

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

1.1 Product identifier

Product Name

• **API Modified**

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, high pressure casing & tubing compound

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.topcoilsite.com
msds@topcoilsite.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

According to: Regulation (EC) No 1272/2008 (CLP)/REACH 1907/2006 [amended by 2015/830]

2.1 Classification of the substance or mixture

CLP

- Carcinogenicity 2 - H351
- Reproductive Toxicity 1 - H360FD
- Effects on or via Lactation - H362
- Hazardous to the aquatic environment Chronic 2 - H411

2.2 Label Elements

CLP

DANGER



- Hazard statements**
- H351 - Suspected of causing cancer.
 - H360FD - May damage fertility. May damage the unborn child.
 - H362 - May cause harm to breast-fed children
 - H411 - 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.
 - P260 - Do not breathe dust.
 - P263 - Avoid contact during pregnancy/while nursing.
 - P264 - Wash thoroughly after handling.
 - P270 - Do not eat, drink or smoke when using this product.
 - P273 - Avoid release to the environment.
 - P280 - Wear protective gloves/protective clothing/eye protection/face protection.

- Response**
- P308+P313 - IF exposed or concerned: Get medical advice/attention.
 - P391 - Collect spillage.

- Storage/Disposal**
- P405 - Store locked up.
 - P501 - Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

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**
- Skin Mild Irritation 3
 - Carcinogenicity 2
 - Reproductive Toxicity 1A
 - Specific Target Organ Toxicity Repeated Exposure 1
 - Hazardous to the aquatic environment Acute 2
 - Hazardous to the aquatic environment Chronic 1

2.2 Label elements

UN GHS

DANGER



- Hazard statements**
- Causes mild skin irritation
 - Suspected of causing cancer.
 - May damage fertility or the unborn child.
 - Causes damage to organs through prolonged or repeated exposure.
 - 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.
 - Do not breathe dust.
 - Wash thoroughly after handling.
 - Do not eat, drink or smoke when using this product.
 - Avoid release to the environment.
 - Wear protective gloves/protective clothing/eye protection/face protection.
- Response**
- If skin irritation occurs: Get medical advice/attention.
 - IF exposed or concerned: Get medical advice/attention.

Get medical advice/attention if you feel unwell.
Collect spillage.

- 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

- 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
Reproductive Toxicity 1A
Specific Target Organ Toxicity Repeated Exposure 1
Hazards Not Otherwise Classified - Health Hazards - Metal fume fever

2.2 Label elements

OSHA HCS 2012

DANGER



- Hazard statements** • Suspected of causing cancer.
May damage fertility or the unborn child.
Causes 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.
Do not breathe dust.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Wear protective gloves/protective clothing/eye protection/face protection.

- Response** • IF exposed or concerned: Get medical advice/attention.
Get medical advice/attention if you feel unwell.

- 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
 - Reproductive Toxicity 1A
 - Specific Target Organ Toxicity Repeated Exposure 1
 - Health Hazards Not Otherwise Classified 1

2.2 Label elements

WHMIS 2015

DANGER



- Hazard statements**
- Suspected of causing cancer.
 - May damage fertility or the unborn child.
 - Causes damage to organs through prolonged or repeated exposure.
 - 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.
 - Do not breathe dust.
 - Wash thoroughly after handling.
 - Do not eat, drink or smoke when using this product.
 - Wear protective gloves/protective clothing/eye protection/face protection.

- Response**
- IF exposed or concerned: Get medical advice/attention.
 - Get medical advice/attention if you feel unwell.

- 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

| Composition | | | | | |
|--------------------|---------------------------------------|------------------|-----------|---|----------|
| Chemical Name | Identifiers | % | LD50/LC50 | Classifications According to Regulation/Directive | Comments |
| Crystalline silica | CAS:14808-60-7 EC Number:238-878-4 | 0% TO 39.285% | NDA | EU CLP: Carc. 1A, H350i; STOT RE 1 (Lungs/Inhl), H372 UN GHS Revision 4: Carc. 1A; STOT RE 1 (Lungs/Inhl) OSHA HCS 2012: Carc. 1A; STOT RE 1 (Lungs/Inhl) WHMIS 2015: Carc. 1A; STOT RE 1 (Lungs/Inhl) | NDA |

| | | | | | |
|---|--|------------------|---|--|-----|
| Asphalt | CAS: 8052-42-4 EINECS: 232-490-9 | 0% TO 39.285% | Ingestion/Oral-Rat LD50 • >5000 mg/kg Inhalation-Rat LC50 • >94.4 mg/m ³ | EU CLP: Carc. 2, H351 UN GHS Revision 4: Carc. 2 OSHA HCS 2012: Carc. 2 WHMIS 2015: Carc. 2 | NDA |
| Lead, powder | CAS: 7439-92-1 EC Number: 231-100-4 | > 25% | NDA | EU CLP: Annex VI, Table 3.1: Repr. 1A, H360FD (Oral); Lact., H362 UN GHS Revision 4: Repr. 1A (Orl); STOT RE 1 (CNS, GI / Orl); Aquatic Acute 3; Aquatic Chronic 1 OSHA HCS 2012: Repr. 1A (Orl); STOT RE 1 (CNS, GI / Orl) WHMIS 2015: Repr. 1A (Orl); STOT RE 1 (CNS, GI / Orl) | NDA |
| Graphite | CAS: 7782-42-5 EC Number: 231-955-3 | > 15% | NDA | EU CLP: STOT RE 1 (Lungs / Inhl), H372 UN GHS Revision 4: STOT RE 1 (Lungs / Inhl) OSHA HCS 2012: Comb. Dust; STOT RE 1 (Lungs / Inhl) WHMIS 2015: Comb. Dust; STOT RE 1 (Lungs / Inhl) | NDA |
| Zinc powder, stabilized | CAS: 7440-66-6 EC Number: 231-175-3 | 10% TO 15% | NDA | EU CLP: Annex VI, Table 3.1: Aquatic Acute 1, H400; Aquatic Chronic 1, H410 UN GHS Revision 4: Skin Irrit. 3; Aquatic Acute 1; Aquatic Chronic 1 OSHA HCS 2012: Comb. Dust; Hazard Not Otherwise Classified - Health Hazard - Metal fume fever WHMIS 2015: Comb. Dust; Hazard Not Otherwise Classified - Health Hazard - Metal fume fever | NDA |
| Copper oxide | CAS: 1317-38-0 EINECS: 215-269-1 | 1% TO 5% | Ingestion/Oral-Rat LD50 • 470 mg/kg | EU CLP: Annex VI, Table 3.1: Aquatic Acute 1, H400; Aquatic Chronic 1, H410 UN GHS Revision 4: Acute Tox. 4 (orl); Aquatic Acute 1; Aquatic Chronic 1 OSHA HCS 2012: Acute Tox. 4 (orl) WHMIS 2015: Acute Tox. 4 (orl) | NDA |
| Zinc O,O-bis(mixed iso-butyl and pentyl) phosphorodithioate | CAS: 68457-79-4 EINECS: 270-608-0 | 0.714% | NDA | EU CLP: Not Classified UN GHS Revision 4: Not Classified OSHA HCS 2012: Not Classified WHMIS 2015: Not Classified | NDA |

See Section 16 for full text of H-statements.

