Increase Concrete Strength

Master X-Seed 55 is a first-of-its-kind, strength-enhancing admixture that improves both early- and late-age strength development in concrete, while supporting sustainable construction. This unique technology improves cement hydration, providing the ability to reduce cement content of a concrete mixture, without decreasing the water-cementitious materials ratio (w/cm).

Strength Safety Factor

This strength-enhancing technology provides the flexibility to expand the performance space of a given concrete mixture and offers an increased strength safety factor.

Strength Development

This unique solution increases both early- and late-age strength development.

Reduce Environmental Impact

Reducing portland cement content in a concrete mixture helps to reduce the embodied energy of the mixture. This has the overall effect of reducing the energy demand and emissions associated with the production of portland cement.

Master X-Seed 55 admixture gives the option of either reducing the total cementitious materials (CM) content or increasing the replacement level of portland cement with a supplementary cementitious material (SCM), while maintaining or enhancing early- and late-age strength development. This is most evident in an optimized sustainable concrete mixture, such as BASF’s Green Sense® Concrete.

Durability

With the addition of Master X-Seed 55 admixture, a concrete mixture can include higher levels of SCMs, which improve the durability characteristics and support the overall life cycle of the concrete.

Quantifying Sustainability

Eco-Efficiency Analysis reviews the environmental impact in proportion to a product’s cost-effectiveness. Eco-Efficiency Analysis reports and Environmental Product Declaration (EPD) for concrete mixtures containing Master X-Seed 55 admixture can be obtained by contacting your BASF representative or by calling technical services at 800-628-9990.

A Material Transparency Report for Master X-Seed 55 admixture can be found on our website: www.master-builders-solutions.basf.us.
Increase Production Efficiency

The early-age strength enhancement provided by Master X-Seed 55 admixture allows for earlier stripping and reuse of forms, thus increasing production efficiency and speed of construction in both precast and ready-mixed concrete applications.

Flexibility in Design

Increased strength development provides engineering and design flexibility.

Benefits of Master X-Seed 55 Admixture

- Seeding technology facilitates growth of CSH crystals and cement hydration
  - Provides a unique improvement in the hydration of portland cement

- Increases strength development (both early- and late-age)
  - Increases strength safety factor
  - Flexibility to expand the performance space of a concrete mixture
  - Permits earlier stripping of forms to improve production efficiency
  - Facilitates construction in cast-in-place concrete applications
  - Offers opportunity for flexibility in design
  - Improves the strength consistency of a concrete mixture even when produced with variable raw materials

- Facilitates optimization of the cementitious materials package of a concrete mixture
  - Increases replacement levels of supplementary cementitious materials
  - Promotes sustainable construction
  - Sustainable reporting documents are available to demonstrate environmental transparency.
CSH Seeding Technology

BASF’s X-Seed technology was first introduced in Europe and Asia, and has been utilized in strength-enhancing applications since 2009. This patented technology to improve the quality of hardened cement paste was used to develop the Master X-Seed 55 strength-enhancing admixture for North America.

Master X-Seed 55 admixture is a stable suspension of synthetically-produced crystalline calcium silicate hydrate (CSH) nanoparticles. These nanoparticles facilitate the growth of CSH crystals between cement grains and improve overall hydration of portland cement (Fig. 1 and 2), thereby increasing early- and late-age strength development.

Figure 1 – Illustration shows increased CSH crystal growth with Master X-Seed 55 admixture

Figure 2 – Image from CryoSEM with portland cement paste treated with Master X-Seed 55 admixture shows active crystal growth between the cement grains
Performance Results

Enhancement in Compressive Strength

The chart below shows the strength enhancement that can be achieved in a concrete mixture containing Master X-Seed 55 admixture compared to a reference untreated mixture.

**Figure 3** – *Enhancement in Compressive Strength from Addition of Master X-Seed 55 Admixture*  
(Nominal cementitious materials content of 611 lb/yd³ [362 kg/m³] with 20 percent fly ash, w/cm of 0.47; Master X-Seed 55 admixture dosage of 10 fl oz/cwt [650 mL/100 kg])

Reduced Cement Content

The chart below shows the effect of Master X-Seed 55 admixture on the compressive strength of concrete that can be achieved with reduced cement content compared to a reference untreated concrete mixture.

**Figure 4** – *Potential for Reducing Cementitious Materials (CM) Content with Master X-Seed 55 Admixture*  
– Mixture’s CM content reduced by 76 lb/yd³ [45 kg/m³]  
(Control: Total binder content - 705 lb/yd³ [418 kg/m³] with 25 percent fly ash, 21 percent limestone powder, w/cm of 0.39; Master X-Seed 55 admixture: Dosage of 7.3 fl oz/cwt [475 mL/100 kg], Total binder content - 629 lb/yd³ [373 kg/m³] with 25 percent fly ash, 21 percent limestone powder, w/cm of 0.40)
Master Builders Solutions from BASF

The Master Builders Solutions brand brings all of BASF’s expertise together to create chemical solutions for new construction, maintenance, repair and renovation of structures. Master Builders Solutions is built on the experience gained from more than a century in the construction industry.

The know-how and experience of a global community of BASF construction experts form the core of Master Builders Solutions. We combine the right elements from our portfolio to solve your specific construction challenges. We collaborate across areas of expertise and regions and draw on the experience gained from countless construction projects worldwide. We leverage global BASF technologies, as well as our in-depth knowledge of local building needs, to develop innovations that help make you more successful and drive sustainable construction.

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