Safety Data Sheet: TLH-0

According to Regulation (EC) No. 1907/2006 (REACH), Annex II as amended by (EU) 2020/878, and Regulation (EC) No. 1272/2008 (CLP)

---

1. Identification of the substance/mixture and of the company/undertaking

1.1. Product Identifier

- **Trade Name:** TLH-0.
- **Synonyms:** Lunar highlands regolith simulant.
- **UFI:** Not applicable (mixture not classified for health/physical hazards).

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

- **Relevant identified uses:** Lunar regolith simulant for industrial or professional research, development, testing, and education.
- **Uses advised against:** Use for medical or food applications.

1.3. Details of the supplier of the safety data sheet

- **Supplier:** Hispansion Works, S.L.
- **Address:** Avenida Gregorio Peces Barba 1, 1.2.C.01, Leganés, ES 28919
- **Telephone (person responsible for SDS):** +34 697 249 837
- **E-mail (person responsible for SDS):** jaimeabellalarraz@hispansion.io

1.4. Emergency telephone number

- **Spain** — Instituto Nacional de Toxicología y Ciencias Forenses (SIT): +34 91 562 04 20 (24/7, ES).
- **Portugal** — CIAV (Centro de Informação Antivenenos, INEM): 800 250 250 (24/7; PT).
- **France** — Numéro ORFILA (centres antipoison): +33 (0)1 45 42 59 59 (24/7; FR).
- **Italy** — Centro Antiveleni, Ospedale Niguarda (Milano): +39 02 6610 1029 (24/7; IT).
- **Luxembourg** — Centre antipoisons (via LU toll-free routing): +352 8002 5500 (24/7; FR/DE).
- **United Kingdom** — National Poisons Information Service (NPIS): 0344 892 0111 (24/7; for healthcare professionals, EN). Public: NHS 111.

- **Germany** — Giftnotruf Berlin (Poison Control Center, Charité): +49 30 19240 (24/7; DE).
- **Poland** — Warsaw Poison Information & Control Centre: +48 22 619 66 54 / +48 22 618 77 10 (24/7; PL).
- **Netherlands** — Nationaal Vergiftigingen Informatie Centrum (NVIC): +31 (0)88 755 8000 (24/7; NL; for healthcare professionals).
- **Greece** — National Poison Information Centre (Athens, "P. & A. Kyriakou"): +30 210 779 3777 (24/7; EL; public & professionals).
- **Austria** — Vergiftungsinformationszentrale (VIZ): +43 1 406 43 43 (24/7; DE).
- **United States** — America's Poison Centers (Poison Help): 1-800-222-1222 (24/7; EN/ES; nationwide routing).
- **Hungary** — Health Toxicological Information Service (ETTSZ): +36 80 201 199 (24/7; HU).
- **Türkiye** — National Poison Information Center (UZEM): 114 (24/7; TR).
- **Denmark** — Giftlinjen (National Poison Information Center): +45 82 12 12 12 (24/7; DA).
- **Switzerland** — Tox Info Suisse (official poison centre): 145 (24/7; DE/FR/IT; EN on request).
- **Australia** — Poisons Information Centre: 13 11 26 (24/7; EN; nationwide hotline.

---

2. Hazards identification

2.1. Classification of the substance or mixture: Not classified as hazardous according to Regulation (EC) No 1272/2008 (CLP).

2.2. Label elements

- **Labelling according to Regulation (EC) No 1272/2008 (CLP):** Supplemental statement (Annex II §2.10): EUH210 — "Safety data sheet available on request." (Reason: mixture not intended for the general public and contains ≥1 % of a substance with a Union OEL — crystalline silica as quartz.) No pictograms, signal word or H/P statements required.

- **Supplemental information:** None required.

2.3. Other hazards

- Handling may generate **airborne mineral dust** capable of mechanically irritating eyes and respiratory tract. Implement dust control measures (see Sections 7 and 8).

- **Crystalline silica (quartz):** present at ~1.2 % (XRD). Quartz has a Union workplace exposure limit; mixture remains not classified, but EUH210 applies; manage respirable dust per Section 8. **Cristobalite/tridymite: Not detected** by XRD in the finished product.
- **Titanium:** bulk chemistry shows ~0.82 % TiO_2 (oxide equivalent); no free TiO_2 polymorphs (rutile/anatase) were identified by XRD.
- **No substances meeting PBT/vPvB criteria or identified as endocrine disruptors** ≥0.1 % w/w are known to be present.

