

**TIP 1.0**

Version number: 2.3  
Replaces version of: 2025-07-03 (1)

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**SECTION 1: Identification****1.1 Product identifier**

Trade name

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**1.2 Relevant identified uses of the substance or mixture and uses advised against**

Relevant identified uses

Thermally conductive pad, silicone based thermal interface material

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

TCLAD  
1600 Orrin Road  
Prescott Wisconsin 54021  
United States

Telephone: 715 262 8206

**1.4 Emergency telephone number**

Emergency information service

CHEMTREC Tel: 1-800-424-9300  
This number is only available during the following  
office hours: Mon-Fri 09:00 AM - 05:00 PM

**SECTION 2: Hazard(s) identification****2.1 Classification of the substance or mixture**

Classification acc. to OSHA "Hazard Communication Standard" (29 CFR 1910.1200)

This mixture does not meet the criteria for classification.

**2.2 Label elements**

Labelling acc. to OSHA "Hazard Communication Standard" (29 CFR 1910.1200)

- Signal word not required

- Pictograms not required

**2.3 Other hazards**

There is no additional information.

Hazards not otherwise classified

Safety data sheet available on request.

Harmful to aquatic life (GHS category 3: aquatic toxicity - acute).

Results of PBT and vPvB assessment

Does not contain a PBT-/vPvB-substance at a concentration of  $\geq 0.1\%$ .

Endocrine disrupting properties

Does not contain an endocrine disruptor (ED) in a concentration of  $\geq 0.1\%$ .

**SECTION 3: Composition/information on ingredients****3.1 Substances**

Not relevant (mixture)

**3.2 Mixtures**

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### Description of the mixture

| Name of substance | Identifier           | Wt%       | Classification acc. to GHS          | Pictograms                                                                          |
|-------------------|----------------------|-----------|-------------------------------------|-------------------------------------------------------------------------------------|
| Aluminum oxide    | CAS No<br>1344-28-1  | 25 – < 50 | Acute Tox. 4 / H332<br>cD / OSHA003 |  |
| fiberglass        | CAS No<br>65997-17-3 | 10 – < 25 | cD / OSHA003                        |                                                                                     |

### Remarks

For full text of abbreviations: see SECTION 16

## SECTION 4: First-aid measures

### 4.1 Description of first-aid measures

#### General notes

Do not leave affected person unattended. Remove victim out of the danger area. Keep affected person warm, still and covered. Take off immediately all contaminated clothing. In all cases of doubt, or when symptoms persist, seek medical advice. In case of unconsciousness place person in the recovery position. Never give anything by mouth.

#### Following inhalation

If breathing is irregular or stopped, immediately seek medical assistance and start first aid actions. Provide fresh air.

#### Following skin contact

Wash with plenty of soap and water.

#### Following eye contact

Remove contact lenses, if present and easy to do. Continue rinsing. Irrigate copiously with clean, fresh water for at least 10 minutes, holding the eyelids apart.

#### Following ingestion

Rinse mouth with water (only if the person is conscious). Do NOT induce vomiting.

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

Symptoms and effects are not known to date.

### 4.3 Indication of any immediate medical attention and special treatment needed

none

## SECTION 5: Fire-fighting measures

### 5.1 Extinguishing media

#### Suitable extinguishing media

Water, Foam, ABC-powder

#### Unsuitable extinguishing media

Water jet

### 5.2 Special hazards arising from the substance or mixture

#### Hazardous combustion products

Carbon monoxide (CO), Carbon dioxide (CO<sub>2</sub>)

### 5.3 Advice for firefighters

In case of fire and/or explosion do not breathe fumes. Coordinate firefighting measures to the fire surroundings. Do not allow firefighting water to enter drains or water courses. Collect contaminated firefighting water separately. Fight fire with normal precautions from a reasonable distance.

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**SECTION 6: Accidental release measures****6.1 Personal precautions, protective equipment and emergency procedures**

For non-emergency personnel

Remove persons to safety.

For emergency responders

Wear breathing apparatus if exposed to vapors/dust/aerosols/gases.

**6.2 Environmental precautions**

Keep away from drains, surface and ground water. Retain contaminated washing water and dispose of it. If substance has entered a water course or sewer, inform the responsible authority.

