Safety data sheet
according to Regulation (EC) No. 1907/2006 and (EU) 2020/878

Trade name:	Thermex	
Revised on:	27/08/2023	**Version:** DE 3.0
Print date:	27/08/2023	**Replaces version DE 2.1**

1. Designation of the product and company name

1.1 Name of the product:

Designation on the label / trade name:

Thermex

Other designations:
Low fluorine, exothermic riser systems, sodium silicate bonded moulded part

Note:
The product is not subject to registration according to REACH Regulation, Article 2(7).

1.2 Use of the product:

1.2.1 Identified uses:
The product is intended for the professional user.
Auxiliary for the foundry industry, use for the production of risers

1.2.2 Uses advised against:
Uses outside of the identified uses.
No applications in the private sector.

1.3 Identification of the company:

Supplier (manufacturer / dealer):
For Germany / EU domestic:

GTP Schäfer GmbH
Benzstrasse 15
41515 Grevenbroich
Germany

Email (competent person):

info@gtp-schaefer.de

Contact point for information:
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1.4 Emergency number:

GTP Schäfer GmbH
Benzstrasse 15
41515 Grevenbroich

Phone: +49 2181 233 94-0 (This number is only available during office hours.)

Mobile: +49 172 2026764

2. Possible hazards

2.1 Classification:

This product (article) contains dangerous substances or mixtures (see chapter 3.2) which, however, are not intended to be released under normal or reasonably foreseeable conditions of use.
The product (material) is not classified as hazardous within the meaning of Ordinance (EG) 1272/2008 and is not included under the labelling area of this ordinance; there are also not sufficient data available for classification.

2.2 Additional hazard warnings for humans and the environment:

The product (material) releases hazardous substances when thermally decomposed as intended.
May form ammonia, nitrous gases (nitrogen oxides), hydrogen fluoride, hydrogen, carbon monoxide/dioxide, soot and/or volatile fluorides after ignition alone or in contact with water, acids or alkalis, depending on the reaction conditions.
Avoid release to the environment in excess of immission control limits for the intended use.
May cause harmful effects if swallowed, inhaled or if in contact with skin.
The products are difficult to extinguish after ignition (high fire temperature).

3. Composition / information on the ingredients:

3.1 Product information:

Description:
Moulding (product) of aluminium grit, sodium nitrate, iron oxide, silicon dioxide (silica sand) and other fillers, bonded with sodium silicate (potassium and sodium salts of silicic acid).

3.2 Hazardous ingredients:

Chemical name	CAS No.:	EC no.:	INDEX No.:	REACH Reg. no.:	Content (%)	Classification according to Ordinance (EG) 1272/2008			Identification	Safety instructions	Remark
						Signal values	Category	Hazard warnings H-statements	Pictogram	P-statements	
Cryolite (TriSodium Hexafluoroaluminate)	13775-53-6	237-410-6	009-016-00-2	01-2119511565-43	≤ 3	Hazard	Acute Tox. (inhal.) 4; STOT Rep. Exp. 1; Aquatic Chronic 2	H332, H362, H372 H411	GHS07, GHS08, GHS09	260,263, 270,273, 308+313, 501	Exists in bound form
Aluminium foil grit	7429-90-5	231-072-3	013-002-00-1	01-2119529443-45	≤ 35	Hazard	Flam. Solid 1; Water React. Flam. Gas 2	H228 H261	GHS02	210, 233, 280, 402+404	Exists in bound form
Sodium nitrate	7631-99-4	231-554-3	n/a	01-2119488221-41	≤ 12	Caution:	Oxide. Solid 3; Eye Irrit. 2	H272 H319	GHS03 GHS07	210220264 280, 305+351+338, 370+378, 501	Exists in bound form

Silicate: Sodium silicate Potassium silicate	1344-09-8 1312-76-1	215-687-4 215-199-1	n/a	01-21194487 25-31 01-21194568 88-17	≤ 12	Hazard Hazard	Met. Corr. 1; Skin Corr. 1B; STOT Single Exp. 3 Met. Corr. 1; Skin Corr. 1B; STOT Single Exp. 3	H290 H314 H335 H290 H314 H335	GHS05 GHS07 GHS05 GHS07	261,262,280, 301+330+331, 303+361+353, 305+351+338	Exists in bound form

n/a = no information

No hazardous ingredients:

Chemical name	**CAS No.:**	**EC no.:**	**INDEX No.:**	**REACH Reg. no.:**	**Content (%)**	**Classification** according to Ordinance (EG) 1272/2008			**Identification**	**Safety instructions**	**Remark**
						Signal values	Category	Hazard notices H-statements	Pictogram	P-statements	
Iron oxide (Di-iron(III) oxide)	1309-37-1	215-168-2	k.A.	01-21194576 14-35	≤ 8	k.A.	k.A.	k.A.	k.A.	k.A.	Exists in bound form
Silicon dioxide (quartz sand)	14808-60-7	238-878-4	n/a	01-21207705 09-45	≤ 60	n/a	n/a	n/a	n/a	260.270, 314	

n/a = no information

3.3 Remark: Classifications not completely written out in this section are listed in chapter 16, as well as safety instructions for the ingredients used.

4. First aid measures:

4.1 General information:
Even if the product (substance) is not classified as dangerous, first aid and medical treatment may be required in case of accidents (e.g. intake) and even if poisoning is suspected.