Section 4 - First Aid Measures

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 • No data available

Hazardous Combustion Products • Hazardous decomposition products formed under fire conditions: Carbon oxides, Zinc oxide, Lead oxides.

5.3 Advice for firefighters

- Structural firefighters' protective clothing will only provide limited protection. Wear positive pressure self-contained breathing apparatus (SCBA).
Runoff from fire control may cause pollution.

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 Measures • 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. Do not breathe dust. 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

| Exposure Limits/Guidelines | | | | | | |
|----------------------------|--------|-------|-----------|-----------|----------------|-------------------------|
| | Result | ACGIH | Argentina | Australia | Canada Alberta | Canada British Columbia |

| | | | | | | |
|---------------------------------|------|--|--|--|--|--|
| Asphalt (8052-42-4) | TWAs | 0.5 mg/m3 TWA (fume, inhalable particulate matter, as benzene-soluble aerosol) | 0.5 mg/m3 TWA [CMP] (Bitumen, inhalable fraction, as soluble aerosol in benzene) | 5 mg/m3 TWA (fume) | 5 mg/m3 TWA (Petroleum; Bitumen, fume) | 0.5 mg/m3 TWA (inhalable fume, as Benzene-soluble aerosol) |
| Crystalline silica (14808-60-7) | TWAs | 0.025 mg/m3 TWA (respirable particulate matter) | 0.05 mg/m3 TWA [CMP] (respirable fraction) | 0.1 mg/m3 TWA (respirable dust) | 0.025 mg/m3 TWA (respirable particulate) | 0.025 mg/m3 TWA (respirable) |
| Copper oxide | TWAs | 1 mg/m3 TWA (dust and mist, as Cu) <i>as Copper compounds</i> | Not established | Not established | Not established | Not established |
| Graphite | TWAs | 2 mg/m3 TWA (all forms except graphite fibers, respirable particulate matter) | 2 mg/m3 TWA [CMP] (all forms except fibers, respirable fraction) | 3 mg/m3 TWA (containing no asbestos and <1% crystalline silica; all forms except fibres; natural and synthetic, respirable dust) | 2 mg/m3 TWA (all forms except Graphite fibres, respirable) | 2 mg/m3 TWA (all forms except Graphite fibres, respirable) |
| Lead, powder (7439-92-1) | TWAs | 0.05 mg/m3 TWA | 0.05 mg/m3 TWA [CMP] | 0.15 mg/m3 TWA (dust and fume) | 0.05 mg/m3 TWA | 0.05 mg/m3 TWA |

Exposure Limits/Guidelines (Con't.)

| | Result | Canada Manitoba | Canada New Brunswick | Canada Northwest Territories | Canada Nova Scotia | Canada Nunavut |
|---------------------------------|--------|--|--|---|--|---|
| Asphalt (8052-42-4) | TWAs | 0.5 mg/m3 TWA (fume, inhalable particulate matter, as Benzene soluble aerosol) | 5 mg/m3 TWA (petroleum fumes) | 0.5 mg/m3 TWA (Bitumen, fume, as Benzene soluble aerosol (inhalable fraction)) | 0.5 mg/m3 TWA (fume, inhalable particulate matter, as Benzene soluble aerosol) | 0.5 mg/m3 TWA (Bitumen, fume, as Benzene soluble aerosol (inhalable fraction)) |
| | STELs | Not established | Not established | 1.5 mg/m3 STEL (Bitumen, fume, as Benzene soluble aerosol (inhalable fraction)) | Not established | 1.5 mg/m3 STEL (Bitumen, fume, as Benzene soluble aerosol (inhalable fraction)) |
| Crystalline silica (14808-60-7) | TWAs | 0.025 mg/m3 TWA (respirable particulate matter) | 0.1 mg/m3 TWA (respirable fraction) | 0.05 mg/m3 TWA (respirable fraction, listed under Silica - crystalline) | 0.025 mg/m3 TWA (respirable particulate matter) | 0.05 mg/m3 TWA (respirable fraction, listed under Silica - crystalline) |
| Copper oxide | TWAs | 1 mg/m3 TWA (dust and mist, as Cu) <i>as Copper compounds</i> | Not established | Not established | 1 mg/m3 TWA (dust and mist, as Cu) <i>as Copper compounds</i> | Not established |
| Graphite | TWAs | 2 mg/m3 TWA (all forms except Graphite fibres, respirable particulate matter) | 2 mg/m3 TWA (all forms except graphite fibres) | 2 mg/m3 TWA (natural, all forms, except Graphite fibres, respirable fraction) | 2 mg/m3 TWA (all forms except Graphite fibres, respirable particulate matter) | 2 mg/m3 TWA (natural, all forms, except Graphite fibres, respirable fraction) |
| | STELs | Not established | Not established | 4 mg/m3 STEL (natural, all forms, except Graphite fibres, respirable fraction) | Not established | 4 mg/m3 STEL (natural, all forms, except Graphite fibres, respirable fraction) |
| Lead, powder (7439-92-1) | TWAs | 0.05 mg/m3 TWA | 0.05 mg/m3 TWA | 0.05 mg/m3 TWA | 0.05 mg/m3 TWA | 0.05 mg/m3 TWA |
| | STELs | Not established | Not established | 0.15 mg/m3 STEL | Not established | 0.15 mg/m3 STEL |

Exposure Limits/Guidelines (Con't.)

| | Result | Canada Ontario | Canada Quebec | Canada Saskatchewan | Canada Yukon | China |
|---------------------|--------|---|--------------------|--|----------------------|---|
| Asphalt (8052-42-4) | STELs | Not established | Not established | 1.5 mg/m3 STEL (fume and inhalable fraction, as Benzene soluble aerosol) | 10 mg/m3 STEL (fume) | 12.5 mg/m3 STEL (fume, as Benzene soluble matter) |
| | TWAs | 0.5 mg/m3 TWA (fume, inhalable, as Benzene soluble aerosol) | 5 mg/m3 TWA (fume) | 0.5 mg/m3 TWA (fume and inhalable fraction, as Benzene soluble aerosol) | 5 mg/m3 TWA (fume) | 5 mg/m3 TWA (fume, as Benzene soluble matter) |

