessment
- PBT: PBT - assessment not available.
- vPvB: vPvB - assessment not available.

12.6 Other adverse effects: No further relevant information available.

SECTION 13: Disposal considerations

13.1 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.

SECTION 14: Transport information

14.1 UN-Number
- ADR, IMDG, IATA: UN2471

14.2 UN proper shipping name
- ADR: 2471 OSMIUM TETROXIDE
- IMDG: OSMIUM TETROXIDE, MARINE POLLUTANT
- IATA: OSMIUM TETROXIDE

14.3 Transport hazard class(es)
- ADR, IATA

- Class: 6.1 Toxic substances.
- Label: 6.1
Trade name: Osmium tetroxide

- IMDG
  - Class: 6.1 Toxic substances.
  - Label: 6.1
- 14.4 Packing group
  - ADR, IMDG, IATA: 1
- 14.5 Environmental hazards:
  - Marine pollutant: Yes (PP)
    - Symbol (fish and tree)
- 14.6 Special precautions for user
  - Hazard identification number (Kemler code): Warning: Toxic substances.
    - 66
  - EMS Number: F-A,S-A
  - Stowage Category: B
  - Stowage Code: SW2 Clear of living quarters.
- 14.7 Transport in bulk according to Annex II of Marpol and the IBC Code
  - Not applicable.

Transport/Additional information:
- ADR
  - Limited quantities (LQ): 0
  - Excepted quantities (EQ): Code: E5
    - Maximum net quantity per inner packaging: 1 g
    - Maximum net quantity per outer packaging: 300 g
- Transport category: 1
- Tunnel restriction code: C/E
- IMDG
  - Limited quantities (LQ): 0
  - Excepted quantities (EQ): Code: E5
    - Maximum net quantity per inner packaging: 1 g
    - Maximum net quantity per outer packaging: 300 g
- UN "Model Regulation": UN 2471 OSMIUM TETROXIDE, 6.1, I

SECTION 15: Regulatory information

- 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
  - Directive 2012/18/EU
  - Named dangerous substances - ANNEX I Substance is not listed.
  - Seveso category H1 ACUTE TOXIC
  - Qualifying quantity (tonnes) for the application of lower-tier requirements 5 t
  - Qualifying quantity (tonnes) for the application of upper-tier requirements 20 t
  - National regulations
  - Technical instructions (air):
    - Class Share in %
      - 1 80-100
- Water hazard class: Water danger class 3 (Assessment by list): extremely hazardous for water.
### 15.2 Chemical safety assessment

A Chemical Safety Assessment has not been carried out.

---

**SECTION 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

**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 européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
- IMDG: International Maritime Code for Dangerous Goods
- IATA: International Air Transport Association
- PP: Severe Marine Pollutant
- GHS: Globally Harmonised System of Classification and Labelling of Chemicals
- EINECS: European Inventory of Existing Commercial Chemical Substances
- CAS: Chemical Abstracts Service (division of the American Chemical Society)
- LC50: Lethal concentration, 50 percent
- LD50: Lethal dose, 50 percent
- vPvB: very Persistent and very Bioaccumulative
- Acute Tox. 2: Acute toxicity - oral – Category 2
- Acute Tox. 1: Acute toxicity - dermal – Category 1
- Skin Corr. 1B: Skin corrosion/irritation – Category 1B

* Data compared to the previous version altered.