Made by: Giorgio Chinca (R&D Manager)
Location: Avalon R&D Lab, Sassuolo Italia
Approved by: Georgi Bonchev (CEO)

AQUA BARRIERA
NANO SMART

Two component cement based mortar, flexible down to -20˚C, with crack bridging capacity over 2 mm, for waterproofing balconies, terraces, bathrooms and swimming pools.

Complies with EN 14891

/Liquid applied water impermeable products for use beneath ceramic tiling bonded with adhesives. /

AQUA BARRIERA *NANO SMART* is used for waterproofing and protection of concrete structures, renders and cementitious screeds.
Some application examples:
• Waterproofing of concrete basins used for containing water.
• Waterproofing bathrooms, showers, balconies, terraces, swimming pools, etc. before laying ceramic tile finishes.
• Waterproofing of plasterboard, render or cementitious surfaces, lightweight cement blocks and marine-grade plywood.
• Flexible smoothing layer for light-sectioned concrete structures, including those subjected to minor deformation when under load (e.g. pre-cast panels).
• Protection of renders or concrete with cracks caused by shrinkage, against the infiltration of water and aggressive atmospheric elements.
• Protection, against the penetration of carbon dioxide, of concrete pillars beams and road and railway viaducts repaired with products from the Avalon range, and structures with an insufficient layer of concrete covering on the reinforcement rods.
• Protection of concrete surfaces which may come into contact with seawater, de-icing salts, such as sodium or calcium chloride, and sulphates.

ADVANTAGES
• Remains flexible at very low temperatures (-20°C).
• CE-certified product in compliance with EN 14891.
• Protects the surface of concrete from CO2 penetration (carbonation).
• Resistant to UV rays.
• 2.5 mm of **AQUA BARRIERA *NANO SMART*** represents the equivalent of 30 mm of concrete against the aggressive action of chlorides (w/c ratio 0.45).
• May also be applied on existing coverings.
• Compatible with ceramic, mosaic and natural stone coverings.

TECHNICAL CHARACTERISTICS

AQUA BARRIERA *NANO SMART* is a two-component mortar based on cementitious binders, fine-grained selected aggregates, special admixtures and synthetic polymers dispersed in water, blended according to a formula developed in Avalon's own research laboratories in Sassuolo /Modena/ Italy.

When the two components are mixed together, a free-flowing mix is obtained which may be easily applied, even on vertical surfaces, at a thickness of up to 2 mm in one single coat.

Due to the high content and quality of the synthetic resins, the cured layer of **AQUA BARRIERA *NANO SMART*** remains constantly flexible under all environmental conditions and resistant to the chemical attack of de-icing salts, sulphates, chlorides and carbon dioxide.

AQUA BARRIERA *NANO SMART* has excellent bonding properties to all concrete, masonry, ceramic and marble surfaces, as long as they are sound and sufficiently clean.

This property, together with its resistance to the deteriorating effect of UV rays, a characteristic of this product, ensures that structures protected and waterproofed with **AQUA BARRIERA *NANO SMART*** have a long service life, even if they are located in areas with particularly difficult climatic conditions, in coastal areas with a saline rich atmosphere or industrial areas where the air is particularly polluted.

- Do not use **AQUA BARRIERA *NANO SMART*** for thick coatings (more than 2 mm per coat).
- Do not apply **AQUA BARRIERA *NANO SMART*** at temperatures below +5°C.
- Do not add cement, aggregates or water to AQUA BARRIERA *NANO SMART*
- Protect from rain and water spillage for the first 24 hours after application.
- Do not apply **AQUA BARRIERA *NANO SMART*** on unprotected surfaces in swimming pools.

APPLICATION PROCEDURE

Preparation of the substrate (see AQUA BARRIERA video in YouTube):

A) Protection and waterproofing of concrete structures and pre-cast units (e.g. pillars and beams for road and railway viaducts, cooling towers, chimneys, underpasses, retaining walls, applications in coastal areas, basins, canals, faces of dams, columns, balcony fronts).

