

RGS-H1 Lunar Highland Regolith Simulant

Prepared in accordance with Regulation (EC) No 1907/2006 (REACH), Annex II, as amended by Commission Regulation (EU) 2020/878

Product code	Revision	Issue date	Language
RGS-H1	Rev 1.0	12 September 2026	English

SECTION 1 Identification of the substance or mixture and of the company or undertaking

Product identifier	RGS-H1 Lunar Highland Regolith Simulant (RGS-H1)
Relevant identified uses	Lunar regolith simulant for in-situ resource utilisation research, dust mitigation and tribology studies, sintering and additive manufacturing trials, geotechnical and equipment abrasion testing, and instrument calibration. Industrial, professional and research use only.
Uses advised against	Not for food, pharmaceutical, cosmetic or medical use. Not for consumer sale.
Details of the supplier of the safety data sheet	Sabancı University Faculty of Engineering and Natural Sciences Universite Caddesi No: 27, Orhanli-Tuzla, 34956 Istanbul, Turkiye Ekin.felek@strocera.com Manufacturing site: Sabancı University, Orhanli-Tuzla, 34956 Istanbul, Turkiye
Emergency telephone number	Turkiye National Poison Information Centre (UZEM): 114 (24 h) Outside Turkiye: contact the national poison centre of the country of use.

SECTION 2 Hazards identification

2.1 Classification of the substance or mixture

STOT RE 2, H373 — May cause damage to the lungs through prolonged or repeated inhalation.

2.2 Label elements

Signal word: Warning

Hazard statement: H373 May cause damage to the lungs through prolonged or repeated inhalation.

Pictogram: GHS08 (health hazard)

Precautionary statements

P260 Do not breathe dust. · P264 Wash hands thoroughly after handling. · P270 Do not eat, drink or smoke when using this product. · P280 Wear protective gloves, eye protection and respiratory protection.

Response: P314 Get medical advice if you feel unwell.

Storage: P405 Store locked up where required by the workplace regime.

Disposal: P501 Dispose of contents and container in accordance with local regulations.

2.3 Other hazards

The product is a fine powder containing respirable crystalline silica, which the International Agency for Research on Cancer classifies in Group 1 as carcinogenic to humans when inhaled in the respirable fraction from occupational sources. Crystalline silica has no harmonised classification under CLP Annex VI; the classification given above is a supplier self-classification made on a conservative basis. Work involving exposure to respirable crystalline silica dust generated by a work process is listed in Annex I to Directive 2004/37/EC on carcinogens and mutagens at work, and employers in the European Union must apply the corresponding workplace controls. The product does not meet the criteria for PBT or vPvB.

SECTION 3 Composition and information on ingredients

Mixture. A blend of characterised terrestrial mineral feedstocks, ground and screened to the fine fraction. Formulated as an analogue of Apollo 16 soil 64501.

Constituent	CAS No.	EC No.	Concentration (wt%)	Classification (CLP)
Plagioclase feldspar group	68476-25-5	270-666-7	55 - 65	Not classified
Pyroxene group (clinopyroxene)	1318-74-7	215-282-2	8 - 12	Not classified
Olivine group (forsterite)	1317-71-1	215-281-7	2 - 6	Not classified
Amorphous silicate (glassy fraction)	7631-86-9	231-545-4	20 - 30	Not classified

Constituent	CAS No.	EC No.	Concentration (wt%)	Classification (CLP)
Crystalline silica (quartz, cristobalite)	14808-60-7 / 14464-46-1	238-878-4 / 238-455-4	1 - 5	Self-classified STOT RE 1, H372

The identity and proportions of the feedstocks are proprietary to the supplier. The mineral phases and their concentration ranges are declared above on a conservative basis from in-house X-ray diffraction and chemical analysis. Crystalline silica is declared at the upper end of the analytical range; no supplier certificate of analysis is available for the feedstocks and the declared range has not been confirmed by an accredited external laboratory. See Section 16.

