SAFETY DATA SHEET

API MODIFIED ARCTIC GRADE

SECTION 1. IDENTIFICATION

Product name : API MODIFIED ARCTIC GRADE

SDS-Identcode : 056G

Manufacturer or supplier’s details
Company name of supplier : Bestolife Corporation
Address : 2126 Vanco Drive
Irving TX 75061,
Telephone : 855-243-9164/972-865-8961
Telefax : 214-631-3047
(24-hours/7 days)
E-mail address : www.bestolife.com

Recommended use of the chemical and restrictions on use
Recommended use : Industrial use
Thread Compound (Pipe Dope) and Jacking grease for use in
Offshore industries
Mining, (without offshore industries)

Restrictions on use : Do not use on oxygen lines or in oxygen enriched atmos-
pheres.

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with 29 CFR 1910.1200
Eye irritation : Category 2A
Carcinogenicity : Category 2
Reproductive toxicity : Category 1A

Effects on or via lactation
Specific target organ toxicity - repeated exposure : Category 1 (Kidney, Central nervous system, Blood)

GHS label elements
Hazard pictograms : 

Signal Word : Danger

Hazard Statements : H319 Causes serious eye irritation.
H351 Suspected of causing cancer.
H360FD May damage fertility. May damage the unborn child.
H362 May cause harm to breast-fed children.
H372 Causes damage to organs (Kidney, Central nervous
system, Blood) through prolonged or repeated exposure.

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/ fume/ gas/ mist/ vapors/ spray.
P263 Avoid contact during pregnancy/ while nursing.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

**Response:**
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P337 + P313 If eye irritation persists: Get medical advice/ attention.

**Storage:**
P405 Store locked up.

**Disposal:**
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards
None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Substance / Mixture</th>
<th>Mixture</th>
</tr>
</thead>
</table>

**Components**

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>Concentration (% w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>7439-92-1</td>
<td>&gt;= 30 - &lt; 50</td>
</tr>
<tr>
<td>Graphite</td>
<td>7782-42-5</td>
<td>&gt;= 10 - &lt; 20</td>
</tr>
<tr>
<td>Distillates (petroleum), hydrotreated light naphthenic</td>
<td>64742-53-6</td>
<td>&gt;= 10 - &lt; 20</td>
</tr>
<tr>
<td>Distillates (petroleum), hydrotreated heavy naphthenic</td>
<td>64742-52-5</td>
<td>&gt;= 10 - &lt; 20</td>
</tr>
<tr>
<td>Copper metal powder</td>
<td>7440-50-8</td>
<td>&gt;= 1 - &lt; 5</td>
</tr>
<tr>
<td>Talc</td>
<td>14807-96-6</td>
<td>&gt;= 1 - &lt; 5</td>
</tr>
<tr>
<td>Calcium oxide</td>
<td>1305-78-8</td>
<td>&gt;= 1 - &lt; 5</td>
</tr>
<tr>
<td>Quartz</td>
<td>14808-60-7</td>
<td>&gt;= 1 - &lt; 5</td>
</tr>
</tbody>
</table>

Actual concentration is withheld as a trade secret

SECTION 4. FIRST AID MEASURES

**General advice:**
In the case of accident or if you feel unwell, seek medical...
If inhaled: If inhaled, remove to fresh air. Get medical attention.

In case of skin contact: In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

In case of eye contact: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. If easy to do, remove contact lens, if worn. Get medical attention.

If swallowed: If swallowed, DO NOT induce vomiting. Get medical attention. Rinse mouth thoroughly with water.

Most important symptoms and effects, both acute and delayed: Causes serious eye irritation. Suspected of causing cancer. May damage fertility. May damage the unborn child. May cause harm to breast-fed children. Causes damage to organs through prolonged or repeated exposure.

Protection of first-aiders: First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists (see section 8).

Notes to physician: Treat symptomatically and supportively.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: Water spray
Alcohol-resistant foam
Carbon dioxide (CO2)
Dry chemical

Unsuitable extinguishing media: None known.

Specific hazards during firefighting: Exposure to combustion products may be a hazard to health.

Hazardous combustion products: Lead compounds
Carbon oxides
Metal oxides

Specific extinguishing methods: Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray to cool unopened containers. Remove undamaged containers from fire area if it is safe to do so. Evacuate area.

Special protective equipment for fire-fighters: In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protection: Use personal protective equipment.
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API MODIFIED ARCTIC GRADE

Version 12.0
Revision Date: 05/06/2020
SDS Number: 118998-00019
Date of last issue: 04/11/2019
Date of first issue: 05/18/2015

Follow safe handling advice and personal protective equipment recommendations.

Discharge into the environment must be avoided.
Prevent further leakage or spillage if safe to do so.
Retain and dispose of contaminated wash water.
Local authorities should be advised if significant spills cannot be contained.

Sweep up or vacuum up spillage and collect in suitable container for disposal.
Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable.
Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

SECTION 7. HANDLING AND STORAGE

Technical measures:
See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.

Advice on safe handling:
Do not get on skin or clothing.
Do not swallow.
Do not get in eyes.
Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment
Keep container tightly closed.
Take care to prevent spills, waste and minimize release to the environment.

Conditions for safe storage:
Keep in properly labeled containers.
Store locked up.
Keep tightly closed.
Store in accordance with the particular national regulations.