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

Advice on how to contain a spill

Covering of drains, Take up mechanically

Advice on how to clean up a spill

Take up mechanically.

Other information relating to spills and releases

Place in appropriate containers for disposal. Ventilate affected area.

**6.4 Reference to other sections**

Hazardous combustion products: see section 5. Personal protective equipment: see section 8. Incompatible materials: see section 10. Disposal considerations: see section 13.

**SECTION 7: Handling and storage****7.1 Precautions for safe handling**

Recommendations

- Measures to prevent fire as well as aerosol and dust generation

Use local and general ventilation. Use only in well-ventilated areas.

Advice on general occupational hygiene

Wash hands after use. Do not eat, drink and smoke in work areas. Remove contaminated clothing and protective equipment before entering eating areas. Never keep food or drink in the vicinity of chemicals. Never place chemicals in containers that are normally used for food or drink. Keep away from food, drink and animal feedingstuffs.

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

Managing of associated risks

- Explosive atmospheres

Removal of dust deposits.

**7.3 Specific end use(s)**

See section 16 for a general overview.

**SECTION 8: Exposure controls/personal protection****8.1 Control parameters**

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| Occupational exposure limit values (Workplace Exposure Limits) |                                |           |            |           |             |            |              |                 |                   |          |                  |
|----------------------------------------------------------------|--------------------------------|-----------|------------|-----------|-------------|------------|--------------|-----------------|-------------------|----------|------------------|
| Country                                                        | Name of agent                  | CAS No    | Identifier | TWA [ppm] | TWA [mg/m³] | STEL [ppm] | STEL [mg/m³] | Ceiling-C [ppm] | Ceiling-C [mg/m³] | Notation | Source           |
| US                                                             | alpha-alumina                  | 1344-28-1 | REL        |           |             |            |              |                 |                   | appx-D   | NIOSH REL        |
| US                                                             | alpha-alumina                  | 1344-28-1 | PEL        |           | 15          |            |              |                 |                   | dust     | 29 CFR 1910.1000 |
| US                                                             | alpha-alumina                  | 1344-28-1 | PEL        |           | 5           |            |              |                 |                   | r        | 29 CFR 1910.1000 |
| US                                                             | aluminium, insoluble compounds | 1344-28-1 | TLV®       |           | 1           |            |              |                 |                   | r        | ACGIH® 2024      |
| US                                                             | aluminium oxide                | 1344-28-1 | PEL (CA)   |           | 10          |            |              |                 |                   | dust     | Cal/OSHA PEL     |
| US                                                             | aluminium oxide                | 1344-28-1 | PEL (CA)   |           | 5           |            |              |                 |                   | r        | Cal/OSHA PEL     |

### Notation

|           |                                                                                                                                                                          |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| appx-D    | see Appendix D - Substances with No Established RELs                                                                                                                     |
| Ceiling-C | ceiling value is a limit value above which exposure should not occur                                                                                                     |
| dust      | as dust                                                                                                                                                                  |
| r         | respirable fraction                                                                                                                                                      |
| STEL      | short-term exposure limit: a limit value above which exposure should not occur and which is related to a 15-minute period (unless otherwise specified)                   |
| TWA       | time-weighted average (long-term exposure limit): measured or calculated in relation to a reference period of 8 hours time-weighted average (unless otherwise specified) |

| Relevant DNELs of components |            |          |                 |                                    |                   |                            |
|------------------------------|------------|----------|-----------------|------------------------------------|-------------------|----------------------------|
| Name of substance            | CAS No     | Endpoint | Threshold level | Protection goal, route of exposure | Used in           | Exposure time              |
| Aluminum oxide               | 1344-28-1  | DNEL     | 3 mg/m³         | human, inhalatory                  | worker (industry) | chronic - systemic effects |
| Aluminum oxide               | 1344-28-1  | DNEL     | 3 mg/m³         | human, inhalatory                  | worker (industry) | chronic - local effects    |
| fiberglass                   | 65997-17-3 | DNEL     | 0.14 mg/m³      | human, inhalatory                  | worker (industry) | chronic - local effects    |

## 8.2 Exposure controls

Appropriate engineering controls

General ventilation.

Individual protection measures (personal protective equipment)

Eye/face protection

Wear eye/face protection.