---

3. Composition/information on ingredients

3.1. Substances: Not applicable (mixture).

3.2. Mixtures: UVCB mineral mixture manufactured from milled anorthosite, basaltic silicates, and altered peridotite. Typical mineral phases identified by XRD include plagioclase feldspars (anorthite/albite), pyroxenes (augite, enstatite), olivine, serpentine (lizardite), zeolite (analcime), amphibole (hornblende), clay minerals (smectite, illite), trace quartz (crystalline silica), and a significant amorphous/glassy phase.

Substance(s) present that require listing under Annex II §3.2.2:

- Quartz (crystalline silica) — CAS 14808-60-7; EC 238-878-4 — ~1.2 %.

  Reason for inclusion: Substance with a Union workplace exposure limit (respirable crystalline silica, RCS).

  Classification/M-factor/SCL/ATE: Not classified for the substance in this mixture context (hazard managed via OEL); no M-factor/SCL/ATE applicable.

Compliance note: Other than the quartz entry above, the finished product does not contain substances that must be listed under Annex II §3.2.2 (no other hazardous or Union-OEL substances at ≥1 % w/w; no PBT/vPvB or endocrine-disrupting substances at ≥0.1 % w/w; no sensitisers at the relevant limits.

---

4. First aid measures

4.1. Description of first aid measures

- **Inhalation:** Remove the product to fresh air and keep at rest. If irritation or coughing persists, seek medical attention.
- **Skin contact:** Wash with water and soap.
- **Eye contact:** Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing. Seek medical advice if irritation persists.
- **Ingestion:** Rinse mouth and drink water. Observe and seek medical advice if unwell.

4.2. Most important symptoms and effects, both acute and delayed: Mechanical irritation to the eyes and upper airways from dust; no specific delayed effects expected for the mixture as supplied.

4.3. Indication of any immediate medical attention and special treatment needed: Treat symptomatically. No specific antidote.

---

5. Firefighting measures

5.1. Extinguishing media: Use extinguishing media appropriate to the surrounding fire. The product is non-combustible.

5.2. Special hazards arising from the substance or mixture: None known. Avoid re-suspension of dust; reduced visibility may occur.

5.3. Advice for firefighters: Standard protective equipment; avoid inhalation of dust.

---

6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures: Avoid dust formation. Provide adequate ventilation. In dusty conditions wear respiratory and eye protection (see Section 8).

6.2. Environmental precautions: Prevent uncontrolled release of dust to drains and surface waters.

6.3. Methods and materials for containment and cleaning up: Collect mechanically. Use HEPA-filtered vacuum or wet methods. Avoid dry sweeping and compressed-air cleaning.

6.4. Reference to other sections: For personal protective equipment, see Section 8. For disposal, see Section 13.

---

7. Handling and storage

7.1. Precautions for safe handling: Keep containers closed by default. Minimize drop heights when transferring. Plan work to minimise respirable crystalline silica (RCS) generation (use wet methods/LEV; no dry sweeping/air-blowing). Implement housekeeping by HEPA vacuum or wet methods. Use PPE as specified in Section 8.

7.2. Conditions for safe storage, including any incompatibilities: Store in tightly closed bags/containers in a dry, cool, well-ventilated place. Avoid moisture ingress and mechanical agitation of fines. Keep away from strong acids and strong oxidizers.

7.3. Specific end use(s): Industrial/professional simulant for laboratory and pilot-scale testing as a lunar regolith analog.

---

8. Exposure controls/personal protection

8.1. Control parameters: Apply national OELs for respirable crystalline silica where applicable. The finished product contains ~1.2 % quartz by XRD; plan dusty tasks to minimise generation of respirable dust.

8.2. Exposure controls

- **Engineering controls:** LEV or enclosure at emission points; sealed transfers/closed mixers where feasible; dust capture/filtration on process ventilation.
- **Personal protective equipment:**
  - **Respiratory protection:** Where engineering/organizational measures cannot keep dust below national OELs, wear EN 149 filtering facepiece FFP2 (routine dusty tasks) or FFP3 (high-dust tasks). Ensure fit-testing and maintenance.
  - **Eye/face protection:** EN 166 safety glasses/goggles during dusty operations.
  - **Hand/skin protection:** Work clothing; gloves for prolonged handling (nuisance dust).

- **Environmental exposure controls:** Prevent nuisance dust emissions; use HEPA filtration and good housekeeping.

