# SAFETY DATA SHEET
# Hafnium Oxide (powder and pieces)

According to Appendix D, OSHA Hazard Communication Standard 29 CFR §1910.1200

## 1. Identification

### Product identifier

**Product name** Hafnium Oxide (powder and pieces)

**Internal identification** Replaces M-2200-135

**CAS number** 12055-23-1

### Recommended use of the chemical and restrictions on use

**Application** Physical vapor deposition of thin films

**Uses advised against** No specific uses advised against are identified.

### Details of the supplier of the safety data sheet

**Supplier** Kurt J Lesker Company

**Manufacturer**

Kurt J Lesker Company
1925 Route 51
Jefferson Hills, PA 15025
+1 412-387-9200

Kurt J Lesker Company LTD
United Kingdom
Austin House
Sidney Little Road
Churchfields Industrial Estate
St Leonards on Sea, East Sussex, TN38 9PU, United Kingdom
Customer Service: +44 (0) 1424 458100
msds@lesker.com

### Emergency telephone number

**Emergency telephone**

Emergency Numbers
North America [USA, Canada, Mexico]: 1-866-519-4752
Mainland China: (+86) 4001 2001 74
Europe: {int'l call prefix}-1-760-476-3961
Asia Pacific: {int'l call prefix}-1-760-476-3960
Middle East & Africa: {int'l call prefix}-1-760-476-3959
South Korea: +080-880-0455
Philippines: (+63) 2 83953471

## 2. Hazard(s) identification

### Classification of the substance or mixture

**Physical hazards** Not Classified

**Health hazards** Not Classified

**Environmental hazards** Not Classified

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### Label elements

**Hazard statements** NC Not Classified

### Other hazards

This product does not contain any substances classified as PBT or vPvB. Based on available knowledge of this material, it has been determined to be non-hazardous and will not pose a risk to persons or the environment in its provided form. However, any cutting, welding, melting, grinding, or use for deposition will produce dust, fume, or particulates containing component elements of this material. Exposure to these components may present significant health hazards. Note: Fine particulate may be a combustible dust which, when dispersed in air, may present an explosion hazard.

## 3. Composition/information on ingredients

### Mixtures

| | |
|---|---|
| **Hafnium Oxide (powder and pieces)** | **100%** |
| CAS number: 12055-23-1 | |

## 4. First-aid measures

### Description of first aid measures

**General information** If in doubt, get medical attention promptly. Show this Safety Data Sheet to the medical personnel.

**Inhalation** No specific recommendations. If throat irritation or coughing persists, proceed as follows. Move affected person to fresh air and keep warm and at rest in a position comfortable for breathing. Loosen tight clothing such as collar, tie or belt. Get medical attention if any discomfort continues.

**Ingestion** No specific recommendations. If throat irritation or coughing persists, proceed as follows. Rinse mouth. Get medical attention if any discomfort continues.

**Skin Contact** No specific recommendations. Rinse with water. Get medical attention if any discomfort continues.

**Eye contact** Rinse with water. Get medical attention if any discomfort continues.

**Protection of first aiders** Use protective equipment appropriate for surrounding materials.

### Most important symptoms and effects, both acute and delayed

**General information** The severity of the symptoms described will vary dependent on the concentration and the length of exposure.

**Inhalation** No specific symptoms known.

**Ingestion** No specific symptoms known. May cause discomfort if swallowed.

**Skin contact** Prolonged contact may cause dryness of the skin.

**Eye contact** No specific symptoms known. May be slightly irritating to eyes.

### Indication of immediate medical attention and special treatment needed

**Notes for the doctor** Treat symptomatically.

**Specific treatments** No special treatment required.

## 5. Fire-fighting measures

### Extinguishing media

**Suitable extinguishing media** The product is not flammable. Extinguish with alcohol-resistant foam, carbon dioxide, dry powder or water fog. Use fire-extinguishing media suitable for the surrounding fire.

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**Unsuitable extinguishing media** Do not use water jet as an extinguisher, as this will spread the fire.