Skin protection

- Hand protection

Wear protective gloves.

- Other protection measures

Take recovery periods for skin regeneration. Preventive skin protection (barrier creams/ointments) is recommended.

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Wash hands thoroughly after handling.

**Respiratory protection**

In case of inadequate ventilation wear respiratory protection.

**Environmental exposure controls**

Use appropriate container to avoid environmental contamination. Keep away from drains, surface and ground water.

**SECTION 9: Physical and chemical properties****9.1 Information on basic physical and chemical properties****Appearance**

|                |                |
|----------------|----------------|
| Physical state | solid          |
| Color          | pink           |
| Odor           | characteristic |

**Other safety parameters**

|                                         |                                   |
|-----------------------------------------|-----------------------------------|
| pH (value)                              | not applicable                    |
| Melting point/freezing point            | not determined                    |
| Initial boiling point and boiling range | 2,980 °C                          |
| Flash point                             | not applicable                    |
| Evaporation rate                        | not determined                    |
| Flammability (solid, gas)               | non-combustible                   |
| Explosion limits of dust clouds         | not determined                    |
| Vapor pressure                          | 0 hPa at 20 °C                    |
| Density                                 | not determined                    |
| Vapor density                           | this information is not available |
| Relative density                        | >1.6 (water = 1)                  |
| Solubility(ies)                         | not determined                    |

**Partition coefficient**

|                             |                                   |
|-----------------------------|-----------------------------------|
| - n-octanol/water (log KOW) | this information is not available |
| Auto-ignition temperature   | not determined                    |
| Viscosity                   | not relevant (solid matter)       |
| Explosive properties        | none                              |
| Oxidizing properties        | none                              |

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**9.2 Other information**

there is no additional information

**SECTION 10: Stability and reactivity****10.1 Reactivity**

Concerning incompatibility: see below "Conditions to avoid" and "Incompatible materials".

**10.2 Chemical stability**

The material is stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

**10.3 Possibility of hazardous reactions**

No known hazardous reactions.

**10.4 Conditions to avoid**

There are no specific conditions known which have to be avoided.

**10.5 Incompatible materials**

Oxidizers

**10.6 Hazardous decomposition products**

Reasonably anticipated hazardous decomposition products produced as a result of use, storage, spill and heating are not known. Hazardous combustion products: see section 5.

**SECTION 11: Toxicological information****11.1 Information on toxicological effects**

Test data are not available for the complete mixture.

**Classification procedure**

The method for classification of the mixture is based on ingredients of the mixture (additivity formula).

**Classification acc. to OSHA "Hazard Communication Standard" (29 CFR 1910.1200)**

This mixture does not meet the criteria for classification.

**Acute toxicity**

Shall not be classified as acutely toxic.

**Acute toxicity estimate (ATE) of components**

| Name of substance | CAS No    | Exposure route        | ATE          |
|-------------------|-----------|-----------------------|--------------|
| Aluminum oxide    | 1344-28-1 | inhalation: dust/mist | >2.3 mg/l/4h |

**Skin corrosion/irritation**

Shall not be classified as corrosive/irritant to skin.

**Serious eye damage/eye irritation**

Shall not be classified as seriously damaging to the eye or eye irritant.

**Respiratory or skin sensitization**

Shall not be classified as a respiratory or skin sensitizer.

**Germ cell mutagenicity**

Shall not be classified as germ cell mutagenic.

**Carcinogenicity**

Shall not be classified as carcinogenic.

**Reproductive toxicity**

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Shall not be classified as a reproductive toxicant.

**Specific target organ toxicity - single exposure**

Shall not be classified as a specific target organ toxicant (single exposure).

**Specific target organ toxicity - repeated exposure**

Shall not be classified as a specific target organ toxicant (repeated exposure).

**Aspiration hazard**

Shall not be classified as presenting an aspiration hazard.

**SECTION 12: Ecological information****12.1 Toxicity**

Harmful to aquatic life.