SECTION 4 First aid measures

General	Move the affected person away from the dust source. If symptoms persist, seek medical advice and show this safety data sheet.
Inhalation	Move to fresh air and keep at rest in a position comfortable for breathing. Rinse the mouth and nose with water. Seek medical advice if coughing or respiratory discomfort continues.
Skin contact	Brush off the dry powder, then wash with soap and water. Do not rub. Seek medical advice if irritation persists.
Eye contact	Do not rub. Rinse cautiously with water for at least 15 minutes, holding the eyelids open. Remove contact lenses if present and easy to do. Seek medical advice if irritation persists, as the particles are abrasive and may cause mechanical injury to the cornea.
Ingestion	Rinse the mouth with water. Do not induce vomiting. Seek medical advice if a significant quantity has been swallowed.
Note to physician	Treat symptomatically. No specific antidote is known.

SECTION 5 Firefighting measures

Extinguishing media	The product is non-combustible. Use extinguishing media appropriate to the surrounding fire. Avoid high-pressure water jets and other methods that raise dust clouds.
Special hazards	The product does not burn and does not support combustion. No hazardous decomposition products are expected under fire conditions.
Advice for firefighters	No special measures are required for the product itself. Wear self-contained breathing apparatus and protective equipment appropriate to the surrounding fire.

SECTION 6 Accidental release measures

Personal precautions	Avoid raising dust. Wear the protective equipment specified in Section 8. Keep persons not wearing protective equipment away from the spill area. Ensure adequate ventilation.
Environmental precautions	Prevent entry into drains, surface water and groundwater. No significant environmental hazard is expected from the material itself.
Containment and cleaning	Do not dry sweep and do not use compressed air. Collect with a vacuum cleaner fitted with a HEPA filter, or by careful wet methods. Place the collected material in a labelled, closable container for disposal or recovery. Wash the area afterwards with water.
Reference	See Section 8 for exposure controls and Section 13 for disposal.

SECTION 7 Handling and storage

Handling	Handle in a way that minimises dust generation. Use local exhaust ventilation at transfer, weighing and screening points. Do not breathe dust. Keep containers closed when not in use. Avoid contact with eyes.
Hygiene	Do not eat, drink or smoke in the working area. Wash hands and exposed skin before breaks and at the end of work. Remove and wash contaminated clothing separately before reuse. Do not remove dust from clothing with compressed air.
Storage	Store in the original sealed container in a dry, well-ventilated place between 5 and 35 degrees Celsius, away from direct sunlight. Reseal immediately after use. No incompatible materials are known under normal storage conditions.
Specific end uses	Research, engineering testing and technical ceramic processing. See Section 1.2.

SECTION 8 Exposure controls and personal protection

8.1 Occupational exposure limits

Parameter	Limit value	Note
Respirable crystalline silica (quartz)	0.1 mg/m ³ (8 h TWA)	European Union binding limit under Directive 2004/37/EC; national limits may be lower
Respirable crystalline silica (cristobalite)	0.05 mg/m ³ (8 h TWA)	Value applied by several national authorities; verify against the limit in the country of use
Inert dust, inhalable fraction	10 mg/m ³ (8 h TWA)	General limit for the non-siliceous fraction
Inert dust, respirable fraction	4 mg/m ³ (8 h TWA)	General limit for the non-siliceous fraction

No DNEL or PNEC values are established for the mixture. For respirable crystalline silica the binding occupational exposure limit is the governing value.

8.2 Engineering controls

Enclose the process wherever practicable. Use local exhaust ventilation at all transfer, weighing, screening and sampling points. Use vacuum extraction or wet methods for cleaning; never dry sweep or use compressed air. Monitor airborne respirable dust and, where exposure is foreseeable, carry out respirable crystalline silica measurement to the applicable national method. Provide eyewash facilities.