Materials to avoid:
Do not store with the following product types:
Strong oxidizing agents
Organic peroxides
Explosives
Gases

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value type (Form of exposure)</th>
<th>Control parameters / Permissible concentration</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>7439-92-1</td>
<td>TWA</td>
<td>0.05 mg/m³ (Lead)</td>
<td>ACGIH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PEL</td>
<td>0.05 mg/m³ (Lead)</td>
<td>OSHA CARC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>0.05 mg/m³</td>
<td>NIOSH REL</td>
</tr>
</tbody>
</table>
SAFETY DATA SHEET

API MODIFIED ARCTIC GRADE

<table>
<thead>
<tr>
<th>Substance Description</th>
<th>SDS Number</th>
<th>Date of last issue: 04/11/2019</th>
<th>Date of first issue: 05/18/2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphite</td>
<td>7782-42-5</td>
<td>TWA (Respirable) 2.5 mg/m³</td>
<td>NIOSH REL</td>
</tr>
<tr>
<td>TWA (Respirable particulate matter)</td>
<td></td>
<td>2 mg/m³</td>
<td>ACGIH</td>
</tr>
<tr>
<td>TWA (Dust)</td>
<td></td>
<td>15 Million particles per cubic foot</td>
<td>OSHA Z-3</td>
</tr>
<tr>
<td>Distillates (petroleum), hydrotreated light naphthenic</td>
<td>64742-53-6</td>
<td>TWA (Mist) 5 mg/m³</td>
<td>OSHA Z-1</td>
</tr>
<tr>
<td>TWA (Inhalable particulate matter)</td>
<td></td>
<td>5 mg/m³</td>
<td>ACGIH</td>
</tr>
<tr>
<td>TWA (Mist)</td>
<td></td>
<td>5 mg/m³</td>
<td>NIOSH REL</td>
</tr>
<tr>
<td>ST (Mist)</td>
<td></td>
<td>10 mg/m³</td>
<td>NIOSH REL</td>
</tr>
<tr>
<td>Distillates (petroleum), hydrotreated heavy naphthenic</td>
<td>64742-52-5</td>
<td>TWA (Mist) 5 mg/m³</td>
<td>OSHA Z-1</td>
</tr>
<tr>
<td>TWA (Inhalable particulate matter)</td>
<td></td>
<td>5 mg/m³</td>
<td>ACGIH</td>
</tr>
<tr>
<td>TWA (Mist)</td>
<td></td>
<td>5 mg/m³</td>
<td>NIOSH REL</td>
</tr>
<tr>
<td>ST (Mist)</td>
<td></td>
<td>10 mg/m³</td>
<td>NIOSH REL</td>
</tr>
<tr>
<td>Copper metal powder</td>
<td>7440-50-8</td>
<td>TWA (Dust and mist) 1 mg/m³</td>
<td>ACGIH</td>
</tr>
<tr>
<td>TWA (Fumes)</td>
<td></td>
<td>0.2 mg/m³</td>
<td>ACGIH</td>
</tr>
<tr>
<td>TWA (Dust)</td>
<td></td>
<td>1 mg/m³</td>
<td>NIOSH REL</td>
</tr>
<tr>
<td>TWA (Mist)</td>
<td></td>
<td>1 mg/m³</td>
<td>NIOSH REL</td>
</tr>
<tr>
<td>TWA (dusts and mists)</td>
<td></td>
<td>1 mg/m³</td>
<td>OSHA Z-1</td>
</tr>
<tr>
<td>TWA (Fumes)</td>
<td></td>
<td>0.1 mg/m³</td>
<td>OSHA Z-1</td>
</tr>
<tr>
<td>Talc</td>
<td>14807-96-6</td>
<td>TWA (Dust) 20 Million particles per cubic foot</td>
<td>OSHA Z-3</td>
</tr>
<tr>
<td>TWA (Respirable)</td>
<td></td>
<td>2 mg/m³</td>
<td>NIOSH REL</td>
</tr>
<tr>
<td>TWA (Respirable particulate matter)</td>
<td></td>
<td>2 mg/m³</td>
<td>ACGIH</td>
</tr>
<tr>
<td>Calcium oxide</td>
<td>1305-78-8</td>
<td>TWA 2 mg/m³</td>
<td>ACGIH</td>
</tr>
<tr>
<td>TWA</td>
<td></td>
<td>2 mg/m³</td>
<td>NIOSH REL</td>
</tr>
<tr>
<td>TWA</td>
<td></td>
<td>5 mg/m³</td>
<td>OSHA Z-1</td>
</tr>
<tr>
<td>Quartz</td>
<td>14808-60-7</td>
<td>TWA (Respirable dust) 0.05 mg/m³</td>
<td>OSHA Z-1</td>
</tr>
<tr>
<td>TWA (Respirable)</td>
<td></td>
<td>10 mg/m³ / %SiO2+2</td>
<td>OSHA Z-3</td>
</tr>
<tr>
<td>TWA (respirable)</td>
<td></td>
<td>250 mpcf</td>
<td>OSHA Z-3</td>
</tr>
</tbody>
</table>
These substance(s) are inextricably bound in the product and therefore do not contribute to a dust inhalation hazard.

Quartz

Biological occupational exposure limits

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Control parameters</th>
<th>Biological specimen</th>
<th>Sampling time</th>
<th>Permissible concentration</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>7439-92-1</td>
<td>Lead (Lead)</td>
<td>In blood</td>
<td>Not critical</td>
<td>200 µg/l</td>
<td>ACGIH BEI</td>
</tr>
</tbody>
</table>

Engineering measures

Minimize workplace exposure concentrations.
Dust formation may be relevant in the processing of this product. In addition to substance-specific OELs, general limitations of concentrations of particulates in the air at workplaces have to be considered in workplace risk assessment. Relevant limits include: OSHA PEL for Particulates Not Otherwise Regulated of 15 mg/m³ - total dust, 5 mg/m³ - respirable fraction; and ACGIH TWA for Particles (insoluble or poorly soluble) Not Otherwise Specified of 3 mg/m³ - respirable particles, 10 mg/m³ - inhalable particles.