Aquatic toxicity (acute) of components

| Name of substance | CAS No     | Endpoint | Value       | Species                             | Exposure time |
|-------------------|------------|----------|-------------|-------------------------------------|---------------|
| Aluminum oxide    | 1344-28-1  | LC50     | 11.5 mg/l   | rainbow trout (Oncorhynchus mykiss) | 48 h          |
| Aluminum oxide    | 1344-28-1  | EC50     | >50 mg/l    | zebra fish (Danio rerio)            | 96 h          |
| fiberglass        | 65997-17-3 | LC50     | >1,000 mg/l | zebra fish (Danio rerio)            | 96 h          |

**12.2 Persistence and degradability**

Data are not available.

**12.3 Bioaccumulative potential**

Data are not available.

**12.4 Mobility in soil**

Data are not available.

**12.5 Results of PBT and vPvB assessment**

Does not contain a PBT-/vPvB-substance at a concentration of  $\geq 0.1\%$ .

**12.6 Endocrine disrupting properties**

Does not contain an endocrine disruptor (ED) in a concentration of  $\geq 0.1\%$ .

**12.7 Other adverse effects**

Data are not available.

**SECTION 13: Disposal considerations****13.1 Waste treatment methods****Sewage disposal-relevant information**

Do not empty into drains. Avoid release to the environment. Refer to special instructions/safety data sheets.

**Waste treatment of containers/packages**

Completely emptied packages can be recycled. Handle contaminated packages in the same way as the substance itself.

**Remarks**

Please consider the relevant national or regional provisions. Waste shall be separated into the categories that can be handled separately by the local or national waste management facilities.

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**SECTION 14: Transport information**

- 14.1 UN number** not subject to transport regulations
- 14.2 UN proper shipping name** not relevant
- 14.3 Transport hazard class(es)** none
- 14.4 Packing group** not assigned
- 14.5 Environmental hazards** non-environmentally hazardous acc. to the dangerous goods regulations
- 14.6 Special precautions for user**  
There is no additional information.
- 14.7 Transport in bulk according to IMO instruments**  
The cargo is not intended to be carried in bulk.

**Information for each of the UN Model Regulations****Transport of dangerous goods by road or rail (49 CFR US DOT) - Additional information**

Not subject to transport regulations.

**International Maritime Dangerous Goods Code (IMDG) - Additional information**

Not subject to IMDG.

**International Civil Aviation Organization (ICAO-IATA/DGR) - Additional information**

Not subject to ICAO-IATA.

**SECTION 15: Regulatory information****15.1 Safety, health and environmental regulations specific for the product in question****National regulations (United States)****Toxic Substance Control Act (TSCA)**

all ingredients are listed (ACTIVE) or exempt from listing

**Superfund Amendment and Reauthorization Act (SARA TITLE III )**

- The List of Extremely Hazardous Substances and Their Threshold Planning Quantities (EPCRA Section 302, 304)

none of the ingredients are listed

- Specific Toxic Chemical Listings (EPCRA Section 313)

Toxics Release Inventory: Specific Toxic Chemical Listings

| Name of substance | CAS No    | Remarks       | Effective date |
|-------------------|-----------|---------------|----------------|
| Aluminum oxide    | 1344-28-1 | fibrous forms | 1987-01-01     |

**Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)**

- List of Hazardous Substances and Reportable Quantities (CERCLA section 102a) (40 CFR 302.4)

none of the ingredients are listed

**Clean Air Act**

none of the ingredients are listed



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### Right to Know Hazardous Substance List

- Cleaning Product Right to Know Act Substance List (CA-RTK)  
none of the ingredients are listed
- Toxic or Hazardous Substance List (MA-TURA)

| Name of substance | CAS No    | DEP CODE | PBT / HHS / LHS | PBT / HHS Threshold | De Minimis Concentration Threshold |
|-------------------|-----------|----------|-----------------|---------------------|------------------------------------|
| Aluminum oxide    | 1344-28-1 |          |                 |                     | 1.0 %                              |

### - Hazardous Substances List (MN-ERTK)

| Name of substance | CAS No     | References | Remarks       |
|-------------------|------------|------------|---------------|
| Aluminum oxide    | 1344-28-1  | A          |               |
| Aluminum oxide    | 1344-28-1  | A          |               |
| fiberglass        | 65997-17-3 | A, N       | dust<br>fiber |
| fiberglass        |            | A          | dust          |

