Build Strong Infra

SILICON
CEMENT PVT. LTD.

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What is GGBS?

Ground Granulated Blast Furnace Slag (GGBS) from Silicon Cement Pvt. Ltd. is a cementitious material used to partially replace Ordinary Portland Cement (OPC) for various Concrete, Masonary, Cement based product manufacturing and Other purposes.

Typical Physical & Chemical Composition for GGBS by Silicon Cement Pvt. Ltd.

GOI%	CaO%	SiO_2%	Al_2O_2%	Fe_2O_2%	MgO%	MnO%	CL%	IR%	SO_3%	Sulphide Sulphur %
-0.35	37.63	35.81	17.92	0.66	7.80	0.21	0.004	0.19	0.20	0.51

Fineness (M^2/kg)	Specific Gravity	Residue by wet basic on 45µ (%)	7 days Slag Activity Index	28 days Slag Activity Index	Glass Content
386	2.9	4.60%	71.32%	91.82%	96.85%

Manufacturing GGBS

Ground granulated blast furnace slag (GGBS) is a by-product from the blast-furnaces used to make iron. Blast-furnaces are fed with a controlled mixture of iron-core, coke and limestone, and operated at a temperature of about 1,500°q. When iron-ore, coke and limestone melt in the blast furnace, two products are produced ie molten iron and molten slag. The molten slag is lighter and floats on the top of the molten iron. The molten slag comprises mostly silicates and alumina from the original iron ore, combined with some oxides from the limestone. The process of granulating the slag involves cooling of molten slag through high-pressure water jets. This rapidly quenches the slag and forms granular particles generally not bigger than 5 mm. The rapid cooling prevents the formation of larger crystals, and the resulting granular material comprises around 95% non-crystalline calcium-aluminosilicates. The granulated slag is further processed by drying and then grinding in a vertical roller mill or Ball press mills to a very fine powder, which is GGBS.

GGBS is a sustainable material for Green Building construction

Advantages of GGBS:

- **Improved workability:** GGBS based concrete demonstrate improved workabilty and finish- ability when compared with 100% ordinary Portland cement concrete system due to its high fineness, as a result we can get segregation free and cohesive Mix.
- **Reduced heat of hydration:** Due to reduced heat of hydration, plastic shrinkage cracks canbe minimized.
- **High compressive and flexural strength:** Concrete made with GGBS provides higher compressive and flexural strength compared with Ordinary Portland cement concrete due to additional calcium silicate hydrate (C-S-H) formation. Silicates in GGBS combine with the calcium hydroxide (CaOH), a byproduct of hydration and form C-S-H which enhances both compressive and flexural strength. Compared to concrete produced with only OPC, the GGBS blend produced concrete tend to have a higher tensile strength and elastic modulus for a given compressive strength.
- **Reduced permeability:** The inter connectivity of capillary pores will be discontinued and thus permeability will be reduced.
- **Resistance to alkali-silica reaction (ASR):** Use of GGBS will reduce the potential of ASR occurring by reducing the amount of alkali available in the system that is available for reaction with the aggregate.
- **Better Particle packing:** Concrete made with GGBS has better particle packing due to particle shape and improved hydration.
- **Excellent resistance to Sulphate attack:** GGBS does not contain CA, so its addition in concrete dilutes the total amount of CA and also reduces the permeability due to which the sulphate do not penetrate in to concrete.
- **Resistance to chloride attack:** Due to reduced permeability and increased densification the diffusion of chloride ions will be greatly minimized in the concrete containing GGBS.
- **Lighter in color:** An Aesthetic appearance and low heat absorption due to its light color.
- Reduced life cycle cost: Concrete produced by using CGBS can significantly improve the durability and extends the life of the structure and thus reduce the life cycle cost of the structure.
- **Fire resistance:** Structures made with GGBS based concrete resist the high temperature than the structures made with Ordinary Portland cement.
- **Resistance to erosion:** Concrete made with GGBS demonstrated the resistance to erosion compared with Ordinary Portland slag cement. The Engineering Consultants and Designers from all over the world are recommending GGBS due to its superior engineering properties

Application of GGBS