



MasterGlenium[®] SKY

Solution for ready-mix
concrete industry





Master Builders Solutions



The **Master Builders Solutions** brand brings all of its 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 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 Master Builders Solutions 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 & protection solutions, performance grouts and performance flooring solutions.



Total Performance Control

Environment

Concrete has to fulfill a variety of requirements, depending on its user, its field of application and the environment in which it is placed: for operators of ready-mix batching plants, economical concrete production is vital; contractors need concrete with long workability and easy placing characteristics; whilst engineers are focused on its mechanical properties such as strength and durability.

To meet all these requirements simultaneously was difficult until now, and the parties concerned often had to accept compromises. However, the entire concrete industry has certain common goals: the production of an economical, yet high-quality concrete over a range of performances including those with low water / cement ratios.

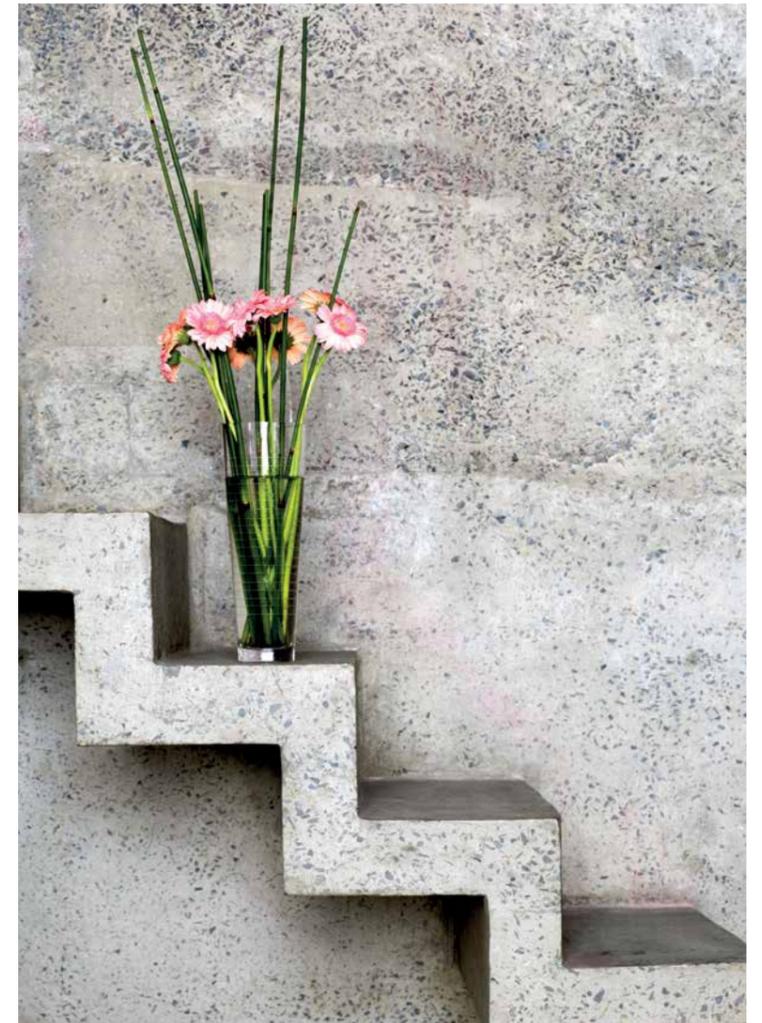
To address all requirements, Master Builders Solutions Construction Chemicals has introduced Total Performance Control™, based on the latest development of the MasterGlenium® SKY technology. This approach addresses local conditions and requirements individually for the first time by delivering concrete of uncompromising high quality.

