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PROCESS OF CRACKING



ARREGHINI®
ITALIAN PAINTS SINCE 1950



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PROCESS OF CRACKING

The formation of cracks and their dynamic development are phenomena linked to various causes that create an interruption in the continuity of the substrate, whether it be made of plaster, reinforced concrete (also prefabricated), natural stone or brick.

The presence of cracks on substrates exposed to atmospheric agents facilitates the penetration of rainwater, the vehicle by means of which all the aggressive chemical substances in the atmosphere enter the substrate, causing the degradation of its structure and the spalling of the paint and the coatings applied as finishes.



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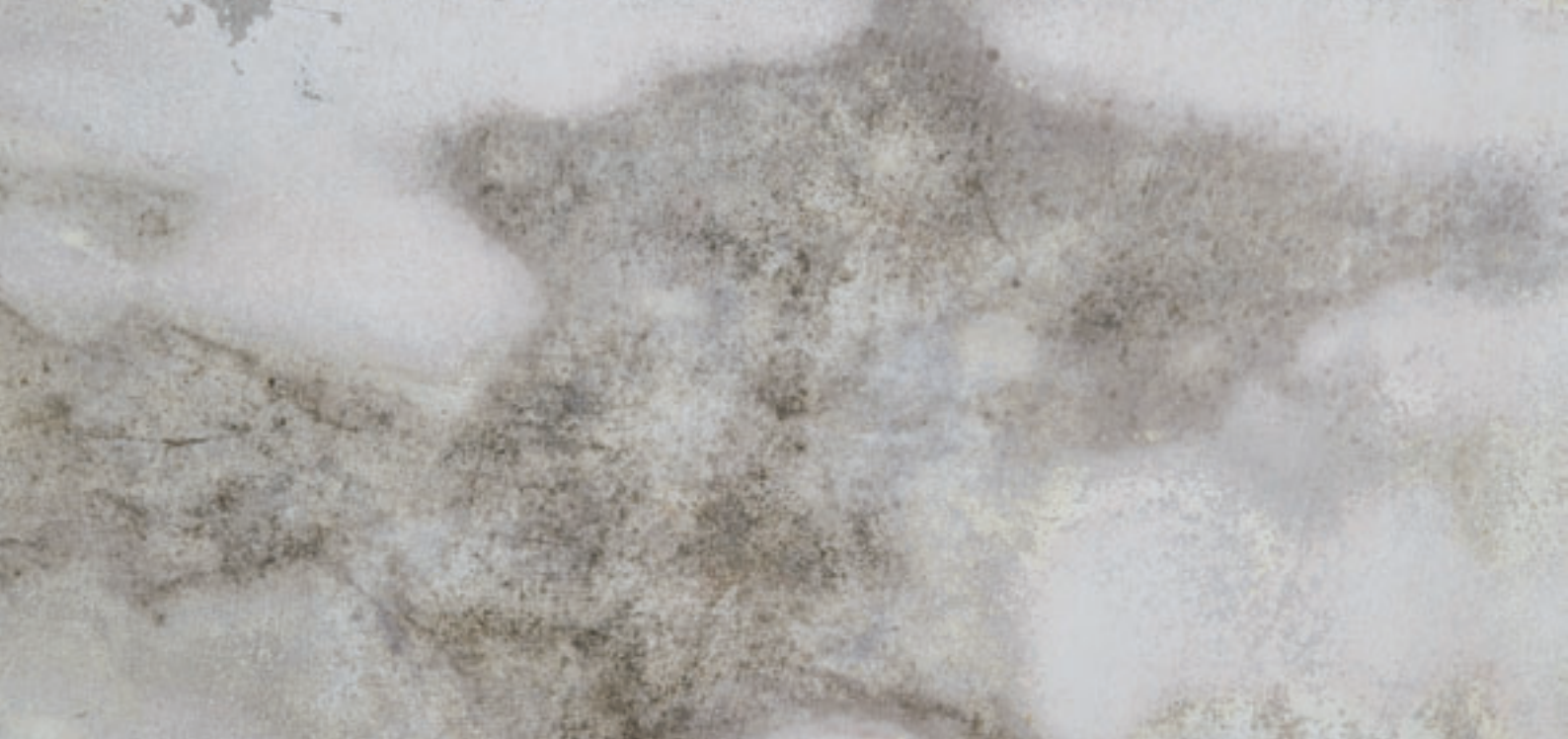
Cracks 250-500 micron

