MGS-1 Mars Global Simulant | **Fact Sheet**

003-05-001-0523

Simulant Name: MGS-1 Mars Global Simulant
Simulant Type: General purpose
Reference Material: Rocknest soil
Uncompressed Bulk Density: 1.40 g/cm^3
Mean Particle Size: 84 µm
Median Particle Size: 53 µm
Particle Size Range: >0.04 µm – 1000 µm

Geotechnical Properties

Grain Density: 2.95g/cm^3
Void Ratio: 1.1
Porosity: 52.5%
Avg Angle of Repose: 38.9°
Max Angle of Repose: 43.6°

More coming soon!

Safety

See SDS for details. Primary hazard is dust inhalation; wear a respirator in dusty conditions.

Mineralogy

As mixed.

Component	Wt.%
Anorthosite	27.1
Glass-rich basalt	22.9
Pyroxene	20.3
Olivine	13.7
Mg- sulfate	4.0
Ferrihydrite	3.5
Hydrated silica	3.0
Magnetite	1.9
Anhydrite	1.7
Fe-carbonate	1.4
Hematite	0.5

Bulk Chemistry

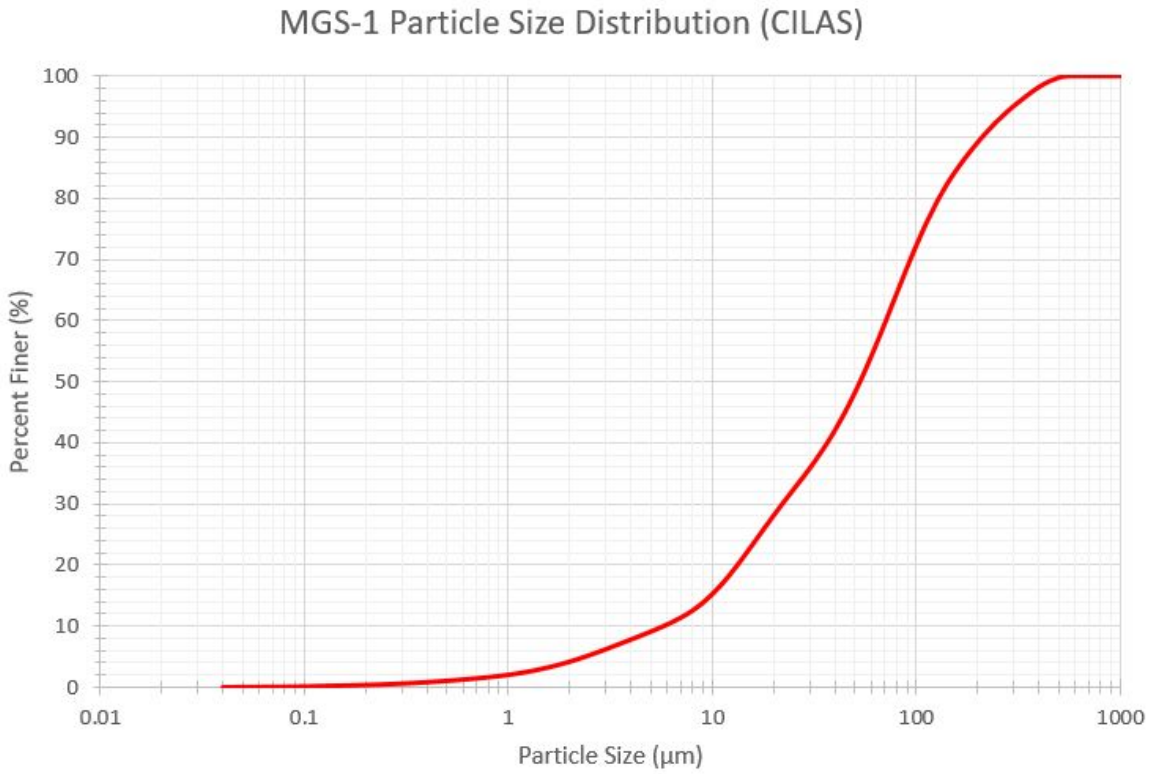
Relative abundances. Measured by XRF.

Oxide	Wt.%
SiO_2	41.7
TiO_2	0.5
Al_2O_3	12.5
FeO	14.3
MnO	0.1
MgO	14.8
CaO	9.2
Na_2O	0.6
K_2O	0.36
P_2O_5	0.8
Total	94.9

Photo credit Matthew Villegas. XRF data obtained by Hamilton Analytical Lab using fused bead sample preparation. Reflectance spectrum courtesy of Dr. Takahiro Hiroi, NASA RELAB, Brown University.

Volumetric Particle Size Distribution

From CILAS 1190 laser diffraction particle size analyzer



Sieve Analysis

Following ASTM Standard E11 using RO-TAP RX-30 sieve shaker

Sieve analysis skews particle size larger, as many of the fines cling to the larger pieces of regolith. This is measured by mass percent rather than volume