Concept

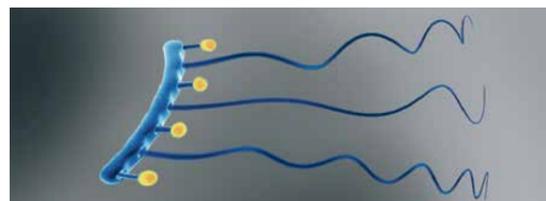
The Total Performance Control concept ensures that ready-mix producers, contractors and engineers achieve a concrete that is of the same high quality as originally specified, starting from production at the batching plant, to the delivery and placement, followed by its hardening process. Latest generation self-compacting concretes, such as Smart Dynamic Concrete®, provide a concrete mix with exceptional placing and self-consolidating characteristics, accelerated cement hydration for early strength development and high quality concrete.

Total Performance Control is the state-of-the-art technology that provides improved short and long term performances of concrete by controlling the two distinct features essential for high-quality concrete: extended workability and a low water / cement ratio.

A key element of the Total Performance Control concept is the newly developed MasterGlenium SKY superplasticizer.



MasterGlenium SKY is an innovative superplasticizer based on latest generation of polycarboxylate ether (PCE) polymers. It is derived directly from the Total Performance Control concept and is specially engineered to simultaneously provide high water reduction and slump retention for ready-mix concrete. As compared with other PCE superplasticizers, it is possible to obtain a high-quality concrete mix with accelerated strength development and extended workability without delayed setting characteristics.

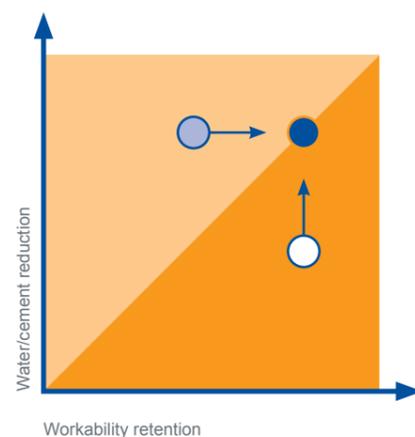


Mechanism of action

The dispersion effect of superplasticizers is based on the absorption of molecules on cement particles, imparting a negative charge that causes electrostatic repulsion and steric hindrance between them and, therefore, dispersion. The hydration, and particularly the ettringite formation, work against the superplasticizer. Already absorbed molecules are covered by the ettringite lawn, thus are ineffective. The particular configuration of the MasterGlenium SKY molecules allows its delayed absorption onto the cement particles and disperses them efficiently over a long period of time.

The molecular structure is essential for the early development of strength. With superplasticizers based on conventional polycarboxylate ether, the molecules cover the entire surface of the cement grain and build a barrier against contact with water. Therefore, the hydration process takes place slowly. The MasterGlenium SKY molecules on the other hand leave sufficient room on the cement surface to allow a rapid hydration reaction, resulting in high early strength development.

Evolution of admixtures performances



- New MasterGlenium SKY technology for ready-mix
- Traditional PCE technology for precast
- Traditional PCE technology for ready-mix

Nanotechnology

Nanotechnology is a science dealing with the interaction of extremely small objects measured in nanometres.

A nanometre (nm) is a millionth of millimetre – the dimension of molecules and polymeric chains. This technology has made enormous strides in the last decade on the predictability of both structure and properties. Today, each individual atom or molecule can be manipulated in order to design functionality into materials at the nanoscale.

In-house expertise in nanotechnology allows Master Builders Solutions Construction Chemicals to control the chemical and physical behaviour of polymers and their interactions with cement by augmenting chain length, side chain length and density, and electrical charges as well as free functional groups. For the first time, nanotechnology allows local requirements and conditions to be better met.