| | | | | | | |
|---------------------------------|-------|--|--|---|--|---|
| | | Benzene-soluble aerosol) | | fraction, as Benzene soluble aerosol) | | |
| Crystalline silica (14808-60-7) | STELs | Not established | Not established | Not established | Not established | 2 mg/m3 STEL (containing 10 - 50% free SiO2, total dust); 1.4 mg/m3 STEL (containing 50 - 80% free SiO2, total dust); 1 mg/m3 STEL (containing >80% free SiO2, total dust); 1.4 mg/m3 STEL (containing 10 - 50% free SiO2, respirable dust); 0.6 mg/m3 STEL (containing 50 - 80% free SiO2, respirable dust); 0.4 mg/m3 STEL (containing >80% free SiO2, respirable dust) |
| | TWAs | 0.10 mg/m3 TWA (designated substances regulation, respirable, listed under Silica, crystalline) | 0.1 mg/m3 TWAEV (respirable dust) | 0.05 mg/m3 TWA (respirable fraction, listed under Silica - crystalline (Trydimite removed)) | 300 particle/mL TWA (listed under Silica - Quartz, crystalline) | 0.7 mg/m3 TWA (containing 50 - 80% free SiO2, total dust); 0.3 mg/m3 TWA (containing 50 - 80% free SiO2, respirable dust); 1 mg/m3 TWA (containing 10 - 50% free SiO2, total dust); 0.7 mg/m3 TWA (containing 10 - 50% free SiO2, respirable dust); 0.5 mg/m3 TWA (containing >80% free SiO2, total dust); 0.2 mg/m3 TWA (containing >80% free SiO2, respirable dust) |
| Graphite | STELs | Not established | Not established | 4 mg/m3 STEL (natural, except Graphite fibres, respirable fraction) | Not established | 8 mg/m3 STEL (total dust); 4 mg/m3 STEL (respirable dust) |
| | TWAs | 2 mg/m3 TWA (except Graphite fibres, respirable) | 2 mg/m3 TWAEV (containing no Asbestos and <1% Crystalline silica, except Graphite fibres, respirable dust) | 2 mg/m3 TWA (natural, except Graphite fibres, respirable fraction) | 20 mppcf TWA; 30 mppcf TWA (synthetic); 10 mg/m3 TWA (synthetic) | 4 mg/m3 TWA (total dust); 2 mg/m3 TWA (respirable dust) |
| Lead, powder (7439-92-1) | STELs | Not established | Not established | 0.15 mg/m3 STEL | 0.45 mg/m3 STEL (dust and fume) | 0.15 mg/m3 STEL (dust); 0.09 mg/m3 STEL (fume) |
| | TWAs | 0.05 mg/m3 TWA (designated substances regulation); 0.05 mg/m3 TWA (applies to workplaces to which the designated substances regulation does not apply) | 0.05 mg/m3 TWAEV | 0.05 mg/m3 TWA | 0.15 mg/m3 TWA (dust and fume) | 0.05 mg/m3 TWA (dust); 0.03 mg/m3 TWA (fume) |

Exposure Limits/Guidelines (Con't.)

| | | | | | | |
|--|---------------|---------------------------------|---------------|--------------------|--------------|------------------|
| | Result | China Highly Toxic Goods | France | Germany DFG | India | Indonesia |
|--|---------------|---------------------------------|---------------|--------------------|--------------|------------------|

| | | | | | | |
|-------------------------------------|----------|--|--|---|---|--|
| Asphalt (8052-42-4) | TWAs | Not established | Not established | Not established | Not established | 0.5 mg/m ³ TWA (soluble aerosol, fume) |
| Crystalline silica (14808-60-7) | TWAs | Not established | 0.1 mg/m ³ TWA [VME] (restrictive limit, alveolar fraction) | Not established | (10600)/(%Quartz + 10) mppcm TWA, dust count; (10)/(%Quartz + 2) mg/m ³ TWA, respirable dust; (30)/(%Quartz + 3) mg/m ³ TWA, total dust | 0.1 mg/m ³ TWA (respirable particulate) |
| Zinc powder, stabilized (7440-66-6) | Ceilings | Not established | Not established | 0.4 mg/m ³ Peak (respirable fraction); 4 mg/m ³ Peak (inhalable fraction) | Not established | Not established |
| | MAKs | Not established | Not established | 0.1 mg/m ³ TWA MAK (respirable fraction); 2 mg/m ³ TWA MAK (inhalable fraction) | Not established | Not established |
| Graphite (7782-42-5) | TWAs | Not established | 2 mg/m ³ TWA [VME] (alveolar fraction) | Not established | Not established | 2 mg/m ³ TWA |
| | MAKs | Not established | Not established | 1.5 mg/m ³ TWA MAK (respirable fraction); 4 mg/m ³ TWA MAK (inhalable fraction) | Not established | Not established |
| Lead, powder (7439-92-1) | TWAs | Not established | 0.1 mg/m ³ TWA [VME] (restrictive limit) | Not established | Not established | 0.05 mg/m ³ TWA |
| | Ceilings | 0.05 mg/m ³ Ceiling (dust); 0.03 mg/m ³ Ceiling (fume) | Not established | Not established | Not established | Not established |

Exposure Limits/Guidelines (Con't.)

| | Result | Israel | Italy | Japan | Malaysia | Mexico |
|---------------------------------|--------|--|---|---|---|---|
| Asphalt (8052-42-4) | STELs | Not established | Not established | Not established | Not established | 10 mg/m ³ STEL [PPT-CT] |
| | TWAs | 0.5 mg/m ³ TWA (fume, inhalable fraction, as benzene soluble aerosol) | Not established | Not established | 5 mg/m ³ TWA (fume) | 5 mg/m ³ TWA VLE-PPT |
| Crystalline silica (14808-60-7) | TWAs | 0.025 mg/m ³ TWA (respirable fraction) | Not established | Not established | 0.1 mg/m ³ TWA (respirable fraction) | 0.1 mg/m ³ TWA VLE-PPT (respirable fraction) |
| Copper oxide | TWAs | 1 mg/m ³ TWA (dust and mist, as Cu) <i>as Copper compounds</i> | Not established | Not established | Not established | Not established |
| Graphite (7782-42-5) | TWAs | 2 mg/m ³ TWA (respirable fraction, all forms except graphite fibers) | Not established | 2 mg/m ³ OEL (Class 1 Dust, total dust); 0.5 mg/m ³ OEL (Class 1 Dust, respirable dust) | 2 mg/m ³ TWA (all forms except Graphite fibres, respirable fraction) | 2 mg/m ³ TWA VLE-PPT (synthetic and natural) |
| Lead, powder (7439-92-1) | TWAs | 0.05 mg/m ³ TWA (women age 45 and over and all men) | 0.075 mg/m ³ TWA Media Ponderata nel Tempo | 0.03 mg/m ³ OEL (provisional) | 0.05 mg/m ³ TWA | 0.15 mg/m ³ TWA VLE-PPT (dust and fume, as Pb) |

Exposure Limits/Guidelines (Con't.)