Personal protective equipment

Respiratory protection

General and local exhaust ventilation is recommended to maintain vapor exposures below recommended limits. Where concentrations are above recommended limits or are unknown, appropriate respiratory protection should be worn. Follow OSHA respirator regulations (29 CFR 1910.134) and use NIOSH/MSHA approved respirators. Protection provided by air purifying respirators against exposure to any hazardous chemical is limited. Use a positive pressure air supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstance where air purifying respirators may not provide adequate protection.

Hand protection

Material

Chemical-resistant gloves

Remarks

Choose gloves to protect hands against chemicals depending on the concentration specific to place of work. Breakthrough time is not determined for the product. Change gloves often! For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective
Eye protection:
Wear the following personal protective equipment:
- Safety goggles

Skin and body protection:
Select appropriate protective clothing based on chemical resistance data and an assessment of the local exposure potential.
Skin contact must be avoided by using impervious protective clothing (gloves, aprons, boots, etc).

Hygiene measures:
- If exposure to chemical is likely during typical use, provide eye flushing systems and safety showers close to the working place.
- When using do not eat, drink or smoke.
- Wash contaminated clothing before re-use.
- See 29 CFR 1910.1025 for additional requirements relating to lead exposure.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Viscous semi-solid
Color: black, copper
Odor: Petroleum
Odor Threshold: No data available
pH: Not applicable (not an aqueous solution)
Melting point/freezing point: No data available
Initial boiling point and boiling range: No data available
Flash point: \( \geq 325.0 \, ^\circ F \) / \( \geq 162.8 \, ^\circ C \)
  Method: ASTM D 92, Cleveland open cup
  Distillates (petroleum), hydrotreated heavy naphthenic
Evaporation rate: Not applicable
Flammability (solid, gas): Not classified as a flammability hazard
Upper explosion limit / Upper flammability limit: No data available
Lower explosion limit / Lower flammability limit: No data available
Vapor pressure: Not applicable
Relative vapor density: Not applicable
Relative density: 1.9
Density: No data available

Solubility(ies):
- Water solubility: negligible

Partition coefficient: n-octanol/water: Not applicable

Autoignition temperature: No data available

Decomposition temperature: No data available

Viscosity:
- Viscosity, dynamic: No data available
- Viscosity, kinematic: Not applicable

Flow time: No data available

Explosive properties: Not explosive

Oxidizing properties: The substance or mixture is not classified as oxidizing.

Molecular weight: No data available

Particle size: No data available

SECTION 10. STABILITY AND REACTIVITY

Reactivity: Not classified as a reactivity hazard.

Chemical stability: Stable under normal conditions.

Possibility of hazardous reactions: Can react with strong oxidizing agents.

Conditions to avoid: None known.

Incompatible materials: Oxidizing agents

Hazardous decomposition products: No hazardous decomposition products are known.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure
- Skin contact
- Ingestion
- Eye contact

Acute toxicity
Not classified based on available information.

Components:

Lead:

- Acute oral toxicity: LD50 (Rat): > 2,000 mg/kg
  Remarks: Based on data from similar materials
Acute dermal toxicity: LD50 (Rat): > 2,000 mg/kg
Remarks: Based on data from similar materials

Graphite:

Acute oral toxicity: LD50 (Rat): > 2,000 mg/kg
Method: OECD Test Guideline 423
Assessment: The substance or mixture has no acute oral toxicity

Acute inhalation toxicity: LC50 (Rat): > 2 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Method: OECD Test Guideline 403

Distillates (petroleum), hydrotreated light naphthenic:

Acute oral toxicity: LD50 (Rat): > 5,000 mg/kg
Method: OECD Test Guideline 401

Acute inhalation toxicity: LC50 (Rat): > 5.53 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Method: OECD Test Guideline 403
Assessment: The substance or mixture has no acute inhalation toxicity

Acute dermal toxicity: LD50 (Rabbit): > 2,000 mg/kg
Assessment: The substance or mixture has no acute dermal toxicity

Distillates (petroleum), hydrotreated heavy naphthenic:

Acute oral toxicity: LD50 (Rat): > 5,000 mg/kg
Method: OECD Test Guideline 401
Remarks: Based on data from similar materials

Acute inhalation toxicity: LC50 (Rat): > 5.53 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Method: OECD Test Guideline 403
Assessment: The substance or mixture has no acute inhalation toxicity
Remarks: Based on data from similar materials

Acute dermal toxicity: LD50 (Rabbit): > 5,000 mg/kg
Method: OECD Test Guideline 402
Remarks: Based on data from similar materials

Copper metal powder:

Acute oral toxicity: LD50 (Rat): > 2,500 mg/kg
Method: OECD Test Guideline 423
Assessment: The substance or mixture has no acute oral toxicity
Acute inhalation toxicity: LC50 (Rat): > 5.11 mg/l
   Exposure time: 4 h
   Test atmosphere: dust/mist
   Method: OECD Test Guideline 436
   Assessment: The substance or mixture has no acute inhalation toxicity

Acute dermal toxicity: LD50 (Rat): > 2,000 mg/kg
   Method: OECD Test Guideline 402
   Assessment: The substance or mixture has no acute dermal toxicity

