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TREATMENT OF DAMP WALLS



ARREGHINI®

ITALIAN PAINTS SINCE 1950



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TREATMENT OF DAMP WALLS

Mineral substrates are continuously exposed to stress due to chemical and atmospheric agents that can cause the degradation of the structures. Water, both in its liquid state and in the form of vapour, presents the most serious threat.



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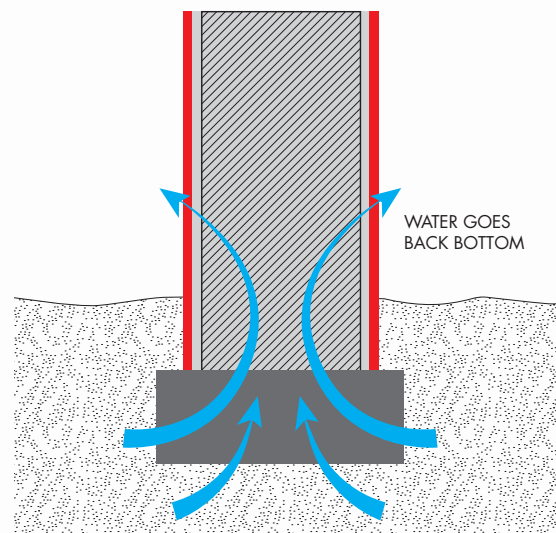
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DIAGNOSTICS OF THE PROBLEM

HUMIDITY AND SALTS

Once of the most frequent phenomena encountered in masonry works is, in fact, the presence of water in the lower parts which, penetrating from the ground up, expands by capillary action. Rising damp is a rare phenomenon in recently constructed buildings in which appropriate materials are used and in which the buried parts are well waterproofed.

It is, on the other hand, very frequent in old buildings found in the historical areas of towns, due to insufficient waterproofing.



These salts may come from the ground, from the water (which always contains dissolved salts) or from masonry works which contain substantial quantities of salts coming both from the original raw materials, or from the aggregates used in the lime and cement mixes.

As the water rises inside the structure, it reaches the outside and, after evaporation, deposits the salts on the surface of the walls. These are deposits of substances on the structure which are usually whitish in colour with a crystalline, powdery or thread-like appearance. Old buildings, therefore, after having been subjected for prolonged periods to capillary rise, can accumulate a huge quantity of salts in their walls.

This destructive effect can increase if the wall is in contact with hygroscopic salts, such as chlorides in a marine atmosphere, sulphates in an industrial atmosphere, or nitrates – often present in agricultural sites formerly used as dung or manure deposits.

The greater the quantity of salts contained in the water and the more impermeable the coating – preventing evaporation – the greater capillary absorption will be.

All the construction materials such as plaster, bricks, brickwork and concrete supports in general are extremely porous. These pores are inter-communicating and form a dense capillary network into which moisture can seep from the ground, along the foundations of buildings that are not sufficiently waterproofed.

Practically all traditionally built walls in direct contact with the damp ground are subject to this phenomenon, and building mortar acts as a means of propagation and bridge for isolated structures.

In the case of rising damp, in addition to the presence of water, which can easily rise to approx. 80-100 centimetres, further damage is caused by soluble salts which tend, on the whole, to be sulphates, but in some cases may also be chlorides or nitrates.



PHYSICAL DETERIORATION

The presence of water can change, and in extreme cases, destroy the properties of the building materials. Freezing, for example, increases the volume of water by approx. 10%. Under certain conditions, this expansion in the capillary structure causes cracking and splitting of the masonry.



