

MASTER®
BUILDERS
SOLUTIONS

MasterLife WP 1000

Self-healing Crystalline Waterproofing Admixture for water-tight Concrete



Water treatment plant neat to La Salle - Aosta (Italy)

MasterLife WP 1000

Self-healing Crystalline Waterproofing Admixture for water-tight Concrete

MasterLife WP 1000 is a powder admixture added to the concrete mix in the batching plant or directly in the concrete mixer. It allows the production of waterproof concrete by forming crystals that diffusely close the capillary porosity of the cementitious matrix, providing concrete structures having watertight properties.
It is a special organic compound formulated near to the Research Laboratories of Master Builders Solutions Italy, that crystallizes in the presence of water and humidity above 95%, sealing the capillary pores and microcracks smaller than 0.4 mm.

MasterLife WP 1000 represents a valid alternative to surface waterproofing systems such as bentonite sheets or polymer-modified mortars, especially in foundation slabs in contact with the groundwater..

MasterLife WP 1000 ensures a reduction in the penetration of pressurized water, allowing the creation of water-tight concrete structures under the real construction site conditions.

The use of **MasterLife WP 1000** is recommended in all cases where the a waterproof, durable concrete is required, resistant to moderately aggressive environments and to positive or negative hydrostatic pressure, such as, for example, tanks, foundation works, foundation slabs, retaining walls, garages, parking lots and underground warehouses in the presence of groundwater, submerged structures, swimming pools, dams and barriers, ports and docks, tunnels and galleries.



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MasterLife WP 1000 gives waterproofing properties to the cement paste matrix by a crystallization process in addition to the hydration products of cement, and it has a healing effect on the cracks that could affect concrete elements as a result of the plastic and/or hygrometric shrinkage phenomena.

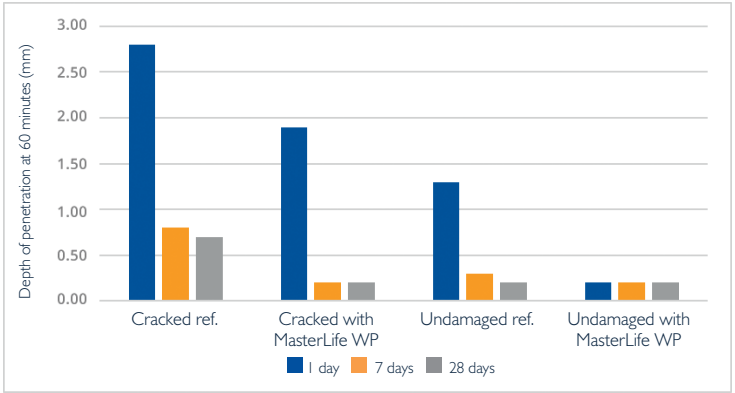
Specifically, thanks to the presence of **MasterLife WP 1000**, crystalline compounds form and grow over time in the cracks, sealing both short and long-term gaps in continuity, ensuring water absorption values in the cracked areas that are essentially identical to those having no cracks.

MasterLife WP 1000, therefore, will constantly and continuously repair all the cracks and microporosities that form over time. Above all, the crystalline reaction will be continuously reactivated in the presence of water or humidity. **MasterLife WP 1000** crystallizes in the presence of water and humidity above 95%, sealing capillary pores and microcracks smaller than 0.4 mm.

Healing of cracks thanks to the formation of crystalline compounds of MasterLife WP 1000 after 2 and 7 days of contact with water



Water absorption determined with Karsten tubes on the intact or cracked surface of concrete slabs



In cracked slabs, water absorption decreases in concrete mixed with MasterLife WP 1000, regardless of the age of the concrete. Furthermore, after 7 days, concrete with MasterLife WP 1000 admixture exhibits identical absorption values in both intact and cracked areas.

Essentially, after 7 days, the self-healing power of **MasterLife WP 1000** allows intact and cracked areas of the concrete to be equal in terms of water absorption.

The addition of **MasterLife WP 1000** allows for the reduction of absorption through the cracks generated by shrinkage in the plastic phase, highlighting that concrete with MasterLife WP 1000 has a self-healing capacity (self-repairing or self-healing) of the cracks, thanks to which it is possible to limit the absorption of water through the continuity solutions.

