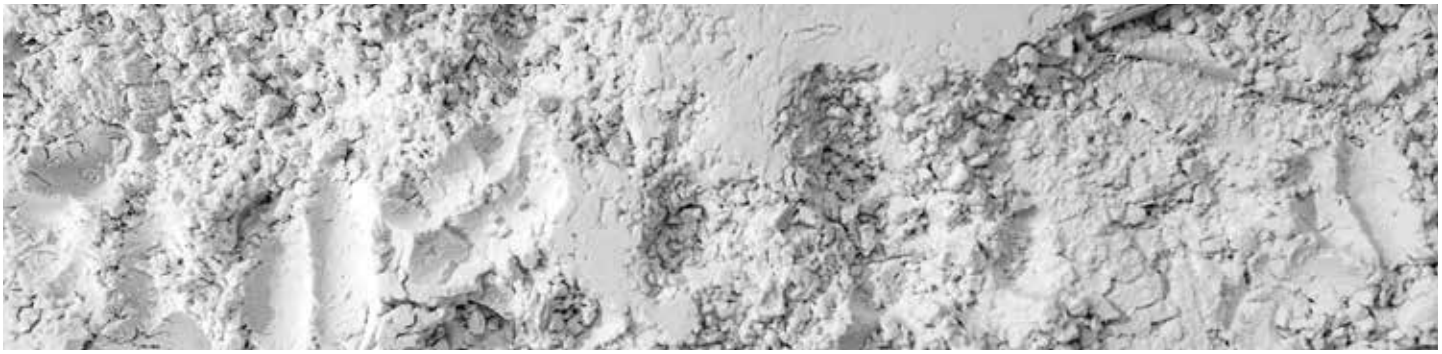
ECA GGBFS

Ground Granulated Blastfurnace Slag



Product Description

GGBFS (Ground Granulated Blastfurnace Slag) is used in combination with Portland cement to produce superior longer lasting concrete. A replacement rate of up to 70% is permitted by the I.S EN 206-1.

GGBS replacement greater than 66% is classified as a sulfate resistant cement by EN 197 and can be used in aggressive ground conditions.

GGBS is an industrial by-product that is diverted from landfill and upcycled into a commodity product. On exiting the iron processing system, molten blast furnace slag is rapidly quenched with water to form Granulated Blastfurnace Slag (GBS). GGBS is produced by drying and grinding the GBS.

Advantages

GGBFS is specified for its technical, environmental and aesthetic qualities by engineers, architects and stakeholders.

Using GGBS in concrete can extend the lifespan, prevent cracking and lower the embodied energy of a project.

- Increased durability against chemical and acid attack
- Increase long term strength
- Improved workability
- Lowers heat of hydration and reduces the risk of thermal cracking
- Sulfate and chloride resistant
- Whiter color lowers pigment requirement
- Lower embodied energy
- Verified environmental product declaration
- Contributes to credits under LEED and BREEAM building rating systems

Typical Properties

Relative Density: 2800- 3000 kg/m3
Bulk Density: 900– 1200 kg/m3
Solar Reflectivity Index (SRI) of concrete:
50% GGBS: 0.60
70% GGBS: 0.74
PH in solution: 8 -10

Chemical Composition

The rate of vitrification means that the glass content of GGBS is greater than 95%. (measured by X-ray diffraction) ensuring highly reactive material. The typical chemical composition of GGBS is provided below:

SiO2	36.5
Al2O3	10.4*
Fe2O3	0.7
CaO	42.4
MgO	8.1
MnO	0.4
TiO2	0.5
SO	0.1
Cl	0.01
Na2O	0.5

*Al2O3 content below 14 % guarantees the durability performance of ECA GGBFS.

Compatibility

With cements: ECA GGBFS can be used with all types of Portland Cements, including cement replacement materials. For use with special cements we recommend that you consult European Concrete Additives.

With Other Admixtures: ECA GGBFS is compatible with all conventional water reducers, superplasticizer, set retarders and EUNICOR DCI Corrosion Inhibitor. Only non-chloride set accelerators may be used with ECA GGBFS concrete. All admixtures must be added separately to assure their

recommended that trial mixtures be made several weeks before construction start up. This will allow the concrete producer an opportunity to determine the proper batching sequence and amounts of other admixtures needed in order to deliver the required concrete mixture to the site. A trial mixture will also help determine whether the construction practices will allow the concrete to meet a specified performance. European Concrete Additives experience with this product can help the concrete producer deliver a satisfactory product regardless of the mix proportions. ECA GGBFS is supplied bagged and ready for use. The method of addition of ECA GGBFS is important as it is vital that Complete, uniform dispersion is achieved. ECA GGBFS is best added after the course aggregates and water, and given an extended mix prior to the addition of fines and cement. ECA GGBFS is always used in combination with a Superplasticizer as the water demand for a concrete containing ECA GGBFS is increased. ECA GGBFS will reduce the surface bleed water of concrete in large applications. Good Practice for curing concrete must be followed to ensure that problems occurring due to decreased bleeding are minimized.

Classification

According to ASTM C989, GGBFS is classified into three grades according to its performance in the "slag activity test".

The three grades are: Grade 80, Grade 100 and Grade 120. Slag activity is determined by the following formula:

Slag activity index, (SP / P) 100 %, Where:

SP = average compressive strength of slag-reference cement mortar cubes at designated ages, MPa (psi).

P = average compressive strength of reference cement mortar cubes at designated ages, MPa (psi).

Table 1 shows the requirements of ASTM C989 for each grade of Ground Granulated Blast-Furnace Slag.

Table 1: Slag Activity Index Requirements of ASTM C989

Slag Activity Index	Slag Activity Index, Avg 5 consecutive samples	Slag Activity Index, any individual samples
7 day index		
Grade 80	-	-
Grade 100	75	70
Grade 120	95	90
28 day index		
Grade 80	75	70
Grade 100	95	90
Grade 120	115	110

Packaging

ECA GGBFS is available in 25 kg bags. Manual dispensing by tearing the bags is the normal method. A simple dust mask should be used when dispensing the bagged product.

Storage

Bagged ECA GGBFS should be stored in a dry, protected area.

Health and Safety

See ECA GGBFS Safety Data Sheet or consult European Concrete Additives.

Technical Service

The Technical Service department of European Concrete Additives is available to assist you in the correct use of our products and its resources are at your disposal entirely without obligation.

Contact Information

Al-Faiha for Engineering Products
techsupport@alfaihaengineering.com
www.alfaihaengineering.com

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