| | Result | Netherlands | NIOSH | OSHA | OSHA Vacated | Portugal |
|---------------------|--------|-----------------|-----------------|-----------------|-----------------|--|
| Asphalt (8052-42-4) | TWAs | Not established | Not established | Not established | Not established | 0.5 mg/m ³ TWA [VLE-MP] (fumes, inhalable fraction, as Benzene soluble aerosol) |

| | | | | | | |
|---------------------------------|----------|---|--|--|--|--|
| | Ceilings | Not established | 5 mg/m ³ Ceiling (fume, 15 min) | Not established | Not established | Not established |
| Crystalline silica (14808-60-7) | TWAs | 0.075 mg/m ³ TWA (respirable dust, listed under Silicon dioxide) | 0.05 mg/m ³ TWA (respirable dust) | 50 µg/m ³ TWA (listed under Respirable crystalline silica) | 0.1 mg/m ³ TWA (respirable dust) | 0.025 mg/m ³ TWA [VLE-MP] (respirable fraction) |
| Copper oxide | TWAs | Not established | 0.1 mg/m ³ TWA (fume, as Cu) | Not established | Not established | Not established |
| Graphite | TWAs | Not established | 2.5 mg/m ³ TWA (natural, respirable dust) | 15 mg/m ³ TWA (synthetic, total dust); 5 mg/m ³ TWA (synthetic, respirable fraction) | 2.5 mg/m ³ TWA (natural, respirable dust); 10 mg/m ³ TWA (synthetic, total dust); 5 mg/m ³ TWA (synthetic, respirable fraction) | 2 mg/m ³ TWA [VLE-MP] (all forms except Graphite fibers, respirable fraction) |
| Lead, powder (7439-92-1) | TWAs | 0.15 mg/m ³ TWA | 0.050 mg/m ³ TWA | 50 µg/m ³ TWA | Not established | 0.15 mg/m ³ TWA [VLE-MP] (mandatory indicative limit value) |

Exposure Limits/Guidelines (Con't.)

| | Result | Russia | Singapore | Thailand | United Kingdom | United States - California |
|---------------------------------|--------|--|---|---------------------------|---|--|
| Asphalt (8052-42-4) | TWAs | Not established | 5 mg/m ³ PEL (fume) | Not established | 5 mg/m ³ TWA (fumes) | 5 mg/m ³ PEL (fume) |
| | STELs | Not established | Not established | Not established | 10 mg/m ³ STEL (fumes) | Not established |
| Crystalline silica (14808-60-7) | TWAs | 1 mg/m ³ TWA (glass, disintegration aerosol, total mass of aerosols, listed under Silicon dioxide amorphous and vitreous); 1 mg/m ³ TWA (total mass of aerosols, listed under Crystalline silicon dioxide) | 0.1 mg/m ³ PEL (respirable dust) | Not established | Not established | 0.3 mg/m ³ PEL (total dust); 0.1 mg/m ³ PEL (respirable dust) |
| | STELs | 3 mg/m ³ STEL (glass, disintegration aerosol, total mass of aerosols, listed under Silicon dioxide amorphous and vitreous); 3 mg/m ³ STEL (regulated under Quartz, total mass of aerosols, listed under Silicon dioxide crystalline) | Not established | Not established | Not established | Not established |
| Graphite (7782-42-5) | TWAs | Not established | 2 mg/m ³ PEL (respirable dust) | Not established | 10 mg/m ³ TWA (inhalable dust); 4 mg/m ³ TWA (respirable dust) | 2.5 mg/m ³ PEL (natural, respirable dust); 10 mg/m ³ PEL (synthetic total dust); 5 mg/m ³ PEL (synthetic respirable fraction) |
| | STELs | Not established | Not established | Not established | 30 mg/m ³ STEL (calculated, inhalable dust); 12 mg/m ³ STEL (calculated, respirable dust) | Not established |
| Lead, powder (7439-92-1) | TWAs | 0.05 mg/m ³ TWA (aerosol) | 0.15 mg/m ³ PEL | 0.2 mg/m ³ TWA | 0.15 mg/m ³ TWA | 0.05 mg/m ³ PEL (dust and fume) |
| | STELs | Not established | Not established | Not established | 0.45 mg/m ³ STEL (calculated) | Not established |

Exposure Limits/Guidelines (Con't.)

| | Result | Venezuela |
|--|--------|-----------|
|--|--------|-----------|

| | | |
|---------------------------------|------|---|
| Asphalt (8052-42-4) | TWAs | 0.5 mg/m3 TWA [VTRE-L-8/40 (fume, as Benzene soluble aerosols)] |
| Crystalline silica (14808-60-7) | TWAs | 0.025 mg/m3 TWA [VTRE-L-8/40 (respirable fraction)] |
| Graphite | TWAs | 2 mg/m3 TWA [VTRE-L-8/40 (dust)] |
| Lead, powder (7439-92-1) | TWAs | 0.05 ppm TWA [VTRE-L-8/40 (protection of the health and safety of workers from risks related to this chemical agent at work)] |

Exposure Control Notations

Japan

- Lead, powder (7439-92-1): **Carcinogens:** (Group 2B - Possibly Carcinogenic to Humans)
- Copper oxide as Copper compounds: **Sensitizers:** (Group 2 skin sensitizer (Evaluation does not necessarily apply to all individuals within the group))

Mexico

- Lead, powder (7439-92-1): **Carcinogens:** (A3 - Confirmed animal carcinogen)
- Asphalt (8052-42-4): **Carcinogens:** (A4 - Not classifiable as a human carcinogen)

Egypt

- Lead, powder (7439-92-1): **Carcinogens:** (Animal Carcinogen)
- 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

- Lead, powder (7439-92-1): **Carcinogens:** (A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans)
- Crystalline silica (14808-60-7): **Carcinogens:** (A2 - Suspected Human Carcinogen)
- Asphalt (8052-42-4): **Carcinogens:** (A4 - Not Classifiable as a Human Carcinogen (fumes))

Indonesia

- Lead, powder (7439-92-1): **Carcinogens:** (A3 - confirmed animal carcinogen)
- Asphalt (8052-42-4): **Carcinogens:** (A4 - not classifiable as a human carcinogen)

Argentina

- Lead, powder (7439-92-1): **Carcinogens:** (A3 - Confirmed animal carcinogen with unknown relevance to humans)
- Crystalline silica (14808-60-7): **Carcinogens:** (A2 - Suspected human carcinogen)
- Asphalt (8052-42-4): **Carcinogens:** (A4 - Not classifiable as a human carcinogen (fumes))

Canada Alberta

- Lead, powder (7439-92-1): **Designated Substances:** (Designated substance - requires code of practice)

Canada British Columbia

- Lead, powder (7439-92-1): **Carcinogens:** (IARC Category 2B - Possible Human Carcinogen) | **Designated Substances:** (IARC Category 2B - Possible Human Carcinogen; Adverse reproductive effect) | **Substances with Reproductive Critical Effects:** (Adverse reproductive effect)
- 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)

- 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))

Canada Manitoba

- Lead, powder (7439-92-1): **Carcinogens:** (A3 Confirmed Animal Carcinogen with Unknown Relevance to Humans)
- Crystalline silica (14808-60-7): **Carcinogens:** (A2 Suspected Human Carcinogen)
- Asphalt (8052-42-4): **Carcinogens:** (A4 Not Classifiable as a Human Carcinogen (fume, Coal tar-free))

