MasterMatrix
Advanced Rheology Control for Concrete
Building on partnership. Our Master Builders Solutions experts find innovative and sustainable solutions to meet your specific construction needs. Our global experience and network help you to be successful – today and tomorrow.

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.

The comprehensive portfolio under the Master Builders Solutions brand encompasses concrete admixtures, cement additives, chemical solutions for underground construction, waterproofing solutions, sealants, concrete repair and protection solutions, performance grouts, performance flooring solutions.
Smart Dynamic Concrete – A New Generation of Highly Fluid Concretes

Industry challenges
In today’s fast-moving and competitive environment, the need for process efficiency to save time and money is a major concern for the construction industry. More fluid concretes allow for such savings.

Combined with growing pressure for greater sustainability, the ready-mix industry is facing the following challenges:

- A demand for robust and more fluid concretes for day-to-day applications
- Higher durability specifications, which require the perfect covering of reinforcement to extend the service life of structures
- Energy efficiency to reduce CO₂ emissions

To meet all these challenges absolutely and simultaneously would require a concrete to fulfill contradicting requirements: cost effectiveness, self-compaction and robustness. The Master Builders Solutions experts from BASF have developed the revolutionary Smart Dynamic Concrete concept – a concept for a new generation of highly fluid concretes – specifically to solve this dilemma.

Concept
The Smart Dynamic Concrete concept consists of a robust mix design with less than 380 kg of fines, a tailor-made MasterGlenium super-plasticizer and the new and unique MasterMatrix, a BASF exclusive, state-of-the-art Viscosity Modifying Agent (VMA), as the key element of this revolutionary concept. Due to the smart and self-organizing molecules of MasterMatrix, concrete mix designs can now be optimized to a unique extent to achieve unmatched performance levels. In fact, it creates a new generation of concrete, which combines the benefits of traditionally vibrated concrete with those of self-compacting concrete and is easy to produce and robust in every day use: Smart Dynamic Concrete.

Smart Dynamic Concrete
Our Smart Dynamic Concrete concept is suitable for upgrading S4 and S5 concretes to a higher performance level with self-compacting characteristics and is as easy to produce as standard concrete.

It allows the concrete industry to achieve better construction process economy, higher concrete durability and increased energy efficiency in order to save time and money and reduce CO₂ emissions. It is not recommended as a substitute for typical SCC applications.

MasterMatrix is the essential component of the Smart Dynamic Concrete concept. It consists of a water-soluble polymer which modifies the rheological properties of the concrete mix. Thanks to its tailored mode of action, MasterMatrix brings a level of viscosity to the mix that allows the right balance between fluidity, passing ability and resistance to segregation – apparently opposing properties – to be achieved.
The rheology of matter is mainly characterized by two parameters: yield value and plastic viscosity. In the Smart Dynamic Concrete concept, these two parameters are controlled by an optimized concrete mix design. The yield value is specially controlled by MasterGlenium superplasticizers and the plastic viscosity by MasterMatrix.

VMAs stabilize unstable concrete, increasing yield value, with much lower increase of plastic viscosity. However, after the addition of 10 l/m³ water, the mix is back in the unstable area. After the addition of 10 l/m³ water, the mix is still in the stable area.

Our reference in Zurich (Switzerland): Leutschen Tower
This unique mix-design optimization now allows the substitution of concrete paste quantity by concrete paste quality to achieve self-compacting properties and concrete stability at the same time.

MasterMatrix, based on BASF’s proprietary technology, consists of intelligent (smart) high molecular weight ionic polymers, which interact among themselves and mainly with water molecules, generating a the water envelope and therefore building up a highly structured cement paste.

An additional mechanism of action that strengthens the effectiveness of the system is the simultaneous adsorption of MasterMatrix molecules on more than one fine particle of the cement or fine sand, leading to a bridging phenomenon which generates an even more powerful molecular matrix.