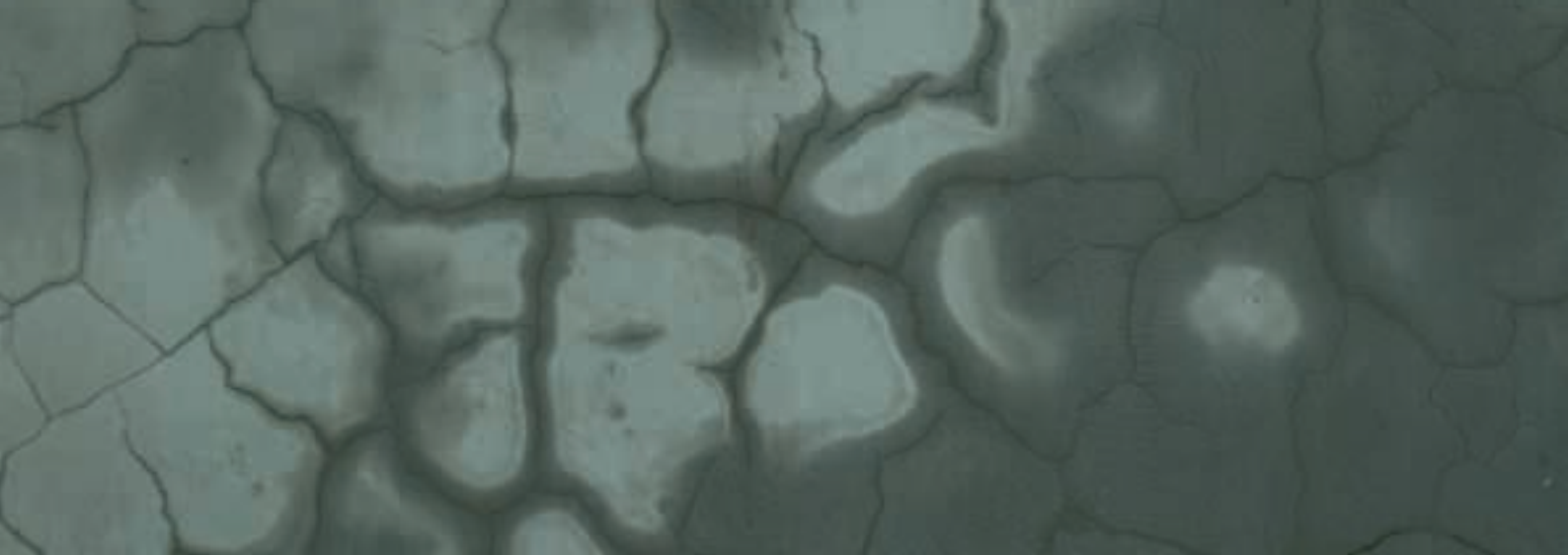
CHEMICAL DEGRADATION

Excessive internal moisture also brings about a deterioration in the consistency of the masonry. The water present, in fact, acts as a vehicle for all the soluble salts existing in the substrate or in the soil, causing remarkably destructive effects. In the presence of moisture, acidic gases such as carbon or sulphur dioxide and salts (sulphates, chlorides and nitrates) interact with calcareous binders, lime and calcium carbonate, making them soluble, leading to the deterioration of the texture of the masonry as a result. After the saturation or evaporation of the water, the crystallization of the salts causes an increase in volume, developing a pressure that is so high that it causes splitting of the structure.



BIOLOGICAL DEGRADATION

Another type of damage caused by persistent moisture inside the masonry is the onset and the proliferation of plant microorganisms, mould, lichens, algae, fungi and moss. The propagation of these microorganisms can lead to the disintegration of the building material and to a reduction in living comfort, if this phenomenon were to emerge in interior environments.



LOSS OF THERMAL INSULATION

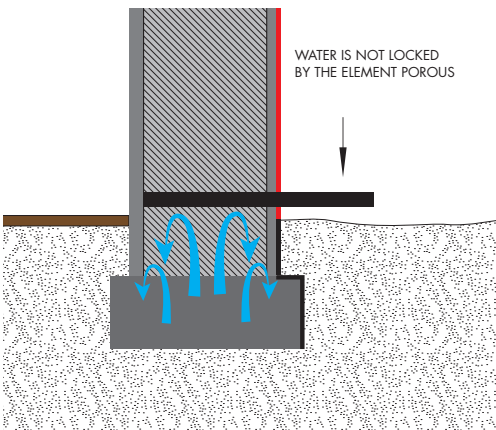
An excessively damp wall can lose up to 50% of its insulating power compared to a dry wall. In addition to reducing living comfort, this considerable heat dispersion also generates higher energy costs.

SOLUTIONS AND REHABILITATION

There are many rehabilitation systems to limit the height to which the water rises and to facilitate its discharge from the masonry. the main methods used are physical and chemical barriers or dehumidifying systems.