Canada New Brunswick

- Lead, powder (7439-92-1): **Carcinogens:** (A3 - Animal Carcinogen)
- Asphalt (8052-42-4): **Carcinogens:** (A4 - Not Classifiable as a Human Carcinogen (fumes))

Canada Nova Scotia

- Lead, powder (7439-92-1): **Carcinogens:** (A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans)
- Crystalline silica (14808-60-7): **Carcinogens:** (A2 - Suspected Human Carcinogen)
- Asphalt (8052-42-4): **Carcinogens:** (A4 - Not Classifiable as a Human Carcinogen (fume, Coal tar-free))

Canada Ontario

- Lead, powder (7439-92-1): **Designated Substances:** (0.05 mg/m3 TWA)
- Crystalline silica (14808-60-7): **Designated Substances:** (0.10 mg/m3 TWA (respirable fraction, listed under Silica, crystalline))

Canada Quebec

- Lead, powder (7439-92-1): **Carcinogens:** (C3 carcinogen - effect detected in animals)
- Crystalline silica (14808-60-7): **Carcinogens:** (C2 carcinogen - effect suspected in humans)

Canada Saskatchewan

- Lead, powder (7439-92-1): **Designated Substances:** (Present)

France

- Lead, powder (7439-92-1): **Carcinogens:** (Carcinogen categories 1A, 1B, 2) | **Reproductive Toxins:** (Reproductive Toxin categories 1A, 1B, 2)

Venezuela

- Lead, powder (7439-92-1): **Ceilings:** (Present)
- Crystalline silica (14808-60-7): **Ceilings:** (Present)
- Asphalt (8052-42-4): **Ceilings:** (Present)

ACGIH

- Lead, powder (7439-92-1): **Carcinogens:** (A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans)
- Crystalline silica (14808-60-7): **Carcinogens:** (A2 - Suspected Human Carcinogen)
- Asphalt (8052-42-4): **Carcinogens:** (A4 - Not Classifiable as a Human Carcinogen (fume, coal tar-free))

Germany TRGS

- Lead, powder (7439-92-1): **Developmental Toxins:** (Category 1A (bioavailable, metal)) | **Reproductive Toxins:** (Category 2 (bioavailable; metal))

Germany DFG

- Lead, powder (7439-92-1): **Carcinogens:** (Category 2 (considered to be carcinogenic for man))
- 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))
- Crystalline silica (14808-60-7): **Carcinogens:** (Category 1 (causes cancer in man; alveola fraction))
- Asphalt (8052-42-4): **Carcinogens:** (Category 2 (considered to be carcinogenic for man; aerosol and vapor)) | **Skin:** (skin notation (aerosol and vapour))

Exposure Limits Supplemental

Thailand

- Graphite (7782-42-5): **Mineral Dusts:** (15 mppcf TWA)
- Graphite as Particulates not otherwise classified (PNO): **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))

Argentina

- Lead, powder (7439-92-1): **BEIs:** (30 µg/100 mL blood not critical Pb (Women of child bearing potential, whose blood Pb level exceeds 10 mg/dL, are at risk of delivering a child with blood Pb level over the current CDC guideline. If the blood Pb of such children remains elevated, they may be at increased risk of cognitive deficiencies. The blood Pb of these children should be closely monitored and appropriate steps should be taken to minimize the child's exposure to environmental lead.))

Canada Yukon

- Lead, powder (7439-92-1): **Miximum Acceptable Body Burdens:** (80 µg/100 mL Medium: blood; 200 µg/L Medium: urine)

Israel

- Lead, powder (7439-92-1): **Action Levels:** (0.025 mg/m³ AL (as Pb)) | **Biological Markers of Occupational Exposure:** (30 µg/100 mL Medium: blood Parameter: Lead (Women age 45 and over and all men); 30 µg/100 mL Medium: blood Parameter: Lead (Women under age 45))
- 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))

Venezuela

- Lead, powder (7439-92-1): **Biological Exposure Indices:** (30 µg/100 mL blood not critical Lead (Note: Women of reproductive age, whose levels of blood Pb exceed 10 µg/dL are at risk of giving birth to children with Pb blood values exceeding said level, which was established by the Center of Disease Control in the United States. If Pb levels in said children remain elevated, they may be at an increased risk of cognitive deficits. The Pb in the blood of those children must be watched very closely and the children must be kept from being exposed to environmental lead.))

OSHA

- Graphite (7782-42-5): **Mineral Dusts:** (15 mppcf TWA (natural))
- Graphite as Particulates not otherwise classified (PNO): **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

- Lead, powder (7439-92-1): **BEIs:** (30 µg/100 mL Medium: blood Time: not critical Parameter: Lead (Note: Women of child bearing potential, whose blood Pb exceeds 10 µg/dL, are at risk of delivering a child with a blood Pb over the current Centers for Disease Control guideline of 10 µg/dL. If the blood Pb of such children remains elevated, they may be at increased risk of cognitive deficits. The blood Pb of these children should be closely monitored and appropriate steps should be taken to minimize the child's exposure to environmental lead.)) | **TLV Basis - Critical Effects:** (CNS and PNS impairment; hematologic effects) | **Notice of Intended Changes (BEIs):** (200 µg/L Medium: blood Time: not critical Parameter: lead)
- 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))
- Crystalline silica (14808-60-7): **TLV Basis - Critical Effects:** (lung cancer; pulmonary fibrosis)
- 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))

Germany TRGS

- Lead, powder (7439-92-1): **BEIs:** (300 µg/L Medium: whole blood Time: no restriction Parameter: Lead (women age below 45 years); 400 µg/L Medium: whole blood Time: no restriction Parameter: Lead (women 45 years and older))

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

BEI = Biological Exposure Indices

MAK = Maximale Arbeitsplatz Konzentration is the maximum permissible concentration

NIOSH = National Institute of Occupational Safety and Health

OSHA = Occupational Safety and Health Administration

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

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

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

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

TWAEV = Time-Weighted Average Exposure Value

Section 9 - Physical and Chemical Properties

9.1 Information on Basic Physical and Chemical Properties

| Material Description | | | |
|-------------------------------------|--------------------|------------------------------|---|
| Physical Form | Solid | Appearance/Description | Brown/copper semi-solid paste with mild petroleum odor. |
| Color | Brown/copper | Odor | Mild, petroleum. |
| Odor Threshold | Data lacking | | |
| General Properties | | | |
| Boiling Point | Data lacking | Melting Point/Freezing Point | Data lacking |
| Decomposition Temperature | Data lacking | pH | Data lacking |
| Specific Gravity/Relative Density | Data lacking | Water Solubility | Insoluble |
| Viscosity | Data lacking | Explosive Properties | Data lacking |
| Oxidizing Properties: | Data lacking | | |
| Volatility | | | |
| Vapor Pressure | Data lacking | Vapor Density | Data lacking |
| Evaporation Rate | Data lacking | | |
| Flammability | | | |
| Flash Point | > 260 °C(> 500 °F) | UEL | Data lacking |
| LEL | Data lacking | Autoignition | Data lacking |
| Flammability (solid, gas) | Data lacking | | |
| Environmental | | | |
| Octanol/Water Partition coefficient | Data lacking | | |

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, Zinc oxide, Lead oxides.