Cracks 500-1250 micron

Cracks 1250-2500 micron

Spread cracks <2,5 mm

Spread crackse >2,5 mm



CHEMICAL

The chemical reaction that is generated between the substrate binding components and the acidic pollutants - conveyed by rainwater - facilitates the formation of salt efflorescence which changes the aesthetic appearance, compactness and conditions of the substrate.



BIOLOGICAL

Biological degradation is characterized by the development of mould and algae, the growth of which is promoted by moisture, which can lead to the deterioration of the substrate.

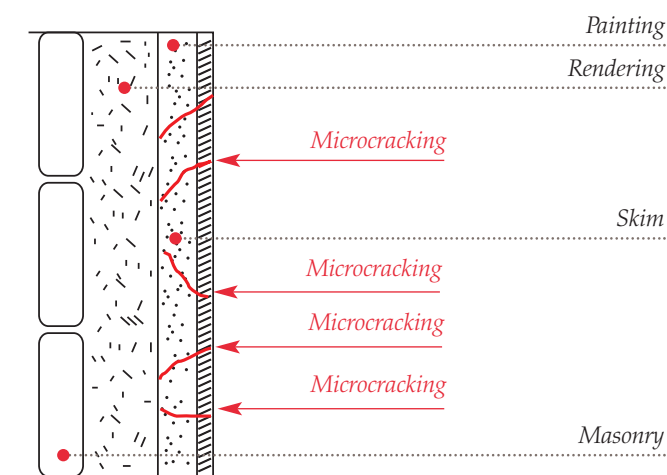


PHYSICAL

Physical degradation is mainly caused by the freezing of the water which, increasing in volume, provokes the crumbling of the substrates. The presence of moisture in the masonry, moreover, increases the dispersion of heat and reduces living comfort.

MICROCRACKING

DUE TO SHRINKAGE

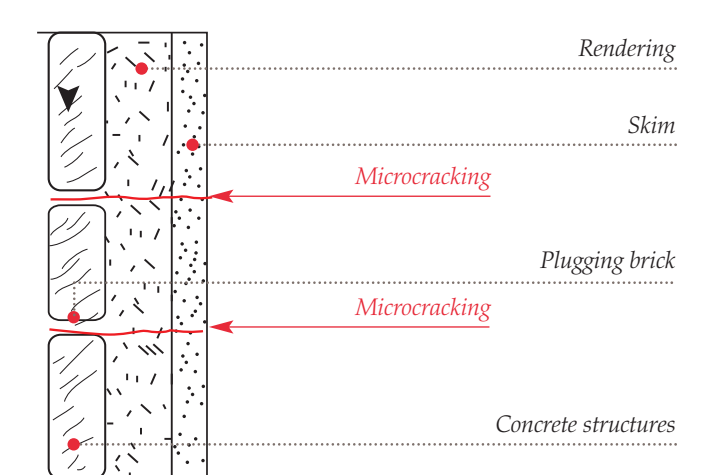


This is a reticular cracking phenomenon that takes place as a result of plaster shrinkage. It may appear two or three months after plastering or sometimes after a number of years, and it only affects the surface layer of the plaster. The cracking, which may cover a limited area, derives from the use of mortars that have not been prepared with an optimal aggregate-binder ratio, or following the application of large thicknesses in a single coat.