Talc:
   Acute oral toxicity: LD50 (Rat): > 5,000 mg/kg
   Remarks: Based on data from similar materials

Calcium oxide:
   Acute oral toxicity: LD50 (Rat): > 2,000 mg/kg
      Method: OECD Test Guideline 425
   Acute inhalation toxicity: (Rat): > 5 mg/l
      Exposure time: 4 h
      Test atmosphere: dust/mist
      Method: OECD Test Guideline 436
      Remarks: Based on data from similar materials
   Acute dermal toxicity: LD50 (Rabbit): > 2,500 mg/kg
      Method: OECD Test Guideline 402
      Assessment: The substance or mixture has no acute dermal toxicity
      Remarks: Based on data from similar materials

Quartz:
   Acute oral toxicity: LD50 (Rat): > 5,000 mg/kg

Skin corrosion/irritation:
   Not classified based on available information.

Components:

Lead:
   Species: Rabbit
   Method: OECD Test Guideline 404
   Result: No skin irritation
   Remarks: Based on data from similar materials

Graphite:
   Species: Rabbit
   Method: OECD Test Guideline 404
   Result: No skin irritation
Distillates (petroleum), hydrotreated light naphthenic:

<table>
<thead>
<tr>
<th>Species</th>
<th>Rabbit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Result</td>
<td>No skin irritation</td>
</tr>
</tbody>
</table>

Distillates (petroleum), hydrotreated heavy naphthenic:

<table>
<thead>
<tr>
<th>Species</th>
<th>Rabbit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Result</td>
<td>No skin irritation</td>
</tr>
<tr>
<td>Remarks</td>
<td>Based on data from similar materials</td>
</tr>
</tbody>
</table>

Copper metal powder:

<table>
<thead>
<tr>
<th>Species</th>
<th>Rabbit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method</td>
<td>OECD Test Guideline 404</td>
</tr>
<tr>
<td>Result</td>
<td>No skin irritation</td>
</tr>
</tbody>
</table>

Talc:

<table>
<thead>
<tr>
<th>Species</th>
<th>Rabbit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Result</td>
<td>No skin irritation</td>
</tr>
</tbody>
</table>

Calcium oxide:

<table>
<thead>
<tr>
<th>Species</th>
<th>Rabbit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method</td>
<td>OECD Test Guideline 404</td>
</tr>
<tr>
<td>Result</td>
<td>Skin irritation</td>
</tr>
<tr>
<td>Remarks</td>
<td>Based on data from similar materials</td>
</tr>
</tbody>
</table>

Serious eye damage/eye irritation

Causes serious eye irritation.

Components:

Lead:

<table>
<thead>
<tr>
<th>Species</th>
<th>Rabbit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Result</td>
<td>No eye irritation</td>
</tr>
<tr>
<td>Method</td>
<td>OECD Test Guideline 405</td>
</tr>
<tr>
<td>Remarks</td>
<td>Based on data from similar materials</td>
</tr>
</tbody>
</table>

Graphite:

<table>
<thead>
<tr>
<th>Species</th>
<th>Rabbit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Result</td>
<td>No eye irritation</td>
</tr>
<tr>
<td>Method</td>
<td>OECD Test Guideline 405</td>
</tr>
</tbody>
</table>

Distillates (petroleum), hydrotreated light naphthenic:

<table>
<thead>
<tr>
<th>Species</th>
<th>Rabbit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Result</td>
<td>No eye irritation</td>
</tr>
</tbody>
</table>

Distillates (petroleum), hydrotreated heavy naphthenic:

<table>
<thead>
<tr>
<th>Species</th>
<th>Rabbit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Result</td>
<td>No eye irritation</td>
</tr>
<tr>
<td>Remarks</td>
<td>Based on data from similar materials</td>
</tr>
</tbody>
</table>
Copper metal powder:
Species : Rabbit
Result : No eye irritation
Method : OECD Test Guideline 405

Talc:
Species : Rabbit
Result : No eye irritation

Calcium oxide:
Species : Rabbit
Result : Irreversible effects on the eye
Method : OECD Test Guideline 405

Respiratory or skin sensitization

Skin sensitization
Not classified based on available information.

Respiratory sensitization
Not classified based on available information.

Components:

Lead:
Test Type : Maximization Test
Routes of exposure : Skin contact
Species : Guinea pig
Method : OECD Test Guideline 406
Result : negative
Remarks : Based on data from similar materials

Graphite:
Test Type : Local lymph node assay (LLNA)
Routes of exposure : Skin contact
Species : Mouse
Result : negative

Distillates (petroleum), hydrotreated light naphthenic:
Test Type : Buehler Test
Routes of exposure : Skin contact
Species : Guinea pig
Method : OECD Test Guideline 406
Result : negative

Distillates (petroleum), hydrotreated heavy naphthenic:
Test Type : Buehler Test
Routes of exposure : Skin contact
Species : Guinea pig
Result : negative
Remarks : Based on data from similar materials
Copper metal powder:
- **Test Type**: Maximization Test
- **Routes of exposure**: Skin contact
- **Species**: Guinea pig
- **Method**: OECD Test Guideline 406
- **Result**: negative

Talc:
- **Routes of exposure**: Skin contact
- **Species**: Humans
- **Result**: negative

Calcium oxide:
- **Test Type**: Local lymph node assay (LLNA)
- **Routes of exposure**: Skin contact
- **Species**: Mouse
- **Method**: OECD Test Guideline 429
- **Result**: negative
- **Remarks**: Based on data from similar materials

Germ cell mutagenicity
Not classified based on available information.

