

SUBH LAABH

**New Strength
& Reliability
for buildings**



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GROUP

GGBS | SLAG SAND
QUARTS SAND | FLY ASH

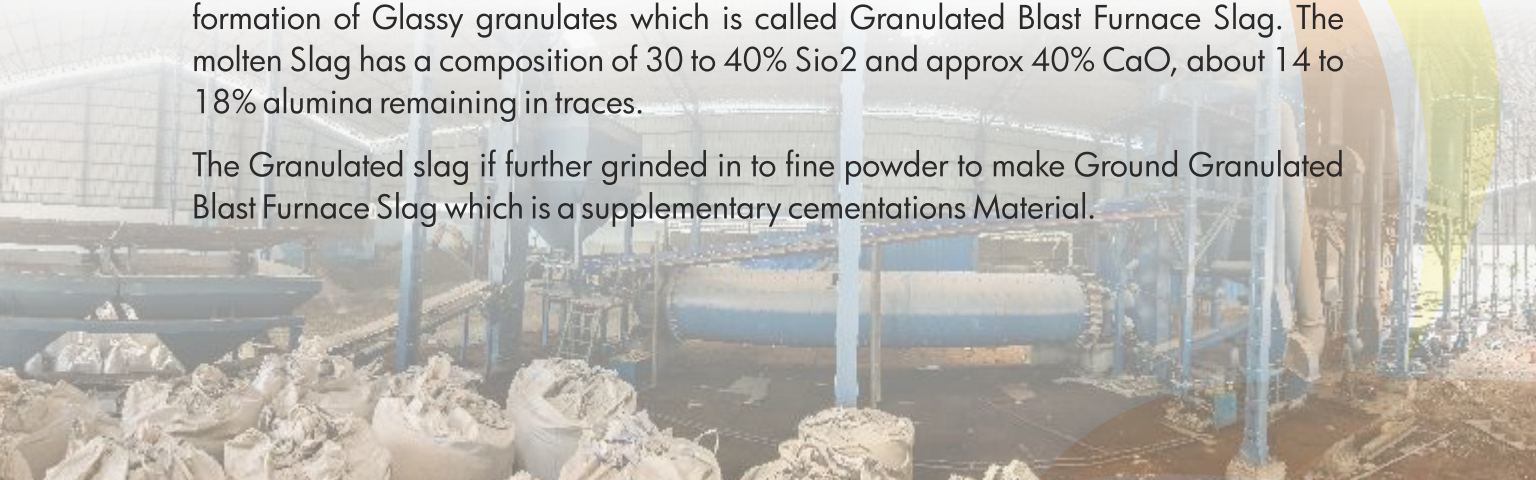


Introduction

What is GGBS?

GGBS is a made from Granulated Blast Furnace Slag which is a by product of blast furnaces used to make iron. Iron ore, Coke and Lime stone are fed in to the furnace and the resulting molten slag floats over the molten iron at a temperature of 1500°C to 1600°C. The molten iron is tapped off, the remaining molten slag consist mainly Siliceous and aluminous residue, is then water quenched rapidly resulting in the formation of Glassy granulates which is called Granulated Blast Furnace Slag. The molten Slag has a composition of 30 to 40% SiO_2 and approx 40% CaO , about 14 to 18% alumina remaining in traces.

The Granulated slag if further grinded in to fine powder to make Ground Granulated Blast Furnace Slag which is a supplementary cementations Material.





Advantages of using GGBS:

1. Controlling thermal crack: Temperature difference within a concrete structure may be caused by portions of the structure losing heat of hydration at different rates or by the weather conditions cooling or heating one portion of the structure to a different degree. GGBS lowers peak and overall heat, which in turn reduces and controls thermal cracking.
2. Durability: GGBS has increased resistance to attack in acidic as well as marine environments.
3. Eco-friendly: Using GGBS reduces the emission of CO₂ and other harmful pollutants which contributes in global warming and are harmful to human health.
4. Surface finish: GGBS makes it easier to achieve a good surface finish.
5. Tensile strength: The GGBS blend concrete tend to have a slightly higher tensile strength.
6. Cost benefit: The GGBS cost is approximately 40% lower than cement, which can save the entire construction cost.

Benefits of using GGBS to Environment:

1. Reduce land reduction: At present, most of blast furnace slag or steel slag is abandoned. Most of the steel plants dump their slag in a barren land which approximately occupies around one acre per ton, that 100 million tons of waste residues will occupy 100 million acres land.
2. Save the resources of limestone, clay and coal: Cement clinker production as per ton consumes 1.1 tons of limestone, 0.18 tons of clay and 0.114 ton of Standard coal.
3. Reduce Carbon Dioxide: 40 million tons of waste residues are used in the production of blast furnace slag cement or steel slag cement every year throughout the country, 4.56 million standard coal will be saved every year, and total CO₂ emission is around 40 million tons.
4. Recycle iron Resource: Steel slag contains 10% residual steel. In India, about 8 million tons of residual steel are discharged along with steel slag every year, after recovery processing, all of those can be recycled.



Advantage of GGBS blended concrete over Fly Ash Blended concrete

1. Concrete made with GGBS are has better particle packing because of improved hydration and particle shape
2. The permitted limit of replacement of Fly ash in OPC is 15-35% (IS 1489 Part 1) but in concrete it cant be more than 30%.But GGBS replacement is permitted up to 25-70% (IS 455) in OPC based on application.
3. Specific gravity of GGBS is nearest to Cement in comparison with Fly ash Based concrete ,That is the reason higher replacement in OPc is possible with GGBS.