CAUSES

- NOT OPTIMAL QUALITY, CHOICE OR PROPORTIONING OF THE COMPONENTS OF PLASTER
- POOR PERFORMANCE
- RAPID EVAPORATION OF WATER
- APPLICATION IN NOT APPROPRIATE ENVIRONMENTAL CONDITIONS
- NON-COMPLIANCE WITH THE TIME OF MATURATION OF THE CONCRETE
- PRESENCE OF GRANULES OF LIME

DUE TO JOINTS



This concerns the formation of cracks next to the joints between the various rows of bricks used for the construction of the infill panels. Similar defects are due to the different expansion coefficient between the components of the connecting mortar and the entire layer of plaster.

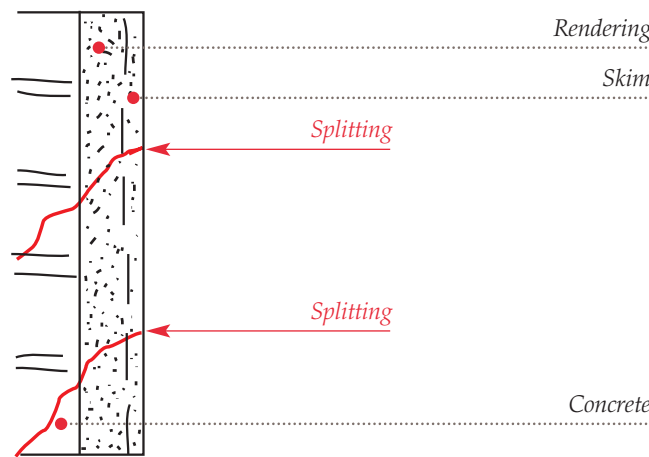
CAUSES

- NON-COMPLIANCE WITH THE TIME OF MATURATION OF THE MORTAR IN JOINTS



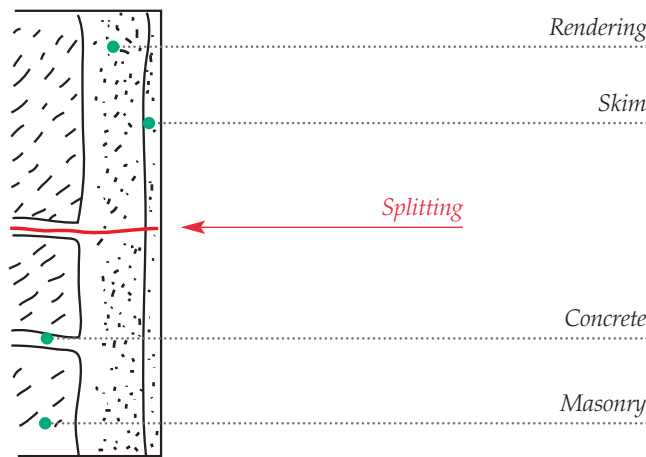
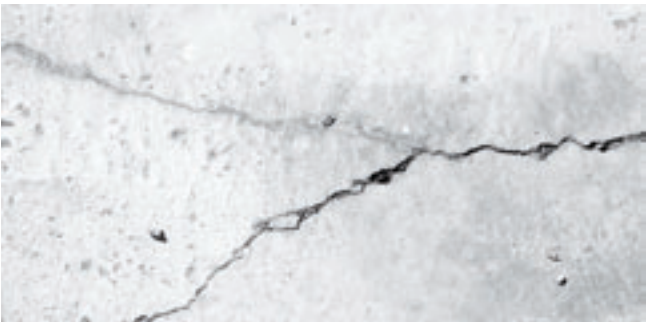
STRUCTURAL CRACKING

SETTLING DYNAMICS



Cracking that takes place subsequent to movements and/or subsidence affecting, in particular, the parts near to the load bearing structure of the buildings, and involving both the plaster and the masonry underneath.

STRUCTURAL DYNAMICS



Phenomenon consisting of horizontal and/or vertical cracks of various dimensions. They follow the direction of the connecting points between the load bearing structures in concrete, the slabs and the pillars, and the infill panels made of brick, brickwork blocks or cement. These are caused by the different expansion coefficients of the various masonry components due to the discontinuity of the insulation and to hygroscopic absorption, affecting the entire layer both of the structure and of the plaster.



