

# PHYSICAL TESTING REPORT

# LUCIDEON

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## Granula

Office 202a  
Building 7  
12 Sibirsk Tract  
Yekaterinburg City  
620100  
Russian Federation

FAO: Mr. Alex Tsypkin

**Report of Tests on:** 1. Granulite 160

**Your Reference:** Cenosphere Granulite 160

**Lucideon Reference:** (172820)-20831

**Date Reported:** 20-Jul-2017

**Order Number:** None

**Date Logged:** 26-Jun-2017

**Date(s) of Test(s):** 14-Jul-2017 to 14-Jul-2017

### Determination of Refractoriness (PCE)

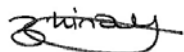
ASTM C24-09(13) Using Orton Pyrometric Reference Cones

### Test Results:

Cone: 31-31.5

Temperature: 1683-1699 °C

**End of Test Report**



Miss Zoe Kinally  
Manager

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# INORGANIC ANALYSIS REPORT



0013

**Granula**  
Office 202a  
Building 7  
12 Sibirsk Tract  
Yekaterinburg City  
620100  
Russian Federation

FAO: Mr. Alex Tsyarkin

**Report of Tests on:** 1. Granulite 160

**Your Reference:** Cenosphere Granulite 160

**Lucideon Reference:** (172820)-20831

**Date Reported:** 29-Jun-2017

**Order Number:** None

**Date Logged:** 26-Jun-2017

**Date(s) of Test(s):** 28-Jun-2017 to 29-Jun-2017

## XRF Analysis

Methods C201 based on BSEN ISO 12677:2011

Result(s)		Units	
Sample Basis			Dried 110 deg C
Silicon Dioxide	SiO <sub>2</sub>	%	61.00
Titanium Dioxide	TiO <sub>2</sub>	%	1.01
Aluminium Oxide	Al <sub>2</sub> O <sub>3</sub>	%	33.32
Iron (III) Oxide	Fe <sub>2</sub> O <sub>3</sub>	%	1.25
Calcium Oxide	CaO	%	0.65
Magnesium Oxide	MgO	%	0.26
Potassium Oxide	K <sub>2</sub> O	%	0.62
Sodium Oxide	Na <sub>2</sub> O	%	0.45
Phosphorus Pentoxide	P <sub>2</sub> O <sub>5</sub>	%	0.31
Chromium (III) Oxide	Cr <sub>2</sub> O <sub>3</sub>	%	<0.01
Manganese (II,III) Oxide	Mn <sub>3</sub> O <sub>4</sub>	%	0.02
Zirconium Oxide	ZrO <sub>2</sub>	%	0.03
Hafnium (IV) Oxide	HfO <sub>2</sub>	%	<0.01
Lead Oxide	PbO	%	<0.02
Zinc Oxide	ZnO	%	<0.01
Barium Oxide	BaO	%	0.14
Strontium (II) Oxide	SrO	%	0.05
Tin (IV) Oxide	SnO <sub>2</sub>	%	<0.01
Copper Oxide	CuO	%	0.01
Loss on Ignition		%	0.41
Loss on Ignition Temperature		°C	1000
Total		%	99.53
Sulphur Trioxide	SO <sub>3</sub>	%	<0.05
UKAS Accredited			Yes

The sulphur trioxide may not be a total sulphur figure but is the sulphur remaining after LOI and fusion. Results are quoted to 2 decimal places but are accurate to 3 significant figures or the number of figures given, whichever is the lesser.

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation.

**End of Test Report**

Mr Josh Rushton  
Technician

**PHYSICAL TESTING ANALYSIS REPORT**

**Description:** Determination of Particle Size Distribution

**Test Method:** In House Method PT55

**Lucideon Reference:** (172820)-20831

**Client:** Granula  
Office 202a  
Building 7  
12 Sibirsk Tract  
Yekaterinburg City  
620100  
Russian Federation

**For the Attention of:** Mr. Alex Tsyarkin

**Date Logged:** 26-Jun-2017

**Date of Tests:** 03-Jul-2017 to 03-Jul-2017

**Report Date:** 03-Jul-2017

**Purchase Order No.:** None

Please find attached the results for the sample(s) recently submitted for analysis.



