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# GROUND-GRANULATED BLAST-FURNACE SLAG (GGBFS)

**Ground-granulated blast-furnace slag (GGBS or GGBFS)** is obtained by quenching molten iron slag (a by-product of iron and steel-making) from a blast furnace in water or steam, to produce a glassy, granular product that is then dried and ground into a fine powder. It is suitable for all types of Construction where OPC required. It is suitable for applications in marine environment, mass concreting and sulphate environment, water retaining structures, basement and other structures which require low heat of hydration.

GGBFS is off-white in colour and substantially lighter than Portland cement. The whitish colour is also observed in concrete made with GGBS, especially at addition of 50% and above. The more pleasing appearance of GGBFS concrete can help soften the visual impact of large structure such as bridges, retaining walls, etc.

**Advantages and benefits of specifying GGBS are outlined below:**



## **Superior Quality Concrete**

- ◆ Improved workability, pump-ability and compaction characteristics for concrete placement
- ◆ Increased strength
- ◆ Reduced permeability
- ◆ More chemically stable
- ◆ High resistance to chloride penetration
- ◆ High resistance to sulphate attack
- ◆ High resistance to ASR ( Alkali Silica Factor)
- ◆ Very low heat of hydration
- ◆ Improved resistance to attack from fire

## **Low Environmental Impact**

- ◆ Production of GGBS involves virtually zero CO2 emissions
- ◆ Use of GGBS extends the life cycle of concrete structures
- ◆ Enhanced durability, reduced maintenance and repair costs
- ◆ Reduces lifetime construction costs

## **Superior Appearance**

- ◆ Improved surface finish
- ◆ Lighter and more even colour
- ◆ Enhanced reflectivity for greater visibility and safety
- ◆ Suppresses/eliminates efflorescence

## **Better Value for Money**

- ◆ Enhanced durability and strength longer life
- ◆ Enhanced architectural appearance reduced need for other expensive finishes or painting
- ◆ Enhanced environmental performance reduce the risk of attracting carbon taxes
- ◆ Lower maintenance costs
- ◆ Enhanced life cycle
- ◆ No additional premium on material costs
- ◆ Overall better value for money



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## GROUND-GRANULATED BLAST-FURNACE SLAG (GGBFS)

Strength gain in %	7 days	28 days	90 days	
100%OPC	75	100	110	
50%OPC+50%GGBS	50	95	115	
30%OPC+70%GGBS	45	95	120	
Compressive strength N/mm2	7 days	28 days	90 days	Development from 7 to 90 days (%)
100% OPC	40	53	60	50
20% GGBS + 80% OPC	35	52	57	63
30% GGBS + 70% OPC	32	50	60	88
50% GGBS + 50% OPC	30	47	56	87
70% GGBS + 30% OPC	25	45	58	132

## COMPARISON TABLE WITH INDIAN STANDARD AND BRITISH STANDARD

Properties	Requirements as per BS: 6699 : 1996	Requirement as per IS Standard - 12089 - 1987	Stallion Energy Pvt. Ltd. Test Report (%)
Fineness (m2/kg)	275 (min.)	-	382
Insoluble residue (IR %)	1.5 (max.)	5% (Max)	0.52
Magnesia content (MgO %)	14.0 (max.)	17% (Max)	8.06
Sulphide sulphur (SO3 %)	2.00 (max.)	2% (Max)	1.58
Loss on Ignition (LOI %)	3.00 (max.)	-	0.70
Manganese content (MnO %)	2.00 (max.)	5.5% (Max)	0.34
Glass content (%)	67 (min.)	85% (Min)	95
<b>Chemical module</b>		-	-
(a) CaO + MgO + SiO2	66.66 (min.)	-	79.42
(b) CaO + MgO/SiO2	>1.0	-	1.24
(c) CaO/SiO2	<1.4	-	1.01
(a) (CaO + MgO + Al2O3) / SiO2	-	1.0 (Min)	1.64

## TYPICAL CHEMICAL RESULT - GGBFS OF STALLION ENERGY PVT.LTD.

Characteristic	Laboratory Test Report (%)
Silica as SiO2 %	35.47
Calcium as CaO %	35.89
Magnesium as MgO %	8.06
Iron Oxide as Fe2O3 %	2.41
Alumina as Al2O3 %	14.27
Loss on Ignition %	0.70
Insoluble Residue %	0.52
Manganese Oxide MnO %	0.34
Alkalies	0.20
Sulphide Sulphur as SO3 %	1.58
Fineness cm2/gm	3820

## ■ : PROFILE : ■

STALLION ENERGY PVT. LTD. as a manufacturer, supplier, importer, exporter & processor has made foray in high growth sector like Coal, Coke, Carbon and Petrochemical products in India. We are in business since 1997. With high growth ratio, now our turnover is above Rs. 2000 million. Our company has long term arrangements to supply products uninterruptedly for our esteemed clients. We have dynamic infrastructure to cater all reasonable demands of our clients. By working closely with our existing application and research laboratory, we will provide tighter specifications for all products, in addition to checking standard quality parameter routinely. We also have dedicated manpower of 200 persons.



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