Active Cool

Better Facades Start Here!

Building With Innovations

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Building with Innovations

The facade is your building’s visiting card, and it will make a bad impression if it is dirty or damaged. The building will also depreciate, because the damage will impair the building fabric. That’s why it is better to eliminate a facade’s "natural" enemies, such as water, UV rays and air pollution, from the outset.

Only coatings finely tuned to the respective substrate fend off harmful external influences and afford valuable building components lasting protection.

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Façade Materials

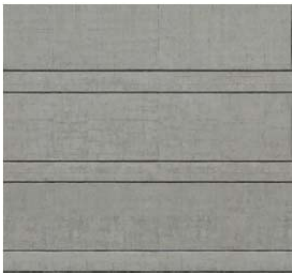
Various materials are used to construct facades, and these materials react differently to external influences. To protect or restore a facade properly, it is thus especially important to have adequate knowledge of the material involved and its requirements.

Natural stone needs special protection

Natural stone is susceptible to various kinds of damage. Natural stone facades of sandstone or limestone are most commonly encountered in connection with historic buildings and architectural monuments. Some sandstones are rich in quartz while others are predominantly argillaceous. Quartz-rich sandstones are much more resistant to weathering than argillaceous sandstones. Lime stones are by nature moderately to poorly resistant to weathering. Their porous surface texture makes them readily susceptible to dirt pickup, while aggressive environmental influences (acid rain and acid fog) cause them to decompose. The porous texture of natural stone is also the reason for its high water-vapor permeability. Exterior coating systems suitable for natural stone must be extremely resistant to weathering and to environmental influences, but must not impair the stone's water permeability. At the same time, the stone must retain its natural, porous appearance. Because of their neutral (non-basic) character, silicone resin emulsion paints do not activate alkali-sensitive iron and manganese-based minerals, and are thus ideal for opaque and transparent coatings.

Concrete requires protection against moisture

Exterior concrete walls are executed in various ways and in various concrete qualities: with steel reinforcement or as multi-wythe walls including thermal insulation; with an exposed or washed concrete surface. On account of its high compressive strength, concrete is much less porous and has fewer capillaries than other materials. As a result, it is less permeable to water vapor. In the case of steel-reinforced concrete building components, a water-repellent coating is essential to prevent corrosion. Coating systems for concrete facades should therefore be durable (requiring less frequent renewal) and weather-resistant, and also amenable to numerous decorative techniques. Exposed concrete is most commonly coated with a weather-resistant glaze. In both cases, we recommend prior use of a water-repellent primer followed by a coating of silicone resin emulsion paint.



Cellular concrete needs protection against the weather

Cellular concrete is a mineral-based construction material comprising quartz sand, lime and cement. It is particularly porous, making it a very good heat insulator and especially amenable to diffusion. However, it can also absorb water. Exterior walls – especially where they are in contact with the ground – must therefore be provided with a protective, water-repellent plaster or coating. To permanently protect cellular concrete facades against moisture and other external influences, they are best coated with silicone resin emulsion paint formulated especially for this purpose. The substrate-compatible paint, which is not only water-repellent, impact-resistant and highly permeable to water vapor, but also protects against frost damage and preserves the porous surface appearance, can be applied directly onto the cellular concrete or onto a plaster covering.

Sand-lime bricks need protection to preserve their surfaces

Sand-lime brick is made from lime, sand and water; it has a high apparent density and is therefore used for outside walls requiring high compressive strength. Since it does not provide adequate thermal insulation, an additional exterior insulation and finish system (EIFS) must be applied to outside walls. Sand-lime bricks are used as building bricks and as weatherproof facing bricks with various surface textures for exposed wall faces. Plastered sand-lime brickwork can be rendered a lot more durable and weatherproof by coating it with a silicone resin emulsion paint. For fair-faced masonry, we recommend the use of a water- and dirt-repellent glaze of silicone resin emulsion paint that preserves the textured finish of the brickwork.

Bricks must always permit diffusion

Brick is a natural, clay-based construction material and the one that is most commonly used in masonry. Different manufacturing methods can be used to enhance specific properties (e.g. thermal insulation, sound insulation, weatherability). Because bricks are very good thermal insulators and permit diffusion, monolithic brick exterior walls do not generally require additional thermal insulation. A mineral-based plaster coated with silicone resin paint will preserve the wall's "breathability" and also provide long-term weather protection.