The surface to be treated must be sound and perfectly clean. Remove all cement laitance, flaky parts and traces of powder, grease, oil and form release agents by sand-blasting, or wash down with high-pressure water jets.

If the structure to be waterproofed and protected with **AQUA BARRIERA *NANO SMART*** is in poor condition, remove the damaged parts by hand or mechanical abrasion or by using a hydro-demolition system or a hydro-scarifier.

The last two techniques, which use high-pressure water, are particularly recommended because the reinforcement rods are not damaged and the structures are not subject to vibration which could cause the onset of small cracks in adjacent concrete.

Once the rust has been completely removed by sandblasting, carry out the repair with a pre-blended mortar from the HERCULES range.

Absorbent surfaces to be treated with **AQUA BARRIERA *NANO SMART*** must be slightly dampened beforehand with water.

B) Waterproofing terraces, balconies and swimming pools

- CEMENTITIOUS SCREEDS:

– if thicknesses of up to 30 mm have to be levelled out (to create slopes, fill in dips, etc.) use

AVAGROUT T30.
• EXISTING FLOORS:
– existing floors and coverings in ceramic, porcelain tiles, clinker or terracotta, etc. must be well bonded to the substrate and free of substances which could compromise the bonding, such as grease, oil, wax, paint, etc. To remove material that could affect the adhesion of **AQUA BARRIERA *NANO SMART*** , clean the floor with a mixture of water and 30% caustic soda, then thoroughly rinse the floor with clean water to eliminate all traces of caustic soda.
• RENDERS:
– cementitious renders must be sufficiently cured (7 days per mm of thickness in good weather conditions), well bonded to the substrate, resistant and free from all dust and paint;
– dampen absorbent surfaces to be treated beforehand with water. Close up of the waterproofing layerIn the waterproofing sector, more than in any other sector, it is essential that particular attention is paid to details, which alone are capable of making a difference.
This is why AquaSTAR 120 Plus and other special accessory articles are indispensable and a determining factor. AquaSTAR 120 Plus is used to seal structural joints and joints subject to high dynamic stress. AquaSTAR 120 Plus is used to waterproof check joints, fillet joints between horizontal and vertical elements and special kits from the Drain range are used to seal drain holes. It is imperative that special care is in these critical areas after levelling and cleaning the substrate and before applying the cementitious waterproofing mortar.

Preparation of the mortar (see AQUA BARRIERA video in YouTube):
Pour component B (liquid) into a suitable, clean container, then slowly add component A (powder) while stirring with a mechanical mixer.
Carefully mix **AQUA BARRIERA *NANO SMART*** for a few minutes, making sure that no powder remains stuck to the sides or the bottom of the container. Keep stirring until a perfectly homogenous mix is obtained. Use a low-speed mechanical mixer for this operation to avoid too much air being dragged into the mix. Do not prepare the mix by hand.
Preparation of **AQUA BARRIERA *NANO SMART*** may also be carried out with a mortar mixer, which is usually supplied with mortar sprayers. If this technique is used, make sure that the mix is homogenous and has no lumps before it is poured into the hopper of the pump.

Manual application of the mortar(see AQUA BARRIERA video in YouTube):
Apply **AQUA BARRIERA *NANO SMART*** within 60 minutes of mixing.
Skim the prepared surface to a feather edge with a thin layer of **AQUA BARRIERA *NANO SMART*** with a smooth trowel then, while the first coat is still fresh, apply a second coat to form a final thickness at least 2 mm thick. When waterproofing terraces, balconies, basins and swimming pools, we recommend embedding alkali-resistant reinforcement mesh in the first coat of **AQUA BARRIERA *NANO SMART*** while it is still wet. The mesh must also be used in areas with either small cracks or in areas which are under particular stress. After the mesh has been laid, finish off the surface with a flat trowel and apply a second layer of **AQUA BARRIERA *NANO SMART*** when the first one has set (after 4-5 hours). After applying **AQUA BARRIERA *NANO SMART***, wait 5 days for curing before laying ceramic tiles. In favourable climatic conditions and with good temperatures this period may be reduced to 24 hours on damp substrates.