**Mr Simon Hall  
Manager**

# Lucideon Analysis Report

Created by: burton  
Last edited: 12/06/2017 10:56:09



## Measurement Details

**Sample Name** (172820)-20831 Granula - 1 Granulite 160 - Cenosphere Granulite 160  
**Measurement Date Time** 03/07/2017 10:50:42  
**Operator Name** Burton  
**Analysis Date Time** 03/07/2017 10:50:42  
**SOP File Name** HydroEV.cfg  
**Result Source** Measurement

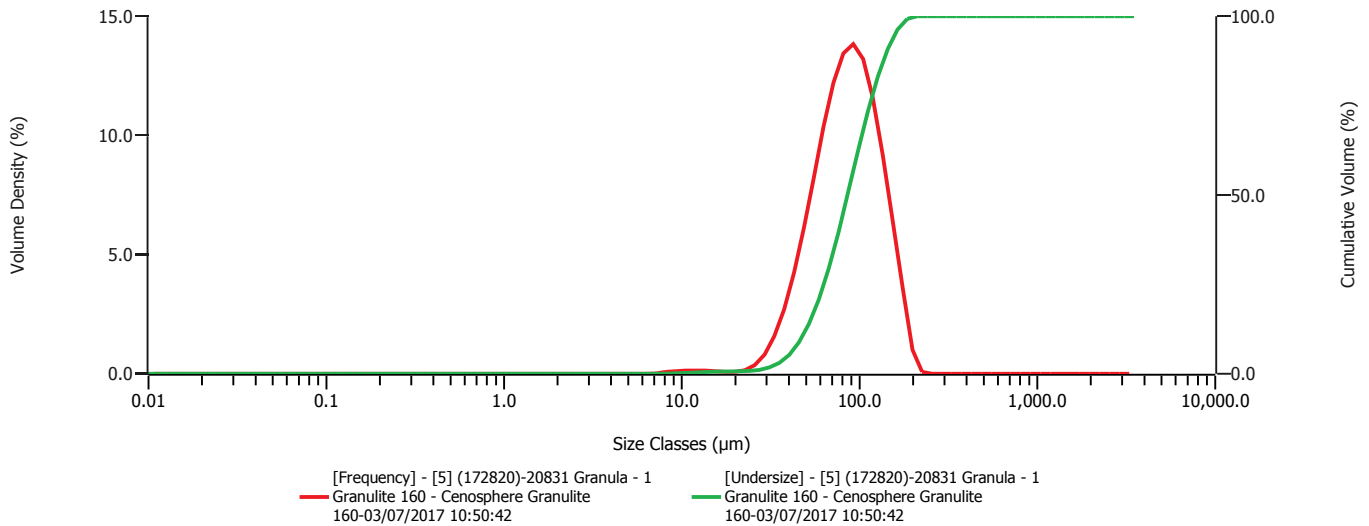
## Analysis

**Particle Name** Aluminium silicate  
**Particle Refractive Index** 1.650  
**Dispersant Name** Propan-2-ol  
**Dispersant Refractive Index** 1.390  
**Particle Absorption Index** 0.100  
**Laser Obscuration** 14.76 %  
**Weighted Residual** 0.36 %  
**Scattering Model** Mie  
**Analysis Model** General Purpose  
**Analysis Sensitivity** Normal

## Result

**Concentration** 0.1512 %  
**Uniformity** 0.342  
**Specific Surface Area** 80.95 m<sup>2</sup>/kg  
**D [3,2]** 74.1 µm  
**D [4,3]** 90.3 µm  
**Span** 1.106  
**Result Units** Volume  
**Dv (10)** 47.1 µm  
**Dv (50)** 85.5 µm  
**Dv (90)** 142 µm