#### Legend

- A American Conference of Governmental Industrial Hygienists (ACGIH), "Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices for 1992-93", available from ACGIH
- dust If the substance poses an airborne particulate exposure hazard, the substance is followed by the word "dust."
- N National Institute for Occupational Safety and Health (NIOSH), "Recommendations for Occupational Safety and Health Standards," August 1988, available from NIOSH, Publications Dissemination Office, Division of Standards Development and Technology Transfer

### - Hazardous Substance List (NJ-RTK)

| Name of substance | CAS No    | Remarks | Classifications |
|-------------------|-----------|---------|-----------------|
| Aluminum oxide    | 1344-28-1 |         |                 |

### - Hazardous Substance List (Chapter 323) (PA-RTK)

| Name acc. to inventory | CAS No    | Classification |
|------------------------|-----------|----------------|
| ALUMINUM OXIDE (AL2O3) | 1344-28-1 | E              |

#### Legend

- E Environmental hazard

### - Hazardous Substance List (RI-RTK)

| Name of substance | CAS No    | References |
|-------------------|-----------|------------|
| Aluminum oxide    | 1344-28-1 | T          |
| Aluminum oxide    | 1344-28-1 | T          |

#### Legend

- T Toxicity (ACGIH®)

### California Environmental Protection Agency (Cal/EPA): Proposition 65 - Safe Drinking Water and

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### Toxic Enforcement Act of 1987

none of the ingredients are listed

### Industry or sector specific available guidance(s)

#### NPCA-HMIS® III

Hazardous Materials Identification System. American Coatings Association.

| Category            | Rating | Description                                                                                                                                                |
|---------------------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Chronic             | /      | none                                                                                                                                                       |
| Health              | 0      | no significant risk to health                                                                                                                              |
| Flammability        | 0      | material that will not burn under typical fire conditions                                                                                                  |
| Physical hazard     | 0      | material that is normally stable, even under fire conditions, and will not react with water, polymerize, decompose, condense, or self-react. Non-explosive |
| Personal protection | -      |                                                                                                                                                            |

#### NFPA® 704

National Fire Protection Association: Standard System for the Identification of the Hazards of Materials for Emergency Response (United States).

| Category       | Degree of hazard | Description                                                                                                   |
|----------------|------------------|---------------------------------------------------------------------------------------------------------------|
| Flammability   | 0                | material that will not burn under typical fire conditions                                                     |
| Health         | 0                | material that, under emergency conditions, would offer no hazard beyond that of ordinary combustible material |
| Instability    | 0                | material that is normally stable, even under fire conditions                                                  |
| Special hazard |                  |                                                                                                               |

### National inventories

| Country | Inventory | Status                              |
|---------|-----------|-------------------------------------|
| US      | TSCA      | all ingredients are listed (ACTIVE) |

#### Legend

TSCA Toxic Substance Control Act

## 15.2 Chemical Safety Assessment

Chemical safety assessments for substances in this mixture were not carried out.

## SECTION 16: Other information, including date of preparation or last revision

### Indication of changes (revised safety data sheet)

| Section | Former entry (text/value)                                                                                                      | Actual entry (text/value)                                                                                                                                      | Safety-relevant |
|---------|--------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 1.4     | Emergency information service:<br>This number is only available during the following office hours: Mon-Fri 09:00 AM - 05:00 PM | Emergency information service:<br>CHEMTREC Tel: 1-800-424-9300<br>This number is only available during the following office hours: Mon-Fri 09:00 AM - 05:00 PM | yes             |

