# SAFETY DATA SHEET

This safety data sheet was created pursuant to the requirements of:
US OSHA Hazard Communication Standard (29 CFR 1910.1200)

**Revision date** 07/16/2026 **Revision Number** 1

## 1. Identification

**Product identifier**

**Product Name** Lead Zirconate Titanate (PZT)

**Other means of identification**

**Safety data sheet number** 06052

**Synonyms** None

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

**Recommended use** Physical vapor deposition of thin films

**Restrictions on use** No information available

**Details of the supplier of the safety data sheet**

**Supplier Address**
Kurt J Lesker Company

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

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

**E-mail** msds@lesker.com

**Emergency telephone number**

**Emergency Telephone** 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**

| | |
|---|---|
| Acute toxicity - Oral | Category 4 |
| Acute toxicity - Inhalation (Gases) | Category 4 |
| Acute toxicity - Inhalation (Vapors) | Category 4 |
| Acute toxicity - Inhalation (Dusts/Mists) | Category 4 |
| Carcinogenicity | Category 1B |
| Reproductive toxicity | Category 1A |
| Effects on or via lactation | Yes |
| Specific target organ toxicity (repeated exposure) | Category 2 |

**Hazards not otherwise classified (HNOC)**
Not applicable

**Label elements**



**Danger**

**Hazard statements**
Harmful if swallowed.
Harmful if inhaled.
May cause cancer.
May damage fertility or the unborn child.
May cause harm to breast-fed children.
May cause damage to organs through prolonged or repeated exposure.

**Precautionary Statements - Prevention**
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Wear protective gloves, protective clothing, eye protection and face protection.
Avoid contact during pregnancy and while nursing.
Wash face, hands and any exposed skin thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Do not breathe dust.

**Precautionary Statements - Response**
IF exposed or concerned: Get medical advice/attention.
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell.
Rinse mouth.

**Precautionary Statements - Storage**
Store locked up.

**Precautionary Statements - Disposal**
Dispose of contents and container in accordance with local, regional, national, and international regulations as applicable.

**Unknown acute toxicity**
31 % of the mixture consists of ingredient(s) of unknown acute oral toxicity.
31 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (gas).
31 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (vapor).
31 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (dust/mist).

**Other information**

Very toxic to aquatic life with long lasting effects.

## 3. Composition/information on ingredients

**Substance**

Not applicable.

**Mixture**

| Chemical name | CAS No. | Weight-% | Trade secret |
|---|---|---|---|
| Lead (pieces) | 7439-92-1 | 69 | * |
| oxygen | 7782-44-7 | 14 | * |
| Titanium (pieces) | 7440-32-6 | 12 | * |
| Zirconium (pieces) | 7440-67-7 | 5 | * |

*The exact percentage (concentration) of composition has been withheld as a trade secret.

## 4. First-aid measures

**Description of first aid measures**

**General advice** Show this safety data sheet to the doctor in attendance. IF exposed or concerned: Get medical advice/attention.

**Inhalation** If breathing has stopped, give artificial respiration. Get medical attention immediately. Remove to fresh air. If symptoms persist, call a physician.

**Eye contact** Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids. Consult a physician.

**Skin contact** Wash skin with soap and water.

**Ingestion** Do NOT induce vomiting. Rinse mouth. Never give anything by mouth to an unconscious person. Get medical attention.

**Self-protection of the first aider** Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination. Avoid breathing dust/fume/gas/mist/vapors/spray. Use personal protective equipment as required. See section 8 for more information.

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

**Symptoms** Coughing and/ or wheezing. Difficulty in breathing.

**Effects of Exposure** May cause cancer. May cause adverse reproductive effects - such as birth defect, miscarriages, or infertility. May cause damage to organs through prolonged or repeated exposure.

**Indication of any immediate medical attention and special treatment needed**

**Note to physicians** Treat symptomatically.

## 5. Fire-fighting measures

**Suitable Extinguishing Media** Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

**Large Fire** CAUTION: Use of water spray when fighting fire may be inefficient.

**Unsuitable extinguishing media** Do not scatter spilled material with high pressure water streams.

**Specific hazards arising from the chemical** No information available.

**Explosion data**

**Sensitivity to mechanical impact** None.

**Sensitivity to static discharge** None.

**Special protective equipment and precautions for fire-fighters** Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Use personal protection equipment.

## 6. Accidental release measures

**Personal precautions, protective equipment and emergency procedures**

**Personal precautions** Ensure adequate ventilation. Avoid generation of dust. Do not breathe dust. Use personal protective equipment as required.