Thanks to the effective control of the rheological parameters, superior homogeneity of the mix, minimum energy dissipation and a minimization of paste volume, and thus of the fine particles content in the mix design, are achieved.
Concrete Benefits
Economics, Ecology and Ergonomics for the Industry

Our innovative concept meets the existing and continuously increasing demand for more fluid concretes and offers the following benefits to the industry:

1. Economical:
Thanks to a unique mechanism of action in concrete, fines savings (< 0.125 mm) can be achieved. The stable and highly fluid concrete is close to self-leveling and thus permits installation without subsequent compaction. The placing process is easy enough to be handled by just one operator, who additionally saves up to 40% of work time. As a result, labor productivity is increased up to fivefold! In addition, it is as easy to produce as standard concrete because the mixes are less sensitive to changes in water demand.

Economical
- Savings on fines
- Up to 40% faster placing
- Up to 5 times higher labour productivity
- Easy to produce

2. Ecological:
The low percentage of fines (e.g. cement), the production of which causes CO₂ emissions, improves the ecological efficiency of concrete. Furthermore, this highly fluid concrete embeds the reinforcement perfectly, protecting it optimally against external corrosion. This characteristic increases the durability of concrete and, as a result considerably extends the life span of buildings thusly equipped.

Ecological
- Less fines, less CO₂
- Higher durability

3. Ergonomic:
Thanks to its self-compacting characteristics, this concrete does not need to be vibrated, which means no noise and no health-hazardous vibrations for the workers. Additionally, the new mix design guarantees a concrete with low stickiness, thus improving its workability.

Ergonomic
- No vibration
- No noise
- Low stickiness
Advantages at a Glance

Smart Dynamic Concrete, a smart technology to meet evolving construction needs.

**Technology**
- Robust mix-design
- Tailor-made superplasticizer
- Unique stabilizer MasterMatrix

**Rheology**
- 60 – 70 cm slump flow
- Self-compacting
- Fast placing

**Concrete benefits in**
- Economics
- Ecology
- Ergonomics

One operator can place Smart Dynamic Concrete significantly faster than three operators can place conventional vibrated concrete.

**Concrete benefits**

**Economical**
- Savings on fines
- Up to 40% faster placing
- Up to 5 times higher labour productivity
- Easy to produce

**Ecological**
- Less fines, less CO₂
- Higher durability

**Ergonomic**
- No vibration
- No noise
- Low stickiness
Values of Smart Dynamic Concrete

- Smart Dynamic Concrete is designed to upgrade S4/S5 concrete to become self-compacting and robust for economical day-to-day use.
- The centerpiece of this concept is MasterMatrix, a high performance VMA, which enables a quantum leap in concrete robustness.
- Smart Dynamic Concrete combines the advantages of both traditionally vibrated concrete and self-compacting concrete.
- This concept makes unique mix-design optimization (by reducing fines) possible.
- Smart Dynamic Concrete adds economical, ecological and ergonomic values to concrete and has the potential to move the market on to the next level of advanced construction practice.

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Master Builders Solutions from BASF for the Construction Industry

MasterAir
Complete solutions for air entrained concrete

MasterBrace
Solutions for concrete strengthening

MasterCast
Solutions for the manufactured concrete product industry

MasterCem
Solutions for cement manufacture

MasterEase
Low viscosity for high performance concrete

MasterEmaco
Solutions for concrete repair

MasterFinish
Solutions for formwork treatment and surface improvement

MasterFlow
Solutions for precision grouting

MasterFiber
Comprehensive solutions for fiber reinforced concrete

MasterGlenium
Solutions for high performance concrete

MasterInject
Solutions for concrete injection

MasterKure
Solutions for concrete curing

MasterLife
Solutions for enhanced durability

MasterMatrix
Advanced rheology control for concrete

MasterPel
Solutions for water tight concrete

MasterPolyheed
Solutions for mid-range concrete

MasterPozzolith
Solutions for water-reduced concrete

MasterProtect
Solutions for concrete protection

MasterRheobuild
Solutions for high strength concrete

MasterRoc
Solutions for underground construction

MasterSeal
Solutions for waterproofing and sealing

MasterSet
Solutions for set control

MasterSuna
Solutions for sand and gravel in concrete

MasterSure
Solutions for extraordinary workability retention

MasterTop
Solutions for industrial and commercial floors

Master X-Seed
Advanced accelerator solutions for concrete

Ucrete
Flooring solutions for harsh environments

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