Section 1: Identification of the Substance/Mixture and of the Company/Undertaking

1.1 Product identifier
Product Name • Thermal-Seal
Synonyms • Anti-Seize; Lubricant; Sealant; Thread Compound

1.2 Relevant identified uses of the substance or mixture and uses advised against
Relevant identified use(s) • Anti-Seize, Lubricant, Sealant, conventional tubing threads in high temperature service

1.3 Details of the supplier of the safety data sheet
Manufacturer • Topco Oilsite Products Ltd.
Bay 7, 3401 - 19th Street N.E.
Calgary, Alberta T2E 6S8
Canada
www.topcooilsite.com
msds@topcooilsite.com
Telephone (General) • 403-219-0255

1.4 Emergency telephone number
Manufacturer • 403-219-0255
Poison & Drug Information Service (Alberta Health Services) • 1-800-332-1414

Section 2: Hazards Identification

EU/EEC

2.1 Classification of the substance or mixture
CLP • Carcinogenicity 2 - H351
Hazardous to the aquatic environment Acute 1 - H400
Hazardous to the aquatic environment Chronic 1 - H410

2.2 Label Elements
CLP WARNING

Hazard statements • H351 - Suspected of causing cancer.
H400 - Very toxic to aquatic life
H410 - Very toxic to aquatic life with long lasting effects

Precautionary statements
Prevention • P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
2.3 Other Hazards

CLP

- Heating above the melting point releases metallic oxides which may cause metal fume fever by inhalation. The symptoms are shivering, fever, malaise and muscular pain. According to Regulation (EC) No. 1272/2008 (CLP) this material is considered hazardous.

UN GHS Revision 4
According to: UN Globally Harmonized System of Classification and Labelling of Chemicals (GHS): Fourth Revised Edition

2.1 Classification of the substance or mixture

UN GHS

- Acute Toxicity Oral 5
- Skin Mild Irritation 3
- Carcinogenicity 2
- Hazardous to the aquatic environment Acute 1
- Hazardous to the aquatic environment Chronic 1

2.2 Label elements

UN GHS

WARNING

Hazard statements

- May be harmful if swallowed
- Causes mild skin irritation
- Suspected of causing cancer.
- Very toxic to aquatic life
- Very toxic to aquatic life with long lasting effects

Precautionary statements

Prevention

- Obtain special instructions before use.
- Do not handle until all safety precautions have been read and understood.
- Avoid release to the environment.
- Wear protective gloves/protective clothing/eye protection/face protection.

Response

- If skin irritation occurs: Get medical advice/attention.
- Call a POISON CENTER/doctor if you feel unwell.
- IF exposed or concerned: Get medical advice/attention.
- Collect spillage.

Storage/Disposal

- Store locked up.
- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Supplemental information

- Supplemental information

2.3 Other hazards

UN GHS

- Heating above the melting point releases metallic oxides which may cause metal fume fever by inhalation. The symptoms are shivering, fever, malaise and muscular pain
According to the Globally Harmonized System for Classification and Labeling (GHS) this product is considered hazardous

**United States (US)**
According to: OSHA 29 CFR 1910.1200 HCS

### 2.1 Classification of the substance or mixture

OSHA HCS 2012  
- Carcinogenicity 2  
  Hazards Not Otherwise Classified - Health Hazards - Metal fume fever

### 2.2 Label elements

OSHA HCS 2012

**WARNING**

- **Hazard statements**
  - Suspected of causing cancer.

- **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/face protection.
  - **Response**
    - IF exposed or concerned: Get medical advice/attention.
  - **Storage/Disposal**
    - Store locked up.
    - Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

### 2.3 Other hazards

OSHA HCS 2012  
- Heating above the melting point releases metallic oxides which may cause metal fume fever by inhalation. The symptoms are shivering, fever, malaise and muscular pain. Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.

**Canada**
According to: WHMIS 2015

### 2.1 Classification of the substance or mixture

WHMIS 2015  
- Carcinogenicity 2  
  Health Hazards Not Otherwise Classified 1

### 2.2 Label elements

WHMIS 2015

**DANGER**

- **Hazard statements**
  - Suspected of causing cancer.
  - Heating above the melting point releases metallic oxides which may cause metal fume fever by inhalation. The symptoms are shivering, fever, malaise and muscular pain.
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/face protection.

Response • IF exposed or concerned: Get medical advice/attention.

Storage/Disposal • Store locked up.
Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

2.3 Other hazards

WHMIS 2015 • In Canada, the product mentioned above is considered hazardous under the Workplace Hazardous Materials Information System (WHMIS).

Section 3 - Composition/Information on Ingredients

3.1 Substances

• Material does not meet the criteria of a substance.

3.2 Mixtures

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Identifiers</th>
<th>%</th>
<th>LD50/LC50</th>
<th>Classifications According to Regulation/Directive</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crystalline silica</td>
<td>CAS:14808-60-7</td>
<td>30%</td>
<td>NDA</td>
<td>EU CLP: STOT RE 1, H372; Carc. 1A; H350i, H350i \nUN GHS Revision 4: \nOSHA HCS 2012: Carc. 1A; STOT RE 1 (Lungs/Inhl) \nWHMIS 2015: Carc. 1A; STOT RE 1 (Lungs/Inhl)</td>
<td>NDA</td>
</tr>
<tr>
<td>Graphite</td>
<td>CAS:7782-42-5</td>
<td>&gt; 25%</td>
<td>NDA</td>
<td>EU CLP: STOT RE 1 (Lungs / Inhl), H372 \nUN GHS Revision 4: STOT RE 1 (Lungs / Inhl) \nOSHA HCS 2012: Comb. Dust; STOT RE 1 (Lungs / Inhl) \nWHMIS 2015: Comb. Dust; STOT RE 1 (Lungs / Inhl)</td>
<td>NDA</td>
</tr>
<tr>
<td>Zinc powder, stabilized</td>
<td>CAS:7440-66-6</td>
<td>10% TO 25%</td>
<td>NDA</td>
<td>EU CLP: Annex VI, Table 3.1: Aquatic Acute 1, H400; Aquatic Chronic 1, H410 \nUN GHS Revision 4: Skin Irrit. 3; Aquatic Acute 1; Aquatic Chronic 1 \nOSHA HCS 2012: Comb. Dust; Hazard Not Otherwise Classified - Health Hazard - Metal fume fever \nWHMIS 2015: Comb. Dust; Hazard Not Otherwise Classified - Health Hazard - Metal fume fever</td>
<td>NDA</td>
</tr>
<tr>
<td>Copper oxide</td>
<td>CAS:1317-38-0</td>
<td>5% TO 10%</td>
<td>Ingestion/Oral-Rat LD50 • 470 mg/kg</td>
<td>EU CLP: Annex VI, Table 3.1: Aquatic Acute 1, H400; Aquatic Chronic 1, H410 \nUN GHS Revision 4: Acute Tox. 4 (Orl); Aquatic Acute 1 (M=10); Aquatic Chronic 1 (M=1) \nOSHA HCS 2012: Acute Tox. 4 (Oral); Hazard Not Otherwise Classified - Health Hazard - Metal Fume Fever \nWHMIS 2015: Acute Tox. 4 (Oral); Hazard Not Otherwise Classified - Health Hazard - Metal Fume Fever</td>
<td>NDA</td>
</tr>
</tbody>
</table>
4.1 Description of first aid measures