SOLUTIONS AND TREATMENTS

The operations to be carried out in order to contain and eliminate the cracks depend on the type of problem to be resolved.

The use of traditional finishes does not lead to positive results. Only materials possessing a high and durable elasticity, in fact, are able to withstand the dimensional variations of the cracks resulting from temperature changes.

Sometimes, with certain types of cracks, a simple finishing coat with an elastic product is not sufficient and it becomes necessary to carry out a series of additional operations: stopping up of the cracks, application of fibreglass meshes or embedding of non-woven polyester fabric.

These techniques help redistribute the stress over larger portions of the surface, aiding the finishing coats to limit the cracking.

In the modern construction industry, buildings are constructed using concrete frameworks that are then covered with brickwork infill panels.

These structures are subject to cracking due to the different degrees of expansion of the materials used. In order to be able to adequately protect this type of construction, it becomes necessary to use special, highly resistant paints as a preventive measure and during maintenance.

CAP Arreghini has designed various products that, after their success on numerous buildings, proved to be extraordinarily effective.

- ELASTO ACTIVE
- ELASTO GUAINA
- ELASTO STUCCO
- RASACAP 50

SYSTEMS FOR PROTECTION FROM THE CRACKS

The following system is suitable for the protection of construction subject to weathering with cracked surfaces of cement plaster, mortar plaster, concrete, precast concrete, old paint.

SURFACE PREPARATION

Surfaces with cracks of any kind shall be subject to initial cleaning with a pressure washer to remove any impurities such as dirt, moss, mould, parts flaking off the casting.

In case of existing coatings, make sure they are well adherent. Otherwise, proceed with the removal. Check that there are no infiltrations of water of any nature.

MAINTENANCE OF OLD PAINT CONTAMINATED BY MOULD

After pressure washing, disinfect the surface by performing a treatment with B1 corresponding to 80-100 ml/m² and then proceed with the protective system.

VARIOUS PLASTERS - PREVENTIVE ACTION AND CRACKS <250 micron

PREPARATION	DRYING	UNDERCOAT	DRYING	1° LAYER	DRYING	2° LAYER	COLOURS	Consumption of the system ml/mq -number of layers	APPLICATION	PERFORMANCE
Not necessary	3-4 hours	MURISOL W PRIMER ACRILIFIX SPECIAL	-	ELASTO ACTIVE 6-7 m ² /l	12-16h	ELASTO ACTIVE 6-7 m ² /l	Tucano Spazio 100 Area 115	80+300 S1+2		Compliant to EN 1062-7 for cracks <250 micron

CRACKS 250-500 micron

PREPARATION	DRYING	UNDERCOAT	DRYING	1° LAYER	DRYING	2° LAYER	COLOURS	Consumption of the system ml/mq -number of layers	APPLICATION	PERFORMANCE
Fill in with ELASTO STUCCO	3-4 hours	MURISOL W PRIMER ACRILIFIX SPECIAL	5-6h	ELASTO ACTIVE 6-7 m ² /l	12-16h	ELASTO ACTIVE 6-7 m ² /l	Tucano Spazio 100 Area 115	80+300 S1+2		Compliant to EN 1062-7 for cracks <500 micron

CRACKS 500-1250 micron

PREPARATION	DRYING	UNDERCOAT	DRYING	1° LAYER	DRYING	2° LAYER	COLOURS	Consumption of the system ml/mq -number of layers	APPLICATION	PERFORMANCE
Fill in with ELASTO STUCCO + ELASTO GUAINA embedded polyester mesh	3-4 hours	MURISOL W PRIMER	5-6h	ELASTO ACTIVE 6-7 m ² /l	12-16h	ELASTO ACTIVE 6-7 m ² /l	Tucano Spazio 100 Area 115	80+300 S1+2		Compliant to EN 1062-7 for cracks <1250 micron