Components:

**Lead:**
- Genotoxicity in vitro: Test Type: In vitro sister chromatid exchange assay in mammalian cells
  - Result: negative
  - Remarks: Based on data from similar materials

- Genotoxicity in vivo: Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
  - Species: Rat
  - Application Route: Ingestion
  - Result: positive
  - Remarks: Based on data from similar materials

**Graphite:**
- Genotoxicity in vitro: Test Type: Bacterial reverse mutation assay (AMES)
  - Method: OECD Test Guideline 471
  - Result: negative

  - Test Type: In vitro mammalian cell gene mutation test
    - Method: OECD Test Guideline 476
    - Result: negative

  - Test Type: Chromosome aberration test in vitro
    - Method: OECD Test Guideline 473
    - Result: negative
Distillates (petroleum), hydrotreated light naphthenic:

Genotoxicity in vitro:
- Test Type: Bacterial reverse mutation assay (AMES)
- Method: OECD Test Guideline 476
- Result: negative

Genotoxicity in vivo:
- Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
- Species: Mouse
- Application Route: Intraperitoneal injection
- Method: OECD Test Guideline 474
- Result: negative

Distillates (petroleum), hydrotreated heavy naphthenic:

Genotoxicity in vitro:
- Test Type: Bacterial reverse mutation assay (AMES)
- Method: OECD Test Guideline 471
- Result: negative

Genotoxicity in vivo:
- Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
- Species: Mouse
- Application Route: Intraperitoneal injection
- Method: OECD Test Guideline 474
- Result: negative

Remarks: Based on data from similar materials

Copper metal powder:

Genotoxicity in vitro:
- Test Type: Bacterial reverse mutation assay (AMES)
- Method: OECD Test Guideline 471
- Result: negative

Genotoxicity in vivo:
- Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
- Species: Mouse
- Application Route: Ingestion
- Result: negative

Remarks: Based on data from similar materials

Talc:

Genotoxicity in vitro:
- Test Type: DNA damage and repair, unscheduled DNA synthesis in mammalian cells (in vitro)
- Result: negative

Genotoxicity in vivo:
- Test Type: Chromosome aberration test in vitro
- Species: Rat
- Application Route: Ingestion
- Result: negative

Calcium oxide:

Genotoxicity in vitro:
- Test Type: Bacterial reverse mutation assay (AMES)
- Method: OECD Test Guideline 471
- Result: negative
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Test Type: Chromosome aberration test in vitro
Method: OECD Test Guideline 473
Result: negative
Remarks: Based on data from similar materials

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative
Remarks: Based on data from similar materials

Carcinogenicity
Suspected of causing cancer.

Product:
Carcinogenicity - Assessment:
Petroleum distillates have been classified as not carcinogenic based on DMSO extract content < 3% (Regulation (EC) 1272/2008, Annex VI, Part 3, Note L).

Components:

Lead:
Species: Rat
Application Route: Ingestion
Exposure time: 2 Years
Result: positive
Remarks: Based on data from similar materials

Carcinogenicity - Assessment:
Limited evidence of carcinogenicity in animal studies

Distillates (petroleum), hydrotreated light naphthenic:
Species: Mouse
Application Route: Skin contact
Exposure time: 78 weeks
Result: negative

Distillates (petroleum), hydrotreated heavy naphthenic:
Species: Mouse
Application Route: Skin contact
Exposure time: 78 weeks
Method: OECD Test Guideline 451
Result: negative

Talc:
Species: Mouse
Application Route: Inhalation (dust/mist/fume)
Exposure time: 2 Years
Result: negative

Calcium oxide:
Species: Rat
## Application Route

<table>
<thead>
<tr>
<th>Route</th>
<th>Time</th>
<th>Result</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ingestion</td>
<td>104 weeks</td>
<td>negative</td>
<td>Based on data from similar materials</td>
</tr>
</tbody>
</table>

## Quartz:

- **Species**: Humans
- **Application Route**: Inhalation (dust/mist/fume)
- **Result**: Positive
- **Remarks**: These substance(s) are inextricably bound in the product and therefore do not contribute to dust inhalation hazard.

## Carcinogenicity - Assessment

- **Group 1: Carcinogenic to humans**
  - Quartz (Silica dust, crystalline)

- **Group 2B: Possibly carcinogenic to humans**
  - Lead

- **OSHA specifically regulated carcinogen**
  - Lead (Lead and inorganic lead compounds)
  - Quartz (crystalline silica)

- **NTP**
  - Reasonably anticipated to be a human carcinogen
    - Lead
  - Known to be human carcinogen
    - Quartz (Silica, Crystalline (Respirable Size))

## Reproductive toxicity

May damage fertility. May damage the unborn child. May cause harm to breast-fed children.

## Components:

### Lead:

- **Effects on fertility**
  - **Test Type**: Two-generation reproduction toxicity study
  - **Species**: Mouse
  - **Application Route**: Ingestion
  - **Result**: Positive
  - **Remarks**: Based on data from similar materials

- **Effects on fetal development**
  - **Test Type**: Embryo-fetal development
  - **Species**: Rat
  - **Application Route**: Ingestion
  - **Result**: Positive
  - **Remarks**: Based on data from similar materials
Reproductive toxicity - Assessment: Positive evidence of adverse effects on sexual function and fertility from human epidemiological studies. Positive evidence of adverse effects on development from human epidemiological studies. Studies indicating a hazard to babies during the lactation period.