Inhalation • Move victim to fresh air. Administer oxygen if breathing is difficult. Give artificial respiration if victim is not breathing.

Skin • In case of contact with substance, immediately flush skin with running water for at least 20 minutes. Get medical attention if symptoms occur.

Eye • In case of contact with substance, immediately flush eyes with running water for at least 20 minutes. Get medical attention if symptoms occur.

Ingestion • Obtain medical attention immediately if ingested.

4.2 Most important symptoms and effects, both acute and delayed

• Refer to Section 11 - Toxicological Information.

4.3 Indication of any immediate medical attention and special treatment needed

Notes to Physician • All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

Section 5 - Firefighting Measures

5.1 Extinguishing media

Suitable Extinguishing Media • In case of fire use media as appropriate for surrounding fire.

Unsuitable Extinguishing Media • No data available

5.2 Special hazards arising from the substance or mixture

Unusual Fire and Explosion Hazards • None

Hazardous Combustion Products • Hazardous decomposition products formed under fire conditions: Carbon oxides.

5.3 Advice for firefighters

• Structural firefighters' protective clothing will only provide limited protection. Wear positive pressure self-contained breathing apparatus (SCBA).

Section 6 - Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal Precautions • Ventilate the area. Do not walk through spilled material. Wear appropriate personal protective equipment, avoid direct contact.

Emergency Procedures • Keep unauthorized personnel away. Stay upwind.

6.2 Environmental precautions

• Avoid run off to waterways and sewers.
6.3 Methods and material for containment and cleaning up

Containment/Clean-up

- Carefully shovel or sweep up spilled material and place in suitable container.

6.4 Reference to other sections

- Refer to Section 8 - Exposure Controls/Personal Protection and Section 13 - Disposal Considerations.

Section 7 - Handling and Storage

7.1 Precautions for safe handling

Handling

- Use only with adequate ventilation. Use good safety and industrial hygiene practices. Wear appropriate personal protective equipment, avoid direct contact. Avoid contact with skin, eyes, and clothing. Do not eat, drink or smoke when using this product. Wash thoroughly with soap and water after handling and before eating, drinking, or using tobacco.

7.2 Conditions for safe storage, including any incompatibilities

Storage

- Keep container tightly closed. Store in a cool, dry, well-ventilated place.

7.3 Specific end use(s)

- Refer to Section 1.2 - Relevant identified uses.

Section 8 - Exposure Controls/Personal Protection

8.1 Control parameters

<table>
<thead>
<tr>
<th></th>
<th>Exposure Limits/Guidelines</th>
<th>Argentina</th>
<th>Australia</th>
<th>Canada Alberta</th>
<th>Canada British Columbia</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Asphalt (8052-42-4)</strong></td>
<td>TWAs</td>
<td>0.5 mg/m³ TWA (fume, inhalable particulate matter, as benzene-soluble aerosol)</td>
<td>0.5 mg/m³ TWA (fume)</td>
<td>5 mg/m³ TWA (fume)</td>
<td>0.5 mg/m³ TWA (inhalable fume, as benzene-soluble aerosol)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 mg/m³ TWA (petroleum fumes)</td>
<td>0.5 mg/m³ TWA (Bitumen, fume, as benzene-soluble aerosol (inhalable fraction))</td>
<td>0.5 mg/m³ TWA (Bitumen, fume, as benzene-soluble aerosol (inhalable fraction))</td>
<td></td>
</tr>
<tr>
<td><strong>Copper oxide</strong></td>
<td>TWAs</td>
<td>1 mg/m³ TWA (dust and mist, as Cu) as Copper compounds</td>
<td>Not established</td>
<td>Not established</td>
<td>Not established</td>
</tr>
<tr>
<td><strong>Graphite</strong></td>
<td>TWAs</td>
<td>2 mg/m³ TWA (all forms except graphite fibers, respirable particulate matter)</td>
<td>2 mg/m³ TWA [CMP] (all forms except fibers, respirable fraction)</td>
<td>3 mg/m³ TWA (containing no asbestos and &lt;1% crystalline silica; all forms except fibres; natural and synthetic respirable dust)</td>
<td>2 mg/m³ TWA (all forms except graphite fibres, respirable)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.5 mg/m³ STEL ( Bitumen, fume, as Benzene soluble aerosol (inhalable fraction))</td>
<td>Not established</td>
<td>Not established</td>
<td>Not established</td>
</tr>
<tr>
<td><strong>Crystalline silica</strong></td>
<td>TWAs</td>
<td>0.025 mg/m³ TWA (respirable particulate matter)</td>
<td>0.05 mg/m³ TWA [CMP] (respirable fraction)</td>
<td>0.1 mg/m³ TWA (respirable dust)</td>
<td>0.025 mg/m³ TWA (respirable particulate)</td>
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<tr>
<td></td>
<td></td>
<td>0.025 mg/m³ TWA (respirable)</td>
<td>0.025 mg/m³ TWA (respirable particulate)</td>
<td>0.025 mg/m³ TWA (respirable particulate)</td>
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Exposure Limits/Guidelines (Con’t.)