CRACKS 1250-2500 micron

PREPARATION	DRYING	UNDERCOAT	DRYING	1° LAYER	DRYING	2° LAYER	COLOURS	Consumption of the system ml/mq -number of layers	APPLICATION	PERFORMANCE
Fill in with ELASTO STUCCO + ELASTO GUAINA embedded polyester mesh	3-4 hours	MURISOL W PRIMER	12-16h	ELASTO ACTIVE 6-7 m ² /l	12-16h	ELASTO ACTIVE 6-7 m ² /l	Tucano Spazio 100 Area 115	80+300 S1+2		Compliant to EN 1062-7 for cracks < 2500 micron

SPREAD CRACKS <2,5 mm

PREPARATION	DRYING	UNDERCOAT	DRYING	1° LAYER	DRYING	2° LAYER	COLOURS	Consumption of the system ml/mq -number of layers	APPLICATION	PERFORMANCE
RASACAP 50 + mesh 160 + RASACAP 50 smooth finish	15 days	Not necessary	-	ELASTO ACTIVE 6-7 m ² /l	12-16h	ELASTO ACTIVE 6-7 m ² /l	Tucano Spazio 100 Area 115	150 + 150 S1 + 1		-

SPREAD CRACKS >2,5 mm

PREPARATION	DRYING	UNDERCOAT	DRYING	1° LAYER	DRYING	2° LAYER	COLOURS	Consumption of the system ml/mq -number of layers	APPLICATION	PERFORMANCE
RASACAP 50 + mesh 160 + RASACAP 50 smooth finish	15 days	Not necessary	-	ELASTO ACTIVE 6-7 m ² /l	12-16h	ELASTO ACTIVE 6-7 m ² /l	Tucano Spazio 100 Area 115	150 + 150 S1 + 1		-

The product has been tested in compliance with EN 15457:2006 and EN 15458:2006 and the results confirm its effectiveness against fungi and algae. We must consider, however, that the active ingredients contained in it are biodegradable and therefore the performances are reduced in time, because of the prolonged action of fungi and algae that are deposited on the film surface.

Besides that, the climatic conditions, the humidity, the presence of organic substances and the rainfall contribute to reduce the effectiveness of the active principles. The anti-mould action occurs by contact of the microorganism with the active ingredient which, in the presence of high rainfall or moisture, comes to a state of "dilution" which makes it less effective.

As a consequence, it is not possible to define the timing of resuming of the microorganisms fungi and algae growth.

Finally, it must be considered that the adaptation of the Biocides Directive issued by the EC required a reclassification of many substances used as active ingredient in preventing the growth of microorganisms, particularly fungi and algae. Following the reclassification, there were placed some limits on the use of biocides commonly used in paints and varnishes. In view of these considerations, it is difficult, or even a risk, to grant a protection against biological pollution.

CAP ARREGHINI PRODUCTS PERFORMANCE DATA

PREPARATION OF THE SUPPORT

	ELASTO STUCCO Elastomeric fibered putty <i>Filler suitable for filling holes and cracks on indoor and outdoor walls. It is a paste composed of acrylic copolymers and elastic synthetic fibres that form a coating that is resistant to micro cracking. It dries quickly and is homogeneous and does not require any pre-treatment. It maintains high elasticity over time even at temperatures below 0 ° C.</i>
	ELASTO GUAINA Roof coating <i>Synthetic product in aqueous dispersion, it forms a rubbery coating that is impermeable and continuous, similar to a sheath. As it is a liquid product to be spread on the surface, it gives the possibility to obtain continuous mantles for waterproofing, without having the problem of necessary joints using prefabricated sheets.</i>
	RASACAP 50 Adhesive/plaster for exterior insulation system <i>This product is suitable for painting systems of indoor wood products, it is easy to apply, ideal for professional use as it is equipped with a high filling capacity, adhesion on water soluble sandblasted surfaces and on different wood species. It has fast drying times which reduces the time needed to paint. It ensures a finish with excellent uniformity and mechanical strength.</i>