4.2 In case of inhalation:
After inhalation of thermal decomposition products (nitrous gases, hydrogen fluoride, hydrogen cyanide, ammonia, carbon monoxide/dioxide), remove the affected person to fresh air and keep calm.
In case of irritation of the respiratory tract / breathing difficulties, consult a doctor immediately.

4.3 In case of contact with the skin:
In case of skin contact, wash thoroughly with plenty of soap and water.
In case of skin reactions, redness or pain, consult a doctor.

4.4 In case of contact with eyes:
In case of contact with eyes (dusts/thermal decomposition products), immediately rinse with running water for 10 to 15 minutes with the eyelids open and consult an ophthalmologist. For contact lens wearers, remove contact lenses immediately and rinse eyes.
If eye irritation occurs, consult an ophthalmologist.

4.5 In case of swallowing:

If large quantities of dust are swallowed or inhaled, have them drink immediately.
Do not induce vomiting.
If swallowed, rinse the mouth with plenty of water (only if the person is conscious) and get medical help immediately.

4.6 Self-protection of the first aider:

When rescuing from a danger area: Pay attention to self-protection!

4.7 Information for the doctor:

Symptoms:

After inhalation of dust:
No acute symptoms expected.

After inhalation of thermal decomposition products:

Nitrous Oxides: Depending on the concentration, rapid narcotic effect up to oxygen deprivation symptoms. The development of pneumonia (with or without preceding pulmonary oedema) can still occur after 10-30 days as a late consequence of acute poisoning. Damage to the blood count / neurological damage.
Hydrogen fluoride: increased secretion, coughing irritation, rapid development of pulmonary oedema, possibly lung damage only after latency.
Hydrogen cyanide, hydrocyanic acid: Irritation of mucous membranes, burning sensation on the tongue, metallic-scratchy taste in mouth and throat; depending on concentration, gradual to sudden onset of systemic effects.
Ammonia: Cough, breathing difficulties, nausea, feeling sick, later inflammation of the respiratory tract.
Di-iron(III) oxide: Inflammatory reactions; later siderosis

In case of contact with the skin:

Hydrogen fluoride: Burns that spread over a wide area and into deeper tissues
Hydrogen cyanide, hydrocyanic acid: first irritation, then redness
Ammonia: Irritation to burns

In case of contact with eyes:

Di-iron(III) oxide: mechanical irritation of the mucous membranes of the eyes
Hydrogen fluoride: Burns
Hydrogen cyanide, hydrocyanic acid: Redness
Ammonia: Tear irritation, burning / stabbing pain in the eye

After ingestion:

Hydrogen cyanide, hydrocyanic acid: Mucous membrane irritation
Di-iron(III) oxide: Damage to the gastrointestinal tract, liver and cardiovascular system
Sodium nitrate: Methemoglobin formation; gastrointestinal complaints with (bloody) vomiting, diarrhoea, abdominal pain.

Hazards:

See symptoms

Treatment:

The following literature sources, as well as other information, can provide information on treatment by a doctor:
BGHM: Nitrous gases in welding and allied processes; 02-2017; DGUV-Information 209-047
BG-Information "Nitric Acid Nitrogen Oxides, Nitrous Gases" 03-1998, ZH 1/214
BGI RCI: Hydrogen fluoride, hydrofluoric acid and inorganic fluorides, 12-2018; DGUV-Information 213-071
BG information "Hydrogen cyanide (prussic acid), cyanides", 12-1989; BGI 569
IFA-DGUV-Gestis substance database
Kühn / Birett
Treat symptomatically

5. Fire-fighting measures

5.1 Suitable extinguishing agents:

Sand, dry extinguishing agent
Cover with the aforementioned extinguishing agents and allow to react in a controlled manner, as far as this is possible without danger.

5.2 Unsuitable extinguishing agents for safety reasons:

Water: when extinguishing with water, danger of formation of hydrogen due to violent chemical reactions / high combustion temperature
Carbon dioxide extinguishing gases: Decomposition process continues auto-oxidatively.

5.3 Special hazards caused by substances or mixtures contained /the product itself, its combustion products or resulting gases:

Thermal decomposition can lead to the release of toxic / corrosive gases or vapours.
See chapter 2.2

5.4 Special protective equipment for fire fighting:

Use suitable respirator (filter types B, K, NO-P2 or combination filter ABEK-P2)
If necessary, wear self-contained breathing apparatus.
Wear suitable personal protective equipment when fighting fires.

5.5 Additional information:

Decomposition processes also continue under water.
Strong exothermic decomposition.
Secure the source of the fire and allow it to burn down in a controlled manner.
Collect contaminated extinguishing water separately. Do not allow to enter drains, soil or bodies of water.
Cool surrounding areas if possible.

6. Measures in case of unintentional release:

6.1 Safety measures related to persons:

Avoid contact with eyes, inhalation and ingestion of dusts; dust mask recommended.
Avoid the formation of dust; vacuum up dust without raising dust.

6.2 Environmental protection measures:

Do not allow product or product residues to enter drains, water bodies or soil.
Ensure waste is collected and stored securely in closed containers.

6.3 Procedure for cleaning:

Avoid contact with water, if necessary hydrogen evolution.
Collect mechanically (avoid the development of dust) and place in suitable containers for disposal.
Treat the material taken up according to the section Disposal.

6.4 Additional information:

Attention is drawn to the observance of the protective measures in Chapters 7, 8 and 13.