Laying ceramic tiles on AQUA BARRIERA *NANO SMART* (see AQUA BARRIERA video in YouTube):
• BALCONIES AND TERRACES:
– bond in place using a C2 class cementitious adhesive such as AVAGEL, AERO FLEX.
– seal the movement joints with a special elastic sealant.

• SWIMMING POOLS:
– bond ceramic tiles in place using a C2 class cementitious adhesive (AVAGEL, AERO FLEX).

Application of AQUA BARRIERA *NANO SMART* by spraying:
After preparing the surface (see paragraph on "Preparation of the substrate"), apply **AQUA BARRIERA *NANO SMART*** with a spray gun with a lance fitting suitable for use with smoothing mortars, at a minimum thickness not less than 2 mm per layer.
If a thicker layer is required, **AQUA BARRIERA *NANO SMART*** must be applied in several coats. Successive coats must only be applied when the previous one is dry (after 4-5 hours).
In areas with small cracks or which are highly stressed, insertion of alkali-resistant reinforcement mesh in the first layer of fresh **AQUA BARRIERA *NANO SMART*** is recommended. Immediately after laying the mesh, **AQUA BARRIERA *NANO SMART*** must be smoothed off with a flat trowel.
If the mesh needs to be encapsulated, a further layer of **AQUA BARRIERA *NANO SMART*** may be applied with a spray gun.
When **AQUA BARRIERA *NANO SMART*** is used for protecting beams and columns on bridges, railway underpasses and façades on buildings etc., the product may be painted using products from the Avalon range, which are acrylic resin-based water dispersions and are available in a wide range of colours.
If **AQUA BARRIERA *NANO SMART*** is used, on the other hand, to protect horizontal surfaces not used for foot traffic such as flat roofs, it may be painted over with Avalon acrylic resin-based flexible paint in water dispersion.

PRECAUTIONS TO BE TAKEN DURING AND AFTER APPLICATION
• No special precautions need to be taken when the temperature is around +20°C.
• During hot weather, it is advisable to keep the product out of direct sunlight (powder and liquid).
• After application, and in particularly dry, hot or windy weather, it is recommended to protect the surface from rapid evaporation by covering it with sheets.

TECHNICAL PERFORMANCE DATA:
The technical data table contains the identification and application data for the product.
The crack-bridging capacity of **AQUA BARRIERA *NANO SMART*** is determined by measuring the maximum width of the crack in the concrete at the moment Aqua BARRIERA fractures.
The degree of protection offered by **AQUA BARRIERA *NANO SMART*** to the concrete substrate is not limited to a simple "covering" of subsequent cracks provoked by heavy loads, shrinkage, temperature variations etc.

AQUA BARRIERA *NANO SMART* itself is also very resistant to chemical attack, as illustrated by the results of the following tests, and offers good protection for the concrete against carbonation and, therefore, subsequent corrosion of the reinforcing rods.
The **AQUA BARRIERA *NANO SMART*** membrane also protects the concrete from the action of sodium chloride (for example seawater).

AQUA BARRIERA *NANO SMART* also provides an impenetrable barrier against calcium chloride (CaCl2) based de-icing salts, which have a destructive action on even the highest quality concrete.

TECHNICAL DATA	
Consistency (comp. A)	gray powder
Consistency (comp. B)	white liquid
Specific weight (dry)	1,4 gr/cm³
Consumption	1,7 kg/m² for each mm of thickness
Max thickness of application	< 2 mm for one layer
Min total thickness of the system	> 2 mm
Pot life	60 min
Time between first and second hand	3-5 hours
Time before applying tiles on Aqua Barriera	> 24 hours
Temperature of application	from +5℃ to +35 ˚C
Resistance to the time	Excellent
Ready for exploitation	after 28 days