Half-timbered buildings require special protection against moisture

This building style has a long tradition in Europe. The construction consists of a timber framework and infill masonry for which various materials may be used: bricks, natural stone, wattle and daub with added straw, or cellular concrete. Half-timbered facades are usually plastered, although in some regions clinker brick is used. Since the masonry is very thin (8-10 inches), it must be protected very efficiently against moisture without impairing the heat insulation properties or the wall's "breathability." Durable, water-repellent and breathable silicone resin emulsion paints are especially well suited for use on these mineral-based substrates.

Façade Damage

Facades are damaged for a variety of reasons. Among the many enemies of facades, water is one of the most serious – be it liquid or gaseous, or in the form of frost. This is because most construction materials are exceptionally “receptive” to water. However, UV rays and, most particularly, air pollution also cause long-term damage.

Airborne pollution leaves its mark

Especially in densely populated areas, facades are subject to deposits of sand, dust and soot. Acid rain, a combination of water and airborne pollutants such as sulfur dioxide, is particularly aggressive because it penetrates deep into the masonry pores, leading to discoloration and decomposition. Facades with a rough, coarse surface texture are more prone to large-area dirt pick-up or graying than facades with a smooth, fine surface.

In addition, all facades are prone to streaking in places that the rain cannot wash clean, for example under cornices, eaves, windowsills, balconies and all kinds of facade projections. The height of the building and the off-vertical slant of the facade also influence dirt pick-up behavior

Airborne risks

Algae are unicellular organisms which are disseminated by the wind and get deposited on facades. To grow, they need light, moisture, carbon dioxide from the air and temperatures of between 20 and 25 °C. Particularly on severely weathered facades that do not dry out well, the algae proliferate and colonize large areas that turn green, brown or red. In many cases, algae only impair the outward appearance of a facade, while the underlying building fabric is not affected.

Damage by microorganisms

Some of the problems associated with algae, mold, lichen and bacteria on facades are:

Staining and discoloration, Unpleasant odors, Allergies and mycoses, Increasing dampness, Material decomposition, Loss of material cohesion, Reduced flexural strength, Spalling, Pitting, Silting

Efflorescence - Salts promote water ingress

Salts contained in the earth or the construction materials dissolve in water and will migrate into the masonry if dampproofing is inadequate. As the water evaporates, the salts become more concentrated, especially in the plaster. There, they crystallize out, effloresce or even force the plaster and masonry to flake off. Damage of this kind occurs most frequently in the ground course and lower areas of the facade.

Salts are harmful to a construction material's interior

There are various salts that will damage the building fabric:

- Sulfates
- Nitrates
- Chlorides
- Carbonates

These salts get into the masonry in a variety of ways:

- as inherent components of the construction material (cementitious mortars, bricks, natural stone)
- as external salts (in the ground, splashes containing de-icing salt)
- by chemical reactions with harmful gases (sulfur dioxide in the air)
- unsuitable renovation products (alkaline water glasses, stone conservation agents)

Cracks make facades susceptible to weathering

Hair cracks and shrinkage cracks due to water loss are fine, web-like cracks that occur in the facade's exterior coating and sometimes also in the plaster. They are caused by applying the paint too thickly, having too much binder in the mortar, by surface concentration of binder (caused by smoothing the plaster), by fine sand in the uppermost layer of plaster or by the plaster's drying too quickly. Water can penetrate through the cracks and lead to moisture and frost damage in the substrate.

Spalling is a sign of poor adhesion

Surface coating systems with high internal stresses sometimes cause adhesion problems. This particularly applies if the coatings are applied to insufficiently firm substrates, which, in the absence of a primer, for example, are highly absorbent. The internal stresses in the paint lead to the formation of cracks, allowing water to ingress and accumulate beneath the coating. This causes the paint to flake off. The high pigment content of intensely-colored paints tends to increase internal stresses still further.

Blistering on the facade

Facades exposed to hygrothermal stresses for any length of time may be subject to blistering. This is caused by seasonal cycles of warming and cooling and of rain ingress and drying out. A film-forming exterior paint that blisters will adhere less well and will detach from the substrate at weak points.