7. Handling and storage:

7.1 Handling:

Only remove the packaging in layers immediately before use.
Observe product information / technical data sheet

7.1.1 Advice for safe handling:

Only intended use, e.g. in metallurgical processes, is permissible.
Avoid dust formation.
Keep away from water.
Ensure sufficient ventilation, especially in closed rooms.
The usual precautionary measures when handling chemicals / hazardous substances must be observed.
Wash hands and face thoroughly before breaks and at the end of work.

Safety measures:

Technical measures:

Measures to prevent aerosol and dust formation:

Handle products in a way that avoids abrasion and dust formation (e.g. no pouring handling).

Measures to protect the environment:

Effectively extract any thermal decomposition products that arise and, if necessary, feed them to an exhaust air purification system.
Treat product residues in accordance with legal regulations.

Specific requirements or handling rules:
Do not eat, drink, smoke or have a cold in the workplace.
Wash hands and/or face before breaks and after work.
Keep away from food, drink and animal feed.
Do not inhale dusts and thermal decomposition products.
Only use the product in quantities corresponding to operational requirements.

7.1.2 Information about fire and explosion protection:
Protect from impermissible heat exposure.
Keep away from sources of ignition - No smoking, no open flames
Do not store in the immediate vicinity of the casting line or melting and furnace equipment.
Avoid dust deposits / remove dust deposits regularly.
Observe the usual preventive fire protection measures.

7.2 Storage:

7.2.1 Technical measures and storage conditions:
Keep away from sources of ignition - No smoking, no open flames
Do not carry out high temperature work
Store in tightly closed containers in a cool and dry place.

7.2.2 Packing materials:

Store only in original packaging (cardboard trays).

7.2.3 Requirements for storage rooms and containers:

No special requirements; do not store outside; dry storage.

7.2.4 Notes on storage together:

Do not store together with:
food and feed
Explosive substances (Storage class 1)
Highly flammable substances (storage class 5.1A)
Contaminable substances (storage class 6.2)
Radioactive substances (Storage class 7)
Do not store together with strong acids and alkalis. Store separately from oxidising agents and reducing agents.

Observation of restrictions and requirements for combined storage according to TRGS 509 / TRGS510 with:
Compressed, liquefied or gases dissolved under pressure (storage class 2A)
Aerosol dispensers (storage class 2B)
Flammable liquid or explosive substances (storage class 3A)
Explosive solids (storage class 4.1A)
Substances liable to spontaneous combustion (storage class 4.2)
Substances which, in contact with water, emit flammable gases (storage class 4.3)
Flammable substances (storage class 5.1 B)
Flammable substances containing ammonium nitrate (storage class 5.1 C)
Organic peroxides (Storage class 5.2)
Flammable highly acute toxic substances (cat. 1 and 2) (storage class 6.1A)
Non-flammable highly acute toxic substances (cat. 1 and 2) (storage class 6.1 B)

7.2.5 Further information on storage conditions:

Storage temperature (°C): + 5 to + 30 °C

Rel. Humidity (%):	Store dry / protect from moisture
Storage stability:	No information
Maximum storage period:	Max. recommended storage period is 1 year. Experience has shown that the product can also be used beyond the specified maximum storage period. A warranty for the guaranteed product properties cannot be assumed after the maximum storage period has expired.
Storage class:	11 - flammable solids (acc. to TRGS 509 / TRGS 510) (recommended)

7.2.6 Specific use:

Recommendation:	Observe product information / technical data sheet

8. Limitation and monitoring of exposure / personal protective equipment:

8.1 Exposure limits:

8.1.1 Components with workplace limit values to be monitored or biological limit values:

8.1.1.1 Occupational exposure limits:

Related to thermal decomposition products / dust emissions
Air limits:

Limit type (country of origin)	Working material	EC no.	CAS no.	Occupational exposure limit		Recommended monitoring procedures	Peak limit	Source
Germany	Dusts (for dusts with a density of 1 g/cm³)	n/a	n/a	4 mg/m³ (inhalable aerosol fraction)	0.3 mg/m³ (alveolar aerosol fraction)	n/a	No exceeding of the level of twice the general dust limit value	DFG
Germany	Aluminium	231-072-3	7429-90-5	4 mg/m³ (inhalable aerosol fraction)	1.5 mg/m³ (alveolar aerosol fraction)	n/a	No exceeding of the level of twice the general dust limit value	DFG

Limit type (country of origin)	Working material	EC no.	CAS no.	Occupational exposure limit		Recommended monitoring procedures	Peak limit	Source
				Long-term	Short-term			
Germany	Nitrous oxide (nitrous gases)	233-032-0	10024-97-2	180 mg/m³	360 mg/m³	n/a	15 min, max. 4 times / shift, interval 1 h	DFG
Germany	Fluorine-hydrogen	231-634-8	7664-39-3	0.83 mg/m³	1.66 mg/m³	n/a	15 min, max. 4 times / shift, interval 1 h	DFG
Germany	Hydrogen cyanide (prussic acid)	200-821-6	74-90-8	2.1 mg/m³	4.2 mg/m³	n/a	15 min, max. 4 times / shift, interval 1 h	DFG
Germany	Ammonia	231-635-3	7664-41-7	14 mg/m³	28 mg/m³	n/a	15 min, max. 4 times / shift, interval 1	DFG
Germany	Carbon monoxide	211-128-3	630-08-0	35 mg/m³	70 mg/m³	n/a	15 min, max. 4 times / shift, interval 1 h	DFG
Germany	Carbon dioxide	204-696-9	124-38-9	9,100 mg/m³	18,200 mg/m³	n/a	15 min, max. 4 times / shift, interval 1 h	DFG
No adequate product-related data available.								

n/a = no information

During the burning of Thermex products, the formation of nitrous gases, hydrocyanic acid and ammonia was detected. Whether the occupational exposure limits are exceeded when using products made from Thermex depends very much on the conditions. Verification of compliance with occupational exposure limits is recommended at least at first use.