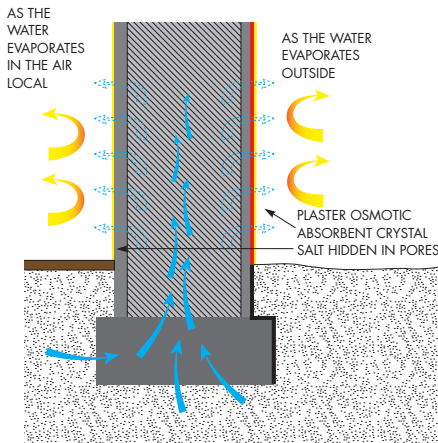
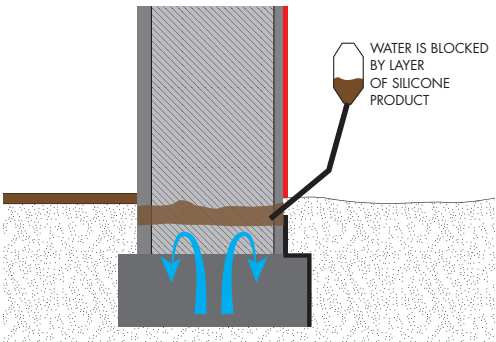
PHYSICAL BARRIER

This involves making a horizontal cut in the wall and inserting a slab of non-porous material, which prevents the rising of the water. This technique is difficult to apply as it can compromise the stability of the buildings.



CHEMICAL BARRIER

This involves pressure injections of silicone products, through a series of holes in the wall. The purpose of these liquids is to make the pores and capillaries hydrophobic, thereby preventing the water from rising any further.



DEHUMIDIFYING SYSTEM

This is a series of products, each of which has its own specific function, and the combination of which provides an effective solution to the problem.

The system is based on:

■ HYDROPHOBIC PRIMER

Silane-based, low molecular weight, highly penetrating applied by spray or brush until wetting of the bottom layer. This treatment prevents and/or limits the damage due to salts (chlorides, sulfates, phosphates and nitrates in the soil and building materials), which, going dissolved through the capillaries of the structure, solidify after the evaporation of the water in substrate surface; crystallization, occurring with remarkable increase in volume (from 4 to 6 times), breaks the capillaries of the plaster and disintegrates it.

■ MACROPOROUS PLASTER

Obtained using porogen additives, which, once mixed with water and applied, have a surface 20 times more diffusive than a traditional plaster. This increased amount of diffusive surface provides greater speed and amount of evaporation, resulting in a gradual restoration of the structure.

■ FINISHING WITH EXCELLENT BREATHABILITY AND LOW WATER PERMEABILITY

Prevents that the moisture from outside, such as the atmospheric one, is added to that already present in the structure for capillary rise, thereby negating the benefit brought by macroporous plaster. The use of siloxane based finishes or hydrophobic silicates allows to provide a protection with high water vapor diffusion, a high impermeability to meteoric water and a pleasant aesthetic effect.

THE DEHUMIDIFYING SYSTEM

MACRO-POROUS PLASTER

Silofix and Rasante KZ are ideal for any interior and exterior work of restoration and curing, even on buildings of historic and artistic interest, as they allow to perfectly restore the original appearance of the wall.

Efficient and decisive, CAP Arreghini dehumidifying system allows to restore the original balance humidity of the walls and is indicated on surfaces of any kind, either mineral or cement, provided without plaster.

CAP Arreghini dehumidifying system can be put in place directly from the enterprise which will perform the next painting. Therefore, this type of intervention, compared to other techniques, it is easier, faster and less invasive.

METHOD OF INTERVENTION

The CAP Arreghini dehumidifying system is used in cases in which the rising damp is both external and internal. The adoption of the system on both sides of the wall guarantees more radical rehabilitation.

