SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

PhaseSheet PTM Pro

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

Use of the substance/mixture

Thermally conductive phase change material for electronic components and heat sinks.

Uses advised against

Do not use for applications other than those intended. Do not grind or mill.

1.3. Details of the supplier of the safety data sheet

Company name:	Thermal Grizzly Holding GmbH
Street:	Gewerbestraße 39
City:	D-16540 Hohen Neuendorf
Telephone:	+49 2941 9336926
Email:	support@thermal-grizzly.com
Website:	www.thermal-grizzly.com

1.4. Emergency telephone number: Poison Information Centre Mainz: +49 6131 19240
24 hours; advice in German and English.

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

The mixture is not classified as hazardous according to Regulation (EC) No 1272/2008.

2.2. Label elements

No hazard pictograms, signal word, hazard statements or precautionary statements are required under CLP.

2.3. Other hazards

The aluminium particles are fully embedded in the polymer matrix. No release of aluminium powder is expected during intended use, including the phase change. Heated material may cause burns. The mixture contains no constituents meeting the criteria for PBT, vPvB, PMT or vPvM, and no constituents with endocrine disrupting properties. The mixture contains no substances in nanoform according to Regulation (EU) 2018/1881.

SECTION 3: Composition/information on ingredients

3.2. Mixtures

CAS No.	Substance name / EC No.	CLP substance classification	% w/w
7429-90-5	Aluminium (bound in a polymer matrix) 231-072-3	Flam. Sol. 1, H228 Water-react. 2, H261	90 %
-	Other ingredients not subject to disclosure (collective entry)	-	10 %
	Total		100 %

The substance classification refers to aluminium in stabilised powder form. For the classification of the finished mixture, see Section 2. For the full text of the hazard statements, see Section 16.

SECTION 4: First aid measures

4.1. Description of first aid measures

After inhalation

Move to fresh air. Seek medical advice if symptoms occur.

After skin contact

Wash with soap and water. Seek medical advice if irritation persists. Seek medical attention for burns caused by heated material; do not forcibly remove material adhering to the skin.

After eye contact

Rinse cautiously with water for several minutes. Remove contact lenses if possible. Seek medical attention if irritation persists.

After ingestion

Rinse mouth. Do not induce vomiting. Seek medical advice if symptoms occur. Never give anything by mouth to an unconscious person.

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

Heated material may cause thermal burns. No further product-specific information on symptoms or delayed effects is available.

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

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media: Use media appropriate to the surrounding fire. If released aluminium powder is burning, use metal fire extinguishing powder or dry sand.

Unsuitable extinguishing media: Do not use water, foam, carbon dioxide or ABC/BC dry powder on burning, released aluminium powder.

5.2. Special hazards arising from the substance or mixture

Fire or thermal decomposition may produce carbon oxides, metal oxides and other irritating decomposition products.

5.3. Advice for firefighters

Wear self-contained breathing apparatus and suitable protective clothing. Prevent fire residues and contaminated extinguishing water from entering watercourses or drains.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Avoid eye contact and prolonged skin contact. Avoid dust formation and inhalation of dust. Observe the protective measures in Section 8. Allow hot material to cool before collection.

6.2. Environmental precautions

Do not allow to enter drains, watercourses or soil.

6.3. Methods and material for containment and cleaning up

Collect mechanically and place in suitable, closed waste containers. Do not blow off with compressed air.

6.4. Reference to other sections

Handling: Section 7. Personal protective equipment: Section 8. Disposal: Section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Ensure adequate ventilation. Avoid eye contact and prolonged skin contact. Use clean, sharp tools for cutting; avoid grinding and milling. Do not eat, drink or smoke during use. Wash hands after use.

7.2. Conditions for safe storage, including any incompatibilities

Store in closed original packaging in a dry place, protected from direct sunlight and heat sources. Keep away from strong oxidising agents, acids and bases.

7.3. Specific end use(s)

Thermal interface material; see Section 1.2. Intended operating temperature range: -40 to +125 °C.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Exposure to free aluminium powder is not expected during intended use.
Germany, TRGS 900: general dust exposure limit of 1.25 mg/m³ (respirable fraction; reference density 2.5 g/cm³, apply density correction) and 10 mg/m³ (inhalable fraction). Observe these limits if dust exposure occurs.
Biological limit value (BGW) for aluminium, TRGS 903: 50 µg/g creatinine in urine. For long-term exposure, take samples at the end of the shift after several preceding shifts.

8.2. Exposure controls

Engineering controls: Ensure adequate ventilation. Capture any dust generated at source.