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| Section | Former entry (text/value)                                                                                                                                                                                                                                                                                                                                                                                                                    | Actual entry (text/value)                                                     | Safety-relevant |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------|
| 5.1     | Suitable extinguishing media:<br>Water spray, BC-powder, Carbon dioxide (CO <sub>2</sub> )                                                                                                                                                                                                                                                                                                                                                   | Suitable extinguishing media:<br>Water, Foam, ABC-powder                      | yes             |
| 6.3     | Advice on how to contain a spill:<br>Covering of drains                                                                                                                                                                                                                                                                                                                                                                                      | Advice on how to contain a spill:<br>Covering of drains, Take up mechanically | yes             |
| 6.3     | Advice on how to clean up a spill:<br>Wipe up with absorbent material (e.g. cloth, fleece).<br>Collect spillage: sawdust, kieselgur (diatomite),<br>sand, universal binder                                                                                                                                                                                                                                                                   | Advice on how to clean up a spill:<br>Take up mechanically.                   | yes             |
| 6.3     | Appropriate containment techniques:<br>Use of adsorbent materials.                                                                                                                                                                                                                                                                                                                                                                           |                                                                               | yes             |
| 7.2     | Conditions for safe storage, including any incompatibilities:<br>There is no additional information.<br>Concerning incompatibility: see below "Conditions to avoid" and "Incompatible materials" (Section 10).                                                                                                                                                                                                                               | Conditions for safe storage, including any incompatibilities                  | yes             |
| 7.2     |                                                                                                                                                                                                                                                                                                                                                                                                                                              | Managing of associated risks                                                  | yes             |
| 7.2     |                                                                                                                                                                                                                                                                                                                                                                                                                                              | - Explosive atmospheres:<br>Removal of dust deposits.                         | yes             |
| 8.2     | Hand protection:<br>Wear suitable gloves. Chemical protection gloves are suitable, which are tested according to EN 374. Check leak-tightness/impermeability prior to use. In the case of wanting to use the gloves again, clean them before taking off and air them well. For special purposes, it is recommended to check the resistance to chemicals of the protective gloves mentioned above together with the supplier of these gloves. | Hand protection:<br>Wear protective gloves.                                   | yes             |
| 9.1     | Physical state:<br>liquid                                                                                                                                                                                                                                                                                                                                                                                                                    | Physical state:<br>solid                                                      | yes             |
| 9.1     | Particle:<br>not relevant (liquid)                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                               | yes             |
| 9.1     | pH (value):<br>not determined                                                                                                                                                                                                                                                                                                                                                                                                                | pH (value):<br>not applicable                                                 | yes             |
| 9.1     | Flash point:<br>not determined                                                                                                                                                                                                                                                                                                                                                                                                               | Flash point:<br>not applicable                                                | yes             |
| 9.1     | Flammability (solid, gas):<br>not relevant, (fluid)                                                                                                                                                                                                                                                                                                                                                                                          | Flammability (solid, gas):<br>non-combustible                                 | yes             |
| 9.1     |                                                                                                                                                                                                                                                                                                                                                                                                                                              | Explosion limits of dust clouds:<br>not determined                            | yes             |
| 9.1     | Viscosity:<br>not determined                                                                                                                                                                                                                                                                                                                                                                                                                 | Viscosity:<br>not relevant (solid matter)                                     | yes             |
| 9.2     | Other information                                                                                                                                                                                                                                                                                                                                                                                                                            | other information:<br>there is no additional information                      | yes             |
| 9.2     | Liquid content:<br>33.76 %                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                               | yes             |
| 9.2     | Solid content:<br>66.24 %                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                               | yes             |

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### Abbreviations and acronyms