---

9. Physical and chemical properties

9.1. Information on basic physical and chemical properties

- **Physical state:** Solid (granular powder).
- **Color:** Grey to dark grey.
- **Odor:** Odorless.
- **Melting point/freezing point:** Not applicable (multi-mineral, high-melting silicates).
- **Boiling point or initial boiling point and boiling range:** Not applicable (solid).
- **Flammability:** Non-flammable.
- **Lower and upper explosion limit:** Not applicable.
- **Flash point:** Not applicable.
- **Auto-ignition temperature:** Not applicable.
- **Decomposition temperature:** No data available (no hazardous decomposition expected under normal use).
- **pH:** Not determined for the dry solid.
- **Kinematic viscosity:** Not applicable (solid).
- **Solubility:** Insoluble in water.
- **Partition coefficient n-octanol/water (log Kow):** Not applicable (inorganic mixture).
- **Vapour pressure:** Not applicable (solid).
- **Density and/or relative density: 1.67 g/cm^3.**
- **Relative vapour density:** Not applicable.
- **Particle characteristics: [9.60um d10 / 137.56um d50 / 1,398.90um d90]** (dynamic image analysis, batch-specific).
- **Explosive properties:** Not explosive.
- **Oxidizing properties:** Not oxidizing.

9.2. Other information

- See Technical Data Sheet for more detailed information regarding chemistry, mineralogy, particle size distribution, particle shape, density, shear strength, and magnetic susceptibility.

---

10. Stability and reactivity

10.1. Reactivity: No specific reactivity hazards

10.2. Chemical stability: Stable under normal conditions of storage and handling.

10.3. Possibility of hazardous reactions: No hazardous reactions known.

10.4. Conditions to avoid: Operations generating uncontrolled airborne dust; accumulation of fine dust.

10.5. Incompatible materials: Strong acids; strong oxidizing agents (general precaution).

10.6. Hazardous decomposition products: None under normal conditions.

---

11. Toxicological information

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

- **Inhalation Acute toxicity (oral/dermal/inhalation):** Not classified.
- **Skin corrosion/irritation:** Not classified; mechanical irritation possible from dust.
- **Serious eye damage/irritation:** Not classified; mechanical irritation possible from dust.
- **Respiratory or skin sensitization:** Not classified; no sensitizing components known.
- **Germ cell mutagenicity / Carcinogenicity / Reproductive toxicity:** Not classified.
- **STOT-single exposure:** Not classified.
- **STOT-repeated exposure:** Not classified. Contains crystalline silica (quartz) ~1.2 % — control RCS exposure during repeated tasks per Section 8.
- **Aspiration hazard:** Not applicable (solid, insoluble).

11.2. Information on other hazards: No information indicating endocrine-disrupting properties. No other hazards identified.

---

12. Ecological information

12.1. Toxicity: No toxicity expected for inert mineral solids.

12.2. Persistence and degradability: Inorganic; not biodegradable.

12.3. Bioaccumulative potential: Not expected to bioaccumulate (insoluble inorganic minerals).

12.4. Mobility in soil: Low mobility; particles will settle.

12.5. Results of PBT and vPvB assessment: The mixture does not contain substances meeting PBT or vPvB criteria.

12.6. Endocrine disrupting properties: The mixture does not contain substances identified as having endocrine-disrupting properties.

12.7. Other adverse effects: None known. Avoid uncontrolled dust releases to the environment.

---

13. Disposal considerations

13.1. Waste treatment methods: Dispose of residues as non-hazardous mineral waste, in accordance with local/national regulations. Example European Waste Catalogue (LoW) entries (confirm locally): 01 04 08 (waste gravel and crushed rocks other than 01 04 07) or 01 04 09 (waste sand and clays). Packaging: Empty completely; recycle or dispose of per local rules (e.g., 15 01 01 paper/board; 15 01 02 plastic).

---

14. Transport information

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 applicable.

14.6. Special precautions for user: Prevent dust release from packages.

14.7. Maritime transport in bulk according to IMO instruments: Not applicable.

15. Regulatory information

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

- **CLP (EC) No 1272/2008:** Mixture not classified for health/physical/environmental hazards.
- **REACH (EC) No 1907/2006:** SDS compiled in accordance with Annex II (EU 2020/878).
- No radiological provisions apply to this product as placed on the market.
- **Contains crystalline silica (quartz) in the finished product at ~1.2 % (XRD).** Substance with a Union OEL → EUH210 on label; SDS available on request (Article 31(3)).

15.2. Chemical safety assessment: A chemical safety assessment has not been carried out for this mixture.

16. Other information

- Training advice: Ensure personnel are trained in dust control, PPE selection/fit (EN 149 FFP2/FFP3; EN 166 eye protection), and housekeeping (HEPA/wet methods).
- Revision date: October 15th 2025
- Version: SDS-TLH-0-v1
- Key references/basis: Finished product XRD/XRF (see Technical Data Sheet for detailed results, including quartz ≈1.2% (XRD) and TiO_2 ≈0.82% as oxide equivalent (XRF)). See Technical Data Sheet for complete results.