

## SAFETY DATA SHEET

### Bismuth Telluride (pieces)

#### 1. Identification

##### Product identifier

**Product name** Bismuth Telluride (pieces)

**Internal identification** Replaces M-2230-070

**CAS number** 1304-82-1

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

**Application** Exterior surface coating.

**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  
15-16 Burgess Road  
Hastings, East Sussex, TN35 4NR  
England  
Customer Service: +44 (0) 1424 458100  
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

#### 2. Hazard(s) identification

##### Classification of the substance or mixture

**Physical hazards** Not Classified

**Health hazards** Acute Tox. 3 - H301 Acute Tox. 2 - H330

**Environmental hazards** Not Classified

##### Label elements

###### Pictogram



**Signal word** Danger

# Bismuth Telluride (pieces)

<b>Hazard statements</b>	H301 Toxic if swallowed. H330 Fatal if inhaled.
<b>Precautionary statements</b>	P260 Do not breathe vapor/ spray. P264 Wash contaminated skin thoroughly after handling. P284 [In case of inadequate ventilation] wear respiratory protection. P301+P310 If swallowed: Immediately call a poison center/ doctor. P304+P340 If inhaled: Remove person to fresh air and keep comfortable for breathing. P320 Specific treatment is urgent (see medical advice on this label).
<b>Contains</b>	Bismuth Telluride (pieces)

## Other hazards

This substance is not classified as PBT or vPvB according to current EU criteria.

## 3. Composition/information on ingredients

### Mixtures

<b>Bismuth Tellurium (pieces)</b>	<b>60-100%</b>
CAS number: 1304-82-1	
<b>Classification</b>	
Acute Tox. 3 - H301	
Acute Tox. 3 - H331	

The Full Text for all Hazard Statements are Displayed in Section 16.

## 4. First-aid measures

### Description of first aid measures

<b>General information</b>	Get medical attention immediately. Show this Safety Data Sheet to the medical personnel.
<b>Inhalation</b>	Move affected person to fresh air and keep warm and at rest in a position comfortable for breathing. Maintain an open airway. Loosen tight clothing such as collar, tie or belt. When breathing is difficult, properly trained personnel may assist affected person by administering oxygen. Get medical attention. Place unconscious person on their side in the recovery position and ensure breathing can take place.
<b>Ingestion</b>	Get medical attention immediately. Rinse mouth thoroughly with water. Give a few small glasses of water or milk to drink. Stop if the affected person feels sick as vomiting may be dangerous. Never give anything by mouth to an unconscious person. Place unconscious person on their side in the recovery position and ensure breathing can take place. Keep affected person under observation.
<b>Skin Contact</b>	Rinse with water.
<b>Eye contact</b>	Rinse with water. Get medical attention if any discomfort continues.
<b>Protection of first aiders</b>	It may be dangerous for first aid personnel to carry out mouth-to-mouth resuscitation.

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

<b>General information</b>	The severity of the symptoms described will vary dependent on the concentration and the length of exposure.
<b>Inhalation</b>	A single exposure may cause the following adverse effects: Drowsiness, dizziness, disorientation, vertigo. Unconsciousness. High concentrations may be fatal.
<b>Ingestion</b>	May cause stomach pain or vomiting. May cause severe internal injury.
<b>Skin contact</b>	Prolonged contact may cause dryness of the skin.
<b>Eye contact</b>	No specific symptoms known. May be slightly irritating to eyes.

# Bismuth Telluride (pieces)

## Indication of immediate medical attention and special treatment needed

**Notes for the doctor** Treat symptomatically. Keep affected person under observation.

## 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.

**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** This product is toxic.

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

### Advice for firefighters

**Protective actions during firefighting** Avoid breathing fire gases or vapors. Evacuate area. Keep upwind to avoid inhalation of gases, vapors, fumes and smoke. Ventilate closed spaces before entering them. 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. Control run-off water by containing and keeping it out of sewers and watercourses. If risk of water pollution occurs, notify appropriate authorities.

**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** Wear protective clothing as described in Section 8 of this safety data sheet. No action shall be taken without appropriate training or involving any personal risk. Avoid inhalation of dust and vapors. Use suitable respiratory protection if ventilation is inadequate.