| Abbr.            | Descriptions of used abbreviations                                                                                                                                                                                                                                                                                                                               |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 29 CFR 1910.1000 | 29 CFR 1910.1000, Tables Z-1, Z-2, Z-3 - Occupational Safety and Health Standards: Toxic and Hazardous Substances (permissible exposure limits)                                                                                                                                                                                                                  |
| 49 CFR US DOT    | 49 CFR U.S. Department of Transportation                                                                                                                                                                                                                                                                                                                         |
| ACGIH®           | American Conference of Governmental Industrial Hygienists                                                                                                                                                                                                                                                                                                        |
| ACGIH® 2024      | From ACGIH®, 2024 TLVs® and BEIs® Book. Copyright 2024. Reprinted with permission. Information on the proper use of the TLVs® and BEIs®: <a href="http://www.acgih.org/tlv-bei-guidelines/policies-procedures-presentations/tlv-bei-position-statement">http://www.acgih.org/tlv-bei-guidelines/policies-procedures-presentations/tlv-bei-position-statement</a> |
| Acute Tox.       | Acute toxicity                                                                                                                                                                                                                                                                                                                                                   |
| ATE              | Acute Toxicity Estimate                                                                                                                                                                                                                                                                                                                                          |
| Cal/OSHA PEL     | California Division of Occupational Safety and Health (Cal/OSHA): Permissible Exposure Limits (PELs)                                                                                                                                                                                                                                                             |
| CAS              | Chemical Abstracts Service (service that maintains the most comprehensive list of chemical substances)                                                                                                                                                                                                                                                           |
| cD               | Combustible dust                                                                                                                                                                                                                                                                                                                                                 |
| Ceiling-C        | Ceiling value                                                                                                                                                                                                                                                                                                                                                    |
| DEP CODE         | Department of Environmental Protection Code                                                                                                                                                                                                                                                                                                                      |
| DGR              | Dangerous Goods Regulations (see IATA/DGR)                                                                                                                                                                                                                                                                                                                       |
| DNEL             | Derived No-Effect Level                                                                                                                                                                                                                                                                                                                                          |
| EC50             | Effective Concentration 50 %. The EC50 corresponds to the concentration of a tested substance causing 50 % changes in response (e.g. on growth) during a specified time interval                                                                                                                                                                                 |
| ED               | Endocrine disruptor                                                                                                                                                                                                                                                                                                                                              |
| GHS              | "Globally Harmonized System of Classification and Labelling of Chemicals" developed by the United Nations                                                                                                                                                                                                                                                        |
| HHS              | Higher hazard substance                                                                                                                                                                                                                                                                                                                                          |
| IATA             | International Air Transport Association                                                                                                                                                                                                                                                                                                                          |
| IATA/DGR         | Dangerous Goods Regulations (DGR) for the air transport (IATA)                                                                                                                                                                                                                                                                                                   |
| ICAO             | International Civil Aviation Organization                                                                                                                                                                                                                                                                                                                        |
| IMDG             | International Maritime Dangerous Goods Code                                                                                                                                                                                                                                                                                                                      |
| LC50             | Lethal Concentration 50%: the LC50 corresponds to the concentration of a tested substance causing 50 % lethality during a specified time interval                                                                                                                                                                                                                |
| LHS              | Lower hazard substance                                                                                                                                                                                                                                                                                                                                           |
| NIOSH REL        | National Institute for Occupational Safety and Health (NIOSH): Recommended Exposure Limits (RELs)                                                                                                                                                                                                                                                                |
| NPCA-HMIS® III   | National Paint and Coatings Association: Hazardous Materials Identification System - HMIS® III, Third Edition                                                                                                                                                                                                                                                    |
| OSHA             | Occupational Safety and Health Administration (United States)                                                                                                                                                                                                                                                                                                    |
| PBT              | Persistent, Bioaccumulative and Toxic                                                                                                                                                                                                                                                                                                                            |
| PEL              | Permissible exposure limit                                                                                                                                                                                                                                                                                                                                       |
| ppm              | Parts per million                                                                                                                                                                                                                                                                                                                                                |
| RTECS            | Registry of Toxic Effects of Chemical Substances (database of NIOSH with toxicological information)                                                                                                                                                                                                                                                              |
| STEL             | Short-term exposure limit                                                                                                                                                                                                                                                                                                                                        |
| TLV®             | Threshold Limit Values                                                                                                                                                                                                                                                                                                                                           |

**TIP 1.0**

Version number: 2.3  
Replaces version of: 2025-07-03 (1)

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| Abbr. | Descriptions of used abbreviations       |
|-------|------------------------------------------|
| TWA   | Time-weighted average                    |
| vPvB  | Very Persistent and very Bioaccumulative |

**Key literature references and sources for data**

OSHA Hazard Communication Standard (HCS), 29 CFR 1910.1200.

Transport of dangerous goods by road or rail (49 CFR US DOT). International Maritime Dangerous Goods Code (IMDG). Dangerous Goods Regulations (DGR) for the air transport (IATA).

**Classification procedure**

Physical and chemical properties: The classification is based on tested mixture.

Health hazards, Environmental hazards: The method for classification of the mixture is based on ingredients of the mixture (additivity formula).

**List of relevant phrases (code and full text as stated in section 2 and 3)**

| Code    | Text                                             |
|---------|--------------------------------------------------|
| H332    | Harmful if inhaled.                              |
| OSHA003 | May form combustible dust concentrations in air. |

**Disclaimer**

This information is based upon the present state of our knowledge. This SDS has been compiled and is solely intended for this product.