Biological limits:

Limit type (country of origin)	Working material	EC no.	CAS no.	Parameter	Limit value	Test material	Source	Remark

Germany	Hydrogen fluoride and inorganic fluorine compounds (fluorides)	231-634-8	7664-39-3	Fluoride	4.0 mg/l	Urine	DFG	at the end of the shift
Germany	Aluminium	231-072-3	7429-90-5	Aluminium	50 µg/g creatinine	Urine	DFG	at the end of the shift (long-term exposure)
Germany	Carbon monoxide	211-128-3	630-08-0	CO-Hb	5%	Blood	DFG	at the end of the shift
No adequate product-related data available.								

n/a = no information

8.1.1.2 DNEL- and PNEC values:

DNEL employees				
Exposure route	**Duration of action**	**Endpoint effect**	**Value**	**Remark**
inhalative / systemic and local	Long-term	repeated exposure	3.72 mg/m³	Related to aluminium grit
inhalative / systemic and local	Short-term	acute toxicity	99.8 mg/m³	Related to cryolite
inhalative / local	Long-term	repeated exposure	0.1 mg/m³	Related to cryolite
dermal / systemic	Long-term	Developmental toxicity	1,020 mg/kg bw/day	Related to cryolite
inhalative / systemic	Long-term	repeated exposure	5.61 mg/m³	Related to potash and soda silicate
dermal / systemic	Long-term	repeated exposure	1.49-1.59 mg/kg bw/day	Related to potash and soda silicate
No adequate product-related data available.				

DNEL User/consumer				
Exposure route	**Duration of action**	**Endpoint effect**	**Value**	**Remark**
inhalative / systemic	Long-term	repeated exposure	7.9 mg/kg bw/day	Related to aluminium grit
inhalative / systemic and local	Short-term	acute toxicity	74.5 mg/m³	Related to cryolite
inhalative / local	Long-term	repeated exposure	25 µg/m³	Related to cryolite
dermal / systemic	Long-term	Repeated exposure	510 mg/kg bw/day	Related to cryolite
inhalative / systemic	Long-term	repeated exposure	1.38 mg/m³	Related to potash and soda silicate
oral / systemic	Long-term	repeated exposure	0.74-0.8 mg/kg bw/day	Related to potash and soda silicate
dermal / systemic	Long-term	repeated exposure	0.74-0.8 mg/kg bw/day	Related to potash and soda silicate
No adequate product-related data available.				

PNEC			
Protection target	**Estimation factor for extrapolation**	**Value**	**Remark**
Freshwater	1000	0.005 mg/L	Related to cryolite
Sewage treatment plant	10	8.7 mg/L	Related to cryolite

Freshwater sediment		30.5 mg/kg (dw)	Related to cryolite
Seawater sediment		3.05 mg/kg (dw)	Related to cryolite
Soil organisms		6.02 mg/kg (dw)	Related to cryolite
Sewage treatment plant	10	18 mg/L	Related to sodium nitrate
Freshwater		7.5 mg/L	Related to potash and soda silicate
Seawater		1 mg/L	Related to potash and soda silicate
Sewage treatment plant	1	348 mg/L	Related to potash and soda silicate
No adequate product-related data available.			

bw = body weight (body weight)
dw = dry weight

8.2 Limitation and monitoring of exposure:

8.2.1 Limitation and monitoring of exposure at the workplace:

Product-related measures to avoid exposure:
Only intended , identified use permitted. Safety instructions for handling are given in Chapter 16.

Instructional measures to avoid exposure:

Only intended , identified use permitted. Safety instructions for handling the individual components are given in Chapter 16.

Organisational measures to avoid exposure:

Only intended , identified use permitted. It must be determined whether the occupational exposure limits are complied with.

Technical measures to avoid exposure:
See Chapter 7. No additional measures are required.
Technical measures and the use of suitable work processes have priority over the use of personal protective equipment.

Personal protective equipment:

Respiratory protection: Normally no personal respiratory protection is required.

Respiratory protection is required for:
If technical extraction or ventilation measures are not possible or insufficient, respiratory protection must be worn (thermal decomposition products / dust).
Exceedance of the respective occupational exposure limit concentration of thermal decomposition products / dust.

For riser production:
Filter unit with filter or blower filter unit type: P2 or FFP2

Intended use:
Filter unit with filter or blower filter unit type:
Filter types B, K, NO-P2 or combination filter ABEK-P2 or fan-assisted respirator (at least TH2P).
Self-contained breathing apparatus:
Use at concentrations above the application limit of filter devices, at oxygen contents below 17 vol% or in unclear conditions.
The wearing time limits according to GefStoffV in connection with the rules for the use of respirators (BGR 190) must be observed.

Hand protection: Normally no hand protection necessary.
The use of water-insoluble skin protection products is recommended.

In case of frequent hand contact:
Gloves for protection against mechanical hazards according to DIN EN 388
The wearing time limits according to GefStoffV in connection with the rules for the use of protective gloves (BGR 195) must be observed.