### Special hazards arising from the substance or mixture

**Specific hazards** None known.

**Hazardous combustion products** Thermal decomposition or combustion products may include the following substances: Harmful gases or vapors.

### Advice for firefighters

**Protective actions during firefighting** Avoid breathing fire gases or vapors. Evacuate area. Cool containers exposed to heat with water spray and remove them from the fire area if it can be done without risk. Cool containers exposed to flames with water until well after the fire is out.

**Special protective equipment for firefighters** Wear positive-pressure self-contained breathing apparatus (SCBA) and appropriate protective clothing. Standard Firefighter's clothing including helmets, protective boots and gloves will provide a basic level of protection for chemical incidents.

## 6. Accidental release measures

### Personal precautions, protective equipment and emergency procedures

**Personal precautions** No specific recommendations. For personal protection, see Section 8.

### Environmental precautions

**Environmental precautions** Avoid discharge into drains or watercourses or onto the ground.

### Methods and material for containment and cleaning up

**Methods for cleaning up** Reuse or recycle products wherever possible. Collect spillage with a shovel and broom, or similar and reuse, if possible. Collect and place in suitable waste disposal containers and seal securely. Flush contaminated area with plenty of water. Wash thoroughly after dealing with a spillage. Dispose of contents/container in accordance with national regulations.

**Reference to other sections** For personal protection, see Section 8.

## 7. Handling and storage

### Precautions for safe handling

**Usage precautions** Read and follow manufacturer's recommendations. Wear protective clothing as described in Section 8 of this safety data sheet. Keep away from food, drink and animal feeding stuffs. Keep container tightly sealed when not in use.

**Advice on general occupational hygiene** Wash promptly if skin becomes contaminated. Take off contaminated clothing and wash before reuse. Wash contaminated clothing before reuse.

### Conditions for safe storage, including any incompatibilities

**Storage precautions** No specific recommendations.

**Storage class** Unspecified storage.

### Specific end uses(s)

**Specific end use(s)** The identified uses for this product are detailed in Section 1.

## 8. Exposure controls/Personal protection

### Exposure controls

**Appropriate engineering controls** No specific ventilation requirements.

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| | |
|---|---|
| **Eye/face protection** | No specific eye protection required during normal use. Large Spillages: Eyewear complying with an approved standard should be worn if a risk assessment indicates eye contact is possible. |
| **Hand protection** | No specific hand protection recommended. Large Spillages: Wear protective gloves. |
| **Hygiene measures** | Wash hands thoroughly after handling. Wash at the end of each work shift and before eating, smoking and using the toilet. Do not eat, drink or smoke when using this product. |
| **Respiratory protection** | No specific recommendations. Provide adequate ventilation. Large Spillages: If ventilation is inadequate, suitable respiratory protection must be worn. |
| **Environmental exposure controls** | Not regarded as dangerous for the environment. |

## 9. Physical and chemical properties

### Information on basic physical and chemical properties

| | |
|---|---|
| **Appearance** | Solid. |
| **Color** | White. |
| **Odor** | No characteristic odor. |
| **Odor threshold** | Not applicable. |
| **pH** | Not applicable. |
| **Melting point** | 2810°C/5090°F |
| **Initial boiling point and range** | Not available. |
| **Flash point** | Not applicable. |
| **Evaporation rate** | Not applicable. |
| **Flammability (solid, gas)** | Not applicable. |
| **Upper/lower flammability or explosive limits** | Not applicable. |
| **Vapor pressure** | Not available. |
| **Vapor density** | Not available. |
| **Relative density** | No information available. |
| **Bulk density** | ~ 9.680 g/cm3 |
| **Solubility(ies)** | Insoluble in water. |
| **Partition coefficient** | No information available. |
| **Auto-ignition temperature** | Not applicable. |
| **Decomposition Temperature** | Not available. |
| **Viscosity** | Not applicable. |
| **Molecular weight** | 210.49 |

## 10. Stability and reactivity

| | |
|---|---|
| **Reactivity** | There are no known reactivity hazards associated with this product. |