Section 11 - Toxicological Information

11.1 Information on toxicological effects

| | | Components |
|--|------------|--|
| Lead, powder (> 25%) | 7439-92-1 | Acute Toxicity: Ingestion/Oral-Woman TDLo • 450 mg/kg 6 Year(s); <i>Peripheral Nerve and Sensation:Flaccid paralysis without anesthesia (usually neuromuscular blockage); Behavioral:Hallucinations, distorted perceptions; Behavioral:Muscle weakness;</i> Inhalation-Human TCLo • 10 µg/m ³ ; <i>Gastrointestinal:Gastritis; Liver:Other changes;</i> Multi-dose Toxicity: Ingestion/Oral-Rat TDLo • 43.75 mg/kg 1 Week(s)-Continuous; <i>Blood:Other changes; Kidney, Ureter, and Bladder:Other changes in urine composition; Biochemical:Metabolism (intermediary):Porphyrin, including bile pigments;</i> Inhalation-Human TCLo • 0.011 mg/m ³ 26 Week(s)-Intermittent; <i>Brain and Coverings:Other degenerative changes;</i> Inhalation-Man TCLo • 0.03 mg/m ³ 5 Year(s)-Intermittent; <i>Endocrine:Androgenic; Mutagen:</i> Cytogenetic analysis • Ingestion/Oral-Monkey • 42 mg/kg 30 Week(s); Cytogenetic analysis • Inhalation-Rat • 23 µg/m ³ 16 Week(s); Reproductive: Ingestion/Oral-Rat TDLo • 790 mg/kg (multigenerations); <i>Reproductive Effects:Effects on Embryo or Fetus:Fetotoxicity (except death, e.g., stunted fetus); Reproductive Effects:Effects on Embryo or Fetus:Fetal death;</i> Inhalation-Rat TCLo • 10 mg/m ³ 24 Hour(s)(1-21D preg); <i>Reproductive Effects:Effects on Embryo or Fetus:Fetotoxicity (except death, e.g., stunted fetus); Reproductive Effects:Specific Developmental Abnormalities:Blood and lymphatic system</i> |
| Zinc powder, stabilized (10% TO 15%) | 7440-66-6 | Irritation: Skin-Human • 300 µg 3 Day(s)-Intermittent • Mild irritation; Tumorigen / Carcinogen: Ingestion/Oral-Mouse TDLo • 12.6 mg/kg 46 Week(s)-Continuous; <i>Tumorigenic:Carcinogenic by RTECS criteria; Gastrointestinal:Tumors; Tumorigenic:Facilitates action of known carcinogen</i> |
| Copper oxide (1% TO 5%) | 1317-38-0 | Acute Toxicity: Ingestion/Oral-Rat LD50 • 470 mg/kg; Multi-dose Toxicity: Ingestion/Oral-Woman TDLo • 0.7 mg/kg 7 Day(s)-Continuous; <i>Gastrointestinal:Hypermotility, diarrhea; Gastrointestinal:Nausea or vomiting; Gastrointestinal:Other changes</i> |
| Zinc O,O-bis(mixed iso-butyl and pentyl) phosphorodithioate (0.714%) | 68457-79-4 | Acute Toxicity: Ingestion/Oral-Rat LD50 • 3.6 g/kg; <i>Behavioral:Somnolence (general depressed activity); Lungs, Thorax, or Respiration:Other changes; Gastrointestinal:Hypermotility, diarrhea</i> |
| Crystalline silica (0% TO 39.285%) | 14808-60-7 | Acute Toxicity: Inhalation-Human TCLo • 16 mppcf 8 Hour(s) 17.9 Year(s)-Intermittent; <i>Lungs, Thorax, or Respiration:Fibrosis, focal (pneumoconiosis); Lungs, Thorax, or Respiration:Cough; Lungs, Thorax, or Respiration:Dyspnea;</i> Inhalation-Rat TCLo • 200 mg/kg; <i>Lungs, Thorax, or Respiration:Fibrosis, focal (pneumoconiosis); Lungs, Thorax, or Respiration:Other changes; Nutritional and Gross Metabolic:Changes in Chemistry or Temperature:Fe;</i> Multi-dose Toxicity: Inhalation-Hamster TCLo • 3 mg/m ³ 6 Hour(s) 78 Week(s)-Intermittent; <i>Lungs, Thorax, or Respiration:Fibrosis (interstitial); Lungs, Thorax, or Respiration:Changes in lung weight;</i> Inhalation-Rat TCLo • 6.2 mg/m ³ 6 Hour(s) 6 Week(s)-Intermittent; <i>Lungs, Thorax, or Respiration:Other changes; Blood:Changes in spleen; Immunological Including Allergic:Increase in cellular immune response;</i> Inhalation-Rat TCLo • 80 mg/m ³ 26 Week(s)-Intermittent; <i>Lungs, Thorax, or Respiration:Fibrosis, focal (pneumoconiosis); Blood:Changes in spleen; Immunological Including Allergic:Decrease in cellular immune response;</i> Mutagen: Micronucleus test • Unreported Route-Hamster • Lung (Somatic cell) • 160 µg/cm ³ ; DNA damage • Unreported Route-Human • Other Cell Type • 120 mg/L 24 Hour(s); Micronucleus test • Unreported Route-Human • Lung (Somatic cell) • 40 µg/cm ³ ; Tumorigen / Carcinogen: Inhalation-Rat TCLo • 50 mg/m ³ 6 Hour(s) 71 Week(s)-Intermittent; <i>Tumorigenic:Carcinogenic by RTECS criteria; Liver:Tumors</i> |
| Asphalt (0% TO 39.285%) | 8052-42-4 | Acute Toxicity: Ingestion/Oral-Rat LD50 • >5000 mg/kg; <i>Gastrointestinal:Hypermotility, diarrhea;</i> Inhalation-Rat LC50 • >94.4 mg/m ³ ; Multi-dose Toxicity: Inhalation-Rat TCLo • 100 mg/m ³ 6 Hour(s) 14 Week(s)-Intermittent; <i>Sense Organs and Special Senses:Olfaction:Tumors; Behavioral:Food intake (animal); Nutritional and Gross Metabolic:Gross Metabolite Changes:Weight loss or decreased weight gain;</i> Inhalation-Human TDLo • <10 mg/m ³ 5.5 Year(s)-Intermittent; <i>Sense Organs and Special Senses:Eye:Conjunctive irritation; Lungs, Thorax, or Respiration:Cough; Gastrointestinal:Changes in structure or function of salivary glands;</i> Mutagen: DNA adduct • Skin-Mouse • 600 mg/kg; Tumorigen / Carcinogen: Skin-Mouse TDLo • 130 g/kg 81 Week(s)-Intermittent; |