Graphite:

Effects on fertility: Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test Species: Rat Application Route: Ingestion Method: OECD Test Guideline 422 Result: negative

Effects on fetal development: Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test Species: Rat Application Route: Ingestion Method: OECD Test Guideline 422 Result: negative

Distillates (petroleum), hydrotreated light naphthenic:

Effects on fertility: Test Type: Reproduction/Developmental toxicity screening test Species: Rat Application Route: Ingestion Result: negative

Effects on fetal development: Test Type: Embryo-fetal development Species: Rat Application Route: Skin contact Result: negative

Copper metal powder:

Effects on fertility: Test Type: Two-generation reproduction toxicity study Species: Rat Application Route: Ingestion Result: negative Remarks: Based on data from similar materials

Effects on fetal development: Test Type: Embryo-fetal development Species: Rabbit Application Route: Ingestion Result: negative

Talc:

Effects on fetal development: Test Type: Embryo-fetal development Species: Rat Application Route: Ingestion Result: negative

Calcium oxide:
Effects on fertility:
Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative
Remarks: Based on data from similar materials

Effects on fetal development:
Test Type: Embryo-fetal development
Species: Mouse
Application Route: Ingestion
Method: OECD Test Guideline 414
Result: negative

STOT—single exposure
Not classified based on available information.

Components:
Calcium oxide:
Assessment: May cause respiratory irritation.

STOT—repeated exposure
Causes damage to organs (Kidney, Central nervous system, Blood) through prolonged or repeated exposure.

Components:
Lead:
Target Organs: Kidney, Central nervous system, Blood
Assessment: Causes damage to organs through prolonged or repeated exposure.

Quartz:
Routes of exposure: Inhalation (dust/mist/fume)
Target Organs: Lungs
Assessment: Shown to produce significant health effects in animals at concentrations of 0.02 mg/l/6h/d or less.

Repeated dose toxicity

Components:
Lead:
Species: Rat
NOAEL: 0.0015 mg/kg
LOAEL: 0.005 mg/kg
Application Route: Ingestion
Exposure time: 6 - 12 Months
Remarks: Based on data from similar materials

Distillates (petroleum), hydrotreated light naphthenic:
Species: Rabbit
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NOAEL: 1,000 mg/kg
Application Route: Skin contact
Exposure time: 4 Weeks
Method: OECD Test Guideline 410

Distillates (petroleum), hydrotreated heavy naphthenic:
Species: Rat
NOAEL: > 0.98 mg/l
Application Route: inhalation (dust/mist/fume)
Exposure time: 28 Days
Remarks: Based on data from similar materials

Copper metal powder:
Species: Rat
NOAEL: >= 2 mg/m³
Application Route: inhalation (dust/mist/fume)
Exposure time: 28 Days

Calcium oxide:
Species: Rat
NOAEL: >= 0.399 mg/l
Application Route: inhalation (dust/mist/fume)
Exposure time: 90 Days
Method: OECD Test Guideline 413

Quartz:
Species: Humans
LOAEL: 0.053 mg/m³
Application Route: inhalation (dust/mist/fume)
Remarks: These substance(s) are inextricably bound in the product and therefore do not contribute to a dust inhalation hazard.

Aspiration toxicity
Not classified based on available information.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

Lead:
Toxicity to fish: LC50 (Oncorhynchus mykiss (rainbow trout)): 0.107 mg/l
Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates: EC50 (Ceriodaphnia dubia (water flea)): 0.029 mg/l
Exposure time: 48 h
Toxicity to algae/aquatic plants: ErC50 (Pseudokirchneriella subcapitata (green algae)): 0.025 mg/l
Toxicity to fish (Chronic toxicity): EC10 (Pseudokirchneriella subcapitata (green algae)): 6.1 µg/l
Exposure time: 72 h

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity): EC10 (Ceriodaphnia dubia (water flea)): 1.7 µg/l
Exposure time: 7 d

Graphite:
Toxicity to fish: LL50 (Danio rerio (zebra fish)): > 100 mg/l
Exposure time: 96 h
Test substance: Water Accommodated Fraction
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates: EL50 (Daphnia magna (water flea)): > 100 mg/l
Exposure time: 48 h
Test substance: Water Accommodated Fraction
Method: OECD Test Guideline 202

Toxicity to algae/aquatic plants: EL50 (Pseudokirchneriella subcapitata (green algae)): > 100 mg/l
Exposure time: 72 h
Test substance: Water Accommodated Fraction
Method: OECD Test Guideline 201

Toxicity to microorganisms: EC50: > 1,012.5 mg/l
Exposure time: 3 h
Method: OECD Test Guideline 209

Distillates (petroleum), hydrotreated light naphthenic:
Toxicity to fish: LL50 (Pimephales promelas (fathead minnow)): > 100 mg/l
Exposure time: 96 h
Test substance: Water Accommodated Fraction

Toxicity to daphnia and other aquatic invertebrates: EL50 (Daphnia magna (water flea)): > 10,000 mg/l
Exposure time: 48 h
Test substance: Water Accommodated Fraction

Toxicity to algae/aquatic plants: NOELR (Pseudokirchneriella subcapitata (green algae)): >= 100 mg/l
Exposure time: 72 h
Test substance: Water Accommodated Fraction

Toxicity to daphnia and other: NOEC (Daphnia magna (water flea)): 10 mg/l
aquatic invertebrates (Chronic toxicity)  
Toxicity to microorganisms  
NOEC (Photobacterium phosphoreum): > 2.17 mg/l  
Exposure time: 4 d

Distillates (petroleum), hydrotreated heavy naphthenic:  
Toxicity to fish  
LC50 (Pimephales promelas (fathead minnow)): > 100 mg/l  
Exposure time: 96 h  
Method: OECD Test Guideline 203  
Remarks: Based on data from similar materials