Eye protection: In case of dust accumulation: Dust goggles with side protection (according to EN 166).

Body protection: Not required. Normal long-sleeved work clothes are sufficient.

Hygiene: Hands, forearms and face should be washed after handling the product, especially before breaks or at the end of work activities.

8.2.2 Limitation and monitoring of environmental exposure:

Product-related measures to avoid exposure:

No special measures required.

Instructional measures to avoid exposure:

Only handle the product within the scope of its intended use.

Organisational measures to avoid exposure:
Low-dust handling.
Only use the product (material) in the required quantities.

Technical measures to avoid exposure:
Effective extraction of thermal decomposition products at the point of origin.

9. Physical and chemical properties:

9.1 General information

Appearance: Product defined form

State of aggregation:	firm	Colour:	Red-grey	Odour:	odourless

9.2 Important health, safety and environmental information:

Exothermic decomposition of the product after ignition without melting with possible release of e.g. CO, CO_2, NO, soot.
Health hazardous dust

9.3 Safety-relevant basic data:

	Value	Method	Remark
pH value (20°C):	approx. 9 - 10	DIN 19260	Measurement in aqueous suspension
Melting point / range (°C):	Not applicable		Not applicable, as decomposition occurs
Boiling point / range (°C):	Not applicable		
Flash point (°C):	Not applicable		
Ignition temperature (°C):	250a) or 900b)	DIN 51794	Product is not self-igniting
Vapour pressure:	Not applicable		Not applicable, as composed of non-volatile inorganic and high molecular weight organic solids
Density (g/cm³):	1,200 - 1,400	DIN 51757	
Bulk density (kg/m³):	Not determined		

Water solubility (20°C in g/l):	No data available		Solubility of inorganic components to be expected
Partition coefficient n-octanol / water (log Pow):	Not determined		
Viscosity, dynamic (mPa*s):	Not applicable		Not applicable, as solid
Dust explosion ability:	Product is not dust explosive		
Explosive limits	Not applicable		
Lower:			
Upper:			

a) at 1 hour temperature exposure b) at 20-50 seconds temperature exposure

10. Stability and reactivity:

10.1 Conditions to avoid:

When heated / exposed to heat:
Risk of ignition

The product as delivered is not dust explosive; however, any fine dusts that may be produced have an increased flammability.

10.2 Substances to avoid:

Acids and oxidising agents
See also chapter 7.2.4.

10.3 Hazardous decomposition products:

Ammonia
nitrous gases (nitrogen oxides)
Hydrogen fluoride and/or volatile fluorides
Hydrogen cyanide (prussic acid)
Hydrogen
Carbon monoxide / dioxide
Carbon black
Exposure limit values for individual substances are listed in chapter 8.

11. Toxicological information

11.1 Toxicokinetics, metabolism and distribution:

Human toxicological data:

	Effective dose	Species	Method	Remark
No sufficient, product-related, classification-relevant data available.				

11.2 Acute effects (toxicological effects):

	Effective dose	Species	Method	Remark
Acute oral toxicity	$LD_{50/14d}$: >5,000 mg/kg	Rat	OECD 401	Related to cryolite
Acute oral toxicity	$LD_{50/14d}$: >15,900 mg/kg	Rat	OECD 401	Related to aluminium grit
Acute oral toxicity	LD_{50}: 3,430 mg/kg	Rat	OECD 401	Related to sodium nitrate
Acute oral toxicity	LD50/14d: >5.000 mg/kg	Rat	EU B.1	Related to di-iron trioxide
Acute oral toxicity	LD_{50}: >5,000 mg/kg	Rat	EPA OPPTS 870.1100	Related to potassium silicate
Acute oral toxicity	LD_{50}: 3,400 mg/kg	Rat	OECD 401	Related to sodium silicate
Acute dermal toxicity	LD_{50}: > 2,100 mg/kg	Rat	n/a	Related to cryolite

Acute dermal toxicity	LD_{50}/24h: > 5,000 mg/kg	Rat	OECD 402	Related to sodium nitrate
Acute dermal toxicity	LD_{50}/24h: > 5,000 mg/kg	Rat	EPA OPPTS 870.1200	Related to potassium water glass
Acute inhalation toxicity	LC_{50}/4h: 4,470 mg/m³	Rat	OECD 403	Related to cryolite
Acute inhalation toxicity:	LC_{50}/4h: > 888 mg/m³	Rat	OECD 403	Related to aluminium grit
Acute inhalation toxicity:	LC50/4h: 5,05 g/m3	Rat	OECD 403	Related to di-iron trioxide
Acute inhalation toxicity:	LC_{50}/4h: > 2,060 mg/m³	Rat	EPA OPPTS 870.1300	Related to potassium silicate
No sufficient, product-related, classification-relevant data available.				

n/a = no information

Specific target organ toxicity (STOT) at single exposure:
No sufficient, product-related, classification-relevant data available.