**Other information** Refer to protective measures listed in Sections 7 and 8.

**Methods and material for containment and cleaning up**

**Methods for containment** Prevent further leakage or spillage if safe to do so.

**Methods for cleaning up** Pick up and transfer to properly labeled containers.

**Prevention of secondary hazards** Clean contaminated objects and areas thoroughly observing environmental regulations.

## 7. Handling and storage

**Precautions for safe handling**

**Advice on safe handling** Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. Do not eat, drink or smoke when using this product. Remove contaminated clothing and shoes. Avoid breathing dust/fume/gas/mist/vapors/spray. Avoid generation of dust. Ensure adequate ventilation.

**Conditions for safe storage, including any incompatibilities**

**Storage Conditions** Keep containers tightly closed in a dry, cool and well-ventilated place. Keep out of the reach of children. Store locked up.

## 8. Exposure controls/personal protection

**Control Parameters**

**Exposure Limits**

| Chemical name | ACGIH TLV | OSHA PEL | NIOSH |
|---|---|---|---|
| Lead (pieces)<br>7439-92-1 | TWA: 0.05 mg/m³ | TWA: 50 µg/m³ | IDLH: 100 mg/m³<br>TWA: 0.050 mg/m³ |

| | | | |
|---|---|---|---|
| Zirconium (pieces)<br>7440-67-7 | STEL: 10 mg/m³<br>TWA: 5 mg/m³ | (vacated) TWA: 5 mg/m³<br>(vacated) STEL: 10 mg/m³ | IDLH: 50 mg/m³<br>TWA: 5 mg/m³<br>STEL: 10 mg/m³ |

**Biological occupational exposure limits**

| Chemical name | ACGIH |
|---|---|
| Lead (pieces)<br>7439-92-1 | 200 µg/L - blood (Lead) - not critical |

**Appropriate engineering controls**

**Engineering controls** Showers
Eyewash stations
Ventilation systems.

**Individual protection measures, such as personal protective equipment**

**Eye/face protection** Appropriate eye/face protection should be selected and used according to the chemical nature, hazards and use of this product and safety requirements of the local jurisdiction.

**Hand protection** Wear suitable gloves.

**Skin and body protection** Wear suitable protective clothing.

**Respiratory protection** Appropriate respiratory protection should be selected and used according to the chemical nature, hazards and use of this product and safety requirements of the local jurisdiction. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

**General hygiene considerations** Do not eat, drink or smoke when using this product. Wash hands before breaks and immediately after handling the product. Avoid breathing dust/fume/gas/mist/vapors/spray.

## 9. Physical and chemical properties

**Information on basic physical and chemical properties**

**Physical state** Solid
**Appearance** solid
**Color** Off-white; Yellowish
**Odor** No characteristic odour
**Odor threshold** No information available

| Property | Values | Remarks • Method |
|---|---|---|
| **pH** | No data available | |
| **pH (as aqueous solution)** | | |
| **Melting point / freezing point** | No data available | |
| **Initial boiling point and boiling range** | No data available | |
| **Flash point** | No data available | |
| **Evaporation rate** | No data available | |
| **Flammability** | No data available | |
| **Flammability Limit in Air** | | |
| **Upper flammability or explosive limits** | No data available | |
| **Lower flammability or explosive limits** | No data available | |
| **Vapor pressure** | No data available | |
| **Relative vapor density** | No data available | |
| **Relative density** | No data available | |

| | |
|---|---|
| **Water solubility** | Insoluble in water |
| **Solubility(ies)** | No data available |
| **Partition coefficient** | No data available |
| **Autoignition temperature** | No data available |
| **Decomposition temperature** | |
| **Kinematic viscosity** | No data available |
| **Dynamic viscosity** | No data available |

**Other information**

| | |
|---|---|
| **Explosive properties** | No information available |
| **Oxidizing properties** | No information available |
| **Softening point** | No information available |
| **Molecular weight** | Pb{ ZrTi)O3 |
| **VOC content** | No information available |
| **Liquid Density** | No information available |
| **Bulk density** | No information available |

## 10. Stability and reactivity

**Reactivity** No information available.

**Chemical stability** Stable under normal conditions.

**Possibility of hazardous reactions** None under normal processing.

**Conditions to avoid** Excessive heat.

**Incompatible materials** None known based on information supplied.

**Hazardous decomposition products** None known based on information supplied.

## 11. Toxicological information

**Information on likely routes of exposure**

**Product Information**

**Inhalation** Specific test data for the substance or mixture is not available. Harmful by inhalation. (based on components).