The dehumidifying system is efficacious in the following cases:

- **REHABILITATION OF THE SURFACES OF DAMP WALLS PRESENTING CAPILLARY RISE PROBLEMS BOTH INSIDE AND OUT;**
- **DEHUMIDIFICATION OF WALLS RUINED BY THE PRESENCE OF SALTS;**
- **REHABILITATION OF UNDERGROUND ENVIRONMENTS AFFECTED BY CONDENSATION AND DAMPNESS, ON CONDITION THAT THERE IS NO INFILTRATION OF WATER FROM THE OUTSIDE.**

PREPARING THE SURFACE

After having identified the upper limit of the damp mark present on the walls, remove the layer of plaster to a height of 50-70 cm above the visible dampness or deterioration, take off the loose and crumbling parts and scrape the joints of the bedding mortar to dislodge any loose material. In conditions of strong salt concentrations, scrape and brush the wall surface down to the bare masonry, wash repeatedly waiting three days between each wash cycle and then smooth and fill any holes with Rasante KZ dehumidifying agent and brick chippings. Prepare the strips using wooden rulers or synthetic material. If Rasante KZ, dehumidifying agent is used, the strips must be prepared two days earlier.



PREPARING THE PRODUCT

Pour 5 litres of clean water for each bag of Rasante KZ, into a rotary cement mixer. Then, add product slowly and mix for 3-5 minutes until a creamy paste is obtained. For the rendering coat, use 10 litres of clean water for each bag of product.

USING THE PRODUCT

When the surface is dry or slightly damp, apply Silofix ready to use with a spray at low pressure (max 2 bar) or a brush. The consumption rate depends on the type of masonry and material absorption level. The purpose of the Silofix is to hydrophobize the substrate and prevent the migration of the capillary water and the consequent surfacing of salts and efflorescence.

After 15-30 minutes, apply a rendering coat with Rasante KZ; after 3-5 hours, apply Rasante KZ at a minimum thickness of 2 cm in a single coat, following the instructions below:

- *Apply the product, taking care not to press it or carry out any finishing operations while the coat is still in the plastic state;*
- *Level off gently, without pressing, using a screed and passing over the level strips installed beforehand;*
- *Level off with a finishing coat 1-2 mm thick, using a sponge trowel to apply the product.*

PROTECTIVE FINISHING PAINTS

On a dehumidifying system, the finish must guarantee resistance to vapour diffusion that is compatibly with the breathability of the plaster, which must be applied in such a way as not to obstruct the discharge of the vapour itself and, at the same time, preventing water from penetrating.

SILOXANE SYSTEM

■ SILOFIX

Consolidating fixative anti-salt for exterior and interior. It consolidates the surface, creating a hydrophobic area that blocks moisture, with the consequent leakage of salts and efflorescence.

■ SIL 96 QUARZO ACTIVE

Siloxane finishing paints. The silicone based system encourages the natural passage of water vapor and prevents its accumulation in the substrate. The breathability of painting siloxane is combined with high water repellency that slips rainwater along the surfaces, without wetting.

MINERAL SYSTEM

As finishing for CAP Arreghini dehumidifying system you can use also mineral paints based on potassium silicate, characterized by high transpiration of water vapor, but these require a greater professional competence in the application.

The mineral system includes:

■ SILICAPFIX

Solution of potassium silicate to be used as consolidating primer and as a diluent for Silicap.



■ SILICAP

Silicate paint. The silicate system ensures maximum breathability of water vapor.

FINISHING SYSTEMS



SILOXANE SYSTEM

DEHUMIDIFYING PLASTERS

PRIMER	DRYING	FINISHING/LAYERS	COLOURS	CONSUMPTION OF THE SYSTEM ml/m²	APPLICATION	PERFORMANCE
SILOFIX	5/8h	SIL96 QUARZO ACTIVE 2S	Tucano Spazio 100 Area 115	110+220	 	Classi EN 1062-1 Gloss: <10 - matt Fineness: <300 micron-medium Vapour permeability: sd<0,14m - high Water permeability: W<0.1 kg/mq*0,5h - low

MINERAL SYSTEM

DEHUMIDIFYING PLASTERS



PRIMER	DRYING	FINISHING/LAYERS	COLOURS	CONSUMPTION OF THE SYSTEM ml/m²	APPLICATION	PERFORMANCE
SILICAP white thinned to 30-40% with SILICAP FIX	5/8h	SILICAP thinned to 15-20% with SILICAP FIX	Tucano Spazio 100 Area 115	110+220	 	High breathability Classes EN 1062-1 Gloss: <10 - matt Fineness: <100 micron-fine Vapour permeability: sd<0,14m - high Water permeability: W>0.1 <0,5kg/mq*0,5h - medium

