

**MASTER<sup>®</sup>**  
**» BUILDERS**  
SOLUTIONS

— MasterGlenium<sup>®</sup>

SKY

**Total Performance Control of the  
Ready-Mix Concrete**



# MasterGlenium® SKY

## Facilitates Total Performance Control

MasterGlenium® SKY is a powerful solution that provides total performance control to meet the demands of the ready-mix concrete industry by saving time and money whilst supporting the achievement of ambitious sustainability goals.



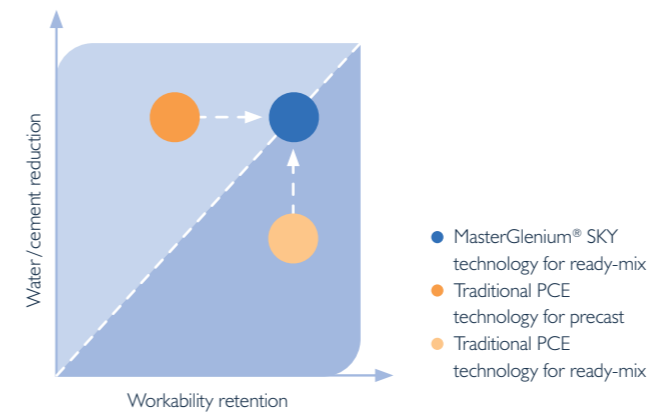
Our reference in Chavannes-près-Renens (Switzerland): Student residence

The well-established generation of superplasticizers, MasterGlenium® SKY are comprised of a technology that combines the seemingly contradictory performance characteristics of high-water reduction and extended workability retention in a single admixture.

Concrete manufactured using MasterGlenium® SKY has specific high-performance characteristics throughout the value chain. Beginning with production at the batching plant, delivery and placement followed by the hardening process, MasterGlenium® SKY meets the technical expectations of ready-mix producers, contractors and engineers.

MasterGlenium® SKY admixtures are an outcome of the development and optimization of polymeric structures which has only been possible through the comprehension of their chemical interaction with cement and in particular their effect on workability retention. This holistic approach of Master Builders Solutions® in product development controls the chemical and physical performance of polymers and their interaction with cement by optimizing the density and length of the side chain, the electrical charges and the free functional groups. The result is a MasterGlenium® SKY product range that is engineered to meet local requirements and conditions.

### Evolution of admixtures performances



Our reference in Mont Saint-Michel (France): Dam over the Couesnon

© Photo: Daniel Fondimare (SM Baie)

### MasterGlenium® SKY at a glance:

- Consistently high-quality concrete at low water / cement ratios
- Prolonged workability of concrete even at high temperatures without delaying strength development
- Meets the desired specifications of concrete through all the hardening stages
- Economic optimization of the mix design while positively impacting sustainability
- Versatile chemistry that can be adapted to many applications under varying conditions



# MasterGlenium® SKY

## A Powerful Combination of Performance, Economy and Sustainability

Water content is the prime factor influencing the properties of concrete in the fresh and hardened states. In the fresh state, water content determines the workability of concrete or the ease with which it can be placed. High consistency concrete (slump > 200 mm) can be placed with little external effort. The degree of compaction also affects the durability of the finished structure. Maintaining workability is important for the transportation and placement of the concrete and performance will depend on the cement type, the admixtures and the temperature of the fresh concrete.

The durability of a concrete structure is related to exposure conditions and depends on the water/cement ratio, homogeneity and degree of compaction.

Compared to previous generations of superplasticizers that excelled in either water reduction or workability retention, MasterGlenium® SKY combines the properties of both improved water reduction and extended workability retention. Characteristics that are difficult to reconcile at the highest technical level.

### Economy

- Reduced raw material costs through optimization of the mix design
- Reduced labor intensity through easier placement and finishing
- Utilization of secondary raw materials or recycled aggregates

### Performance

- Extended workability retention
- Water reduction
- Highly robust concrete

### Sustainability

- Reduced CO<sub>2</sub> emissions by facilitating the use of low clinker cements
- Wide use of supplementary cementitious materials (SCMs)
- Natural resource preservation by enabling the use of locally available raw materials



Our reference in Limassol (Cyprus): ONE Limassol Tower

### Water/consistence classes

Consistence class	S1	S2	S3	S4	S5	S6
Slump (cm)	1–4	5–9	10–15	16–20	> 20	> 65*
Water requirement (l/m <sup>3</sup> )						
No admixture	180	195	205	215	225	not feasible
Previous admixture generation for workability retention (dosage 1.2% bwc)	145	155	165	175	180	180–190
Previous admixture generation for water reduction (dosage 1.0% bwc)	125	135	145	155	160	160–170
MasterGlenium® SKY (dosage 1.0% bwc)	125	135	145	155	160	160–170

\*Slump flow

Compared to conventional admixtures for workability retention, MasterGlenium® SKY not only shows that it improves the consistency class but also significantly reduces the water content:

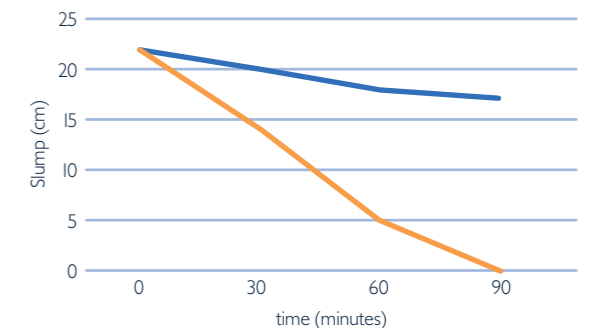
- Consistency class is improved by two levels
- Water content is improved from S2 to S4 (155 l/m<sup>3</sup>) and S3 to S5 (165 l/m<sup>3</sup>)
- Optimized cement content