<table>
<thead>
<tr>
<th></th>
<th>Canada Manitoba</th>
<th>Canada New Brunswick</th>
<th>Canada Northwest Territories</th>
<th>Canada Nova Scotia</th>
<th>Canada Nunavut</th>
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</thead>
<tbody>
<tr>
<td><strong>Asphalt (8052-42-4)</strong></td>
<td>TWAs</td>
<td>0.5 mg/m³ TWA (fume, inhalable particulate matter, as benzene-soluble aerosol)</td>
<td>5 mg/m³ TWA (petroleum fumes)</td>
<td>0.5 mg/m³ TWA (Bitumen, fume, as Benzene soluble aerosol (inhalable fraction))</td>
<td>0.5 mg/m³ TWA (Bitumen, fume, as Benzene soluble aerosol (inhalable fraction))</td>
</tr>
<tr>
<td></td>
<td>STELs</td>
<td>Not established</td>
<td>Not established</td>
<td>1.5 mg/m³ STEL (Bitumen, fume, as Benzene soluble aerosol (inhalable fraction))</td>
<td>Not established</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.5 mg/m³ STEL (Bitumen, fume, as Benzene soluble aerosol (inhalable fraction))</td>
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<td>Substance</td>
<td>TWAs</td>
<td>STELs</td>
<td>TWAs</td>
<td>STELs</td>
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<td></td>
</tr>
<tr>
<td>Copper oxide</td>
<td>Not established</td>
<td>Not established</td>
<td>Not established</td>
<td>Not established</td>
<td></td>
</tr>
<tr>
<td>TWAs</td>
<td>1 mg/m³ TWA (dust and mist, as Cu) as Copper compounds</td>
<td>2 mg/m³ TWA (all forms except Graphite fibers, respirable particulate matter)</td>
<td>2 mg/m³ TWA (natural, all forms, except Graphite fibers, respirable fraction)</td>
<td>2 mg/m³ TWA (natural, all forms, except Graphite fibers, respirable fraction)</td>
<td></td>
</tr>
<tr>
<td>TWAs</td>
<td>Not established</td>
<td>Not established</td>
<td>2 mg/m³ TWA (dust and mist, as Cu) as Copper compounds</td>
<td>Not established</td>
<td></td>
</tr>
<tr>
<td>TWAs</td>
<td>Not established</td>
<td>4 mg/m³ STEL (natural, all forms, except Graphite fibers, respirable fraction)</td>
<td>Not established</td>
<td>4 mg/m³ STEL (natural, all forms, except Graphite fibers, respirable fraction)</td>
<td></td>
</tr>
<tr>
<td>Crystalline silica (14808-60-7)</td>
<td>0.025 mg/m³ TWA (respirable particulate matter)</td>
<td>Not established</td>
<td>0.05 mg/m³ TWA (respirable fraction, listed under Silica - crystalline)</td>
<td>Not established</td>
<td></td>
</tr>
<tr>
<td>TWAs</td>
<td>0.1 mg/m³ TWA (respirable fraction)</td>
<td>4 mg/m³ STEL (natural, all forms, except Graphite fibers, respirable fraction)</td>
<td>2 mg/m³ TWA (respirable particulate matter)</td>
<td>0.05 mg/m³ TWA (respirable fraction, listed under Silica - crystalline)</td>
<td></td>
</tr>
</tbody>
</table>