Eye/face protection: Wear safety glasses with side protection according to EN ISO 16321-1 if there is a risk of eye contact; use tightly fitting eye protection if dust is generated.

Skin/hand protection: Nitrile gloves (NBR; at least 0.11 mm) are recommended to protect against soiling during prolonged or repeated handling of the solid, undamaged film. Adjust wear time to mechanical stress and soiling. Replace damaged or contaminated gloves. For contact with softened or liquefied material, select chemical protective gloves according to EN ISO 374-1 using the glove manufacturer's resistance and wear time information. Wash hands after handling.

Respiratory protection: Not required during intended handling of the solid film. If dust is generated and extraction is inadequate, use suitable particulate respiratory protection, e.g. FFP2 according to EN 149 or a half mask with a P2 filter according to EN 143.

Thermal hazards: Use suitable thermal protective gloves according to EN 407 when in contact with hot material.

Environmental exposure controls: Prevent release to the environment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state / form	Solid / film at ambient temperature
Colour	Grey
Odour	Odourless
Melting point/freezing point	Phase change at approx. 45 °C (ASTM D3418). Freezing point not determined.
Boiling point or initial boiling point and boiling range	Not determined.
Flammability	Non-flammable in the tested, matrix-bound state; see Section 9.2.1.
Lower and upper explosion limit	Not applicable: solid.
Flash point	Not determined.
Auto-ignition temperature	Not determined.
Decomposition temperature	Not determined.
pH	Not applicable: water-insoluble mixture.
Kinematic viscosity	Not applicable at ambient temperature: solid.
Solubility in water	Insoluble.
Partition coefficient n-octanol/water (log value)	Not applicable to the mixture.
Vapour pressure	Not determined.
Density	Approx. 2.6 g/cm³ (ASTM D792).
Relative vapour density	Not applicable: solid.
Particle characteristics	Matrix-bound aluminium particles: D90 ≥ 5 µm. Median (D50), measurement method and distribution basis not available. The mixture contains no substances in nanoform according to Regulation (EU) 2018/1881.

9.2. Other information

9.2.1 Information with regard to physical hazard classes: Evaluation of the tests on the finished, matrix-bound material does not result in classification as a flammable solid or as a mixture which, in contact with water, emits flammable gases. The evaluation covers the intended phase change.

9.2.2 Other safety characteristics: Operating temperature range -40 to +125 °C. If processing generates free aluminium dust, it may form explosive mixtures with air.

SECTION 10: Stability and reactivity

10.1. Reactivity

No hazardous reactivity is known during intended use, including the phase change.

10.2. Chemical stability

Stable under the specified storage and operating conditions.

10.3. Possibility of hazardous reactions

No hazardous reactions are known under intended conditions with an intact polymer matrix. Released aluminium may react with strong acids or bases to form flammable hydrogen.

10.4. Conditions to avoid

Overheating beyond the intended operating range, open flames, processing that generates dust and contact with incompatible materials.

10.5. Incompatible materials

Strong oxidising agents, strong acids and strong bases.

10.6. Hazardous decomposition products

None known during intended use. In the event of fire or thermal decomposition: carbon oxides, metal oxides and other irritating decomposition products.

SECTION 11: Toxicological information

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

No toxicological test data generated for the mixture itself are available. The assessment is based on the available information on the ingredients according to Regulation (EC) No 1272/2008. Based on the available data, the classification criteria for the hazard classes listed below are not met.

Acute toxicity	Classification criteria are not met.
Skin corrosion/irritation	Classification criteria are not met.
Serious eye damage/irritation	Classification criteria are not met.
Respiratory or skin sensitisation	Classification criteria are not met.
Germ cell mutagenicity	Classification criteria are not met.
Carcinogenicity	Classification criteria are not met.
Reproductive toxicity	Classification criteria are not met.
Specific target organ toxicity — single exposure	Classification criteria are not met.
Specific target organ toxicity — repeated exposure	Classification criteria are not met.
Aspiration hazard	Classification criteria are not met.
Endocrine disruption for human health	Classification criteria are not met.

Quantitative toxicological values (LD50, LC50, ATE) are not available for the mixture. Possible routes of exposure: skin/eye contact and accidental ingestion; inhalation of dust during mechanical processing. Inhalation exposure is not expected with intact film. Product-specific data on acute, delayed and chronic effects are not available.

11.2. Information on other hazards

11.2.1 Endocrine disrupting properties: The mixture contains no constituents with endocrine disrupting properties.
11.2.2 Other information: Contact with hot material may cause thermal burns.

SECTION 12: Ecological information

12.1. Toxicity

Based on the available information on the ingredients, the criteria for classification as hazardous to the aquatic environment are not met. No ecotoxicological test data generated for the mixture itself are available.