Irritation and corrosion:

	Exposure time	Species	Valuation	Method	Remark
Primary irritant effect on the skin	24 / 72 h	Rabbit	No irritation	n/a	Related to cryolite
Primary irritant effect on the skin	24 / 48 / 72 h	Rabbit	No irritation	OECD 404	Related to di-iron trioxide
Primary irritant effect on the skin	24 / 48 / 72 h and 5 d	Rabbit	Slightly - moderately irritant	OECD 404	Related to potassium silicate
Primary irritant effect on the skin	24 / 48 / 72 h	Rabbit	Corrosive	OECD 404	Related to sodium silicate
Irritation of the eyes	24 / 48 / 72 / 96 h / 7 d	Rabbit	No irreversible damage	n/a	Related to cryolite
Irritation of the eyes	24 / 48 / 72 h	Rabbit	Irritant	OECD 405	Related to sodium nitrate
Irritation of the eyes	14 d	Rabbit	No irreversible damage	OECD 405	Related to di-iron trioxide
Irritation of the eyes	7 d	Rabbit	Slightly irritant	OECD 405	Related to potassium silicate
Irritation of the eyes	4 h	Rabbit	Irritant - strong irritant	FHSA 16	Related to sodium silicate
No sufficient, product-related, classification-relevant data available.					

n/a = no information

Oral toxicity:
No sufficient, product-related, classification-relevant data available.

Dermal toxicity:
Contact with dust causes irritation of the skin and mucous membranes.

Inhalation toxicity:
Inhalation of dusts can lead to irritation of the respiratory tract (nose and throat) and breathing difficulties.

Irritation of the eyes:
No sufficient product-related data available; contact with dust can cause mechanical irritation and injury.

Sensitisation:
In case of contact with the skin: No sufficient, product-related, classification-relevant data available.
In case of inhalation: No sufficient, product-related, classification-relevant data available.

Aspiration hazard:

In case of inhalation: No sufficient, product-related, classification-relevant data available.

Toxicity after repeated exposure (subacute, subchronic, chronic):

No sufficient, product-related, classification-relevant data available.

Chronic exposure to cryolite can produce hydrogen fluoride or soluble or volatile fluorides in metallurgical processes by reaction with suitable reactants and lead to characteristic changes in the teeth and bone system in the bodies of workers.
Cryolite showed fluoride accumulation in urine, bones and teeth as well as irritant effects in the respiratory tract in a 90-d inhalation test according to OECD 413 in rats. The NOAEC for systemic effects was 0.5 mg/m³, the NOAEC for local effects in the respiratory tract was 0.21 mg/m³.

Sodium nitrate can cause damage to blood cells if ingested repeatedly.

Sodium silicate showed increased urination and soft stools in rats in a 28-d test according to OECD 407.

Specific target organ toxicity (STOT) in case of repeated exposure:

No sufficient, product-related, classification-relevant data available.

CMR effects (carcinogenic, mutagenic and toxic for reproduction):

Silicon dioxide (alveolar fraction):

Carcinogenicity:	Carcinogen, category 1; carcinogenic and contributing to cancer risk

Cryolite:

Carcinogenicity:	Non carcinogenic (rat)
In-vitro mutagenicity:	Negative (Ames test activated / non-activated; Salmonella typhimurium)
In-vivo mutagenicity:	No cell changes (mouse)
Germ cell mutagenicity:	No embryotoxic effects observed (rat) (NOAEL 100 mg/kg/bw/d).
Reproductive toxicity:	Not harmful to fertility (rat) (NOAEL 128 mg/kg/bw/d).

Sodium nitrate:

Carcinogenicity:	Non carcinogenic (rat)
In-vitro mutagenicity:	Negative (Ames test activated / non-activated; Salmonella typhimurium)
In-vivo mutagenicity:	No cell changes (mouse)
Germ cell mutagenicity:	No harmful effect (mouse, rat, hamster)
Reproductive toxicity:	Not harmful to fertility (rabbits)

Silicate:

Carcinogenicity:	No data available
In-vitro mutagenicity:	Negative (Ames test activated / non-activated; Salmonella typhimurium) (potassium silicate) Negative (bacteria test activated / non-activated) (sodium silicate)
In-vivo mutagenicity:	No cell changes (mouse) (potassium silicate) No cell changes (mouse) (sodium silicate)
Germ cell mutagenicity:	No data available
Reproductive toxicity:	No effects (rat) (Pot.silicate) No specific effects (rat) (sodium silicate)

Di-iron trioxide:

Carcinogenicity:	Carcinogenic, category 3; substance data provide evidence of a carcinogenic effect

No sufficient, product-related, classification-relevant data available.

11.3 Experiences from practice

Classification relevant observations: No data available regarding product handling.

Other observations: No data available regarding product handling.

11.4 Information on other hazards / endocrinology:
Observations, information, data on health effects which may be caused by endocrine-disrupting properties are not available with regard to the use of the product.