Toxicity to daphnia and other aquatic invertebrates  
EC50 (Daphnia magna (Water flea)): > 10,000 mg/l  
Exposure time: 48 h  
Remarks: Based on data from similar materials

Toxicity to algae/aquatic plants  
EC50 (Pseudokirchneriella subcapitata (green algae)): > 100 mg/l  
Exposure time: 72 h  
Method: OECD Test Guideline 201  
Remarks: Based on data from similar materials

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)  
NOEC (Daphnia magna (Water flea)): 10 mg/l  
Exposure time: 21 d  
Remarks: Based on data from similar materials

Toxicity to microorganisms  
NOEC: > 1.93 mg/l  
Exposure time: 10 min  
Remarks: Based on data from similar materials

Copper metal powder:  
Toxicity to fish  
LC50: > 10 - 100 µg/l  
Exposure time: 96 h

Toxicity to fish (Chronic toxicity)  
NOEC: > 1 - 10 µg/l

Talc:  
Toxicity to fish  
LC50 (Brachydanio rerio (zebrafish)): > 100,000 mg/l  
Exposure time: 24 h

Calcium oxide:  
Toxicity to fish  
LC50 (Oncorhynchus mykiss (rainbow trout)): > 100 mg/l  
Exposure time: 96 h  
Method: OECD Test Guideline 203  
Remarks: Based on data from similar materials

Toxicity to daphnia and other aquatic invertebrates  
EC50 (Daphnia magna (Water flea)): > 100 mg/l  
Exposure time: 96 h  
Method: OECD Test Guideline 202  
Remarks: Based on data from similar materials

Toxicity to algae/aquatic plants  
ErC50 (Pseudokirchneriella subcapitata (green algae)): > 100 mg/l
### Exposure Time

- **Exposure time:** 72 h
- **Method:** OECD Test Guideline 201
- **Remarks:** Based on data from similar materials

### EC10

- **EC10** *(Pseudokirchneriella subcapitata (green algae)):* > 1 mg/l
- **Exposure time:** 72 h
- **Method:** OECD Test Guideline 201
- **Remarks:** Based on data from similar materials

### Toxicity to Daphnia and Other Aquatic Invertebrates (Chronic Toxicity)

- **Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity):**
  - **NOEC** *(Crangon crangon (shrimp)):* > 1 mg/l
  - **Exposure time:** 14 d
  - **Method:** OECD Test Guideline 201
  - **Remarks:** Based on data from similar materials

### Toxicity to Microorganisms

- **Toxicity to microorganisms:**
  - **EC50:** > 100 mg/l
  - **Exposure time:** 3 h
  - **Method:** OECD Test Guideline 209
  - **Remarks:** Based on data from similar materials

### Quartz:

- **Ecotoxicology Assessment**
  - **Acute aquatic toxicity:** No toxicity at the limit of solubility.
  - **Chronic aquatic toxicity:** No toxicity at the limit of solubility.

### Persistence and Degradability

#### Components:

- **Distillates (petroleum), hydrotreated light naphthenic:**
  - **Biodegradability:** Result: Not readily biodegradable.
    - **Biodegradation:** 2 - 8 %
    - **Exposure time:** 28 d
    - **Method:** OECD Test Guideline 301B

- **Distillates (petroleum), hydrotreated heavy naphthenic:**
  - **Biodegradability:** Result: Not readily biodegradable.
    - **Biodegradation:** 2 - 4 %
    - **Exposure time:** 28 d
    - **Method:** OECD Test Guideline 301B

### Bioaccumulative Potential

No data available

### Mobility in Soil

No data available

### Other Adverse Effects

No data available
SECTION 13. DISPOSAL CONSIDERATIONS

**Disposal methods**
- **Waste from residues**: Dispose of in accordance with local regulations.
- **Contaminated packaging**: Empty containers should be taken to an approved waste handling site for recycling or disposal. Empty containers retain residue and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury and/or death. If not otherwise specified: Dispose of as unused product.

SECTION 14. TRANSPORT INFORMATION

**International Regulations**

**UNRTDG**
- **UN number**: UN 3077
- **Proper shipping name**: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Lead, Copper metal powder)
- **Class**: 9
- **Packing group**: III
- **Labels**: 9

**IATA-DGR**
- **UN/ID No.**: UN 3077
- **Proper shipping name**: Environmentally hazardous substance, solid, n.o.s. (Lead, Copper metal powder)
- **Class**: 9
- **Packing group**: III
- **Labels**: Miscellaneous,
- **Packing instruction (cargo aircraft)**: 956
- **Packing instruction (passenger aircraft)**: 956
- **Environmentally hazardous**: yes

**IMDG-Code**
- **UN number**: UN 3077
- **Proper shipping name**: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Lead, Copper metal powder)
- **Class**: 9
- **Subsidiary risk**: ENVIRONM.
- **Packing group**: III
- **Labels**: 9 (ENVIRONM.)
- **EmS Code**: F-A, S-F
- **Marine pollutant**: yes

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**
Not applicable for product as supplied.

**Domestic regulation**
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Date of first issue: 05/18/2015

49 CFR
UN/ID/NA number: UN 3077
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Lead, Copper metal powder)
Class: 9
Packing group: III
Labels: CLASS 9
ERG Code: 171
Marine pollutant: yes (Lead, Copper metal powder)
Remarks: THE ABOVE INFORMATION ONLY APPLIES TO PACKAGE SIZES WHERE THE HAZARDOUS SUBSTANCE MEETS THE REPORTABLE QUANTITY.