Respiratory protection	Required wherever the respirable crystalline silica limit may be approached or exceeded, and recommended for all open handling of the dry powder. Use a filtering half mask of at least FFP3 (EN 149) or a powered air-purifying respirator with a P3 filter (EN 12941). Fit testing and a respiratory protection programme are required in the European Union under Directive 2004/37/EC.
Hand protection	General-purpose work gloves. Chemically resistant gloves are not required.
Eye and face protection	Tight-fitting goggles (EN 166) where dust is generated. Safety glasses with side shields for closed handling.
Skin and body protection	Standard work clothing, changed and laundered separately. Do not take contaminated clothing home. Do not clean clothing with compressed air.

SECTION 9 Physical and chemical properties

Property	Value
Physical state	Solid, fine powder
Colour	Light grey
Odour	Odourless
Odour threshold	Not applicable
pH	Approx. 8 to 10 in aqueous suspension (10 per cent by weight)
Melting point	Approx. 1100 to 1250 degrees Celsius (silicate melting range)
Boiling point	Not applicable
Flash point	Not applicable, inorganic solid
Evaporation rate	Not applicable
Flammability	Non-combustible
Explosive limits	Not applicable. The product is not a combustible dust.
Vapour pressure	Not applicable
Relative density	2.77 g/cm ³ (true density)
Bulk density	Approx. 1.25 g/cm ³ poured; approx. 1.65 g/cm ³ tapped
Solubility in water	Practically insoluble
Partition coefficient	Not applicable
Auto-ignition temperature	Not applicable
Decomposition temperature	Does not decompose below the melting range
Viscosity	Not applicable
Oxidising properties	None
Particle size	Dv(10) 2.93 micrometres, Dv(50) 8.84 micrometres, Dv(90) 74.0 micrometres (laser diffraction)
Upper size cut	75 micrometre sieve

Property	Value
Particle shape	Highly irregular, angular to sub-angular, with sharp fracture edges

Particle characteristics are reported where relevant to the physical form of the product.

SECTION 10 Stability and reactivity

Reactivity	The product is not reactive under normal conditions of handling and storage.
Chemical stability	Stable under the recommended storage conditions.
Possibility of hazardous reactions	None known.
Conditions to avoid	Conditions that generate airborne dust.
Incompatible materials	None known under normal conditions of use. Strong hydrofluoric acid attacks silicate and oxide minerals.
Hazardous decomposition products	None known. The product does not decompose at ambient temperature.

SECTION 11 Toxicological information

Endpoint	Information
Acute oral toxicity	No data on the mixture. Not classified.
Acute dermal toxicity	No data on the mixture. Not classified.
Acute inhalation toxicity	No data on the mixture. Not classified for acute effects.
Skin corrosion and irritation	Not classified. The angular particles are abrasive and prolonged contact may cause mechanical irritation.
Serious eye damage and irritation	Not classified. The particles are hard and angular and may cause mechanical irritation or abrasion of the cornea.
Respiratory or skin sensitisation	Not classified.
Germ cell mutagenicity	Not classified.
Carcinogenicity	Not classified under CLP, as crystalline silica has no harmonised classification. However, the International Agency for Research on Cancer has classified crystalline silica inhaled in the form of quartz or cristobalite from occupational sources in Group 1, carcinogenic to humans. Exposure must be controlled accordingly.
Reproductive toxicity	Not classified.
STOT single exposure	Not classified. High airborne dust concentrations may cause transient irritation of the upper respiratory tract.
STOT repeated exposure	STOT RE 2, H373. Prolonged or repeated inhalation of respirable crystalline silica may cause silicosis, a progressive and irreversible fibrotic lung disease, and is associated with an increased risk of lung cancer, chronic obstructive pulmonary disease and renal and autoimmune effects.
Aspiration hazard	Not classified.
Nanoform information	The product is not a nanoform. The median particle size exceeds 100 nanometres and the fraction below 100 nanometres is not intentionally manufactured.