### Environmental precautions

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

### Methods and material for containment and cleaning up

**Methods for cleaning up** Wear protective clothing as described in Section 8 of this safety data sheet. Clear up spills immediately and dispose of waste safely. Provide adequate ventilation. 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. For waste disposal, see Section 13.

**Reference to other sections** For personal protection, see Section 8. See Section 11 for additional information on health hazards. See Section 12 for additional information on ecological hazards. For waste disposal, see Section 13.

## 7. Handling and storage

### Precautions for safe handling

# Bismuth Telluride (pieces)

**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. This product is toxic. Immediate first aid is imperative. Do not handle until all safety precautions have been read and understood. Do not handle broken packages without protective equipment. Do not reuse empty containers.

**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** Store locked up. Keep only in the original container. Keep container tightly closed, in a cool, well ventilated place. Keep containers upright. Protect containers from damage.

**Storage class** Toxic storage.

## Specific end uses(s)

**Specific end use(s)** The identified uses for this product are detailed in Section 1.2.

## 8. Exposure Controls/personal protection

### Control parameters

#### Occupational exposure limits

Long-term exposure limit (8-hour TWA): ACGIH 5 mg/m<sup>3</sup>  
as Bi<sub>2</sub>Te<sub>3</sub>

A4

Long-term exposure limit (8-hour TWA): OSHA 15 mg/m<sup>3</sup> total dust

Long-term exposure limit (8-hour TWA): ACGIH 10 mg/m<sup>3</sup>  
as Bi<sub>2</sub>Te<sub>3</sub>

A4

Long-term exposure limit (8-hour TWA): OSHA 5 mg/m<sup>3</sup> respirable fraction

#### **Bismuth Tellurium (pieces)**

Long-term exposure limit (8-hour TWA): ACGIH 5 mg/m<sup>3</sup>  
as Bi<sub>2</sub>Te<sub>3</sub>

A4

Long-term exposure limit (8-hour TWA): OSHA 15 mg/m<sup>3</sup> total dust

Long-term exposure limit (8-hour TWA): ACGIH 10 mg/m<sup>3</sup>  
as Bi<sub>2</sub>Te<sub>3</sub>

A4

Long-term exposure limit (8-hour TWA): OSHA 5 mg/m<sup>3</sup> respirable fraction

ACGIH = American Conference of Governmental Industrial Hygienists.

A4 = Not Classifiable as a Human Carcinogen.

OSHA = Occupational Safety and Health Administration.

### Exposure controls

#### **Protective equipment**



#### **Appropriate engineering controls**

Provide adequate general and local exhaust ventilation. Ensure the ventilation system is regularly maintained and tested. Good general ventilation should be adequate to control worker exposure to airborne contaminants. Observe any occupational exposure limits for the product or ingredients.

#### **Eye/face protection**

Unless the assessment indicates a higher degree of protection is required, the following protection should be worn: Tight-fitting safety glasses.

#### **Hand protection**

No specific hand protection recommended.

## Bismuth Telluride (pieces)

<b>Other skin and body protection</b>	Wear appropriate clothing to prevent repeated or prolonged skin contact.
<b>Hygiene measures</b>	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.
<b>Respiratory protection</b>	Ensure all respiratory protective equipment is suitable for its intended use and is NIOSH approved. Check that the respirator fits tightly and the filter is changed regularly. Gas and combination filter cartridges should comply with OSHA 1910.134. Full face mask respirators with replaceable filter cartridges should comply with OSHA 1910.134. Half mask and quarter mask respirators with replaceable filter cartridges should comply with OSHA 1910.134.
<b>Environmental exposure controls</b>	Keep container tightly sealed when not in use. Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

### 9. Physical and Chemical Properties

#### Information on basic physical and chemical properties

<b>Appearance</b>	Solid.
<b>Color</b>	Grey.
<b>Odor</b>	No characteristic odor.
<b>Odor threshold</b>	Not applicable.
<b>pH</b>	Not applicable.
<b>Melting point</b>	580°C
<b>Initial boiling point and range</b>	Not available.
<b>Flash point</b>	Not applicable.
<b>Evaporation rate</b>	Not applicable.
<b>Flammability (solid, gas)</b>	Not applicable.
<b>Upper/lower flammability or explosive limits</b>	Not applicable.
<b>Vapor pressure</b>	Not available.
<b>Vapor density</b>	Not available.
<b>Relative density</b>	7.74 @ 25°C
<b>Bulk density</b>	Not available.
<b>Solubility(ies)</b>	Insoluble in water.
<b>Partition coefficient</b>	Not applicable.
<b>Auto-ignition temperature</b>	Not applicable.
<b>Decomposition Temperature</b>	Not available.
<b>Viscosity</b>	Not applicable.
<b>Molecular weight</b>	800.76