Chemical composition (in %)

GGBS is made of mainly silicate and alumina silicates of calcium. OPC cement can be used as catalyst as it contains mainly lime, calcium sulphates and alkalis .

The material has glassy structure. The material can be grounded to 45 microns and more. The surface area varies from 350 to 450 m²/kg blaines. When water and OPC cement is mixed with GGBS, The GGBS gets activated, Hydration process starts and sets like normal Cement.

Chemical module:

$\frac{\text{CaO} + \text{MgO} + 1/3\text{Al}_2\text{O}_3}{\text{SiO}_2 + 2/3 \text{Al}_2\text{O}_3}$	1.04	Min1%
$\frac{\text{CaO} + \text{MgO} + \text{Al}_2\text{O}_3}{\text{SiO}_2}$	1.90	Min1%

Parameter	Subh Laabh GGBS	As per IS 12089-1987
Insoluble Residue	1.74	5.0
Manganese Oxide (MnO)	0.84	5.5
Magnesium oxide (MgO)	9.69	17.0
Sulphide sulphur	0.52	2.0
CaO	37.34	---
Al ₂ O ₃	14.42	---
FE ₂ O ₃	1.11	---
SiO ₂	37.73	---
Glass Content	92%	Min 85%

Slag Sand

A non metallic product consisting of glass containing silicates and alumina silicates of lime, is a by-product of metal smelting processes and does not contain materials that may affect the strength and durability of concrete, such as chlorides, organic matter, clay, silt and shells.

As per experts, it is the best eco-friendly alternative to river sand that is a by-product of steel production. This is why GBFS is being commonly used by most builders these days instead of river sand. In fact, several government agencies like Public Works Department too are using this sand alternative.

Advantages:

- Environmentally friendly
- Highly reactive silica, improved strength.
- Slag Sand contain chemical like silica, alumina, calcium, magnesium and ferrous. The
- same chemicals are present in Cement.
- Available throughout the year.

Application:

Slag sand has a wide range of application, such as it can be used 100% individually and also in combination with river sand, crusher dust and M-sand in plain Concrete, reinforced concrete, standard ready mix concrete, asphalt concrete and many more.

Test report on Slag Sand

Sieve analysis:

Sieve size	Cumulative % Passing
10mm	100.00
4.75mm	99.8
2.36mm	99.6
1.18mm	85.45
600 microns	34.5
300 microns	17
150 microns	4.6

Overall Evaluation:

Sieve size	Cumulative % Passing
Loose bulk density	1.2-1.3
Specific gravity	2.7
Silt%, wet sieving	<1.5
Particle shape	Sub-angular to sub rounded
Inorganic coating	None
Organic coating	None
Deleterious material	None
Expensive material	None

Quartz Sand

Quartz Sand is manufactured by crushing quartz lumps to various sizes and is also known Quartz Silica Sand. Quartz Sand has very high silica content as compared to river sand and has negligible or no natural impurities.

Basically, quartz sand replaces river sand and can be used solely in place river sand. It has very low silt content compared to river sand and highly superior to normal construction sands.

Our Sand satisfies IS 383 -1970



Test report on Quartz Sand

I.S. Sieve Size		Percent retained		Cumulative Percent retained (B)		percent passing		Cumulative % passing		Specification As per IS: 383 - 1970 (Reaffirmed 1990) (Cu. Percentage Passing)		
in mm	in gm	in %	in %	in %	in %	in %	in %	Zone I	Zone II	Zone III		
4.75	250.0	3.0	0.0	0.0	95.0	100.0	100.0	90-100	80-100	80-100		
2.36	1700.0	34.0	5.0	5.0	65.0	65.0	61.0	60-95	75-100	85-100		
1.18	2000.0	43.0	39.0	39.0	60.0	60.0	21.0	30-70	55-90	75-90		
0.8	888.0	17.4	96.4	96.4	56.8	56.8	3.6	15-34	35-55	60-90		
0.3	170.0	3.4	99.8	99.8	56.8	56.8	0.2	5-20	8-32	12-40		
0.15	12.0	0.2	100.0	100.0	56.8	56.8	0.0	0-10	0-10	0-10		

REMARKS: The quartz sand sample tested as per the IS: 383 - 1970 (Reaffirmed 1990) and it conforms Zone I as per I.S and is satisfactory for use.
 * Hence, the QUARTZ SAND can be used as it is.

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Conclusion

To conclude, we at Subh Laabh Industry commit in providing quality product and greenersolution to many infrastructural problems. Our mission is to provide the customer with the best quality material at best possible price and also create awareness among individuals the application and benefits of all our products.

Many countries have been using GGBS blend concrete past several years. From all the available technical specs and knowledge, it can be said that there are many technical benefits which are yet to be gained from GGBS. Once the user is made aware of the properties and benefits of the material, there is no specific reason for not using GGBS. Already many developed countries are using it, it is time even we all should go for it and make earth a better place to be in as it helps in reduction of Co 2 emission and in conserving non-renewable resources of lime stone.

And as far as the slag sand and quartz sand is concerned, these are the best environmental friendly alternative to river sand. As soil erosion is a major concern, it is both economical and sustainable to use slag sand and quartz sand. It can be used 100% individually and also in combination with river sand and crusher dust and also M-sand.



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