Subsequently the water content can be reduced by 20 liters which can also be expressed as a cement content reduction as follows:

- A water/cement ratio of w/c = 0.65 results in a cement reduction of 30 kg
- A water/cement ratio of w/c = 0.50 results in a cement reduction of 40 kg
- A water/cement ratio of w/c = 0.45 results in a cement reduction of 45 kg

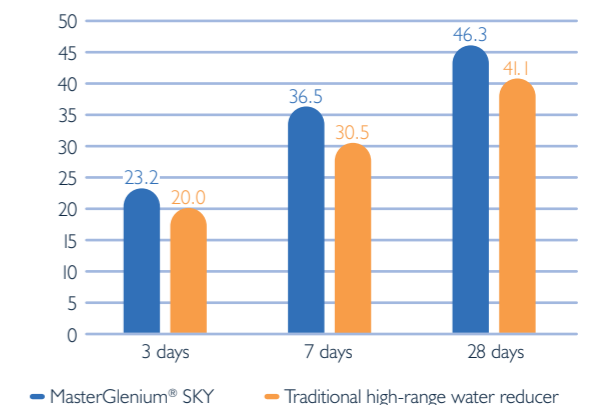
MasterGlenium® SKY achieves the desired strengths even with a lower cement content and supports the ready-mix industry in meeting its challenging CO<sub>2</sub> reduction targets.

### Workability retention



— MasterGlenium® SKY: 240 kg/m<sup>3</sup> CEM II A/LL 42.5 R; water (total) 155 l/m<sup>3</sup>; w/c ratio = 0.64; admixture = 2.4 l/m<sup>3</sup>  
 — Traditional high-range water reducer: 270 kg/m<sup>3</sup> CEM II A/LL 42.5 R; water (total) 180 l/m<sup>3</sup>; w/c ratio = 0.67; admixture = 2.7 l/m<sup>3</sup>

### Compressive strength (MPa)



Removing 30 kg of cement can save over 20 kg CO<sub>2</sub> emissions\*, while lowering the cost of the concrete.

\*Depending on the type of cement utilized



# Flexible and Customized Solutions

Concrete compositions can vary greatly depending on the applications and exposition classes. The nature of available sand and aggregates can also be quite diversified and will depend largely on the geographical location. At the same time, the depletion of natural resources and the need to recycle and reuse materials pose extreme challenges when trying to achieve the desired concrete performance. The construction industry is committed to achieving the relevant sustainability targets which will require a major effort towards increased utilization of locally available resources.

MasterGlenium® SKY is a flexible technology that, thanks to the accumulated competence and experience of the Master Builders Solutions® research centers, can be adapted to accommodate diversified types of locally sourced raw materials.

Master Builders Solutions® offers customized solutions that meet the needs of our customers locally and are optimized to achieve the sustainable utilization of natural resources through the efficient, economical, and environmentally friendly use of chemical admixtures in concrete.

## Boost your concrete performance and benefit from the combined power of MasterGlenium® SKY and ...

- MasterSuna® for challenging sands containing clay minerals or recycled aggregates
- MasterMatrix® for stability against segregation
- MasterLife® SRA for shrinkage and dimensional control
- MasterFiber® to minimize the need for reinforcement and avoid plastic shrinkage
- Master X-Seed® to accelerated hardening under demanding conditions



Our reference in Dohna (Germany): Seidewitztal Bridge A 17)

# Master Builders Solutions®

As Master Builders Solutions®, we are a leading global producer of responsible solutions for the construction industry, focussed on delivering our vision: **Inspiring people to build better.**

We provide value-added technology and market-leading R&D capabilities to improve the performance of construction materials and to enable the reduction of CO<sub>2</sub> emissions in the production of concrete. The comprehensive portfolio under the Master Builders Solutions® brand encompasses concrete admixtures, cement additives, and solutions for underground construction.

We collaborate across areas of expertise and regions and draw on the experience gained from countless construction projects worldwide, leveraging global 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.

Founded in 1909, Master Builders Solutions® operates 35 production sites globally, supporting you in mastering your building challenges of today and tomorrow – for a decarbonised future.



# Master Builders Solutions® for the Construction Industry

## MasterAir

Complete solutions for air entrained concrete

## MasterCast®

Solutions for the manufactured concrete product industry

## MasterCem®

Solutions for cement manufacture

## MasterCO<sub>2</sub>re™

Solutions for low-clinker concrete

## MasterEase®

Low viscosity for high performance concrete

## MasterFinish®

Solutions for formwork treatment and surface improvement

## MasterFiber®

Comprehensive solutions for fiber reinforced concrete

## MasterGlenium®

Solutions for high performance concrete

## MasterKure®

Solutions for concrete curing

## MasterLife®

Solutions for enhanced durability

## MasterMatrix®

Advanced rheology control for concrete

## MasterPel®

Solutions for hydrophobization, anti-efflorescence and surface protection

## MasterPolyheed®

Solutions for mid-range concrete

## MasterPozzolith®

Solutions for water-reduced concrete

## MasterRheobuild®

Solutions for high strength concrete

## MasterRoc®

Solutions for underground construction and surface improvement

## MasterSet®

Solutions for set control

## MasterSphere®

Solutions for guaranteed freeze-thaw resistance

## MasterSuna®

Solutions for sand and gravel in concrete

## MasterSure®

Solutions for extraordinary workability retention

## Master X-Seed®

Advanced accelerator solutions for concrete

## Unveil the Power of MasterCO<sub>2</sub>re™: Intelligent Cluster System for Low-clinker Concrete Production

[info.master-builders-solutions.com/en/masterco2re](http://info.master-builders-solutions.com/en/masterco2re)



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