Safety Data Sheet: TLM-0

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

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

1.1. Product Identifier

- **Trade Name:** TLM-0.
- **Synonyms:** Lunar low-Ti mare 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.

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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):** Not applicable (no classification).
- **Supplemental information:** None required. (EUH210 not required because the mixture does not contain ≥1% of any substance with a Union workplace exposure limit.)

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 ~0.6 % (XRD). Below Annex II §3.2.2 listing threshold (1 % for substances with a Union OEL) and does not trigger

CLP classification for the mixture; nevertheless, manage respirable dust per national OELs. **Cristobalite/tridymite: Not detected** by XRD in the finished product.

- **Titanium:** bulk chemistry shows ~1.7 % 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.

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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.

This mixture does not contain any substances that are required to be listed under 3.2.1 or 3.2.2 of Annex II to REACH as amended by (EU) 2020/878 (i.e., no hazardous substances ≥ the relevant limits; no substances with a Union workplace exposure limit present at >1%; no PBT/vPvB or endocrine-disrupting substances at ≥0.1% w/w; no sensitisers at the thresholds specified in 3.2.2).

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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.

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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.

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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.

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7. Handling and storage

7.1. Precautions for safe handling: Keep containers closed by default. Minimize drop heights when transferring. Do not use compressed air for cleaning. 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.

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8. Exposure controls/personal protection

8.1. Control parameters: Apply national OELs for respirable crystalline silica where applicable. The finished product contains ~0.6 % 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.

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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: 1.52 g/cm³.**
- **Relative vapour density:** Not applicable.
- **Particle characteristics: [6.26um d10 / 48.43um d50 / 1,116.3um 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.

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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.

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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.
- **Aspiration hazard:** Not applicable (solid, insoluble).

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

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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.

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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).

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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.

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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% (XRD).** This does **not** trigger listing under Annex II §3.2.2 nor EUH210; manage **respirable dust** via Section 8.

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

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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 3rd 2025
- Version: SDS-TLM-0-v1
- Key references/basis: Finished product XRD/XRF (see Technical Data Sheet for detailed results, including quartz ≈0.6% (XRD) and TiO_2 ≈1.7% as oxide equivalent (XRF)). See Technical Data Sheet for complete results.