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| | |
|---|---|
| **Stability** | Stable at normal ambient temperatures and when used as recommended. Stable under the prescribed storage conditions. |
| **Possibility of hazardous reactions** | No potentially hazardous reactions known. |
| **Conditions to avoid** | There are no known conditions that are likely to result in a hazardous situation. |
| **Materials to avoid** | No specific material or group of materials is likely to react with the product to produce a hazardous situation. |
| **Hazardous decomposition products** | Does not decompose when used and stored as recommended. Thermal decomposition or combustion products may include the following substances: Harmful gases or vapors. |

## 11. Toxicological information

### Information on toxicological effects

| | |
|---|---|
| **Toxicological effects** | Not regarded as a health hazard under current legislation. |

**Acute toxicity - oral**

| | |
|---|---|
| **Notes (oral $LD_{50}$)** | Based on available data the classification criteria are not met. |

**Acute toxicity - dermal**

| | |
|---|---|
| **Notes (dermal $LD_{50}$)** | Based on available data the classification criteria are not met. |

**Acute toxicity - inhalation**

| | |
|---|---|
| **Notes (inhalation $LC_{50}$)** | Based on available data the classification criteria are not met. |

**Skin corrosion/irritation**

| | |
|---|---|
| **Animal data** | Based on available data the classification criteria are not met. |

**Serious eye damage/irritation**

| | |
|---|---|
| **Serious eye damage/irritation** | Based on available data the classification criteria are not met. |

**Respiratory sensitization**

| | |
|---|---|
| **Respiratory sensitization** | Based on available data the classification criteria are not met. |

**Skin sensitization**

| | |
|---|---|
| **Skin sensitization** | Based on available data the classification criteria are not met. |

**Germ cell mutagenicity**

| | |
|---|---|
| **Genotoxicity - in vitro** | Based on available data the classification criteria are not met. |

**Carcinogenicity**

| | |
|---|---|
| **Carcinogenicity** | Based on available data the classification criteria are not met. |
| **IARC carcinogenicity** | None of the ingredients are listed or exempt. |

**Reproductive toxicity**

| | |
|---|---|
| **Reproductive toxicity - fertility** | Based on available data the classification criteria are not met. |
| **Reproductive toxicity - development** | Based on available data the classification criteria are not met. |

**Specific target organ toxicity - single exposure**

| | |
|---|---|
| **STOT - single exposure** | Not classified as a specific target organ toxicant after a single exposure. |

**Specific target organ toxicity - repeated exposure**

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| | |
|---|---|
| **STOT - repeated exposure** | Not classified as a specific target organ toxicant after repeated exposure. |

**Aspiration hazard**

| | |
|---|---|
| **Aspiration hazard** | Not relevant. Solid. |

| | |
|---|---|
| **General information** | No specific health hazards known. The severity of the symptoms described will vary dependent on the concentration and the length of exposure. |
| **Inhalation** | No specific symptoms known. |
| **Ingestion** | No specific symptoms known. May cause discomfort if swallowed. |
| **Skin Contact** | Prolonged contact may cause dryness of the skin. |
| **Eye contact** | No specific symptoms known. May be slightly irritating to eyes. |
| **Route of exposure** | Ingestion Inhalation Skin and/or eye contact |
| **Target Organs** | No specific target organs known. |

## 12. Ecological information

| | |
|---|---|
| **Ecotoxicity** | Not regarded as dangerous for the environment. However, large or frequent spills may have hazardous effects on the environment. |
| **Toxicity** | Based on available data the classification criteria are not met. |

**Persistence and degradability**

| | |
|---|---|
| **Persistence and degradability** | The degradability of the product is not known. |

**Bioaccumulative potential**

| | |
|---|---|
| **Bio-Accumulative Potential** | No data available on bioaccumulation. |
| **Partition coefficient** | No information available. |

**Mobility in soil**

| | |
|---|---|
| **Mobility** | No data available. |

**Other adverse effects**

| | |
|---|---|
| **Other adverse effects** | None known. |

## 13. Disposal considerations

**Waste treatment methods**

| | |
|---|---|
| **General information** | The generation of waste should be minimized or avoided wherever possible. Reuse or recycle products wherever possible. This material and its container must be disposed of in a safe way. |
| **Disposal methods** | Dispose of surplus products and those that cannot be recycled via a licensed waste disposal contractor. Waste packaging should be collected for reuse or recycling. Incineration or landfill should only be considered when recycling is not feasible. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of the local water authority. |

