

## LABORATORY TESTINGS

Industrial Sand even finds its way into laboratory testings. In laboratory, Silica sand operates as a moisture absorption, to find density of the material. Uniform grain shape and grain size distributions produce efficient density test. Ground silica performs as repeatable, reproducible, low clay, silt percentage with very low compaction properties.

Sl. No.	Required Properties	Specified Standards
1	Size of the material	0.063 - 0.600 mm
2	AFS No.	50 - 55
3	Coarse grain size 0.425 - 0.600 mm	Max. 15 %
4	Medium grain size 0.212 - 0.425 mm	Max. 60 %
5	Fine grain size 0.063 - 0.212 mm	Max. 25 %
6	Shape	Rounded
7	Moisture	Max. 0.2 %
8	Foreign Particles	Never
9	Bulk Density	1.52 gm / cm <sup>3</sup>



## LOOTAH MINERALS

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Industrial sand is used in the filtration of drinking water, the processing of wastewater and the production of water from wells. Uniform grain shapes and grain size distributions produce efficient filtration bed operation in removal of contaminants in both potable water and wastewater. Chemically inert, silica will not degrade or react when it comes in contact with acids, contaminants, volatile organics or solvents. Silica gravel is used as packing material in deep-water wells to increase yield from the aquifer by expanding the permeable zone around the well screen and preventing the infiltration of fine particles from the formation.

Sl. No.	Required Properties	Specified Standards
1	Size of the material	0.500 - 1.00 mm
2	Washed and Dried Sand	..
3	AFS No.	15 - 20
4	Coarse Grain Size 0.850 - 1.00 mm	Max. 25 %
5	Medium Grain Size 0.500 - 0.600 mm	Max. 75 %
6	Passing 0.500 mm	Max. 3 %
7	Clay Content	Max. 0.5 %
8	Moisture Content	Max. 0.2 %
9	Specific Gravity	2.65 g/cc
10	SiO <sub>2</sub>	Min. 99.5 %
11	Al <sub>2</sub> O <sub>3</sub>	Max. 0.2 %
12	K <sub>2</sub> O	Max. 0.02 %
13	CaO	Max. 0.05 %
14	MgO	Max. 0.004 %
15	Na <sub>2</sub> O	Max. 0.2 %



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## FOUNDRY CASTINGS

Industrial sand is an essential part of the ferrous and non-ferrous foundry industry. Because of the high silica content and our ability to meet a wide range of sand specifications, we are helping foundry customer's produce high integrity castings which are free of defects with superior surface finishes. Crystalline silica has higher melting point than iron, copper and aluminium. This enables castings to be produced by pouring molten metal into moulds made out of silica sand and a binder. Quartz and cristobalite flours are the main components in investment casting ( also called precision casting ) for the production of specialist products such as jewellery, dental bridges, aviation turbines and golf clubs.

Sl. No.	Required Properties	Specified Standards
1	Size of the material	0.106 - 0.500 mm
2	Washed and Dried sand	--
3	AFS No.	45 - 50
4	Coarse grain size 0.300 - 0.500 mm	Max. 65 %
5	Medium grain size 0.150 - 0.300 mm	Max. 30 %
6	Fine grain Size 0.106 mm	Max. 5 %
7	Moisture Content	Max. 0.20 %
8	Clay content	Max. 0.2 %
9	pH	6.5 to 7.5
10	ADV	Max. 2.2 ml
11	Salt Content	Nil
12	Cl	Nil
13	F	Nil
14	I	Nil
15	Foreign Particles	Nil
16	% Retain 3 consecutive sieves	Min. 85%
17	SiO <sub>2</sub>	Min. 99.4%



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Silica is the major ingredient in virtually all types of glass. The principal glass products include containers (bottles and jars), flat glass (windows, mirrors, vehicle glass), Tableware (drinking glasses, bowls, decanters), lighting glass (light bulbs, fluorescent tubes), TV tubes and screens (including flat screens), decorative glass, optical glass, etc. The glass fibers, mainly used for composite reinforcing or in decorative textiles, are made from fine ground silica flour. To effectively serve the glass industry we must closely monitor screen size for consistent particle size and distribution. By meeting the strict requirements for quality and consistency, we enables its customers to realize maximum production efficiencies and cost savings.