**Eye contact** Specific test data for the substance or mixture is not available.

**Skin contact** Specific test data for the substance or mixture is not available.

**Ingestion** Specific test data for the substance or mixture is not available. Harmful if swallowed. (based on components).

**Symptoms related to the physical, chemical and toxicological characteristics**

**Symptoms** Coughing and/ or wheezing.

**Acute toxicity** Harmful if swallowed. Harmful by inhalation.

**Numerical measures of toxicity**

**The following ATE values have been calculated for the mixture**

| | |
|---|---|
| **ATEmix (oral)** | 500.00 mg/kg |
| **ATEmix (dermal)** | 99,999.00 mg/kg |
| **ATEmix (inhalation-gas)** | 4,500.00 ppm |

**ATEmix (inhalation-vapor)** 11.00 mg/l
**ATEmix (inhalation-dust/mist)** 1.50 mg/l

**Unknown acute toxicity**

31 % of the mixture consists of ingredient(s) of unknown acute oral toxicity
31 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (gas)
31 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (vapor)
31 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (dust/mist)

**Delayed and immediate effects as well as chronic effects from short and long-term exposure**

**Skin corrosion/irritation** No information available.

**Serious eye damage/eye irritation** No information available.

**Respiratory or skin sensitization** No information available.

**Germ cell mutagenicity** No information available.

**Carcinogenicity** Contains a known or suspected carcinogen. Classification based on data available for ingredients. May cause cancer.

The table below indicates whether each agency has listed any ingredient as a carcinogen.

| Chemical name | ACGIH | IARC | NTP | OSHA |
|---|---|---|---|---|
| Lead (pieces)<br>7439-92-1 | A3 | Group 2A | Reasonably Anticipated | X |

**Legend**

**ACGIH (American Conference of Governmental Industrial Hygienists)**
A3 - Animal Carcinogen
**IARC (International Agency for Research on Cancer)**
Group 2A - Probably Carcinogenic to Humans
**NTP (National Toxicology Program)**
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen
**Occupational Safety and Health Administration of the US Department of Labor**
X - Present

**Reproductive toxicity** Classification based on data available for ingredients. May damage fertility or the unborn child. May cause harm to breast-fed children.

**STOT - single exposure** No information available.

**STOT - repeated exposure** May cause damage to organs through prolonged or repeated exposure.

**Target organ effects** Kidney, Respiratory system, Eyes, Skin, Central nervous system, Blood, Gastrointestinal tract (GI), Gingival Tissue.

**Aspiration hazard** No information available.

**Other adverse effects** No information available.

**Interactive effects** No information available.

## 12. Ecological information

**Ecotoxicity** Very toxic to aquatic life with long lasting effects.

| Chemical name | Algae/aquatic plants | Fish | Toxicity to microorganisms | Crustacea |
|---|---|---|---|---|
| Lead (pieces)<br>7439-92-1 | - | LC50: =0.44mg/L (96h, Cyprinus carpio)<br>LC50: =1.17mg/L (96h, Oncorhynchus mykiss)<br>LC50: =1.32mg/L (96h, Oncorhynchus mykiss) | - | EC50: =600µg/L (48h, water flea) |

**Persistence and degradability** No information available.

**Bioaccumulation** There is no data for this product.

**Other adverse effects** No information available.

## 13. Disposal considerations

**Disposal methods**

**Waste from residues/unused products** Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.

**Contaminated packaging** Do not reuse empty containers.

**California Hazardous Waste Status** This product contains one or more substances that are listed with the State of California as a hazardous waste.

## 14. Transport information

**DOT** Not regulated

## 15. Regulatory information

**International Inventories**

**TSCA** Contact supplier for inventory compliance status.

| Chemical name | CAS No. | Inventory Listing Status | Commercial Activity Designation |
|---|---|---|---|
| Lead (pieces) | 7439-92-1 | Present | Active |

| Chemical name | CAS No. | Inventory Listing Status | Commercial Activity Designation |
|---|---|---|---|
| oxygen | 7782-44-7 | Present | Active |
| Titanium (pieces) | 7440-32-6 | Present | Active |
| Zirconium (pieces) | 7440-67-7 | Present | Active |

**DSL/NDSL** Contact supplier for inventory compliance status.
**EINECS/ELINCS** Contact supplier for inventory compliance status.
**ENCS** Contact supplier for inventory compliance status.
**IECSC** Contact supplier for inventory compliance status.
**KECI** Contact supplier for inventory compliance status.
**PICCS** Contact supplier for inventory compliance status.
**AIIC** Contact supplier for inventory compliance status.
**NZIoC** Contact supplier for inventory compliance status.