## 14. Transport information

| | |
|---|---|
| **General** | The product is not covered by international regulations on the transport of dangerous goods (IMDG, IATA, DOT). |

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| | |
|---|---|
| **Road transport notes** | Not regulated. |
| **Rail transport notes** | Not regulated. |
| **Sea transport notes** | Not regulated. |
| **Air transport notes** | Not regulated. |
| **DOT transport notes** | Not regulated. |

**UN Number**

| | |
|---|---|
| **UN No. (International)** | Not applicable. |

**UN proper shipping name**

| | |
|---|---|
| **Proper shipping name (International)** | Not applicable. |

**Transport hazard class(es)**

| | |
|---|---|
| **Transport Labels (International)** | No transport warning sign required. |

**Packing group**

| | |
|---|---|
| **Packing group (International)** | Not applicable. |

**Environmental hazards**

**Environmentally Hazardous Substance**
No.

**Special precautions for user**

Not applicable.

| | |
|---|---|
| **Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code** | Not applicable. |

## 15. Regulatory information

**US Federal Regulations**

**SARA Section 302 Extremely Hazardous Substances Tier II Threshold Planning Quantities**
None of the ingredients are listed or exempt.

**CERCLA/Superfund, Hazardous Substances/Reportable Quantities (EPA)**
None of the ingredients are listed or exempt.

**SARA Extremely Hazardous Substances EPCRA Reportable Quantities**
None of the ingredients are listed or exempt.

**SARA 313 Emission Reporting**
None of the ingredients are listed or exempt.

**CAA Accidental Release Prevention**
None of the ingredients are listed or exempt.

**FDA - Essential Chemical**
None of the ingredients are listed or exempt.

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### FDA - Precursor Chemical
None of the ingredients are listed or exempt.

### SARA (311/312) Hazard Categories
None of the ingredients are listed or exempt.

### OSHA Highly Hazardous Chemicals
None of the ingredients are listed or exempt.

## US State Regulations

### California Proposition 65 Carcinogens and Reproductive Toxins
None of the ingredients are listed or exempt.

### California Air Toxics "Hot Spots" (A-I)
None of the ingredients are listed or exempt.

### California Air Toxics "Hot Spots" (A-II)
None of the ingredients are listed or exempt.

### California Directors List of Hazardous Substances
None of the ingredients are listed or exempt.

### Massachusetts "Right To Know" List
None of the ingredients are listed or exempt.

### Rhode Island "Right To Know" List
None of the ingredients are listed or exempt.

### Label Prop 65 data

### Minnesota "Right To Know" List
None of the ingredients are listed or exempt.

### Pennsylvania "Right To Know" List
None of the ingredients are listed or exempt.

### New Jersey "Right To Know" List
None of the ingredients are listed or exempt.

## Inventories

### EU - EINECS/ELINCS
All the ingredients are listed or exempt.

### Canada - DSL/NDSL
All the ingredients are listed or exempt.

### US - TSCA
All the ingredients are listed or exempt.

### US - TSCA 12(b) Export Notification
None of the ingredients are listed or exempt.

### Australia - AICS
All the ingredients are listed or exempt.

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**Japan - ENCS**
All the ingredients are listed or exempt.

**Korea - KECI**
All the ingredients are listed or exempt.

**China - IECSC**
All the ingredients are listed or exempt.

**Philippines - PICCS**
All the ingredients are listed or exempt.

**New Zealand - NZIOC**
All the ingredients are listed or exempt.

**Taiwan - TCSI**
All the ingredients are listed or exempt.

## 16. Other information

| | |
|---|---|
| **Training advice** | Only trained personnel should use this material. |
| **Revision date** | 8/2/2022 |
| **Revision** | 4 |
| **Supersedes date** | 3/6/2020 |
| **SDS No.** | 4717 |

**End of SDS**

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