12. Environment-related information:

12.1 Ecotoxicity:

Aquatic toxicity	Effective dose	Exposure duration	Species	Method	Valuation	Remark
Acute fish toxicity	LC_{50}: 99 mg/l	96 h	Fish	OECD 203		Related to cryolite
Acute fish toxicity	LC_{50}: >100 mg/l	96 h	Fish	OECD 203		Related to sodium nitrate
Acute fish toxicity	LC0: 10 g/ml	96 h	Fish	OECD 203	no toxic effects	Related to di-iron trioxide
Acute fish toxicity	LC_0: >146mg/l	48 h	Fish	DIN 38412 Part 15		Related to potassium silicate
Acute fish toxicity	LC_{50}: 3185 mg/l	96 h	Fish	OECD 203		Related to sodium silicate
Acute daphnia toxicity	EC_{50}: 156 mg/l	48 h	Daphnie	OECD 202		Related to cryolite
Acute daphnia toxicity	EC_{50}: 8,609 mg/l	24 h	Daphnie	OECD 202		Related to sodium nitrate
Acute daphnia toxicity	EC50: > 100 mg/l	48 h	Daphnie	OECD 202	no toxic effects	Related to di-iron trioxide
Acute daphnia toxicity	EC_0: > 146 mg/l	24 h	Daphnie	OECD 202		Related to potassium silicate
Acute daphnia toxicity	EC_{50}: 1,700 mg/l	48 h	Daphnie	OECD 202		Related to sodium silicate
Acute algal toxicity	EbC_{50}: 3.2 mg/l	72 h	Algae (biomass)	OECD 201		Related to cryolite
Acute algal toxicity	ErC_{50}: 8.8 mg/l	72 h	Alga (growth)	OECD 201		Related to cryolite
Acute algal toxicity	NOEC: > 20 mg/l	72 h	Alga (growth)	OECD 201	no toxic effects	Related to di-iron trioxide
Acute algal toxicity	EbC_{50}: 207 mg/l	72 h	Algae (biomass)	DIN 38412 Part 9		Related to sodium silicate
Acute algal toxicity	ErC_0: > 345 mg/l	72 h	Alga (growth)	DIN 38412 Part 9		Related to sodium silicate
No sufficient, product-related, classification-relevant data available.						

n/a = no information

12.2 Mobility:

Known or expected distribution to environmental compartments:

No surface tension or adsorption/desorption data available.

12.3 Bio-accumulative potential:

Due to the inert character of the product (material) (composed of inorganic substances), no data are available on the bio-accumulation potential, nor on the individual substances.

12.4 Persistence and degradability:
No sufficient, product-related data available (inorganic product, not affected by degradation)

Cryolite: Biodegradation test according to OECD 209: EC_{50} / 30min. and 3h: >160 mg/l (poorly biodegradable)

Sodium nitrate: Biodegradation test according to OECD 209: EC_{50} / 3h: >1,000 mg/l (no significant adverse effects)

Di-iron trioxide: Biodegradation test according to ISO 8192: EC50 / 3 h: > 10 g/l (no significant adverse effects)

12.5 Result of the determination of the PBT properties:
The PBT properties of the substances used were not determined.

12.6 Endocrine disrupting effects on the environment:
No adverse effects known.

12.7 Other harmful effects:
No other adverse effects known.

13. Notes on disposal

13.1 Disposal / waste (product):
Unused product:
Contact manufacturer regarding recycling. Check the possibility of recycling.
Otherwise disposal according to the Closed Substance Cycle Waste Management Act (KrWG): hazardous waste according to § 3 Waste Catalogue Ordinance (AVV).

Consumed product:
Only dispose of completely reacted and cooled product.
Disposal in accordance with the Closed Substance Cycle Waste Management Act (KrWG).

13.2 EAK / AVV waste code:
Suggested list for waste codes/waste designations according to AVV:
Unused product:
10 10 05* casting moulds and sands containing dangerous substances before casting
10 10 06 foundry moulds and sands before casting other than those mentioned in 10 10 05

Consumed product:
10 10 07* casting moulds and sands containing dangerous substances after casting
10 10 08 casting moulds and sands after casting other than those mentioned in 10 10 07

13.3 Packaging:
Non-contaminated and empty packaging can be recycled.

14. Transport information

14.1 Transport hazard classes:

Land transport (ADR (RID)):

Official designation:	Not classified for this mode of transport.	Hazard label:
Class:		UN number:
Classification code:		Packing group:

Water transport (ADN(R) /IMDG-code):

Official designation:	Not classified for this mode of transport.	Hazard label:
Class:		UN number:
Classification code:		Packing group:

EmS: Marine Pollutant:

IMDG Code: Product is not transported in bulk.

Air transport (ICAO-TI / IATA-DGR):

Official designation: Not classified for this mode of transport. Hazard label:
Class: UN number:
Classification code: Packing group:

14.2 Special precautions for the user:

No special precautions regarding transport or movement within or outside the premises
Premises are required.

15. Legislation

15.1 EU Regulations

Chemical safety assessment:

For individual substances in this product, risk assessments were carried out and registration dossiers prepared:
- Risk assessments for cryolite by the EU and for the potassium and sodium salts contained in the sodium silicate mixture by the OECD;
- Registration dossiers on cryolite, aluminium, Di-iron trioxide, sodium nitrate, silicon dioxide and the potassium and sodium salts contained in the sodium silicate mixture by the European Chemicals Agency (ECHA).

Labelling:

Hazard symbols and hazard designation:

Hazard-determining components for labelling:	n/a, as not subject to compulsory labelling
H-statements:	n/a, as not subject to compulsory labelling
P-statements:	n/a, as not subject to compulsory labelling
Special labelling of certain products:	n/a, as not subject to compulsory labelling

Approval and / or restrictions on use:

Approvals:
No information.
Usage restrictions:
No information.