Alicante Spain: Active Cool Phtotocatalytic 2014

Façade Coatings

Facade coatings are a key aspect of masonry protection, because external influences can cause severe damage to the building fabric. The building will also depreciate. Coatings must be finely tuned to the respective substrate and applied in a suitable manner. Naturally, these coatings should also fully meet specific design criteria.

REQUIREMENTS

Tailored properties specific to construction materials

Every facade construction material has its own specific properties and reacts differently to external influences. Ideally, a facade coating's property profile is identical to the substrate's in order to afford the best possible protection.

COATING SYSTEMS

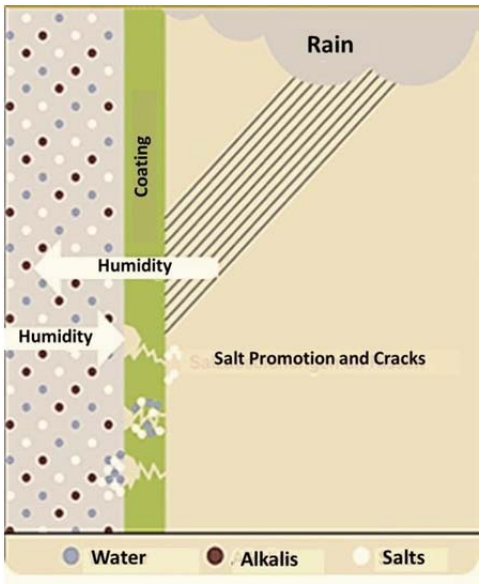


Figure 1. Crack and Efflorescence

Coating systems are categorized according to their binders.
A complete system comprises a primer and the paint. It is important to ensure that the physical properties of all the system components are tuned to each other and to the respective substrate. Only then can the system provide long-lasting and effective protection against facade damage specific to the building in question.

Effective protection plus an aesthetic appearance

A colored exterior coating is a stylistic tool used in architecture that simultaneously provides essential protection against the weather and other external influences. The choice of paint will depend on its compatibility with the substrate and the properties of the paint system.

On account of the various binders used, the physical and chemical properties of paints differ considerably. The more permeable the paint, the more breathable the exterior wall is. Because moisture trapped inside a wall can cause health problems and also damage the building fabric, we recommend the use of a paint that does not seal the exterior wall but allows it to breathe. At the same time, however, it must prevent ingress of water.

EXTERIOR INSULATION & FINISH SYSTEMS

Façade Protection and Energy Savings

Exterior insulation and finish systems (EIFS) are used on walls with insufficient thermal insulation.
A distinction is made between mineral high-build systems, low-build systems with silicate-emulsion-bound surface materials and cement-free, polymer-emulsion-bound systems. Since their surface temperature drops slightly below that of the air, EIFS tend to collect condensation on the surface. This can take up to 15 hours to dry on facades facing north and north-west.
For this reason, EIFS are susceptible to algae and mold formation. Sometimes they are also subject to system-related cracks or mechanical damage which permits water ingress. To ensure long-lasting effectiveness of the EIFS, repair work must be thorough and of a suitable nature. The special properties of solvent-free silicone resin primers and silicon resin emulsion paints make them ideal for all EIFS – including systems with Styrofoam, which is attacked by solvents.

Table 1: Coatings classes per binder and designation

Class	Binder	Designation
Mineral	Hydrated lime Water glass	Whitewash 2-part silicate paint (without polymer emulsion)
Mineral / organic	Hydrated lime, casein	Lime-casein paint
	Water glass, Polymer emulsion Silicone resin, Polymer emulsion	1-part silicate paint Silicate emulsion paint Silicone resin emulsion paint
Organic	Polymer emulsion	Emulsion paint

How Active Cool Helps Building Better

A Silicone resin based emulsion paint By Abolin

Active Cool is Silicone resin based emulsion paint (SREPs). Active Cool binder technology ranks among the most modern coating systems and offer unparalleled advantages when applied to new or undamaged facades or during the course of renovation or repair work. Because this paint combines the special properties of mineral and of polymer-bound coatings, it protects facades reliably for a long time. Moreover, due to the mineral appearance, it offers compelling advantages for the design of facades in the private, public and industrial sectors or for the conservation and repair of historic buildings under preservation order.