Sl. No.	Required Properties	Specified Standards
1	Size of the material	0.000 - 1.180mm
2	AFS No.	65 - 75
3	Coarse grain size	Max. 40 %
4	Medium grain size	Max. 40 %
5	Fine grain size	Max. 20 %
6	Foreign Particles	Nil
7	Moisture Content	Max. 0.1 %
8	Clay content	Max. 0.2 %
9	LOI	Max. 0.03 %
10	Melting Point	3100° F
11	Shape	Rounded
12	SiO <sub>2</sub>	99.60 %
13	Fe <sub>2</sub> O <sub>2</sub>	Max. 0.03 %
14	Al <sub>2</sub> O <sub>3</sub>	Max. 0.20 %
15	CaO	Max. 0.05 %
16	TiO <sub>2</sub>	Max. 0.04%
17	MgO	Max. 0.01 %



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**GLASS REINFORCED CEMENT**

Industrial Sand is used in GRC industries as primary component, due to Silica's High boiling point, High heat resistance, Low co-efficient of expansion, Low thermal conductivity and shrinkage. Other two properties of silica are also involved in this industry such as High porosity and High resistance to chemicals. In Glass reinforced cement fibres are used as reinforced cement and polymer resins are used as composing material. Fibres are made from silica compound by melting it upto 1710<sup>0</sup> C.

Sl. No.	Required Properties	Specified Standards
1	Size of the material	0.000 - 0.300 mm
2	AFS No.	65 - 70
3	Medium grain size 0.150 - 0.300 mm	Max. 75 %
4	Fine grain size 0 - 0.150 mm	Max. 25 %
5	SiO <sub>2</sub>	Min. 99.4 %
6	Fe <sub>2</sub> O <sub>3</sub>	Max. 0.2 %
7	Al <sub>2</sub> O <sub>3</sub>	Max. 0.2 %
8	LOI	Max. 0.1 %
9	pH	7

Sl. No.	Required Properties	Specified Standards
1	Size of the material	0.300 - 0.600 mm
2	AFS No.	30 - 35
3	Medium grain size 0.425 - 0.600 mm	Max. 55 %
4	Fine grain size 0.300 - 0.425 mm	Max. 45 %

Sl. No.	Required Properties	Specified Standards
1	Size of the material	0.300 - 0.850 mm
2	AFS No.	25 - 30
3	Coarse grain size 0.600 - 0.850 mm	Max. 30 %
4	Medium grain size 0.425 - 0.600 mm	Max. 50 %
5	Fine grain size 0.300 - 0.425 mm	Max. 20 %



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Known commonly as proppant, or "frac sand," Industrial sand is pumped down holes in deep well applications to prop open rock fissures and increase the flow rate of natural gas or oil. In this specialized application round, whole grain deposits are used to maximize permeability and prevent formation cuttings from entering the well bore. Silica's hardness and its overall structural integrity combine to deliver the required crush resistance of the high pressure present in wells up to 2,450 meters deep. Its chemical purity is required to resist chemical attack in corrosive environments.

Sl. No.	Required Properties	Specified Standards
1	Size of the material	1.180 - 2.360 mm
2	AFS No.	5 to 10
3	Coarse grain size 1.700 - 2.00 mm	Max. 25 %
4	Medium grain size 1.400 - 1.700 mm	Max. 60 %
5	1.180 - 1.400 mm	Max. 15 %
6	Bulk Density	1.53 gm/cm <sup>3</sup>

Sl. No.	Required Properties	Specified Standards
1	Size of the material	100 Microns
2	Bulk Density.	1.03 g/cm <sup>3</sup>
3	Oil Absorption	24g/100g
4	Specific surface area	0.9 m <sup>2</sup> /g
5	pH	7
6	SIO <sub>2</sub>	98.8 - 99.1%
7	Fe <sub>2</sub> O <sub>3</sub>	0.025 - 0.04%
8	Al <sub>2</sub> O <sub>3</sub>	0.50 - 1.00 %
9	TIO <sub>2</sub>	0.04 - 0.09 %



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**CONSTRUCTION CHEMICALS**

Silica Sand is the primary structural component in a wide variety of building and construction products. Whole grain silica is put to use in flooring compounds, mortars, specialty cements, stucco, roofing shingles, skid resistant surfaces and asphalt mixtures to provide packing density and flexural strength without adversely affecting the chemical properties of the binding system. Ground silica performs as functional extender to add durability and anti-corrosion and weathering properties in epoxy based compounds, sealants and caulks.