Benefits of Total Performance Control

Ready-mix producer

Ready-mix concrete is characterized by a great number and variety of different mix designs. Utilizing different types of fillers, cements and binders together with the increasing trend towards more performance, and durability based concrete specifications. At the same time, ready-mix producers must maintain their profitability in the face of rising materials, labour and equipment costs. As a result, producers are optimising their production and logistic costs. The Total Performance Control concept supports these goals by providing the capability of delivering high-quality concrete at any time to the job site. This new concept facilitates the production of concrete with both extended workability and a low water / cement ratio. Cost savings in production may be realized through mix design optimizations for cement types and aggregate composition. In addition, the single product MasterGlenium SKY is suitable for many applications. As a result, it enables ready-mix producers to optimize inventory, to facilitate logistics and to reduce investments in tanks and dispenser equipment and thus also, decreases maintenance costs.

Contractor

The focus of the contractor is twofold. During the placing process, contractors require easy placing and finishing characteristics as well as extended workability. After placing, the need for fast strength development arises; certain minimal strengths must be achieved before a structural element can be removed from its form and borne off. The faster a form can be reused, the more profitable the process. Increased early strength makes more rapid reutilization of the form possible, therefore shortening the production cycle. The building process is quicker, and equipment and personnel can be employed more efficiently. When a self consolidating concrete is used, broader savings are possible such as reduction in labour, equipment and time.

The Total Performance Control concept ensures the placed concrete is as specified and ordered from the ready-mix plant. The requirements of easy placing and finishing as well as early strength development are achieved by using MasterGlenium SKY.



Engineer

The engineering community is increasingly designing structures with far more emphasis on durability and service life. Service life expectations of over 100 years are no longer uncommon and as the demand for taller, longer, more complex structures increases so will the need for a concrete to meet these challenging needs.

To optimize costs during the whole service life, it is necessary to process a high-quality concrete with better durability and to ensure

that concrete meets original specifications. The three distinct features essential for high-quality concrete and thus higher durability are a low water / cement ratio, long workability and complete compaction. The Total Performance Control concept with MasterGlenium SKY allows the design, production and placement of a concrete meeting these performance criteria simultaneously. (Of course adequate curing should also be considered). As a result, longer service lives with less maintenance work. Therefore, optimized economy are given.



Conclusion

Total Performance Control and MasterGlenium SKY technology introduce a new generation of superplasticizers, solving the needs of the entire ready-mix industry:

- Ensuring a constant high-quality concrete at a low water / cement ratio.
- Providing a concrete with extended workability at high temperatures, without delayed strength development.
- Ensuring a concrete that meets the original specification from the fresh to the hardened stage.
- Offering a single, versatile admixture for many types of applications and conditions.
- Facilitating the production of self-consolidating concrete when used in conjunction with MasterMatrix®.



With Master Builders Solutions, you will find a competent and professional partner that will optimize the use of concrete in every situation. Increasing quality and durability, safety and aesthetics, we work within the framework of environmental responsibility and the economic realities of the industry.

Maximizing the performance of concrete is central to everything we do.



Master Builders Solutions 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

MasterEmaco®

Solutions for concrete repair

MasterFinish®

Solutions for formwork treatment

MasterFlow®

Solutions for precision grouting

MasterFiber®

Comprehensive solutions for fiber reinforced concrete

MasterGlenium®

Solutions for hyperplasticized concrete

MasterInject®

Solutions for concrete injection

MasterKure®

Solutions for concrete curing

MasterLife®

Solutions for enhanced durability

MasterMatrix®

Advanced rheology control solutions for self-consolidating concrete

MasterPel®

Solutions for water tight concrete

MasterPolyheed®

Solutions for high performance concrete

MasterPozzolith®

Solutions for water-reduced concrete

MasterProtect®

Solutions for concrete protection

MasterRheobuild®

Solutions for superplasticized concrete

MasterSeal®

Solutions for waterproofing and sealing

MasterRoc®

Solutions for underground construction

MasterSet®

Solutions for retardation control

MasterSure®

Solutions for workability control

MasterTop®

Solutions for industrial and commercial floors

Master X-Seed®

Advanced accelerator solutions for pre-cast concrete

Ucrete®

Flooring solutions for harsh environments

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