**Exposure Limits/Guidelines (Con't.)**

<table>
<thead>
<tr>
<th>Result</th>
<th>Canada Ontario</th>
<th>Canada Quebec</th>
<th>Canada Saskatchewan</th>
<th>Canada Yukon</th>
<th>China</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asphault (8052-42-4)</td>
<td>STELs</td>
<td>Not established</td>
<td>1.5 mg/m³ STEL (fume and inhalable fraction, as Benzene soluble aerosol)</td>
<td>10 mg/m³ STEL (fume)</td>
<td>12.5 mg/m³ STEL (fume, as Benzene soluble matter)</td>
</tr>
<tr>
<td>TWAs</td>
<td>0.5 mg/m³ TWA (fume, inhalable, as Benzene-soluble aerosol)</td>
<td>5 mg/m³ TWAEV (fume)</td>
<td>0.5 mg/m³ TWA (fume and inhalable fraction, as Benzene soluble aerosol)</td>
<td>5 mg/m³ TWA (fume)</td>
<td>5 mg/m³ TWA (fume, as Benzene soluble matter)</td>
</tr>
<tr>
<td>Graphite</td>
<td>STELs</td>
<td>Not established</td>
<td>4 mg/m³ STEL (natural, except Graphite fibres, respirable fraction)</td>
<td>Not established</td>
<td>8 mg/m³ STEL (total dust); 4 mg/m³ STEL (respirable dust)</td>
</tr>
<tr>
<td>TWAs</td>
<td>2 mg/m³ TWA (except Graphite fibres, respirable)</td>
<td>2 mg/m³ TWAEV (containing no Asbestos and &lt;1% Crystalline silica, except Graphite fibres, respirable dust)</td>
<td>2 mg/m³ TWA (natural, except Graphite fibres, respirable fraction)</td>
<td>20 mppcf TWA; 30 mppcf TWA (synthetic); 10 mg/m³ TWA (synthetic)</td>
<td>4 mg/m³ TWA (total dust); 2 mg/m³ TWA (respirable dust)</td>
</tr>
<tr>
<td>Crystalline silica (14808-60-7)</td>
<td>STELs</td>
<td>Not established</td>
<td>Not established</td>
<td>Not established</td>
<td>Not established</td>
</tr>
<tr>
<td>TWAs</td>
<td>0.10 mg/m³ TWA (designated substances regulation, respirable, listed under Silica, crystalline)</td>
<td>0.1 mg/m³ TWAEV (respirable dust)</td>
<td>0.05 mg/m³ TWA (respirable fraction, listed under Silica - crystalline (Trydimite removed))</td>
<td>300 particle/mL TWA (listed under Silica - Quartz, crystalline)</td>
<td>0.7 mg/m³ TWA (containing 50-80% free SiO2, total dust); 0.5 mg/m³ TWA (containing &gt;80% free SiO2, total dust)</td>
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<tr>
<td></td>
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<td>1.4 mg/m³ STEL (containing 50-80% free SiO2, total dust); 0.6 mg/m³ STEL (containing 50-80% free SiO2, respirable dust); 2 mg/m³ STEL (containing 10-50% free SiO2, total dust); 1.4 mg/m³ STEL (containing 10-50% free SiO2, respirable dust); 1 mg/m³ STEL (containing &gt;80% free SiO2, total dust); 0.4 mg/m³ STEL (containing &gt;80% free SiO2, respirable dust)</td>
<td>0 mg/m³ TWA (containing &gt;80% free SiO2, respirable dust)</td>
<td>0 mg/m³ TWA (containing &gt;80% free SiO2, respirable dust)</td>
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<tr>
<td>Result</td>
<td>France</td>
<td>Germany DFG</td>
<td>India</td>
<td>Indonesia</td>
<td>Israel</td>
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<tr>
<td>Asphalt (8052-42-4)</td>
<td>TWAs</td>
<td>Not established</td>
<td>Not established</td>
<td>0.5 mg/m³ TWA</td>
<td>0.5 mg/m³ TWA (soluble aerosol, fume)</td>
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<td>(fume, inhalable fraction, as benzene</td>
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<td>soluble aerosol)</td>
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<tr>
<td>Copper oxide</td>
<td>TWAs</td>
<td>Not established</td>
<td>Not established</td>
<td>Not established</td>
<td>1 mg/m³ TWA (dust and mist, as Cu)</td>
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<td></td>
<td></td>
<td>as Copper compounds</td>
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<tr>
<td>Zinc powder, stabilized (7440-66-6)</td>
<td>Ceilings</td>
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<td>Not established</td>
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<tr>
<td></td>
<td>MAKs</td>
<td>0.4 mg/m³ Peak</td>
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<td></td>
<td></td>
<td>(respirable fraction);</td>
<td>(inhalable fraction)</td>
<td>(respirable fraction);</td>
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</tr>
<tr>
<td></td>
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<td>2 mg/m³ TWA MAK</td>
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<td>2 mg/m³ TWA MAK</td>
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<td>(respirable fraction);</td>
<td></td>
<td>(inhalable fraction)</td>
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<td>4 mg/m³ TWA MAK</td>
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<tr>
<td>Graphite (7782-42-5)</td>
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<td>2 mg/m³ TWA</td>
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<td>except graphite fibers)</td>
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<td>MAKs</td>
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<tr>
<td>Crystalline silica (14808-60-7)</td>
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<td>0.1 mg/m³ TWA [VME]</td>
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<td>0.025 mg/m³ TWA (respirable fraction)</td>
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<td>(restrictive limit,</td>
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<td></td>
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<td>alveolar fraction)</td>
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<td>(10600)/(10%Quartz +</td>
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<td></td>
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<td>10) mppcm TWA, dust</td>
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<td>count;</td>
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<td>(10)/(1%Quartz + 2)</td>
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<td>mg/m³ TWA,</td>
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<td></td>
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<td>respirable dust;</td>
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<td>(30)/(1%Quartz + 3)</td>
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<tr>
<td></td>
<td></td>
<td>mg/m³ TWA, total dust</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(10)/(%Quartz + 10)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>mppcm TWA, dust count;</td>
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<tr>
<td></td>
<td></td>
<td>(10) mg/m³ TWA,</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>respirable dust;</td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td>(30) mg/m³ TWA, total</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>dust</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>0.1 mg/m³ TWA</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(respirable particulate)</td>
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<table>
<thead>
<tr>
<th>Result</th>
<th>Japan</th>
<th>Malaysia</th>
<th>Mexico</th>
<th>Netherlands</th>
<th>NIOSH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asphalt (8052-42-4)</td>
<td>STELs</td>
<td>Not established</td>
<td>Not established</td>
<td>10 mg/m³ STEL [PPT-CT]</td>
<td>Not established</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Not established</td>
</tr>
<tr>
<td></td>
<td>TWAs</td>
<td>Not established</td>
<td>5 mg/m³ TWA (fume)</td>
<td>5 mg/m³ TWA VLE-PPT</td>
<td>Not established</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Not established</td>
</tr>
<tr>
<td></td>
<td>Ceilings</td>
<td>Not established</td>
<td>Not established</td>
<td>5 mg/m³ Ceiling (fume, 15 min)</td>
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<td></td>
<td></td>
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<td></td>
<td>Not established</td>
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<td>Copper oxide</td>
<td>TWAs</td>
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<td>Not established</td>
<td>Not established</td>
<td>0.1 mg/m³ TWA (fume, as Cu)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graphite (7782-42-5)</td>
<td>TWAs</td>
<td>2 mg/m³ OEL (Class 1</td>
<td>2 mg/m³ TWA (all forms</td>
<td>2 mg/m³ TWA VLE-PPT</td>
<td>Not established</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dust, total dust);</td>
<td>except Graphite fibres,</td>
<td>(synthetic and natural)</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>0.5 mg/m³ OEL (Class 1</td>
<td>respirable fraction)</td>
<td></td>
<td>Not established</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dust, respirable dust)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compound</td>
<td>TWAs</td>
<td>STELs</td>
<td>OSHA</td>
<td>OSHA Vacated</td>
<td>Portugal</td>
</tr>
<tr>
<td>-------------------</td>
<td>-----------------------------</td>
<td>-------------------------------</td>
<td>------------------</td>
<td>--------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Crystalline silica (14808-60-7)</td>
<td>0.03 mg/m³ OEL (respirable dust) as Silica, crystalline (general form)</td>
<td>0.05 mg/m³ TWA (respirable dust)</td>
<td>0.075 mg/m³ TWA (respirable dust, listed under Silicium dioxide)</td>
<td>0.05 mg/m³ TWA (respirable dust)</td>
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</tr>
<tr>
<td>Asphalt (8052-42-4)</td>
<td>Not established</td>
<td>Not established</td>
<td>Not established</td>
<td>0.5 mg/m³ TWA [VLE-MP] (fumes, inhalable fraction, as Benzene soluble aerosol)</td>
<td>Not established</td>
</tr>
<tr>
<td>Graphite</td>
<td>15 mg/m³ TWA (synthetic, total dust); 5 mg/m³ TWA (synthetic, respirable fraction)</td>
<td>2.5 mg/m³ TWA (natural, respirable dust); 10 mg/m³ TWA (synthetic, total dust); 5 mg/m³ TWA (synthetic, respirable fraction)</td>
<td>2 mg/m³ TWA [VLE-MP] (all forms except Graphite fibers, respirable fraction)</td>
<td>Not established</td>
<td>2 mg/m³ PEL (respirable dust)</td>
</tr>
<tr>
<td>Crystalline silica</td>
<td>50 µg/m³ TWA (listed under Respirable crystalline silica)</td>
<td>0.1 mg/m³ TWA (respirable dust)</td>
<td>0.025 mg/m³ TWA [VLE-MP] (respirable fraction)</td>
<td>1 mg/m³ TWA (quartz glass, disintegration aerosol, total mass of aerosols, listed under Silicon dioxide amorphous and vitreous); 1 mg/m³ TWA (containing &gt;70% Silicon dioxide in dust, total mass of aerosols, listed under Crystalline silicon dioxide)</td>
<td>0.1 mg/m³ PEL (respirable dust)</td>
</tr>
<tr>
<td>Asphalt (8052-42-4)</td>
<td>Not established</td>
<td>Not established</td>
<td>Not established</td>
<td>Not established</td>
<td>Not established</td>
</tr>
<tr>
<td>Graphite</td>
<td>0.5 mg/m³ TWA (Benzene soluble aerosol)</td>
<td>5 mg/m³ TWA (fumes)</td>
<td>5 mg/m³ PEL (fume)</td>
<td>0.5 mg/m³ TWA [VTRE-L-8/40 (fume, as Benzene soluble aerosols)</td>
<td></td>
</tr>
<tr>
<td>STELs Not established</td>
<td>10 mg/m³ STEL (fumes)</td>
<td>Not established</td>
<td>Not established</td>
<td>Not established</td>
<td>Not established</td>
</tr>
<tr>
<td>TWAs Not established</td>
<td>10 mg/m³ TWA (inhausable dust); 4 mg/m³ TWA (respirable dust)</td>
<td>2.5 mg/m³ TWA (natural, respirable dust); 10 mg/m³ PEL (synthetic total dust); 5 mg/m³ PEL (synthetic respirable fraction)</td>
<td>2 mg/m³ TWA [VTRE-L-8/40 (dust)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STELs Not established</td>
<td>30 mg/m³ STEL (calculated, inhalable dust); 12 mg/m³ STEL (calculated, respirable dust)</td>
<td>Not established</td>
<td>Not established</td>
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</tr>
</tbody>
</table>
### Crystalline Silica