Sl. No.	Required Properties	Specified Standards
1	Size of the material	0.075 - 0.600 mm
2	AFS No.	50 - 55
3	Above 0.500 mm	Max. 1 %
4	Below 0.075 mm	Max. 5 %
5	Humidity	1 - 1.5 %
6	LOI	Max. 0.70 %
7	SiO <sub>2</sub>	Min. 99.30 %
8	Al <sub>2</sub> O <sub>3</sub>	Max. 0.14 %
9	Fe <sub>2</sub> O <sub>3</sub>	Max. 0.015 %
10	TiO <sub>2</sub>	Max. 0.010 %
11	F, Cl, Br, I and their Salts	Never
12	Mn	Never
13	Cr	Never
14	Foreign Particles	Never

Sl. No.	Required Properties	Specified Standards
1	Size of the Material	0 - 0.300 mm
2	AFS No.	65 - 70
3	Medium grain size 0.150 - 0.300 mm	Max. 75 %
4	Fine grain size 0 - 0.150 mm	Max. 25 %



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## TRAFFIC PAINTS AND TEXTURE COATINGS

Paint formulators select micron-sized industrial sands to improve the appearance and durability of architectural and industrial paint and coatings. High purity silica contributes critical performance properties such as brightness and reflectance, color consistency, and oil absorption. In architectural paints, silica fillers improve tint retention, durability, and resistance to dirt, mildew, cracking and weathering. Low oil absorption allows increased pigments loading for improved finish color. In marine and maintenance coatings, the durability of silica imparts excellent abrasion and corrosion resistance.

Sl. No.	Required Properties	Specified Standards
1	Size of the material	0.125 - 0.710 mm
2	Washed and Dried Sand	..
3	AFS No.	40 - 45
4	Coarse Grain Size 0.425 - 0.710 mm	Max. 50 %
5	Medium Grain Size 0.212 - 0.425 mm	Max. 35 %
6	Fine Grain Size 0.125 - 0.212 mm	Max. 15 %
7	Clay Content	Max. 0.05 %
8	Moisture Content	Max. 0.3 %
9	Bulk Density	1.5 gm/ cm <sup>3</sup>
10	ph	7
11	SiO <sub>2</sub>	Min. 99.5 %
12	Fe <sub>2</sub> O <sub>3</sub>	Max. 0.025 %
13	Al <sub>2</sub> O <sub>3</sub>	Max. 0.20 %
14	TiO <sub>2</sub>	Max. 0.022 %
15	K <sub>2</sub> O + Na <sub>2</sub> O	Max. 0.15 %
16	CaO + MgO	Max. 0.03 %
17	LOI	Max. 0.1 %

Sl. No.	Required Properties	Specified Standards
1	Size of the material	75 Microns
2	Bulk Density	0.9 g/cm <sup>3</sup>
3	Oil Absorption	25g/100g
4	pH	7
5	SiO <sub>2</sub>	98.8 - 99.1 %
6	Fe <sub>2</sub> O <sub>3</sub>	0.025 - 0.04 %
7	Al <sub>2</sub> O <sub>3</sub>	0.50 - 1.00 %
8	TiO <sub>2</sub>	0.04 - 0.09 %



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**CERAMICS AND REFRACTORIES**

Ground silica is an essential component of the glaze and body formulations of all types of ceramic products, including tableware, sanitary ware and floor and wall tile. In the ceramic body, silica is the skeletal structure upon which clays and flux components attach. The SiO<sub>2</sub> contribution is used to modify thermal expansion, regulate drying and shrinkage, and improve structural integrity and appearance. Silica products are also used as the primary aggregate in both shape and monolithic type refractories to provide high temperature resistance to acidic attack in industrial furnaces.

