Elsons

#1 ABOUT STERLING SLAG

Elsons Corporation is highly organized channel partners with leading producers of **GGBFS**. We, at Elsons Corporation, supply the raw material to various Mega Infrastructure Projects and Builders with strong international and local logistic support we make Elsons a reliable partner for any project we work.

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GGBFS *(Ground Granulated Blast-furnace Slag)* is a cementitious material whose main use is in concrete and is a by-product from the blast-furnaces used to make iron. Although normally designated as **'GGBFS'** in the UK, it can also be referred to as **'GGBFS'** or 'slag cement'.

Granulated blast furnace **slag** has been used as a raw material for cement production and as an aggregate and insulating material. and granulated slag have also been used as sand blasting shot materials.

Why slag is used in cement?

Slag cement is most widely used in concrete, either as a separate cementitious component or as part of a blended cement. It works synergistically with portland cement to increase strength, reduce permeability, improve resistance to chemical attack and inhibit rebar corrosion.

GGBFS is an off white fine powder that can be added as a pozzolanic addition to lime mortars, plasters & renders to accelerate and increase set & durability.

What is the difference between **Fly Ash** and **GGBFS**?

The majority of fly ash is utilized in the cement industry, for construction of roads and embankments, and for manufacturing of bricks, while **GGBFS** is mainly used as partial replacement of cement in concrete. These industrial by-products have also great potential to be used as stabilizing agents.

Ground granulated blast furnace slag **(GGBFS)** is designated in **ASTM C 989** and consists mainly of silicates and aluminosilicates of calcium. **GGBFS** is divided into three classifications based on its activity index. Grade 80 has a low activity index and is used primarily in mass structures because it generates less heat than portland cement. Grade 100 has a moderate activity index, is most similar to portland cement with respect to cementitious behavior, and is readily available. Grade 120 has a high activity index and is more cementitious than portland cement.

Advantages:

When used in portland cement, **GGBFS** offers the following advantages over unmodified portland cement:

- Increased sulfate resistance
- Increased alkali silica reaction resistance
- Increased pore refinement
- Decreased water demand
- Decreased permeability
- Increased long-term strength
- Less heat generated during hydration
- Produces white cement

GGBFS can be used as a portland cement replacement ranging from **35%-70%** by mass

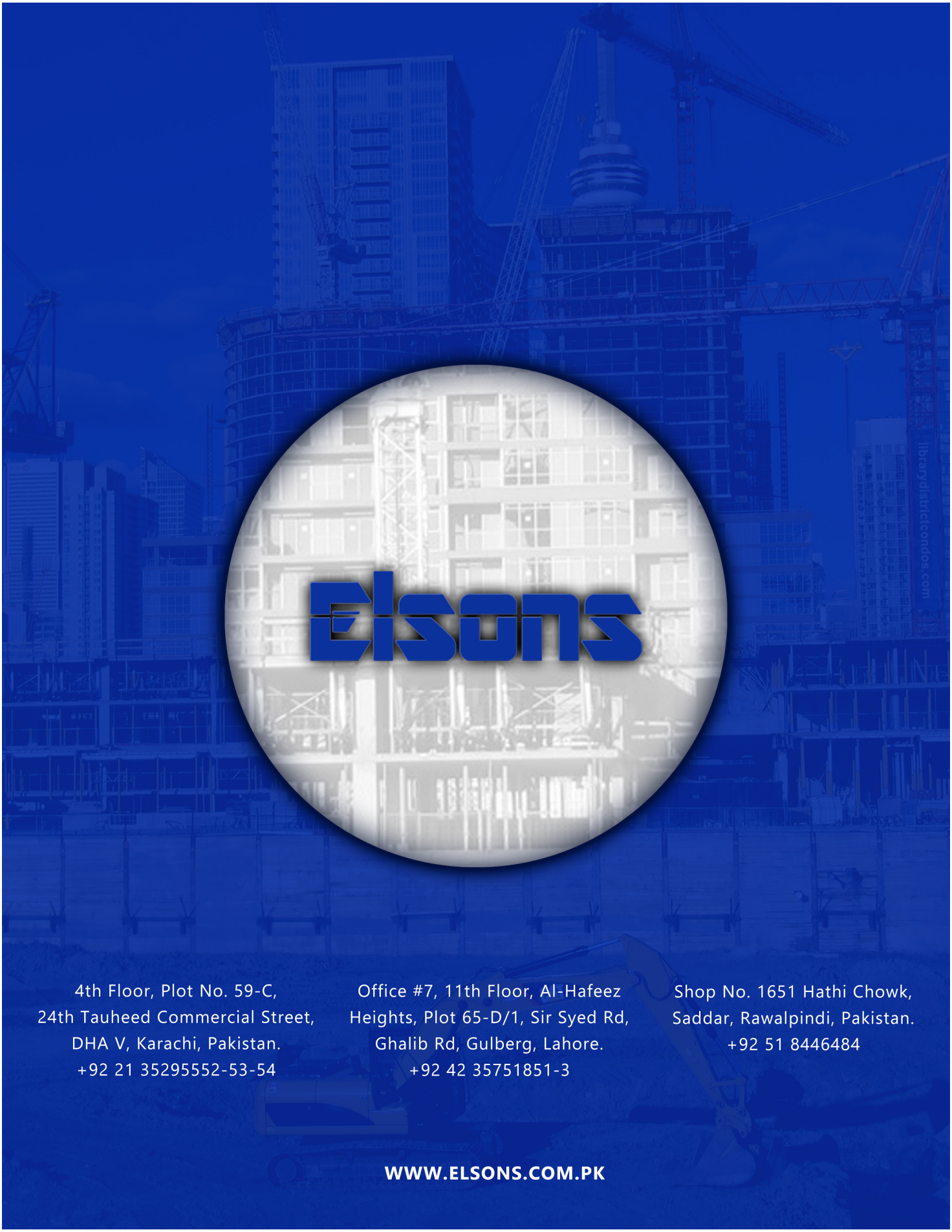
Application

GGBFS is used in all concrete applications:
Structures and foundations.
Structures of Offshore and Marine.
Mass concrete as Dams, Bridges and Causeways.
Concrete exposed to severe environments as waste water treatment plants High rise structures.

Before using **GGBFS** as a portland cement replacement, several precautions must be realized. Since the granulated blast furnace slag is ground, it is not round. An admixture is needed to increase workability rather than increasing the water content. **GGBFS** only provides increased sulfate resistance or resistance to ASR if > 35% by mass is added. The time of set is slightly delayed by approximately 20 minutes, and early compressive strengths are decreased. **GGBFS** also causes increased drying shrinkage. When using this or any other alternative cementing material with portland cement, it is necessary to create trial mixtures to ensure proper proportioning for the desired properties.

Typical Specifications of GGBFS

Loss on Ignition **(LOI)**	**0.5**	Sulphur Tri-Oxide **(SO3)**	**0.3**
Silicon Dioxide **(SiO2)**	**36.5**	Patassium Oxide **(K2O)**	**0.8**
Aluminum Oxide **(Al2O3)**	**11.0**	Sodium Oxide **(Na2O)**	**0.65**
Ferric Oxide **(Fe2O3)**	**1.0**	Chloride Ion Content **(Cl-)**	**0.03**
Calcium Oxide **(CaO)**	**38.5**	Residue on 45 microns **(%)**	**4.0**
Magnesium Oxide **(MgO)**	**7.8**	Blaine **(m2/kg)**	**440**
Sulfur as Sulphide **(S)**	**1 .0**	Initial Setting Time.	**210**



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