Tumorigenic: Carcinogenic by RTECS criteria; Lungs, Thorax, or Respiration: Tumors; Skin and Appendages: Other: Tumors

| GHS Properties | Classification |
|-------------------------------|---|
| Acute toxicity | EU/CLP•Data lacking UN GHS 4•Data lacking OSHA HCS 2012•Data lacking WHMIS 2015•Data lacking |
| Skin corrosion/Irritation | EU/CLP•Data lacking UN GHS 4•Skin Mild Irritation 3 OSHA HCS 2012•Data lacking WHMIS 2015•Data lacking |
| Serious eye damage/Irritation | EU/CLP•Data lacking UN GHS 4•Data lacking OSHA HCS 2012•Data lacking WHMIS 2015•Data lacking |
| Skin sensitization | EU/CLP•Data lacking UN GHS 4•Data lacking OSHA HCS 2012•Data lacking WHMIS 2015•Data lacking |
| Respiratory sensitization | EU/CLP•Data lacking UN GHS 4•Data lacking OSHA HCS 2012•Data lacking WHMIS 2015•Data lacking |
| Aspiration Hazard | EU/CLP•Data lacking UN GHS 4•Data lacking OSHA HCS 2012•Data lacking WHMIS 2015•Data lacking |
| Carcinogenicity | EU/CLP•Carcinogenicity 2; Suspected of causing cancer UN GHS 4•Carcinogenicity 2 OSHA HCS 2012•Carcinogenicity 2 WHMIS 2015•Carcinogenicity 2 |
| Germ Cell Mutagenicity | EU/CLP•Data lacking UN GHS 4•Data lacking OSHA HCS 2012•Data lacking WHMIS 2015•Data lacking |
| Toxicity for Reproduction | EU/CLP•Effects on or via lactation; Toxic to Reproduction 1A UN GHS 4•Toxic to Reproduction 1A OSHA HCS 2012•Toxic to Reproduction 1A WHMIS 2015•Toxic to Reproduction 1A |
| STOT-SE | EU/CLP•Data lacking UN GHS 4•Data lacking OSHA HCS 2012•Data lacking WHMIS 2015•Data lacking |
| STOT-RE | EU/CLP•Data lacking UN GHS 4•Specific Target Organ Toxicity Repeated Exposure 1 OSHA HCS 2012•Specific Target Organ Toxicity Repeated Exposure 1 WHMIS 2015•Specific Target Organ Toxicity Repeated Exposure 1 |

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) • No data available

Chronic (Delayed) • No data available

Other

Chronic (Delayed) • Repeated and prolonged exposure to lead may cause effects on the gastrointestinal tract and central nervous system.

Carcinogenic Effects • Repeated and prolonged exposure may cause cancer.

| Carcinogenic Effects | | | |
|----------------------|------------|------------------------------|---|
| | CAS | IARC | NTP |
| Asphalt | 8052-42-4 | Group 2B-Possible Carcinogen | Not Listed |
| Crystalline silica | 14808-60-7 | Group 1-Carcinogenic | Known Human Carcinogen |
| Lead, powder | 7439-92-1 | Group 2A-Probable Carcinogen | Reasonably Anticipated to be Human Carcinogen |

Reproductive Effects • Repeated and prolonged exposure may cause reproductive effects. May cause harm to breast-fed children.

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

LC = Lethal Concentration

LD = Lethal Dose

TC = Toxic Concentration

TD = Toxic Dose

Section 12 - Ecological Information

12.1 Toxicity

| Components | | |
|--------------------------------------|-----------|---|
| Lead, powder (> 25%) | 7439-92-1 | Aquatic Toxicity-Fish: 96 Hour(s) LC50 <i>Cyprinus carpio</i> (<i>Common Carp</i>) 0.4 mg/L Comments: Acute Toxicity of Heavy Metals to Common Carp (<i>Cyprinus carpio</i>) 28 Day(s) NOEC <i>Cyprinus carpio</i> (<i>Common Carp</i>) 0.00003 mg/L Comments: Bioaccumulation of Micropollutants and Biomarker Responses in Caged Carp (<i>Cyprinus carpio</i>) Aquatic Toxicity-Crustacea: 28 Day(s) NOEC <i>Hyaella azteca</i> (<i>Scud</i>) 0.006 mg/L Comments: Acute and Chronic Toxicity of Lead in Water and Diet to the Amphipod <i>Hyaella azteca</i> Aquatic Toxicity-Algae and Other Aquatic Plant(s): 72 Hour(s) EC50 <i>Chaetoceros sp.</i> (<i>Diatom</i>) 0.105 mg/L Comments: Toxicity and Bioaccumulation of Copper and Lead in Five Marine Microalgae |
| Zinc powder, stabilized (10% TO 15%) | 7440-66-6 | Aquatic Toxicity-Fish: 96 Hour(s) LC50 <i>Pimephales promelas</i> (<i>Fathead Minnow</i>) 0.238 mg/L Comments: Trace Metals Toxicity and Bioaccumulation in Mudskipper <i>Periophthalmus waltoni</i> Koumans 1941 (Gobiidae: Perciformes) 28 Day(s) NOEC <i>Cyprinus carpio</i> (<i>Common Carp</i>) 0.0026 mg/L Comments: Bioaccumulation of Micropollutants and Biomarker Responses in Caged Carp (<i>Cyprinus carpio</i>) Aquatic Toxicity-Crustacea: 21 Day(s) NOEC Water Flea 0.062 mg/L Comments: Bioavailability Models for Predicting Acute and Chronic Toxicity of Zinc to Algae, Daphnids, and Fish in Natural Surface Waters 48 Hour(s) EC50 <i>Ceriodaphnia dubia</i> 0.07 mg/L Comments: Influence of Water Chemistry on the Acute Toxicity of Copper and Zinc to the Cladoceran <i>Ceriodaphnia cf dubia</i> Aquatic Toxicity-Algae and Other Aquatic Plant(s): 72 Hour(s) EC50 <i>Pseudokirchneriella subcapitata</i> (<i>Green Algae</i>) 0.106 mg/L Comments: Bioavailability Models for Predicting Acute and Chronic Toxicity of Zinc to Algae, Daphnids, and Fish in Natural Surface Waters |

| | | |
|-------------------------|-----------|--|
| | | 14 Day(s) NOEC <i>Euglena gracilis</i> (Flagellate Euglenoid) 0.0075 mg/L Comments: Water Quality Bioassay Using Selected Protozoa, II. The Effects of Zinc on Population Growth of <i>Euglena gracilis</i> |
| Copper oxide (1% TO 5%) | 1317-38-0 | Aquatic Toxicity-Fish: 4 Day(s) LC50 <i>Western Mosquitofish</i> >56000 mg/L 20 Day(s) NOEC <i>Common carp</i> 0.0128 mg/L Aquatic Toxicity-Crustacea: 2 Day(s) EC50 <i>Water flea</i> 92.7 mg/L |