12.2. Persistence and degradability

No data available for the mixture.

12.3. Bioaccumulative potential

No data available for the mixture.

12.4. Mobility in soil

Water-insoluble material. Quantitative information on mobility in soil is not available.

12.5. Results of PBT and vPvB assessment

The mixture contains no constituents meeting the PBT or vPvB criteria under REACH Annex XIII.

12.6. Endocrine disrupting properties

The mixture contains no constituents with endocrine disrupting properties.

12.7. Other adverse effects

The mixture contains no constituents meeting the PMT or vPvM criteria under CLP. Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Collect product residues and contaminated packaging separately and hand over to a licensed waste contractor for recovery or disposal. Do not discharge into drains or watercourses. Recycle clean packaging. Determine the waste code under the German Waste Catalogue Ordinance according to origin and use in consultation with the waste contractor.

SECTION 14: Transport information

The product is not subject to the dangerous goods regulations under ADR/RID, ADN, the IMDG Code and ICAO-TI/IATA-DGR.

14.1. UN number or ID number

Not applicable.

14.2. UN proper shipping name

Not applicable.

14.3. Transport hazard class(es)

Not applicable.

14.4. Packing group

Not applicable.

14.5. Environmental hazards

Not environmentally hazardous within the meaning of the dangerous goods regulations. Not a marine pollutant under the IMDG Code.

14.6. Special precautions for user

Transport in dry, undamaged, closed packaging. Observe the information in Section 7.

14.7. Maritime transport in bulk according to IMO instruments

Not intended.

SECTION 15: Regulatory information

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

European Union: REACH Regulation (EC) No 1907/2006, Annex II as amended by Regulation (EU) 2020/878; CLP Regulation (EC) No 1272/2008 as amended, including the new hazard classes under (EU) 2023/707.

The mixture contains no substances on the REACH Candidate List (Article 59) at concentrations of 0.1 % by weight or above, and no constituents subject to authorisation under REACH Annex XIV. No restrictions under REACH Annex XVII are known for the use specified in Section 1.2.

Regulation (EU) 2019/1148: Where aluminium particles are < 200 µm, the information and reporting obligations under Articles 7 and 9 must be observed due to the aluminium content. Suspicious transactions and significant disappearances or thefts must be reported to the competent national contact point within 24 hours.

Germany: TRGS 220, TRGS 900 and TRGS 903. Water hazard: generally hazardous to water pursuant to Section 3(2), sentence 1, No 8 of the German AwSV (solid mixture).

15.2. Chemical safety assessment

No chemical safety assessment is available for the mixture.

SECTION 16: Other information

Version 1.0 is the first public version of this MSDS.

Classification procedures and data sources

Physical hazards: evaluation of test data for the finished material, including the intended phase change. Health and environmental hazards: evaluation of the available ingredient data against the CLP criteria. The substance classification in Section 3 applies to stabilised aluminium powder; it is not the classification of the finished mixture.

Data sources: technical product data; information on composition and material testing; harmonised classifications under CLP Annex VI; DGUV GESTIS Substance Database; TRGS 900 and TRGS 903.

Full text of the hazard statements

H228: Flammable solid.
H261: In contact with water releases flammable gases.

Abbreviations

D90/D50: 90th and 50th percentiles of the particle size distribution, respectively.

Flam. Sol. 1: flammable solids, Category 1. Water-react. 2: substances and mixtures which, in contact with water, emit flammable gases, Category 2.
CLP: classification, labelling and packaging of substances and mixtures. REACH: registration, evaluation, authorisation and restriction of chemicals. SVHC: substance of very high concern.
PBT: persistent, bioaccumulative and toxic. vPvB: very persistent and very bioaccumulative. PMT: persistent, mobile and toxic. vPvM: very persistent and very mobile.
BGW: biological limit value. NBR: nitrile rubber. LD50/LC50: median lethal dose/concentration. ATE: acute toxicity estimate. TRGS: German Technical Rules for Hazardous Substances. AwSV: German Ordinance on Installations for Handling Substances Hazardous to Water.
ADR/RID/ADN: dangerous goods regulations for road/rail/inland waterways. IMDG: dangerous goods regulations for maritime transport. ICAO-TI/IATA-DGR: dangerous goods regulations for air transport. IMO: International Maritime Organization. ASTM: ASTM International (test standards). DGUV: German Social Accident Insurance. GESTIS: Hazardous Substance Information System. MSDS: Material Safety Data Sheet.

Training

Before use, instruct workers on safe handling and the necessary protective measures.