15.2 National regulations (Germany)

Notes on employment restrictions:	The respective national regulations for the protection of young people at work and the protection of expectant mothers must be observed.
Major Accident Ordinance (12th Federal Immission Control Ordinance (BImSchV)):	As a product, it is not subject to the 12. BImSchV
Water hazard class:	1 hazardous to water (self-classification according to VwVwS not applicable, as it is a product)
Technical Instructions Air (TA-Luft):	The respective emission limit values must be observed: Ammonia: 30 mg/m³ Nitrogen oxides: 350 mg/m³ (as nitrogen dioxide) Total dust, including fine dust: 20 mg/m³ Carbon monoxide: 150 mg/m³ Fluorides: 3 mg/m³ (as hydrogen fluoride) Hydrogen cyanide: 3 mg/m³ Cyanide: 1 mg/m3(as CN)
Other regulations, restrictions and prohibition ordinances:	TRGS 900 limit values in the air at the workplace; DFG

16. Other information

16.1 Wording of the H and P statements:

Full text of the H- and P-phrases of the individual components of the product (material) mentioned in chapter 3 as well as abbreviations of the labels of the individual substances mentioned in chapter 2:

Hazard warnings:

H228	Flammable solid
H261:	Contact with water produces flammable gases
H272:	May intensify fire; oxidiser
H290:	May be corrosive to metals
H314:	Causes severe skin burns and eye damage
H319:	Causes severe eye irritation
H332:	Hazardous to health when inhaled
H335:	May irritate the respiratory tract
H362:	May harm infants through breast milk
H372:	Damages the organs in case of prolonged and repeated exposure
H411:	Toxic to aquatic organisms, with long lasting effects

Safety instructions:

Prevention:

P210	Keep away from heat, sparks, open flames, hot surfaces. Do not smoke.
P220	Keep away from clothing, combustible materials, store away from
P221	Avoid mixing with flammable substances under all circumstances
P233	Keep container tightly closed
P260	Do not inhale dust, smoke, gas, mist, vapour, aerosol
P261	Avoid inhalation of dust, smoke, gas, mist, vapour, aerosol
P262	Do not get in eyes, on skin or on clothing
P263	Avoid contact during pregnancy and lactation
P264	Wash thoroughly after use...
P270	Do not eat, drink or smoke after use
P271	Use only outdoors or in well-ventilated areas
P273	Avoid release into the environment
P280	Wear protective gloves, clothing, eye protection, face protection

Reaction:

P301+330+331	If swallowed: Rinse out mouth. Do not induce vomiting
P303+361+353	In case of contact with skin (or hair): Remove all soiled, soaked clothing immediately. Wash skin with water, shower.
P304+340	In case of inhalation: Remove to fresh air and immobilise in a position that facilitates breathing.
P305+351+338	In case of contact with the eyes: Rinse gently with water for a few minutes. Remove any contact lenses if possible. Continue rinsing.
P308+313	In case of exposure or if affected: Seek medical advice / seek medical help
P314	If you feel unwell, seek medical advice
P337+P313	If eye irritation persists: Seek medical advice/medical help
P370+P378	In case of fire: Use extinguishing media

Storage:

P402+404	Store in a tightly closed container in a dry place.

Disposal:

P501	Dispose of contents, container in accordance with local, regional, national, international regulations

16.2

Training notes:

The employees are to be regularly instructed in accordance with the legal requirements about the scope and the associated hazard.

16.3 Recommended restriction of use:

No private application.

16.4 Further information:

The information in this safety data sheet corresponds to the best of our knowledge at the time of printing. The information is intended to provide points of reference for the safe handling of the product named in this safety data sheet for storage, processing, transport and disposal. The information cannot be transferred to other products. Insofar as the product specified in this safety data sheet is blended, mixed or processed with other materials, or is subjected to processing, the information in this safety data sheet cannot be transferred to the new material produced in this way, unless expressly stated otherwise.

16.5 Data sources:

1.) Current material safety data sheets
2.) IFA-DGUV-Gestis substance database "Iron oxide"; search status: 26/06/2023
3.) IFA-DGUV-Gestis substance database "Kryolith"; search status: 04/06/2023
4.) IFA-DGUV-Gestis substance database "Sodium nitrate"; search status: 04/06/2023
5.) RIGOLETTO database "Catalogue of substances hazardous to water" Federal Environment Agency (UBA); revision: 11/04/2023
6.) TA Air 2021
7.) TRGS 900 Technical Rules for Hazardous Substances - Occupational Exposure Limits; revision: 23/06/2022
8.) DFG (German Research Foundation) - MAK- und BAT-Werte-Liste, Mitteilungen 58, Wiley-VCH, 2022
9.) ECHA/EU - REACH registration dossier sodium nitrate, dated 10.01.2023
10.) ECHA/EU - REACH Registration Dossier Aluminium Grit, dated 07.05.2023
11.) ECHA/EU - REACH Registration Dossier Di-iron(III)-oxide, status 09.05.2023
12.) ECHA/EU - REACH Registration Dossier Potash Water Glass, dated 22.06.2023
13.) ECHA/EU - REACH registration dossier sodium silicate, dated 31.03.2023
14.) ECHA/EU - REACH Registration Dossier Silicon Dioxide, dated 27/5/2018
15.) ECHA/EU - REACH Registration Dossier Trisodium hexafluoroaluminate (Cryolite), dated 20.10.2020
16.) EU - Risk Assessment Report "Trisodiumhexafluoroaluminate", 04-2006
17.) OECD/ICCA - SIDS Initial Assessment Report "Soluble Silicates", 2006
18.) TRGS 509 Technical rules for hazardous substances - Storage of liquid and solid hazardous substances in stationary containers; dated: 20/07/2022
19.) TRGS 510 Technical rules for hazardous substances - Storage of hazardous substances in portable containers; dated: 16/02/2021
20.) DGUV I209-095 Dust containing quartz in the foundry industry; dated: 03-2023