- 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

| | 14.1 UN number | 14.2 UN proper shipping name | 14.3 Transport hazard class(es) | 14.4 Packing group | 14.5 Environmental hazards |
|-----------|----------------|---|---------------------------------|--------------------|----------------------------|
| DOT | UN3077 | Environmentally hazardous substance, solid, n.o.s (Zinc, Copper oxide, Lead) | 9 | III | NDA |
| TDG | UN3077 | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Zinc, Copper oxide, Lead) | 9 | III | NDA |
| IMO/IMDG | UN3077 | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Zinc, Copper oxide, Lead) | 9 | III | NDA |
| IATA/ICAO | UN3077 | Environmentally hazardous substance, solid, n.o.s (Zinc, Copper oxide, Lead) | 9 | III | NDA |

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

SARA Hazard Classifications

- Chronic

| State Right To Know | | |
|---------------------|-----|----|
| Component | CAS | PA |
| | | |

| | | |
|---|------------|-----|
| Asphalt | 8052-42-4 | Yes |
| Copper oxide | 1317-38-0 | No |
| Crystalline silica | 14808-60-7 | Yes |
| Lead, powder | 7439-92-1 | Yes |
| Zinc O,O-bis(mixed iso-butyl and pentyl) phosphorodithioate | 68457-79-4 | No |
| Zinc powder, stabilized | 7440-66-6 | Yes |

| Inventory | | | | | | |
|---|------------|----------------|------------|-------------|-------|-----------|
| Component | CAS | Australia AICS | Canada DSL | Canada NDSL | China | EU EINECS |
| Asphalt | 8052-42-4 | Yes | Yes | No | Yes | Yes |
| Copper oxide | 1317-38-0 | Yes | Yes | No | Yes | Yes |
| Crystalline silica | 14808-60-7 | Yes | Yes | No | Yes | Yes |
| Lead, powder | 7439-92-1 | Yes | Yes | No | Yes | Yes |
| Zinc O,O-bis(mixed iso-butyl and pentyl) phosphorodithioate | 68457-79-4 | Yes | Yes | No | Yes | Yes |
| Zinc powder, stabilized | 7440-66-6 | Yes | Yes | No | Yes | Yes |

| Inventory (Con't.) | | | | |
|---|------------|-----------|------------|------|
| Component | CAS | EU ELNICS | Japan ENCS | TSCA |
| Asphalt | 8052-42-4 | No | No | Yes |
| Copper oxide | 1317-38-0 | No | Yes | Yes |
| Crystalline silica | 14808-60-7 | No | Yes | Yes |
| Lead, powder | 7439-92-1 | No | Yes | Yes |
| Zinc O,O-bis(mixed iso-butyl and pentyl) phosphorodithioate | 68457-79-4 | No | Yes | Yes |
| Zinc powder, stabilized | 7440-66-6 | No | No | Yes |

United States - California

Environment

U.S. - California - Proposition 65 - Carcinogens List

| | | |
|--|------------|-----------------------|
| •Copper oxide | 1317-38-0 | Not Listed |
| •Lead, powder | 7439-92-1 | carcinogen, 10/1/1992 |
| •Asphalt | 8052-42-4 | Not Listed |
| •Zinc powder, stabilized | 7440-66-6 | Not Listed |
| •Zinc O,O-bis(mixed iso-butyl and pentyl) phosphorodithioate | 68457-79-4 | Not Listed |
| •Crystalline silica | 14808-60-7 | Not Listed |

U.S. - California - Proposition 65 - Developmental Toxicity

| | | |
|--|------------|-----------------------------------|
| •Copper oxide | 1317-38-0 | Not Listed |
| •Lead, powder | 7439-92-1 | developmental toxicity, 2/27/1987 |
| •Asphalt | 8052-42-4 | Not Listed |
| •Zinc powder, stabilized | 7440-66-6 | Not Listed |
| •Zinc O,O-bis(mixed iso-butyl and pentyl) phosphorodithioate | 68457-79-4 | Not Listed |
| •Crystalline silica | 14808-60-7 | Not Listed |

U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)

| | | |
|--|------------|-----------------|
| •Copper oxide | 1317-38-0 | Not Listed |
| •Lead, powder | 7439-92-1 | 0.5 µg/day MADL |
| •Asphalt | 8052-42-4 | Not Listed |
| •Zinc powder, stabilized | 7440-66-6 | Not Listed |
| •Zinc O,O-bis(mixed iso-butyl and pentyl) phosphorodithioate | 68457-79-4 | Not Listed |
| •Crystalline silica | 14808-60-7 | Not Listed |

U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)

| | | |
|--|------------|-----------------------|
| •Copper oxide | 1317-38-0 | Not Listed |
| •Lead, powder | 7439-92-1 | 15 µg/day NSRL (oral) |
| •Asphalt | 8052-42-4 | Not Listed |
| •Zinc powder, stabilized | 7440-66-6 | Not Listed |
| •Zinc O,O-bis(mixed iso-butyl and pentyl) phosphorodithioate | 68457-79-4 | Not Listed |
| •Crystalline silica | 14808-60-7 | Not Listed |

U.S. - California - Proposition 65 - Reproductive Toxicity - Female

| | | |
|--|------------|---|
| •Copper oxide | 1317-38-0 | Not Listed |
| •Lead, powder | 7439-92-1 | female reproductive toxicity 2/27/87 |
| •Asphalt | 8052-42-4 | Not Listed |
| •Zinc powder, stabilized | 7440-66-6 | Not Listed |
| •Zinc O,O-bis(mixed iso-butyl and pentyl) phosphorodithioate | 68457-79-4 | Not Listed |
| •Crystalline silica | 14808-60-7 | Not Listed |

U.S. - California - Proposition 65 - Reproductive Toxicity - Male

| | | |
|--|------------|--|
| •Copper oxide | 1317-38-0 | Not Listed |
| •Lead, powder | 7439-92-1 | male reproductive toxicity, 2/27/87 |
| •Asphalt | 8052-42-4 | Not Listed |
| •Zinc powder, stabilized | 7440-66-6 | Not Listed |
| •Zinc O,O-bis(mixed iso-butyl and pentyl) phosphorodithioate | 68457-79-4 | Not Listed |
| •Crystalline silica | 14808-60-7 | Not Listed |

15.2 Chemical Safety Assessment

- No Chemical Safety Assessment has been carried out.

15.3 Other Information

- WARNING: This product contains a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

Section 16 - Other Information**Relevant Phrases (code & full text)**

- H350i - May cause cancer by inhalation.
- H372 - Causes damage to organs through prolonged or repeated exposure.
- H400 - Very toxic to aquatic life
- H410 - Very toxic to aquatic life with long lasting effects

Revision Date

- 05/September/2017

Last Revision Date

- 05/September/2017

Preparation Date

- 05/September/2017

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