



GROUND GRANULATED BLAST FURNACE SLAG

A Green Product for Concrete

The future global challenge for the construction industry is clearly to meet the world's growing needs while at the same time limiting the impact of its burdens by drastic improvement of its activities.

Due to exponential growing in urbanization and industrialization, byproducts from industries are becoming an increasing concern for recycling and waste management. Ground granulated blast furnace slag (GGBS) is a by-product from the blast-furnaces of iron and steel industries. Hence GGBS is the future of modern day construction.



What is GGBS ?

GGBS is a hydraulic binder, i.e. a cement, which has been known and use for more than 100 years. GGBS is a stable, uniform, non-metallic, non-flammable, non-hazardous material. GGBS is obtained by quenching Molten Iron Slag (a by-product of Iron & Steel making) from a Blast Furnace in Water or Steam, to produce a glassy, granular product that is then dried & ground into fine powder. It improves the quality and durability of concrete.

It is used to make durable concrete structure in combination with Ordinary Portland Cement & other pozzolanic material. GGBS conforms to IS 16714– 2018, EN 15167-1 and ASTM C989-1999.

GGBS is one of the Greenest Construction Materials & ensures Green Regulated Solution

Typical Physical Properties

Colour	Off-white
Specific Gravity	2.85 – 2.95
Bulk Density	1000–1300 Kg/M ³
Fineness	350 – 450 M ² /Kg

Tests	Results	Specification requirement (IS: 16714-2018)
Calcium Oxide (CaO)	33.8%	
Silica (SiO ₂)	31.2%	
Alumina (Al ₂ O ₃)	10.8%	
Magnesium Oxide (MgO)	10.5%	Max 17%
Manganese Oxide (MnO)	0.11%	Max 5.5%
Glass Content	89%	Min 85%
Insoluble residue	1%	Max 3%
Loss on ignition	2.98%	Max 3%

Advantages of GGBS

- Substantial improvement in durability and workability
- Increased stiffening time and long-term comprehensive strength
- Very low porosity and permeability, leads to durable structure
- Very low heat of hydration and robust with all admixtures
- Protect the reinforcement steel from corrosion
- Reduced CO₂ emissions since the production is eco-friendly and reduces waste of steel industry
- Reduced cost for manufacturing concrete since it costs less than cement.
- Reduced water consumption in concrete making
- Conserves natural resources & reduces mining

Conclusion

GGBS blended concrete have been used successfully in concrete for many years in many countries throughout the world. From all the available technical literature it is suggested that there are potentially many technical benefits to be gained from using the GGBS. Where structures must be designed for durability requirements in very aggressive environment GGBS blend mixes are

recommended in standards of most developed and developing countries. Many countries have accepted the benefits and have recommended its use in their national standards. Once the user is made aware of the properties of the material and understood the benefits to be gained there is no reason why it should not continue to be used successfully and more often in existing and future project.