**Legend:**
**TSCA** - United States Toxic Substances Control Act Section 8(b) Inventory
**DSL/NDSL** - Canadian Domestic Substances List/Non-Domestic Substances List
**EINECS/ELINCS** - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
**ENCS** - Japan Existing and New Chemical Substances
**IECSC** - China Inventory of Existing Chemical Substances
**KECL** - Korean Existing Chemicals Inventory
**PICCS** - Philippines Inventory of Chemicals and Chemical Substances
**AIIC** - Australian Inventory of Industrial Chemicals
**NZIoC** - New Zealand Inventory of Chemicals

**US Federal Regulations**

**SARA 313**
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

| Chemical name | SARA 313 - Threshold Values % |
|---|---|
| Lead (pieces) - 7439-92-1 | 0.1 |

**SARA 311/312 Hazard Categories**
Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

**CWA (Clean Water Act)**
This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

| Chemical name | CWA - Reportable Quantities | CWA - Toxic Pollutants | CWA - Priority Pollutants | CWA - Hazardous Substances |
|---|---|---|---|---|
| Lead (pieces)<br>7439-92-1 | - | X | X | - |

**CERCLA**
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302).

| Chemical name | Hazardous Substances RQs | Extremely Hazardous Substances RQs | Reportable Quantity (RQ) |
|---|---|---|---|
| Lead (pieces)<br>7439-92-1 | 10 lb | - | RQ 10 lb final RQ<br>RQ 4.54 kg final RQ |

**US State Regulations**

**California Proposition 65**

This product contains the following Proposition 65 chemicals:.

| Chemical name | California Proposition 65 |
|---|---|
| Lead (pieces) - 7439-92-1 | Carcinogen<br>Developmental<br>Female Reproductive<br>Male Reproductive |

**U.S. State Right-to-Know Regulations**

| Chemical name | New Jersey | Massachusetts | Pennsylvania |
|---|---|---|---|
| Lead (pieces)<br>7439-92-1 | X | X | X |
| oxygen<br>7782-44-7 | X | X | X |
| Titanium (pieces)<br>7440-32-6 | X | - | - |
| Zirconium (pieces)<br>7440-67-7 | X | X | X |

**U.S. EPA Label Information**

**EPA Pesticide Registration Number** Not applicable

## 16. Other information

**NFPA** **Health hazards** 3 **Flammability** 0 **Instability** 0 **Special hazards** -
**HMIS** **Health hazards** 2 * **Flammability** 0 **Physical hazards** 0 **Personal protection** X
*Chronic Hazard Star Legend* ** = Chronic Health Hazard*

**Key or legend to abbreviations and acronyms used in the safety data sheet**

**Legend Section 8: Exposure controls/personal protection**

| | | | |
|---|---|---|---|
| TWA | TWA (time-weighted average) | STEL | STEL (Short Term Exposure Limit) |
| Ceiling | Maximum limit value | Sk* | Skin designation |

**Key literature references and sources for data used to compile the SDS**

Agency for Toxic Substances and Disease Registry (ATSDR)
U.S. Environmental Protection Agency ChemView Database
European Food Safety Authority (EFSA)
Environmental Protection Agency
Acute Exposure Guideline Level(s) (AEGL(s))
U.S. Environmental Protection Agency Federal Insecticide, Fungicide, and Rodenticide Act
U.S. Environmental Protection Agency High Production Volume Chemicals
Food Research Journal
Hazardous Substance Database
International Uniform Chemical Information Database (IUCLID)
National Institute of Technology and Evaluation (NITE)
Australia National Industrial Chemicals Notification and Assessment Scheme (NICNAS)
NIOSH (National Institute for Occupational Safety and Health)
National Library of Medicine's ChemID Plus (NLM CIP)
National Library of Medicine’s PubMed database (NLM PUBMED)
U.S. National Toxicology Program (NTP)
New Zealand's Chemical Classification and Information Database (CCID)
Organization for Economic Co-operation and Development Environment, Health, and Safety Publications
Organization for Economic Co-operation and Development High Production Volume Chemicals Program
Organization for Economic Co-operation and Development Screening Information Data Set
World Health Organization

| | |
|---|---|
| **Revision date** | 07/16/2026 |
| **Revision Note** | No information available. |

**Disclaimer**

**The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.**

**End of Safety Data Sheet**