## Frequency (compatible) and Undersize



Size (µm)	% Volume Under	Size (µm)	% Volume Under	Size (µm)	% Volume Under	Size (µm)	% Volume Under	Size (µm)	% Volume Under	Size (µm)	% Volume Under
0.0100	0.00	0.0876	0.00	0.767	0.00	6.72	0.00	58.9	20.69	516	100.00
0.0114	0.00	0.0995	0.00	0.872	0.00	7.64	0.00	66.9	29.35	586	100.00
0.0129	0.00	0.113	0.00	0.991	0.00	8.68	0.06	76.0	39.57	666	100.00
0.0147	0.00	0.128	0.00	1.13	0.00	9.86	0.15	86.4	50.84	756	100.00
0.0167	0.00	0.146	0.00	1.28	0.00	11.2	0.25	98.1	62.44	859	100.00
0.0189	0.00	0.166	0.00	1.45	0.00	12.7	0.36	111	73.52	976	100.00
0.0215	0.00	0.188	0.00	1.65	0.00	14.5	0.47	127	83.22	1110	100.00
0.0244	0.00	0.214	0.00	1.88	0.00	16.4	0.55	144	90.91	1260	100.00
0.0278	0.00	0.243	0.00	2.13	0.00	18.7	0.61	163	96.27	1430	100.00
0.0315	0.00	0.276	0.00	2.42	0.00	21.2	0.67	186	99.29	1630	100.00
0.0358	0.00	0.314	0.00	2.75	0.00	24.1	0.78	211	100.00	1850	100.00
0.0407	0.00	0.357	0.00	3.12	0.00	27.4	1.06	240	100.00	2100	100.00
0.0463	0.00	0.405	0.00	3.55	0.00	31.1	1.71	272	100.00	2390	100.00
0.0526	0.00	0.460	0.00	4.03	0.00	35.3	2.99	310	100.00	2710	100.00
0.0597	0.00	0.523	0.00	4.58	0.00	40.1	5.21	352	100.00	3080	100.00
0.0679	0.00	0.594	0.00	5.21	0.00	45.6	8.72	400	100.00	3500	100.00
0.0771	0.00	0.675	0.00	5.92	0.00	51.8	13.81	454	100.00		



Size (µm)	% Volume In	Size (µm)	% Volume In	Size (µm)	% Volume In	Size (µm)	% Volume In	Size (µm)	% Volume In	Size (µm)	% Volume In		
0.0100	0.00	0.0679	0.00	0.460	0.00	3.12	0.00	21.2	0.11	144	5.36	976	0.00
0.0114	0.00	0.0771	0.00	0.523	0.00	3.55	0.00	24.1	0.28	163	3.03	1110	0.00
0.0129	0.00	0.0876	0.00	0.594	0.00	4.03	0.00	27.4	0.65	186	0.71	1260	0.00
0.0147	0.00	0.0995	0.00	0.675	0.00	4.58	0.00	31.1	1.27	211	0.00	1430	0.00
0.0167	0.00	0.113	0.00	0.767	0.00	5.21	0.00	35.3	2.22	240	0.00	1630	0.00
0.0189	0.00	0.128	0.00	0.872	0.00	5.92	0.00	40.1	3.51	272	0.00	1850	0.00
0.0215	0.00	0.146	0.00	0.991	0.00	6.72	0.00	45.6	5.10	310	0.00	2100	0.00
0.0244	0.00	0.166	0.00	1.13	0.00	7.64	0.06	51.8	6.88	352	0.00	2390	0.00
0.0278	0.00	0.188	0.00	1.28	0.00	8.68	0.08	58.9	8.66	400	0.00	2710	0.00
0.0315	0.00	0.214	0.00	1.45	0.00	9.86	0.10	66.9	10.22	454	0.00	3080	0.00
0.0358	0.00	0.243	0.00	1.65	0.00	11.2	0.11	76.0	11.27	516	0.00	3500	
0.0407	0.00	0.276	0.00	1.88	0.00	12.7	0.11	86.4	11.60	586	0.00		
0.0463	0.00	0.314	0.00	2.13	0.00	14.5	0.08	98.1	11.07	666	0.00		
0.0526	0.00	0.357	0.00	2.42	0.00	16.4	0.06	111	9.71	756	0.00		
0.0597	0.00	0.405	0.00	2.75	0.00	18.7	0.06	127	7.69	859	0.00		

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**Report of Tests on:** 1. Granulite 160

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**Lucideon Reference:** (172820)-20831

**Date Reported:** 29-Jun-2017

**Order Number:** None

**Date Logged:** 26-Jun-2017

**Date(s) of Test(s):** 27-Jun-2017 to 28-Jun-2017

### Loss on Drying

Methods C201 based on BSEN ISO 12677:2011

Result(s)	Units
Sample Basis	As Received
Loss on Drying Temperature	°C
Loss on Drying	%
UKAS Accredited	Yes

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation.

**End of Test Report**

Mr Josh Rushton  
Technician

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