<table>
<thead>
<tr>
<th>TWAs</th>
<th>0.025 mg/m³ TWA (respirable dust)</th>
<th>0.1 mg/m³ TWA (respirable as Silica, crystalline (general form))</th>
<th>0.3 mg/m³ PEL (total dust); 0.1 mg/m³ PEL (respirable dust)</th>
<th>0.025 mg/m³ TWA (VTR-E-L-8/40 (respirable fraction))</th>
</tr>
</thead>
<tbody>
<tr>
<td>STELs</td>
<td>Not established</td>
<td>0.3 mg/m³ STEL (calculated, respirable as Silica, crystalline (general form))</td>
<td>Not established</td>
<td>Not established</td>
</tr>
</tbody>
</table>

### Exposure Control Notations

**Japan**

- Copper oxide as Copper compounds: Sensitizers: (Group 2 skin sensitizer (Evaluation does not necessarily apply to all individuals within the group))
- Crystalline silica as Silica, crystalline (general form): Carcinogens: (Group 1 - Carcinogenic to Humans)

**Mexico**

- Asphalt (8052-42-4): Carcinogens: (A4 - Not classifiable as a human carcinogen)

**Egypt**

- Graphite (7782-42-5): Nuisance Dusts: (10 mg/m³ TWA (synthetic, containing <1% Quartz, total dust); 30 mppcf TWA (synthetic, containing <1% Quartz, total dust); 3 mg/m³ TWA (synthetic, containing <1% Quartz, total dust))

**Portugal**

- Asphalt (8052-42-4): Carcinogens: (A4 - Not Classifiable as a Human Carcinogen (fumes))
- Crystalline silica (14808-60-7): Carcinogens: (A2 - Suspected Human Carcinogen)

**Indonesia**

- Asphalt (8052-42-4): Carcinogens: (A4 - not classifiable as a human carcinogen)

**Argentina**

- Asphalt (8052-42-4): Carcinogens: (A4 - Not classifiable as a human carcinogen (fumes))
- Crystalline silica (14808-60-7): Carcinogens: (A2 - Suspected human carcinogen)

**Canada Alberta**

- Crystalline silica as Silica, crystalline (general form): Designated Substances: (Designated substance - requires code of practice (respirable))

**Canada British Columbia**

- Asphalt (8052-42-4): Carcinogens: (IARC Category 2A - Probable Human Carcinogen (fume; occupational exposure to oxidized Bitumens and their emissions during road paving); IARC Category 2B - Possible Human Carcinogen (fume; occupational exposure to straight-run Bitumens and their emissions during road paving)) | Designated Substances: (IARC Category 2B - Possible Human Carcinogen (fume; occupational exposure to straight-run Bitumens and their emissions during road paving); IARC Category 2A - Probable Human Carcinogen (fume; occupational exposure to oxidized Bitumens and their emissions during road paving))
- Crystalline silica (14808-60-7): Carcinogens: (ACGIH Category A2 - Suspected Human Carcinogen; IARC Category 1 - Human Carcinogen) | Designated Substances: (ACGIH Category A2 - Suspected Human Carcinogen; IARC Category 1 - Human Carcinogen)

**Canada Manitoba**

- Asphalt (8052-42-4): Carcinogens: (A4 Not Classifiable as a Human Carcinogen (fume, Coal tar-free))
- Crystalline silica (14808-60-7): Carcinogens: (A2 Suspected Human Carcinogen)

**Canada New Brunswick**

- Asphalt (8052-42-4): Carcinogens: (A4 - Not Classifiable as a Human Carcinogen (fumes))

**Canada Nova Scotia**

- Asphalt (8052-42-4): Carcinogens: (A4 - Not Classifiable as a Human Carcinogen (fume, Coal tar-free))
- Crystalline silica (14808-60-7): Carcinogens: (A2 - Suspected Human Carcinogen)

**Canada Ontario**

- Crystalline silica (14808-60-7): Designated Substances: (0.10 mg/m³ TWA (respirable fraction, listed under Silica, crystalline))

**Canada Quebec**

- Crystalline silica (14808-60-7): Carcinogens: (C2 carcinogen - effect suspected in humans)

**Canada Saskatchewan**

- Crystalline silica as Silica, crystalline (general form): Designated Substances: (Present (respirable size))

**Venezuela**

- Asphalt (8052-42-4): Ceilings: (Present)
- Crystalline silica (14808-60-7): Ceilings: (Present)

**ACGIH**

- Asphalt (8052-42-4): Carcinogens: (A4 - Not Classifiable as a Human Carcinogen (fume, coal tar-free))
- Crystalline silica (14808-60-7): Carcinogens: (A2 - Suspected Human Carcinogen)

**Germany DFG**

- Zinc powder, stabilized (7440-66-6): Pregnancy: (no risk to embryo/fetus if exposure limits adhered to (respirable; inhalable))
- Graphite (7782-42-5): Pregnancy: (no risk to embryo/fetus if exposure limits adhered to (inhalable fraction; respirable fraction))
- Asphalt (8052-42-4): Carcinogens: (Category 2 (considered to be carcinogenic for man; aerosol and vapor)) | Skin: (skin notation (aerosol and vapour))
- Crystalline silica (14808-60-7): Carcinogens: (Category 1 (causes cancer in man; alveola fraction))