UNDERCOAT

	MURISOL W Waterborne masonry undercoat <i>Wall primer formulated with synthetic resins dispersed in water with special technology that ensures secure adhesion on different types of surfaces, it has insulating and consolidating capacities. It ensures uniformity of absorption and therefore uniform finishes and excellent adhesion for later coatings. According to the type of resin and the particular lamellar pigments contained within them, it ensures high breathability, improves colour resistance and a saves up on subsequent layers in the coating system.</i>
	MURISOL Solventborne masonry undercoat <i>Consolidating pigmented solvent-based primer with special technology that ensures secure adhesion on different types of surfaces, it has insulating and consolidating capacities. It ensures uniformity of absorption, hence uniform finishes and excellent adhesion for later coatings. According to the type of resin and the particular lamellar pigments contained within them, it ensures high breathability, improves colour resistance and a saves up on subsequent layers in the coating system.</i>
	ACRILIFIX SPECIAL Waterborne masonry primer for exteriors <i>This is a primer for walls, formulated with colloidal resins in water dispersion using a special technology that ensures a secure adhesion on different types of surfaces, as well as insulating and consolidating capacities. It ensures uniformity of absorption and therefore, a uniform finish and excellent adhesion for later coatings. It is mainly formulated for outdoor processing that uses acrylic systems.</i>

FINISHING

	ELASTO ACTIVE Elastomeric anti-mould anti-algae fibered paint <i>Acrylic copolymer formulated paint with elastic fibres of polyethylene in aqueous dispersion, free from plasticizers, which form a suitable coating that resists micro cracking. It is waterproof and adequately breathable, it is 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>
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IMPORTANT

The described system has been successfully tested at 23°C with a relative humidity of 60%. Under different conditions, the drying time and the different phases may vary.

To obtain good results, avoid applying Elasto Active with high humidity, because the dry film would become too sensitive to water, in case of rain. All waterborne products, during drying, are very sensitive to low temperatures, which may adversely affect the results. They should be applied at temperatures higher than + 5°C on dry surfaces. The product dries and is overcoatable in 8-12 hours, but the process of polymerization and hardening is complete in over 10 days in optimal conditions (+15° +30°C with humidity of the support 10%, relative air humidity 70%; with lower temperatures and higher humidity the drying time increases, if the humidity is 85%, the product does not dry).

During the drying time, if the paint may suffer complete washout due to rainwater or condensation - in the case of fog or humidity higher than 85% - it may occur more or less extended semigloss areas, with streaking effects. This phenomenon, of a temporary nature, does not affect the resistance of the product and can be removed by pressure washing with water or naturally through the subsequent action of rain and sun. We do not recommend an immediate repainting because the problem can easily recur.

The systems described and the proposed solutions have proved to be as the most practical, efficient and fast procedures at all, during the long experience on many buildings.

SEE ALSO THE OTHER CAP ARREGHINI BOOKS

-  PROTECTION OF PLASTER IN EXTERIOR ENVIRONMENTS
-  TYPES OF PLASTER: PREPARATION AND RESTORATION WORKS
-  MOULD AND ALGAE
-  ASBESTOS ENCAPSULATION TECHNIQUE
-  PROTECTION AND REHABILITATION OF CONCRETE
-  THERMAL INSULATION WITH THERMOCAP THICK COATING SYSTEM
-  TREATMENT OF DAMP WALLS
-  TREATMENT OF METALS
-  TREATMENT OF WOOD





CAP ARREGHINI SpA - ITALIAN PAINTS SINCE 1950

V.le Pordenone, 80 - 30026 PORTOGRUARO (VE) - Tel. +39 0421 278111 - Fax +39 0421 75498
info@caparreghini.it - www.caparreghini.it - Azienda con Sistema Certificato UNI EN ISO 9001