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Self-healing Crystalline Waterproofing Admixture for water-tight Concrete

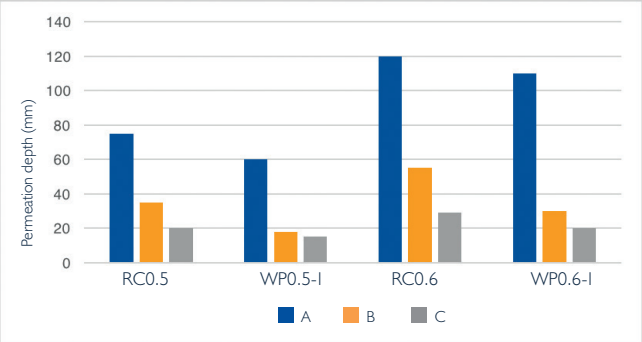
An experimental research was conducted at the laboratories of the University of Bergamo on specimens prepared with standard concrete (RC) or with 1.0% of **MasterLife WP 1000 (WP)** with two w/c ratios equal to 0.6 and 0.5 respectively and cured with three different methodologies:

A) stored in formwork for 24 hours at a temperature of 20°C and then left in the air (T=20°C and RH 60%): wet curing 1 g;

B) stored in formwork for 24 hours at a temperature of 20°C, then immersed in water (T=20°C) for 7 days and subsequently left in the air (T=20°C and RH 60%): humid curing;

C) stored in a formwork for 24 hours at a temperature of 20°C and then immersed in water (T=20°C): wet curing.

Concrete permeability - Permeation tests according to UNI EN 12390-8



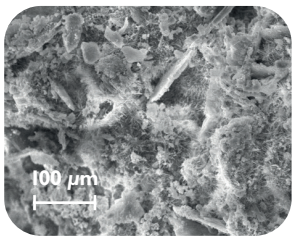
With a concrete mix with a w/c ratio of 0.5 (Rck 40 MPa), the required hydraulic seal (pH2O ≤ 20 mm) is achieved only with a wet curing period of 28 days, which is never guaranteed on real construction sites. Only with the addition of the MasterLife WP 1000 additive are pH2O levels ≤ 20 mm achieved with a curing period of just 7 days.

Concrete with MasterLife WP 1000 and a w/c ratio of 0.6 (Rck 30 MPa) cured for 7 days had a lower water penetration (30 mm) than that (35 mm) recorded for concrete with a w/c ratio of 0.50 (Rck 40 MPa), but mixed without the admixture.

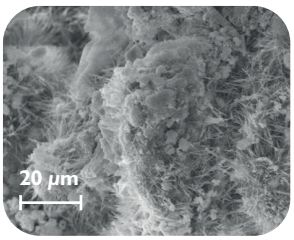
MasterLife WP 1000 presents itself as an effective solution to compensate for the shorter duration of wet curing (compared to the theoretical laboratory duration) of real structures, allowing the achievement of the hydraulic seal requirement which, otherwise, in the absence of the additive would become an unattainable objective on the real construction site.

SEM images of the fracture surfaces of WP 0.50-1 concrete.
Note the presence of crystals formed by MasterLife WP 1000, partially occluding the capillary pores.

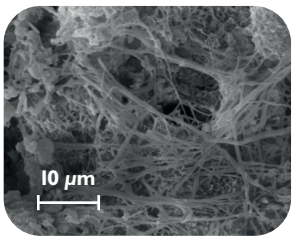
1000 x



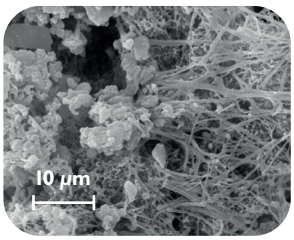
2500 x



10000 x



10000 x



MasterLife WP 1000

References



Construction of the new sports hall in ORISTANO, Sardinia, Italy

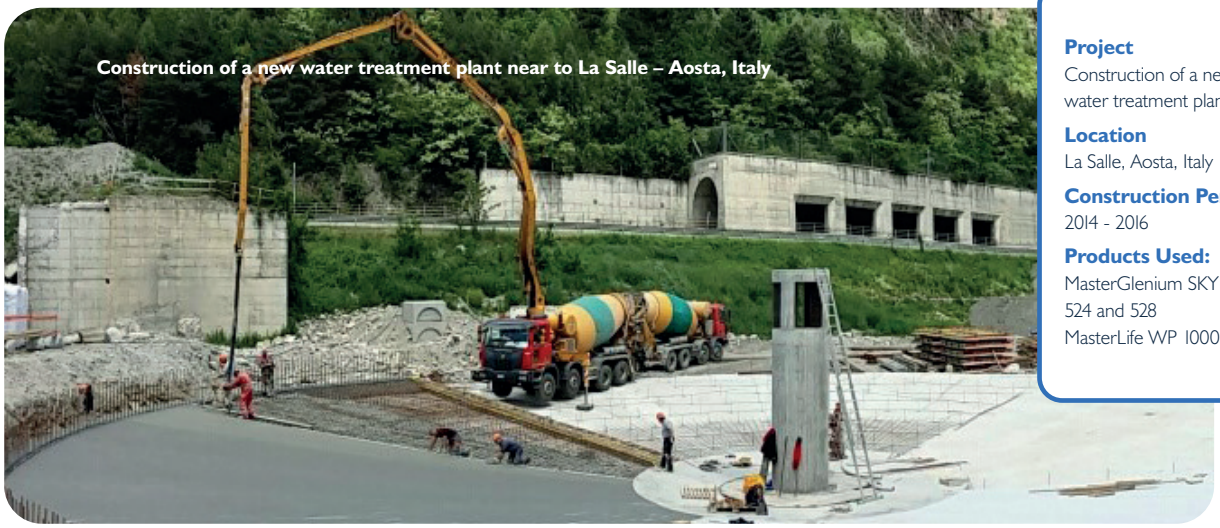
Project
Construction of the new sports hall