### Exposure Limits Supplemental

**Thailand**

- Graphite (7782-42-5): Mineral Dusts: (15 mppcf TWA)
• Graphite as Particulates not otherwise classified (PNOC): **Mineral Dusts:** (15 mppcf TWA (respirable dust); 15 mg/m3 TWA (total dust); 50 mppcf TWA (total dust); 5 mg/m3 TWA (respirable dust))

• Crystalline silica (14808-60-7): **Mineral Dusts:** (TWA ((250/(%SiO2 + 5)), mppcf, respirable dust); TWA ((10/(%SiO2 + 2)), mg/m3, respirable dust); TWA ((30/(%SiO2 + 2)), mg/m3, total dust))

Israel

• Asphalt (8052-42-4): **Biological Markers of Occupational Exposure:** (Medium: urine Time: end of shift at end of workweek Parameter: 1-Hydroxypyrene with hydrolysis (nonquantitative))

OSHA

• Graphite (7782-42-5): **Mineral Dusts:** (15 mppcf TWA (natural))

• Graphite as Particulates not otherwise classified (PNOC): **Mineral Dusts:** (15 mppcf TWA (respirable fraction); 5 mg/m3 TWA (respirable fraction); 50 mppcf TWA (total dust); 15 mg/m3 TWA (total dust))

• Crystalline silica (14808-60-7): **Mineral Dusts:** ((250)/(%SiO2 + 5) mppcf TWA, respirable fraction; (10)/(%SiO2 + 2) mg/m3 TWA, respirable fraction)

ACGIH

• Graphite (7782-42-5): **TLV Basis - Critical Effects:** (pneumoconiosis (all forms except graphite fibers))

• Copper oxide as Copper compounds: **TLV Basis - Critical Effects:** (gastrointestinal (dust and mist); irritation (dust and mist))

• Asphalt (8052-42-4): **BEIs:** (Medium: urine Time: end of shift at end of workweek Parameter: 1-Hydroxypyrene with hydrolysis (nonquantitative)) | **TLV Basis - Critical Effects:** (eye and upper respiratory tract irritation (fume))

• Crystalline silica (14808-60-7): **TLV Basis - Critical Effects:** (lung cancer; pulmonary fibrosis)

8.2 Exposure controls

Engineering Measures/Controls • Good general ventilation should be used. Ventilation rates should be matched to conditions.

If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Personal Protective Equipment

Respiratory • In case of insufficient ventilation, wear suitable respiratory equipment.

Eye/Face • Wear protective eyewear (goggles, face shield, or safety glasses).

Skin/Body • Natural Rubber, latex gloves. Break through time: 4-8 Hours. Wear long sleeves and/or protective coveralls.

Environmental Exposure Controls • Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways. Follow best practice for site management and disposal of waste.

Key to abbreviations

ACGIH = American Conference of Governmental Industrial Hygiene

PEL = Permissible Exposure Level determined by the Occupational Safety and Health Administration (OSHA)

BEI = Biological Exposure Indices

STEL = Short Term Exposure Limits are based on 15-minute exposures

MAK = Maximale Arbeitsplatz Konzentration is the maximum permissible concentration

TLV = Threshold Limit Value determined by the American Conference of Governmental Industrial Hygienists (ACGIH)

NIOSH = National Institute of Occupational Safety and Health

TWA = Time-Weighted Averages are based on 8h/day, 40h/week exposures

OSHA = Occupational Safety and Health Administration

TWAEV = Time-Weighted Average Exposure Value

Section 9 - Physical and Chemical Properties

9.1 Information on Basic Physical and Chemical Properties

<table>
<thead>
<tr>
<th>Material Description</th>
<th>Physical Form</th>
<th>Appearance/Description</th>
<th>Odor Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Brown/copper</td>
<td>Odor</td>
<td>Data lacking</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>Brown/copper</td>
<td>Odor</td>
<td>Mild, petroleum.</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>General Properties</th>
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<th>Melting Point/Freezing Point</th>
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<tr>
<td>Decomposition Temperature</td>
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<td>pH</td>
<td>Data lacking</td>
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<td>Specific Gravity/Relative Density</td>
<td>Data lacking</td>
<td>Water Solubility</td>
<td>Data lacking</td>
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<td>Viscosity</td>
<td>Data lacking</td>
<td>Explosive Properties</td>
<td>Data lacking</td>
</tr>
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<td>Oxidizing Properties:</td>
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<thead>
<tr>
<th>Volatility</th>
<th>Vapor Pressure</th>
<th>Vapor Density</th>
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<tbody>
<tr>
<td>Evaporation Rate</td>
<td>Data lacking</td>
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<td></td>
</tr>
</tbody>
</table>
9.2 Other Information
• No additional physical and chemical parameters noted.