### 10. Stability and reactivity

<b>Reactivity</b>	There are no known reactivity hazards associated with this product.
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## Bismuth Telluride (pieces)

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

### 11. Toxicological information

#### Information on toxicological effects

##### Acute toxicity - oral

**Notes (oral LD<sub>50</sub>)** Acute Tox. 3 - H301 Toxic if swallowed.

**ATE oral (mg/kg)** 100.0

##### Acute toxicity - dermal

**Notes (dermal LD<sub>50</sub>)** Based on available data the classification criteria are not met.

##### Acute toxicity - inhalation

**Notes (inhalation LC<sub>50</sub>)** Acute Tox. 3 - H331 Toxic if inhaled.

**ATE inhalation (dusts/mists mg/l)** 0.5

##### 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

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

## Bismuth Telluride (pieces)

### Aspiration hazard

Aspiration hazard Not relevant. Solid.

### **General information**

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

### **Inhalation**

A single exposure may cause the following adverse effects: Drowsiness, dizziness, disorientation, vertigo. Unconsciousness. High concentrations may be fatal.

### **Ingestion**

May cause stomach pain or vomiting. May cause severe internal injury.

### **Skin Contact**

Prolonged contact may cause dryness of the skin.

### **Eye contact**

No specific symptoms known.

### **Route of entry**

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

### **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**

Not applicable.

### 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. When handling waste, the safety precautions applying to handling of the product should be considered. Care should be taken when handling emptied containers that have not been thoroughly cleaned or rinsed out. Empty containers or liners may retain some product residues and hence be potentially hazardous.

### **Disposal methods**

Dispose of surplus products and those that cannot be recycled via a licensed waste disposal contractor. Waste, residues, empty containers, discarded work clothes and contaminated cleaning materials should be collected in designated containers, labeled with their contents. Incineration or landfill should only be considered when recycling is not feasible.

## 14. Transport information

### **General**

For limited quantity packaging/limited load information, consult the relevant modal documentation using the data shown in this section.

### UN Number

## Bismuth Telluride (pieces)

UN No. (TDG)	3284
UN No. (IMDG)	3284
UN No. (ICAO)	3284
UN No. (DOT)	3284

### UN proper shipping name

Proper shipping name (TDG)	TELLURIUM COMPOUND, N.O.S.
Proper shipping name (IMDG)	TELLURIUM COMPOUND, N.O.S.
Proper shipping name (ICAO)	TELLURIUM COMPOUND, N.O.S.
Proper shipping name (DOT)	TELLURIUM COMPOUND, N.O.S.

### Transport hazard class(es)

TDG class	6.1
TDG label(s)	6.1
IMDG Class	6.1
ICAO class/division	6.1

### Transport labels



### Packing group

TDG Packing Group	III
IMDG packing group	III
ICAO packing group	III
DOT packing group	III

### Environmental hazards

Environmentally Hazardous Substance  
No.

### Special precautions for user

Always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

EmS F-A, S-A

## 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.



## Bismuth Telluride (pieces)

### **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.

### **FDA - Precursor Chemical**

None of the ingredients are listed or exempt.

### **SARA (311/312) Hazard Categories**

Acute

### **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**

All the ingredients are listed or exempt.

#### **Minnesota "Right To Know" List**

None of the ingredients are listed or exempt.

#### **New Jersey "Right To Know" List**

All the ingredients are listed or exempt.

#### **Pennsylvania "Right To Know" List**

All the ingredients are listed or exempt.

### **Inventories**

#### **US - TSCA**

All the ingredients are listed or exempt.

#### **US - TSCA 12(b) Export Notification**

None of 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.

### **16. Other information**

## Bismuth Telluride (pieces)

**SDS No.**

4809

**Hazard statements in full**

H301 Toxic if swallowed.

H330 Fatal if inhaled.

H331 Toxic if inhaled.

**End of SDS**