SECTION 12 Ecological information

Toxicity	No aquatic toxicity data are available for the product. The constituents are inert inorganic minerals of low solubility and adverse effects on aquatic organisms are not expected at the concentrations arising from normal use.
Persistence and degradability	The product is inorganic and not biodegradable. Methods for determining biodegradability are not applicable.
Bioaccumulative potential	Not expected to bioaccumulate.
Mobility in soil	The product is a solid powder of low water solubility and is expected to remain in the soil matrix.
PBT and vPvB assessment	The product does not contain substances assessed as PBT or vPvB.
Endocrine disrupting properties	The product does not contain substances identified as having endocrine disrupting properties at a concentration of 0.1 per cent by weight or above.

Other adverse effects None known.

SECTION 13 Disposal considerations

Waste treatment	Dispose of the product and its container in accordance with national and local regulations. Recovery or reuse is preferred where the application allows. Avoid generating dust during disposal operations.
Contaminated packaging	Empty containers may retain product residue. Handle empty containers as if they contained product. Dispose of or recycle in accordance with local regulations.
Waste code	The waste code is assigned by the user according to the origin of the waste and the applicable national waste list. For unused product a code under the mineral waste group is generally applicable.

SECTION 14 Transport information

UN number or ID number	Not applicable
UN proper shipping name	Not applicable
Transport hazard class	Not applicable
Packing group	Not applicable
Environmental hazards	Not a marine pollutant
Special precautions for user	None beyond the handling precautions in Section 7. Transport in closed, labelled containers, secured against movement and rupture.
Maritime bulk transport	Not applicable. The product is not carried in bulk under IMO instruments.

The product is not classified as dangerous goods under ADR, RID, ADN, IMDG or the IATA Dangerous Goods Regulations. A separate non-dangerous goods declaration is available on request for air and sea consignments.

SECTION 15 Regulatory information

The product is not subject to authorisation under REACH Annex XIV. Naturally occurring minerals that have not been chemically modified are exempt from registration under REACH Annex V, entry 7; the exemption status of each feedstock is assessed by the supplier. Work involving exposure to respirable crystalline silica dust generated by a work process is listed in Annex I to Directive 2004/37/EC. No constituent appears on the Candidate List. No chemical safety assessment has been carried out for this mixture.

SECTION 16 Other information

16.1 Revision

This is revision 1.0 of this safety data sheet, issued on 12 September 2026. This is the first issue; no previous revision exists.

16.2 Abbreviations

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road. CAS: Chemical Abstracts Service. CLP: Regulation (EC) No 1272/2008 on classification, labelling and packaging. DNEL: Derived no-effect level. EC: European Community. IATA DGR: International Air Transport Association Dangerous Goods Regulations. IARC: International Agency for Research on Cancer. IMDG: International Maritime Dangerous Goods Code. PBT: Persistent, bioaccumulative and toxic. PNEC: Predicted no-effect concentration. REACH: Regulation (EC) No 1907/2006. RCS: Respirable crystalline silica. SDS: Safety data sheet. STOT RE: Specific target organ toxicity, repeated exposure. TWA: Time-weighted average. vPvB: Very persistent and very bioaccumulative.

16.3 Sources

Regulation (EC) No 1907/2006 (REACH) as amended. Regulation (EC) No 1272/2008 (CLP) as amended, including Annex VI harmonised classifications. Directive 2004/37/EC on carcinogens, mutagens and reprotoxic substances at work, Annex I. ECHA Guidance on the compilation of safety data sheets. IARC Monographs on the evaluation of carcinogenic risks to humans, Volume 100C. In-house X-ray diffraction, X-ray fluorescence, laser diffraction and scanning electron microscopy analyses carried out on the product.

16.4 Training

Persons handling the product should be instructed in the hazards described in Section 2, the exposure controls in Section 8 and the emergency procedures in Sections 4 and 6 before first use.

16.5 Disclaimer

The information in this safety data sheet relates only to the product named in Section 1 and to the composition stated in Section 3. It is given in good faith on the basis of the data available at the date of issue and does not constitute a specification or a warranty of any property. The user is responsible for assessing the suitability and safety of the product for the intended application and for compliance with the regulations in force at the place of use.