Section 10: Stability and Reactivity

10.1 Reactivity
• No dangerous reaction known under conditions of normal use.

10.2 Chemical stability
• Stable under normal temperatures and pressures.

10.3 Possibility of hazardous reactions
• Hazardous polymerization will not occur.

10.4 Conditions to avoid
• Keep away from heat, sparks and flame.

10.5 Incompatible materials
• None in particular.

10.6 Hazardous decomposition products
• Hazardous decomposition products formed under fire conditions: Carbon oxides.

Section 11 - Toxicological Information

11.1 Information on toxicological effects

<table>
<thead>
<tr>
<th>Components</th>
<th>Acute Toxicity</th>
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</thead>
<tbody>
<tr>
<td>Zinc powder, stabilized (10% TO 25%)</td>
<td>Irritation: Skin-Human • 300 µg 3 Day(s)-Intermittent • Mild irritation; Tumorigen / Carcinogen: Ingestion/Oral-Mouse TDL0 • 12.6 mg/kg 46 Week(s)-Continuous; Tumorigenic:Carcinogenic by RTECS criteria; Gastrointestinal:Tumors; Tumorigenic:Facilitates action of known carcinogen</td>
</tr>
<tr>
<td>Copper oxide (5% TO 10%)</td>
<td>Acute Toxicity: Ingestion/Oral-Rat LD50 • 470 mg/kg</td>
</tr>
<tr>
<td>Asphalt (2.1%)</td>
<td>Acute Toxicity: Ingestion/Oral-Rat LD50 • &gt;5000 mg/kg; Gastrointestinal:Hypermotility, diarrhea; Skin-Rabbit LD50 • 2000 mg/kg; Multi-dose Toxicity: Inhalation-Rat TCL0 • 100 mg/m³ 6 Hour(s) 14 Week(s)-Intermittent; Sense Organs and Special Senses:Olfaction;Tumors; Behavioral:Food intake (animal); Nutritional and Gross Metabolic:Gross Metabolite Changes:Weight loss or decreased weight gain; Inhalation-Human TDL0 • 10 mg/m³ 5.5 Year(s)-Intermittent; Sense Organs and Special Senses:Eye:Conjunctive irritation; Lungs, Thorax, or Respiration:Cough; Gastrointestinal:Changes in structure or function of salivary glands; Tumorigen / Carcinogen: Skin-Mouse • 69 g/kg 43 Week(s)-Intermittent; Tumorigenic:Equivocal tumorigenic agent by RTECS criteria; Lungs, Thorax, or Respiration:Tumors; Skin and Appendages:Other:Tumors</td>
</tr>
<tr>
<td>Zinc O,O-bis(mixed isobutyl and pentyl) phosphorodithioate (0.5355%)</td>
<td>Acute Toxicity: Ingestion/Oral-Rat LD50 • 3.6 g/kg; Behavioral:Somnolence (general depressed activity); Lungs, Thorax, or Respiration:Other changes; Gastrointestinal:Hypermotility, diarrhea</td>
</tr>
</tbody>
</table>
| Crystalline silica (30%) | Acute Toxicity: Inhalation-Human TCL0 • 16 mppcf 8 Hour(s) 17.9 Year(s)-Intermittent; Lungs, Thorax, or Respiration:Fibrosis, focal (pneumoconiosis); Lungs, Thorax, or Respiration:Cough; Lungs, Thorax, or Respiration:Dyspnea; Inhalation-Rat TCL0 • 200 mg/kg; Lungs, Thorax, or Respiration:Fibrosis, focal (pneumoconiosis); Lungs, Thorax, or Respiration:Other changes; Nutritional and Gross Metabolic:Changes in Chemistry or Temperature:Fe; Multi-dose Toxicity: Inhalation-Hamster TCL0 • 3 mg/m³ 6 Hour(s) 78 Week(s)-Intermittent; Lungs,}
Thorax, or Respiration:Fibrosis (interstitial); Lungs, Thorax, or Respiration:Changes in lung weight; Inhalation-Rat TCLo • 80 mg/m³ 26 Week(s)-Intermittent; Lungs, Thorax, or Respiration:Fibrosis, focal (pneumoconiosis); Blood:Changes in spleen; Immunological Including Allergic:Decrease in cellular immune response; Inhalation-Rat TCLo • 58 mg/m³ 13 Week(s)-Intermittent; Lungs, Thorax, or Respiration:Other changes; Endocrine:Changes in thymus weight; Blood:Changes in leucocyte (WBC) count; 

Mutagen: Micronucleus test • Unreported Route-Human • Lung (Somatic cell) • 40 µg/cm²: DNA damage • Unreported Route-Human • Other Cell Type • 120 mg/L 24 Hour(s); DNA damage • Unreported Route-Human • Other Cell Type • 120 mg/L; 

Tumorigen / Carcinogen: Inhalation-Rat TCLo • 50 mg/m³ 6 Hour(s) 71 Week(s)-Intermittent; 

GHS Properties | Classification
--- | ---
Acute toxicity | EU/CLP•Data lacking
| UN GHS • Acute Toxicity - Oral 5 - ATEmix (oral) = 2115 mg/kg
| OSHA HCS 2012•Data lacking
| WHMIS 2015•Data lacking

Skin corrosion/Irritation | EU/CLP•Data lacking
| UN GHS • Skin Mild Irritation 3
| OSHA HCS 2012•Data lacking
| WHMIS 2015•Data lacking

Serious eye damage/Irritation | EU/CLP•Data lacking
| UN GHS • Data lacking
| OSHA HCS 2012•Data lacking
| WHMIS 2015•Data lacking

Skin sensitization | EU/CLP•Data lacking
| UN GHS • Data lacking
| OSHA HCS 2012•Data lacking
| WHMIS 2015•Data lacking

Respiratory sensitization | EU/CLP•Data lacking
| UN GHS • Data lacking
| OSHA HCS 2012•Data lacking
| WHMIS 2015•Data lacking

Aspiration Hazard | EU/CLP•Data lacking
| UN GHS • Data lacking
| OSHA HCS 2012•Data lacking
| WHMIS 2015•Data lacking

Carcinogenicity | EU/CLP•Carcinogenicity 2; Suspected of causing cancer
| UN GHS • Carcinogenicity 2
| OSHA HCS 2012•Carcinogenicity 2
| WHMIS 2015•Carcinogenicity 2

Germ Cell Mutagenicity | EU/CLP•Data lacking
| UN GHS • Data lacking
| OSHA HCS 2012•Data lacking
| WHMIS 2015•Data lacking

Toxicity for Reproduction | EU/CLP•Data lacking
| UN GHS • Data lacking
| OSHA HCS 2012•Data lacking
| WHMIS 2015•Data lacking

STOT-SE | EU/CLP•Data lacking
| UN GHS • Data lacking

STOT-RE | EU/CLP•Data lacking
| UN GHS • Data lacking
Potential Health Effects

Inhalation
Acute (Immediate) • Under normal conditions of use, no health effects are expected.
Chronic (Delayed) • No data available

Skin
Acute (Immediate) • Causes mild skin irritation.
Chronic (Delayed) • No data available

Eye
Acute (Immediate) • Under normal conditions of use, no health effects are expected.
Chronic (Delayed) • No data available

Ingestion
Acute (Immediate) • May be harmful if swallowed.
Chronic (Delayed) • No data available

Carcinogenic Effects • Repeated and prolonged exposure may cause cancer.

<table>
<thead>
<tr>
<th>Carcinogenic Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asphalt</td>
</tr>
<tr>
<td>8052-42-4</td>
</tr>
<tr>
<td>Group 2B-Possible Carcinogen</td>
</tr>
<tr>
<td>Not Listed</td>
</tr>
<tr>
<td>Crystalline silica</td>
</tr>
<tr>
<td>14808-60-7</td>
</tr>
<tr>
<td>Group 1-Carcinogenic</td>
</tr>
<tr>
<td>Known Human Carcinogen</td>
</tr>
</tbody>
</table>

11.2 Other information

• Heating above the melting point releases metallic oxides which may cause metal fume fever which is an influenza like illness. Symptoms include headache, metallic taste in the mouth, cough, thirst, throat irritation, shortness of breath, fever, sweating and pain in the limbs. This illness is not permanent and recovery usually occurs within 24-48 hours after onset.