Sl. No.	Required Properties	Specified Standards
1	Size of the material	0.000 - 1.180 mm
2	AFS No.	65 - 75
3	Coarse grain size 0.600 - 1.180 mm	Max. 40 %
4	Medium grain size 0.300 - 0.600 mm	Max. 40 %
5	Fine grain size 0.000 - 0.300 mm	Max. 20 %
6	SiO <sub>2</sub>	Min. 99.00 %
7	Al <sub>2</sub> O <sub>3</sub>	Max. 0.55 %
8	Fe <sub>2</sub> O <sub>3</sub>	Max. 0.20 %
9	Moisture	Max. 0.30 %

Sl. No.	Required Properties	Specified Standards
1	Size of the material	75 Microns
2	Bulk Density	0.9 g/cm <sup>3</sup>
3	Oil Absorption	25g/100g
4	pH	7
5	SiO <sub>2</sub>	98.8 - 99.1 %
6	Fe <sub>2</sub> O <sub>3</sub>	0.025 - 0.04 %
7	Al <sub>2</sub> O <sub>3</sub>	0.50 - 1.00 %
8	TiO <sub>2</sub>	0.04 - 0.09 %



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Silica sand is the raw material for the production of silicon metal and ferrosilicon. Silicon metal is used in the production of alloys based on aluminium, copper and nickel. Ferrosilicon is a major alloying ingredient for iron and steel. Metal ores are purified in the furnace by silica sand that is transformed into metal slag.

Sl. No.	Required Properties	Specified Standards
1	Size of the material	0.063 - 0.500
2	Washed and Dried Sand	..
3	AFS No.	60 - 65
4	Clay Content	Max. 0.20 %
5	Moisture Content	Max. 0.30 %
6	LOI	Max. 0.40 %
7	pH	6.5 to 7.0
8	ADV	2 ml
9	% Retain 3 Consecutive sizes	Min. 90 %
10	Coarse Grains > 500 mic.	1%
11	Medium Grains 355 - 250 mic	35%
12	Fine Grains 180 Mic.	43%
13	Dust < 125 Mic.	2.50%
14	Average grain size	0.25 mm
15	SiO <sub>2</sub>	Min. 99.40 %



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Industrial sand even finds its way into sports and recreation. Silica sand is used for golf course bunkers and greens as well as the construction of natural or synthetic athletic fields. In golf and sports turf applications silica sand is the structural component of an inert, uncontaminated, growing media. Silica sand is also used to repair greens and to facilitate everyday maintenance like root aeration and fertilization. The natural grain shape and controlled particle size distribution of silica provides the required permeability and compaction properties for drainage, healthy plant growth and stability.

Sl. No.	Required Properties	Specified Standards
1	Size of the material	0.000 - 2.36 mm
2	Washed and Dried Sand	..
3	AFS No.	40 - 45
4	Coarse Grains 1.180 - 2.360 mm	Max. 10 %
5	Medium Grains 0.250 - 1.180 mm	Max. 70 %
6	Fine Grains 0.050 - 0.250 mm	Max. 20 %
7	Clay Content	Max. 0.20 %
8	Moisture Content	Max. 0.30 %
9	Foreign Particles	Nil
10	Bulk Density	1.55 gm/cm <sup>3</sup>
11	SiO <sub>2</sub>	Min. 98 %
12	Grain Shape	Rounded

Sl. No.	Required Properties	Specified Standards
1	Size of the material	0.212 - 0.850 mm
2	Washed and dried sand	..
3	AFS No.	35 - 40
4	Coarse grains 0.600 - 0.850 mm	Max. 20 %
5	Medium grains 0.425 - 0.600 mm	Max. 40 %
6	Fine grains 0.212 - 0.425 mm	Max. 40 %



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Silica is used in farming, market gardening, horticulture and forestry in applications such as soil conditioner or carrier for fertilizer and animal feed additives.

Sl. No.	Required Properties	Specified Standards
1	Size of the material	0.500 - 1.00 mm.
2	Washed and dried sand	..
3	AFS	15 - 20
4	Coarse Grain Size 0.850 - 1.00 mm	Max. 27 %
5	Medium Grain Size 0.500 - 0.850 mm	Max. 70 %
6	Passing 0.500 mm	Max. 3 %
7	Clay Content	Max. 0.5 %
8	Moisture Content	Max. 0.2 %
9	Specific Gravity	2.65 g/cc
10	Hardness	5.5 - 8.00 mohs
11	SiO <sub>2</sub>	Min. 99.3 %
12	Al <sub>2</sub> O <sub>3</sub>	Max. 0.19 %
13	K <sub>2</sub> O	Max. 0.02 %
14	CaO	Max. 0.02 %
15	MgO	Max. 0.02 %
16	Na <sub>2</sub> O	Max. 0.2 %



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