Location
Oristano, Sardinia, Italy

Construction Period
2016 - 2017

Products Used
MasterGlenium SKY 624
MasterLife WP 1000

To build the foundation for the new sports hall in Oristano, we used our additives: MasterGlenium SKY 624, a highly effective water-reducing admixture; MasterLife WP 1000, Self-healing Crystalline waterproofing admixture for water-tight concrete.



Construction of a new water treatment plant near to La Salle – Aosta, Italy

Project
Construction of a new water treatment plant

Location
La Salle, Aosta, Italy

Construction Period
2014 - 2016

Products Used:
MasterGlenium SKY 524 and 528
MasterLife WP 1000

Design of a new urban wastewater treatment plant serving the Valdigne Mont-Blanc Mountain Community (municipalities of Courmayeur, Pré Saint Didier and La Salle) located along the Dora stream in the municipality of La Salle (AO). Since waterproofing and hydraulic sealing of the structures were required, we used our additives: MasterGlenium SKY 524 and 528, highly effective water-reducing additives; MasterLife WP 1000, Self-healing Crystalline waterproofing admixture for water-tight concrete.

Master Builders Solutions®

At Master Builders Solutions®, we are a global leader in responsible solutions for the construction industry, driven by our vision to **inspire people to build better.**

We provide value-added technologies and advanced R&D capabilities aimed at continuously improving the performance of construction materials and enabling the reduction of CO_{2}[2] emissions throughout the concrete production process.

The comprehensive Master Builders Solutions® portfolio includes concrete admixtures and additives, cement additives, and solutions for underground construction.

Through our product portfolio and our technical and technological expertise, we are ready to help you address and overcome any challenge in the construction industry.

We operate in more than 60 countries worldwide, drawing on the experience gained from countless successfully completed projects. By combining globally developed technologies with our in-depth understanding of diverse local construction requirements, we are able to innovate, contribute to your success, and support you on the path towards more sustainable construction.

Founded in 1909, Master Builders Solutions® operates 35 production sites worldwide. This global presence enables us to support you in meeting the challenges of today and tomorrow, working together towards a decarbonized future.



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Solutions for air-entrained concrete

MasterBoost®
Solutions to boost strength development in low-clinker systems

MasterCast®
Solutions for semi-dry manufactured concrete products

MasterCell®
Solutions for lightweight concrete

MasterCem®
Solutions for cement production

MasterCO$_2$re®
Solutions for low-clinker concrete

MasterColor®
Solutions for architectural concrete

MasterCrete®
Solutions for the repair and strengthening of existing concrete structures

MasterEase®
Solutions for enhanced concrete rheology and low viscosity

MasterFiber®
Solutions for fibre-reinforced concrete

MasterFill®
Solutions for structural injection

MasterFinish®
Solutions for formwork release and surface finishing

MasterFlux®
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Solutions for high-performance concrete with high workability and low water/cement ratios

MasterJoint®
Solutions for joint treatment

MasterKure®
Solutions for concrete curing

MasterLife®
Solutions for enhanced concrete durability

MasterMatrix®
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MasterPel®
Solutions for water repellency, efflorescence control and surface protection

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MasterRoc®
Solutions for underground construction and ground improvement

MasterSet®
Solutions for hydration control

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Solutions for the protection of reinforced concrete structures

MasterShield® WP
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https://info.master-builders-solutions.com/x-seed300next



Master Builders Solutions Italia Spa
Via Vicinale delle Corti, 21
31100 Treviso, Italy
T +39 0422 429200

infomac@masterbuilders.com
https://www.master-builders-solutions.com/it-it

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