Special precautions for user
The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know

CERCLA Reportable Quantity

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Component RQ (lbs)</th>
<th>Calculated product RQ (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>7439-92-1</td>
<td>10</td>
<td>32</td>
</tr>
<tr>
<td>Zinc</td>
<td>7440-66-6</td>
<td>1000</td>
<td>8110</td>
</tr>
<tr>
<td>Cadmium</td>
<td>7440-43-9</td>
<td>10</td>
<td>116279</td>
</tr>
</tbody>
</table>

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity
This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards:
- Carcinogenicity
- Reproductive toxicity
- Specific target organ toxicity (single or repeated exposure)
- Serious eye damage or eye irritation

SARA 313
The following components are subject to reporting levels established by SARA Title III, Section 313:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Reporting Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>7439-92-1</td>
<td>&gt;= 30 - &lt; 50 %</td>
</tr>
<tr>
<td>Zinc</td>
<td>7440-66-6</td>
<td>&gt;= 10 - &lt; 20 %</td>
</tr>
<tr>
<td>Copper metal powder</td>
<td>7440-50-8</td>
<td>&gt;= 1 - &lt; 5 %</td>
</tr>
</tbody>
</table>

US State Regulations
Pennsylvania Right To Know
California Prop. 65
WARNING: This product can expose you to chemicals including Lead, which is/are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

California List of Hazardous Substances

<table>
<thead>
<tr>
<th>Chemical</th>
<th>CAS Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>7439-92-1</td>
</tr>
<tr>
<td>Graphite</td>
<td>7782-42-5</td>
</tr>
<tr>
<td>Distillates (petroleum), hydrotreated light naphthenic</td>
<td>64742-53-6</td>
</tr>
<tr>
<td>Distillates (petroleum), hydrotreated heavy naphthenic</td>
<td>64742-52-5</td>
</tr>
<tr>
<td>Zinc</td>
<td>7440-66-6</td>
</tr>
<tr>
<td>Copper metal powder</td>
<td>7440-50-8</td>
</tr>
<tr>
<td>Talc</td>
<td>14807-96-6</td>
</tr>
<tr>
<td>Calcium oxide</td>
<td>1305-78-8</td>
</tr>
<tr>
<td>Zinc oxide</td>
<td>1314-13-2</td>
</tr>
</tbody>
</table>

California Permissible Exposure Limits for Chemical Contaminants

<table>
<thead>
<tr>
<th>Chemical</th>
<th>CAS Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>7439-92-1</td>
</tr>
<tr>
<td>Graphite</td>
<td>7782-42-5</td>
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<td>Distillates (petroleum), hydrotreated light naphthenic</td>
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<tr>
<td>Talc</td>
<td>14807-96-6</td>
</tr>
<tr>
<td>Calcium oxide</td>
<td>1305-78-8</td>
</tr>
<tr>
<td>Quartz</td>
<td>14808-60-7</td>
</tr>
</tbody>
</table>

California Regulated Carcinogens

<table>
<thead>
<tr>
<th>Chemical</th>
<th>CAS Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>7439-92-1</td>
</tr>
<tr>
<td>Quartz</td>
<td>14808-60-7</td>
</tr>
</tbody>
</table>

The ingredients of this product are reported in the following inventories:

- **DSL** : All components of this product are on the Canadian DSL
- **TSCA** : All chemical substances in this product are either listed on the TSCA Inventory or are in compliance with a TSCA Inventory exemption.
- **AICS** : All ingredients listed or exempt.

**SECTION 16. OTHER INFORMATION**

Further information
**SAFETY DATA SHEET**

**API MODIFIED ARCTIC GRADE**

<table>
<thead>
<tr>
<th>Version</th>
<th>Revision Date:</th>
<th>SDS Number:</th>
<th>Date of last issue:</th>
<th>Date of first issue:</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.0</td>
<td>05/06/2020</td>
<td>118998-00019</td>
<td>04/11/2019</td>
<td>05/18/2015</td>
</tr>
</tbody>
</table>

**NFPA 704:**

<table>
<thead>
<tr>
<th>Flammability</th>
<th>Health</th>
<th>Instability</th>
<th>Special hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**HMIS® IV:**

- **HEALTH**: 4
- **FLAMMABILITY**: 1
- **PHYSICAL HAZARD**: 0

HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. The "*" represents a chronic hazard, while the "/" represents the absence of a chronic hazard.

**Full text of other abbreviations**

- ACGIH: USA. ACGIH Threshold Limit Values (TLV)
- ACGIH BEI: ACGIH - Biological Exposure Indices (BEI)
- NIOSH REL: USA. NIOSH Recommended Exposure Limits
- OSHA CARC: OSHA Specifically Regulated Chemicals/Carcinogens
- OSHA Z-1: USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
- OSHA Z-3: USA. Occupational Exposure Limits (OSHA) - Table Z-3 Mineral Dusts
- ACGIH / TWA: 8-hour, time-weighted average
- NIOSH REL / TWA: Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek
- NIOSH REL / ST: STEL - 15-minute TWA exposure that should not be exceeded at any time during a workday
- OSHA CARC / PEL: Permissible exposure limit (PEL)
- OSHA Z-1 / TWA: 8-hour time weighted average
- OSHA Z-3 / TWA: 8-hour time weighted average

AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxican; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to
50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Sources of key data used to compile the Material Safety Data Sheet:

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Items where changes have been made to the previous version are highlighted in the body of this document by two vertical lines.

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 is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user’s end product, if applicable.