IMPORTANT



- Apply at temperatures of between +5°C and +30°C.
- Do not apply in direct sunlight or on very windy days.
- In the hot season, supervise the curing of the product applied, wetting it, if necessary, during the first 48 hours.
- When the product is in the setting phase, it must not be mixed with additional water.
- Maximum breathability is guaranteed as the porosity of the skim coat is maintained during the work phase, entraining the right quantity of air (30%) during the preparation of the mortar and avoiding the use of fine trowelling and, even more important, of the pressure exerted by the scraping of the plaster.

CAP ARREGHINI PRODUCTS INFORMATION DATA

PRIMER

	SILOFIX Siloxane masonry primer <i>This is a primer for walls, formulated with synthetic resins dispersed in water using a particular technology that ensures secure adhesion on different types of surfaces as well as insulating capacity. It ensures uniformity of absorption and therefore, a uniform finish and excellent adhesion for later coatings. It is formulated primarily for siloxane processing.</i>
	SILICAP FIX Silicate masonry primer <i>This is a water-soluble primer with mineral binders based on potassium silicate. Due to its chemical nature, it does not form a film, but hardens by chemically reacting with the surface. It ensures a secure adhesion and consolidating capacity on mineral surfaces.</i>

FINISHING

	SIL96 QUARZO ACTIVE Acrylic-siloxane matt quartz paint for exteriors <i>Water-soluble paint, it is waterproof and adequately breathable, easy to apply, ideal for professional use as it is extremely compatible and has excellent adhesion, filling power and coverage of different types of surfaces.</i>
	SILICAP Silicate mineral paint for exteriors <i>Paint with mineral binders based on potassium silicate. Does not form a film due to its chemical nature, but hardens by reacting chemically with the surface. It is characterized by a high diffusion of water vapour such so as to ensure the transpiration that is required to obtain dry walls, making it suitable for finishing of dehumidifying systems.</i>

DIFFERENCES BETWEEN THE TWO FINISHING SYSTEMS

SILOXANE SYSTEM	MINERAL SYSTEM
■ <i>Anti-salt.</i>	■ <i>No anti-salt.</i>
■ <i>Water-repellent</i>	■ <i>No water-repellent</i>
■ <i>Vapour permeable</i>	■ <i>Vapour permeable</i>
■ <i>It can be applied on mineral surface and also on organic coatings.</i>	■ <i>It can be applied only on a mineral surface</i>
■ <i>Application flexible and easier (requires less control of the conditions of temperature and humidity)</i>	■ <i>Application with more skills (for example do not use with temperatures above 30° C and on warm substrate or with more than 65% humidity. Low thicknesses involve a higher number of layers.)</i>
■ <i>Uniform colour, even in the presence of restoring with new and / or different plaster.</i>	■ <i>In case of repairs or plasters of different nature and/or different seasoning, the colour may not be uniform.</i>
■ <i>Wide colour choice</i>	■ <i>The available colours are only derived from inorganic pigments.</i>
■ <i>No problem when facing substrates with colour residues left during painting (the stains can be easily removed without degradation of the product).</i>	■ <i>Because silicate reacts with marble and glass, it is essential to protect all artifacts made of these materials before painting to prevent corrosion of the product itself.</i>

SEE ALSO THE OTHER CAP ARREGHINI BOOKS

-  A01 PROTECTION OF PLASTER IN EXTERIOR ENVIRONMENTS
-  A02 PROCESS OF CRACKING
-  A03 TYPES OF PLASTER: PREPARATION AND RESTORATION WORKS
-  A04 MOULD AND ALGAE
-  A05 ASBESTOS ENCAPSULATION TECHNIQUE
-  A06 PROTECTION AND REHABILITATION OF CONCRETE
-  A07 THERMAL INSULATION WITH THERMOCAP THICK COATING SYSTEM
-  A09 TREATMENT OF METALS
-  A10 TREATMENT OF WOOD





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