

PRODUCT CATALOGUE / / / CAT-004

Regolithia

RGL-16

Test the Moon, *before* the Moon.

POSITION / / / CAT-004

The test bed is the **experiment**.

APOLLO-TRACEABLE / / / HIGHLAND AND MARE / / / SUB-75 μm / / / ITAR-FREE

A mobility trial, an abrasion trial and an ISRU trial ask different questions of the same soil. Regolithia answers them with two mineral-based simulants, each formulated to reproduce the modal mineralogy and bulk chemistry of a named Apollo return sample: Highland RGS-H1 against Apollo 16 soil 64501, Mare RGS-M1 against Apollo 17 soil 72501.

The formulation is solved as a bounded non-negative least-squares problem that converges on the modal mineralogy and the oxide chemistry simultaneously. Every modelled phase and every oxide is reported against its target value on the datasheet, with the deviation stated explicitly, so the fit can be recomputed rather than taken on trust.

01 / / / TRACEABILITY

Traceability

Each variant is matched to a named Apollo return sample, not to a generic regolith description. Phase match 96.4% for RGS-H1 and 99.2% for RGS-M1, computed over the four modelled phases.

02 / / / DISTRIBUTION

Distribution

Supplied as standard in the fine, sub-75 μm fraction and characterised by laser diffraction: Dv(50) 8.84 μm Highland, 10.4 μm Mare. Alternative size fractions on request.

03 / / / EXPORT

Export

ITAR-free across the supply chain. No United States export licence sits between a purchase order and a delivered lot.

ON REQUEST

- / Alternative particle size fractions
- / Compositions matched to other reference soils

- / Quantities beyond the 100 g reference batch



STR-TDS-RGS-H1 / / / STR-TDS-RGS-M1 / / / RGL-16

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SPECIFICATION / / / STR-TDS-RGS-H1 · STR-TDS-RGS-M1

Regolithia RGL-16

APOLLO-TRACEABLE / / / HIGHLAND AND MARE / / / SUB-75 µm / / / ITAR-FREE

STATUS

Fidelity is reported as phase match over the four modelled phases together with a full oxide-by-oxide comparison. Bulk chemistry and modal composition are calculated from the SEM-EDS and XRD compositions of the feedstocks and the optimised blend; phase identification by XRD, particle size by laser diffraction.

XRD / / / LASER DIFFRACTION / / / SEM-EDS

DELIVERY AND HANDLING

- / Dry, free-flowing sub-75 µm silicate powder; Highland light to medium grey, Mare dark grey. Reference batch 100 g; larger quantities on request.
- / Sealed container with PE liner; batch and revision identified on the label. Store sealed and dry, 5 to 35 °C; re-dry at 105 °C for 2 h if moisture uptake is suspected.
- / Fine respirable dust: handle with FFP2/FFP3 respiratory protection, safety glasses and gloves. RGS-M1 contains a minor amount of crystalline silica (low cristobalite).
- / Certificate of Analysis and Safety Data Sheet ship with every delivery.

KEY DATA

HIGHLAND RGS-H1

MARE RGS-M1

REFERENCE SOIL	Apollo 16 / 64501	Apollo 17 / 72501
PHASE MATCH	96.4%	99.2%
MODAL RMSE	0.79 wt%	0.23 wt%
CHEMICAL RMSE	4.90 wt%	1.96 wt%
DV(10 / 50 / 90)	2.93 / 8.84 / 74.0 µm	3.29 / 10.4 / 74.1 µm
SIZE CUT	< 75 µm mesh	< 75 µm mesh
TEXTURE CLASS	Silt	Silt
REFERENCE BATCH	100 g	100 g

FIDELITY AGAINST THE NAMED APOLLO SOIL / / / FULL SPECIFICATION STR-TDS-RGS-H1, STR-TDS-RGS-M1

NOTES

- / Space-weathering products are absent: no agglutinitic glass of lunar origin, no nanophase metallic iron and no solar-wind implanted volatiles.
- / RGS-H1 chemical fit is limited by the sodic character of terrestrial plagioclase feedstock: against the reference soil the material is depleted in Al₂O₃ by 11.6 wt% and in CaO by 8.7 wt%. Applications that depend on Al or Ca content should evaluate the oxide table on the datasheet.
- / An X-ray amorphous fraction is present in both variants but has not yet been quantified by Rietveld refinement.
- / The match to the reference is defined on mineralogy and chemistry; the particle size distribution is a product specification in its own right and is not part of that match.

APPLICATIONS / / / CAT-004

In service

RGL-16



ROVER WHEEL SOIL INTERACTION
MOBILITY



IN-SITU RESOURCE UTILIZATION
ISRU



LUNAR DUST MITIGATION
DUST

USE CASES

- / Landing gear and touchdown testing
- / Rover wheel soil interaction

- / In-situ resource utilization research
- / Lunar dust mitigation

- / Lunar construction research
- / Excavation and drilling validation

REQUIREMENT AND RESPONSE / / / CAT-004

What it **answers**

RGL-16

The left column is the problem on your side. The right column names the sector flyer that carries the full mapping.

REQUIREMENT	MATERIAL RESPONSE	SECTOR / / / FLYER
A test bed that behaves like the landing site	Highland matched to Apollo 16 soil 64501 at 96.4% phase match; Mare to Apollo 17 soil 72501 at 99.2%. Modal RMSE 0.79 and 0.23 wt%.	SPACE / / / AN-002
Element availability for extraction yield	Bulk chemistry reported oxide by oxide against the reference soil: chemical RMSE 4.90 wt% (RGS-H1) and 1.96 wt% (RGS-M1), each deviation stated.	SPACE / / / AN-002
Grain size matched to the test protocol	Standard fine fraction < 75 µm; Dv(50) 8.84 µm (RGS-H1) and 10.4 µm (RGS-M1), poorly sorted, silt texture class. Alternative size fractions on request.	SPACE / / / AN-002
Evidence that survives a design review	Every modelled phase and every oxide is reported against its target with the deviation stated; fidelity metrics carry their basis so they can be recomputed.	SPACE / / / AN-002

PROCESS / / / CAT-004

Specification first

RGL-16

FORMULATION / / / CHARACTERIZATION / / / VALIDATION / / / DELIVERY

01 / / / FORMULATION

Formulation

Your specification is the starting point. Composition, particle distribution and thermal behaviour are set against your process, not selected from a grade list.

02 / / / CHARACTERIZATION

Characterization

Every formulation is measured before it ships: phase by X-ray diffraction, particle size by laser diffraction, morphology by SEM, to the methods named on the datasheet.

03 / / / VALIDATION

Validation

Sintered and thermal properties are tested to the ASTM method where one applies. Where a test is documented on video, the record travels with the material.

04 / / / DELIVERY

Delivery

Powder blend or simulant in a sealed, lined container, batch and revision on the label. A Certificate of Analysis and a Safety Data Sheet ship with every delivery. ITAR-free across the supply chain.



Bring your *specification*.

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FULL SPECIFICATION / / / STR-TDS-RGS-H1 / / / STR-TDS-RGS-M1