Key to abbreviations
LD = Lethal Dose
TC = Toxic Concentration
TD = Toxic Dose

Section 12 - Ecological Information

12.1 Toxicity

<table>
<thead>
<tr>
<th>Components</th>
<th>Aquatic Toxicity-Fish: 96 Hour(s) LC50</th>
<th>Aquatic Toxicity-Crustacea: 21 Day(s) NOEC</th>
<th>Aquatic Toxicity-Algae and Other Aquatic Plant(s): 72 Hour(s) EC50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc powder, stabilized (10% TO 25%)</td>
<td>7440-66-6</td>
<td></td>
<td>Subcapitata (Green Algae) 0.106 mg/L</td>
</tr>
<tr>
<td>Copper oxide (5% TO 10%)</td>
<td>1317-38-0</td>
<td></td>
<td>Euglena gracilis (Flagellate Euglenoid) 0.0075 mg/L</td>
</tr>
</tbody>
</table>

• Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects.

12.2 Persistence and degradability

• Material data lacking.

12.3 Bioaccumulative potential

• Material data lacking.
12.4 Mobility in Soil
• Material data lacking.

12.5 Results of PBT and vPvB assessment
• No PBT and vPvB assessment has been conducted.

12.6 Other adverse effects
• No studies have been found.

Section 13 - Disposal Considerations

13.1 Waste treatment methods
Product waste • Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Packaging waste • Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Section 14 - Transport Information

<table>
<thead>
<tr>
<th>14.1 UN number</th>
<th>14.2 UN proper shipping name</th>
<th>14.3 Transport hazard class(es)</th>
<th>14.4 Packing group</th>
<th>14.5 Environmental hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOT UN3077</td>
<td>Environmentally hazardous substance, solid, n.o.s. (Zinc powder, Copper oxides)</td>
<td>9</td>
<td>III</td>
<td>NDA</td>
</tr>
<tr>
<td>TDG UN3077</td>
<td>ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Zinc powder, Copper oxides)</td>
<td>9</td>
<td>III</td>
<td>NDA</td>
</tr>
<tr>
<td>IMO/IMDG UN3077</td>
<td>ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Zinc powder, Copper oxides)</td>
<td>9</td>
<td>III</td>
<td>NDA</td>
</tr>
<tr>
<td>IATA/ICAO UN3077</td>
<td>Environmentally hazardous substance, solid, n.o.s. (Zinc powder, Copper oxides)</td>
<td>9</td>
<td>III</td>
<td>NDA</td>
</tr>
</tbody>
</table>

14.6 Special precautions for user • None specified.

14.7 Transport in bulk according to Annex II of Marpol and the IBC Code • Data lacking.

Section 15 - Regulatory Information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS</th>
<th>PA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asphalt</td>
<td>8052-42-4</td>
<td>Yes</td>
</tr>
<tr>
<td>Copper oxide</td>
<td>1317-38-0</td>
<td>No</td>
</tr>
<tr>
<td>Crystalline silica</td>
<td>14808-60-7</td>
<td>Yes</td>
</tr>
<tr>
<td>Graphite</td>
<td>7782-42-5</td>
<td>Yes</td>
</tr>
<tr>
<td>Zinc O,O-bis(mixed iso-butyl and pentyl) phosphorodithioate</td>
<td>68457-79-4</td>
<td>No</td>
</tr>
<tr>
<td>Zinc powder, stabilized</td>
<td>7440-66-6</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Inventory
<table>
<thead>
<tr>
<th>Component</th>
<th>CAS</th>
<th>Australia AICS</th>
<th>Canada DSL</th>
<th>Canada NDSL</th>
<th>China</th>
<th>EU EINECS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asphalt</td>
<td>8052-42-4</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Copper oxide</td>
<td>1317-38-0</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Crystalline silica</td>
<td>14808-60-7</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Graphite</td>
<td>7782-42-5</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Zinc O,O-bis(mixed iso-butyl and pentyl) phosphorodithioate</td>
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<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Zinc powder, stabilized</td>
<td>7440-66-6</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Inventory (Con’t.)**

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS</th>
<th>EU ELNICS</th>
<th>Japan ENCS</th>
<th>TSCA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asphalt</td>
<td>8052-42-4</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Copper oxide</td>
<td>1317-38-0</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Crystalline silica</td>
<td>14808-60-7</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Graphite</td>
<td>7782-42-5</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Zinc O,O-bis(mixed iso-butyl and pentyl) phosphorodithioate</td>
<td>68457-79-4</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Zinc powder, stabilized</td>
<td>7440-66-6</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**United States - California**

**Environment**

- **U.S. - California - Proposition 65 - Carcinogens List**
  - Copper oxide
  - Asphalt
  - Zinc powder, stabilized
  - Zinc O,O-bis(mixed iso-butyl and pentyl) phosphorodithioate
  - Crystalline silica
  - Graphite
  
- **U.S. - California - Proposition 65 - Developmental Toxicity**
  - Copper oxide
  - Asphalt
  - Zinc powder, stabilized
  - Zinc O,O-bis(mixed iso-butyl and pentyl) phosphorodithioate
  - Crystalline silica
  - Graphite
  
- **U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)**
  - Copper oxide
  - Asphalt
  - Zinc powder, stabilized
  - Zinc O,O-bis(mixed iso-butyl and pentyl) phosphorodithioate
  - Crystalline silica
  - Graphite
  
- **U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)**
  - Copper oxide
  - Asphalt
  - Zinc powder, stabilized
  - Zinc O,O-bis(mixed iso-butyl and pentyl) phosphorodithioate
  - Crystalline silica
  - Graphite
  
- **U.S. - California - Proposition 65 - Reproductive Toxicity - Female**
  - Copper oxide
  - Asphalt
  - Zinc powder, stabilized
  - Zinc O,O-bis(mixed iso-butyl and pentyl) phosphorodithioate
  - Crystalline silica
  - Graphite
  
- **U.S. - California - Proposition 65 - Reproductive Toxicity - Male**
15.2 Chemical Safety Assessment
• No Chemical Safety Assessment has been carried out.

Section 16 - Other Information

Relevant Phrases (code & full text)
• H372 - Causes damage to organs through prolonged or repeated exposure.
  H350i - May cause cancer by inhalation.

Revision Date
• 18/May/2018

Last Revision Date
• 18/May/2018

Preparation Date
• 18/May/2018

Disclaimer/Statement of Liability
• 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.

Key to abbreviations
NDA = No Data Available