FINAL PERFORMANCE - thickness 2 mm		
Characteristics	Requirements according to EN 1504-2	Performance figures for Aqua Barriera *Nano Smart*
Adhesion to concrete - after 28 days at +20°C and 50% R.H. (N/mm²):	For flexible systems with no traffic: ≥ 0.8, with traffic: ≥ 1.5	2 N/mm²
Thermal compatibility to freeze/thaw cycles with de-icing salts, measured as adhesion (N/mm²):	For flexible systems with no traffic: ≥ 0.8 with traffic: ≥ 1.5	1 N/mm²
Adhesion to concrete - after 7 days at +20°C and 50% R.H. + 21 days in water (N/mm²):	No required	2 N/mm²
Characteristics	Requirements according to EN 14891	Performance figures for Aqua Barriera *Nano Smart*
Adhesion after immersion in basic water (N/mm²):	≥ 0.5 N/mm²	1.5 N/mm²
Adhesion after immersion in chlorinated water (N/mm²):	≥ 0.5 N/mm²	0.8 N/mm²
Crack-bridging ability at +23°C (mm):	≥ 0.75 mm	2,00 mm
Crack-bridging ability at -20°C (mm):	≥ 0.75 mm	1,0 mm
Impermeability to water under pressure (1.5 bar for 7 days of positive lift):	No penetration	No penetration
Resistance at UV - ray		resistant

Cleaning
Due to the high bonding strength of **AQUA BARRIERA *NANO SMART***, even on metals, it is recommended to wash work tools with water before the mortar sets. Once it has set, cleaning may only be carried out by mechanical means.

CONSUMPTION
Manual application:
approx. 1.7 kg/m² per mm of thickness.
Spray gun application:
approx. 2.2 kg/m² per mm of thickness.
*The consumption figures indicated are for a seamless film applied on a flat surface and will be higher on uneven surfaces.

PACKAGING
Units of 33,35 kg: component A: 25 kg bags, component B: 8,35 kg tanks.
Units of 16 kg: component A: 12 kg bags; component B: 4 kg tanks.

STORAGE
AQUA BARRIERA *NANO SMART* component A may be stored for up to 12 months in its original packaging.
AQUA BARRIERA *NANO SMART* component B may be stored up to 24 months.
Store **AQUA BARRIERA *NANO SMART*** in a dry place and at a temperature of at least +5°C.

SAFETY INSTRUCTIONS FOR PREPARATION AND APPLICATION
AQUA BARRIERA *NANO SMART* component A contains cement that when in contact with sweat or other body fluids causes irritant alkaline reaction and allergic reactions to those predisposed. It can cause damage to eyes. In case of contact with eyes or skin wash immediately with plenty of water and seek medical attention.
AQUA BARRIERA *NANO SMART* component B is not considered dangerous according to the current regulation regarding the classification of mixtures. It is recommended to wear gloves and goggles and to take the usual precautions taken for the handling of chemicals.
For further and complete information about the safe use of our product please refer to the latest version of our Material Safety Data Sheet.

QUALITY STANDARDS
Manufacturing quality assurance standards conform to EN ISO 9001.
All Avalon products are supplied with product guarantee to be free from manufacturing defects and to be fit for purpose. The guarantee covers materials replacement costs and labor.
This guarantee is subject to use of product in accordance with Avalon's instructions and technical data, and good working practice.
No liability can be accepted for any loss or damage arising from incorrect use of products or poor workmanship, over which Avalon has no control.
Contact Avalon Marketing Department for full details.

PRODUCT FOR PROFESSIONAL USE.

WARNING

Although the technical details and recommendations contained in this product data sheet correspond to the best of our knowledge and experience, all the above information must, in every case, be taken as merely indicative and subject to confirmation after long-term practical application; for this reason, anyone who intends to use the product must ensure beforehand that it is suitable for the envisaged application. In every case, the user alone is fully responsible for any consequences deriving from the use of the product.

Prepared by: Giorgio Chinca Signature

(Research and Development Manager)

Location: Avalon R&D Lab, Sassuolo Italy

Approved by: Georgi Bonchev Signature:
(General Manager)

Quality control: Tunai Yumerov Signature:
(Production Manager)