Active Cool combines the useful properties of mineral coatings with those of polymer-bound coatings. As a result, it is superior to both mineral and polymer-bound coatings in many respects:

Retaining a Building's Value

Every facade is attacked by rain, dirt pick-up and UV rays. Damage may cause algae to be deposited on the facade coating or it may cause the coating to exhibit cracking, salt efflorescence and spalling. This damage destroys valuable building fabric and incurs considerable costs for renovation and repair work. Modern and functional facade coatings largely avoid such damage. Active Cool paint gives facades long-lasting protection against environmental influences, thus making an active contribution toward protecting each building.

Water Repellency and Breathability

Active Cool paint exerts a permanent water-repellent effect. The silicone resin's organic group is responsible for the water repellency. The inorganic portion of the silicone resin "cements" the filler and the pigment together, creating capillaries and pores into which the organic groups project. They render the capillaries and pores permanently water-repellent; thus although the paint is open-pored and does not form a film on the surface, water is unable to penetrate and simply beads off.

Dry facades prevent algae

Facades coated with Active Cool paint stay dry for more of the year than otherwise, and the microbes are deprived of their medium. Fungal spores and algae are also washed off by the rain. For seriously endangered facades (copious greenery, high humidity, high groundwater table), Active Cool, due to a unique developed formula, performs a photocatalically active surface which exhibit an excellent algicidal and fungicidal activity.

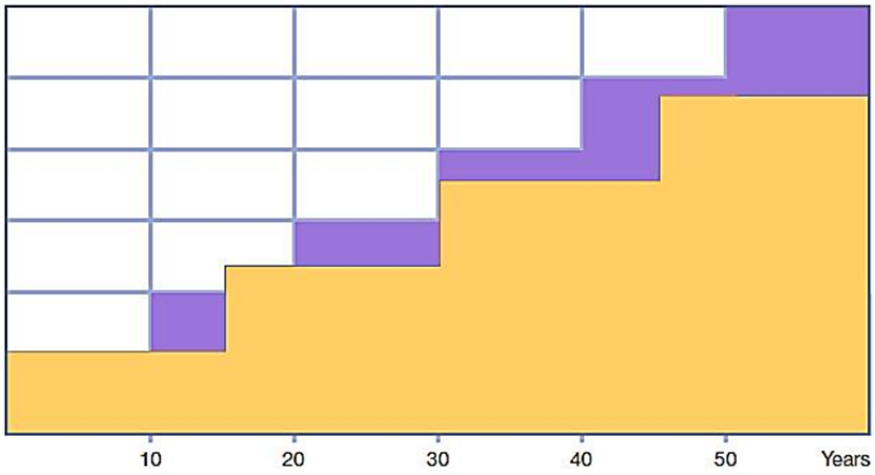
Facades that can breathe

Active Cool durable coating is an effective way to stop water ingress while simultaneously enabling the facade to breathe. Every building has areas where moisture can collect below the coating. Long-lasting protection is assured only when this moisture can escape rapidly. This is a requirement that has a crucial impact on the effectiveness of modern exterior insulation and finish systems (EIFS). Moisture penetration can considerably restrict the energy-saving potential of EIFS.

Cost Effective and Durable

Long-lasting facade protection saves renovation costs A surface coating will only keep a facade looking perfect if it provides permanent protection against water ingress and the accumulation of moisture below the coating. On account of its key properties such as high permeability to water vapor and low water absorption, Active Cool paint is more durable than other surface coatings - buildings do not need to be renovated for 20 years or more. It is its durability that makes Active Cool superior to cheaper brands with respect to the cost/benefit ratio, too, because the cheapest paint is not necessarily the most cost-effective. On average, the material accounts for just 17 percent of renovation costs, whereas personnel costs represent the lion's share at 83 percent.

Economic Feasibility Calculation



Application and renovation cycles for other coating systems

Application and renovation cycles for Active Cool paint

Number of renovation cycles

If Active Cool paint is used, total costs can be significantly reduced.

Convincingly Cost-Effective
An investment that pays off long-term

Active Cool reduces the need for renovation: the intervals between renovations are considerably longer so that, on average, the number of renovations needed over a period of fifty years can be reduced by two.

Material costs account for an average of 17% of total renovation costs. Other factors account for the remaining 83%. This means that despite the slightly higher material cost of silicone resin emulsion paints, each time renovation is avoided, 83% of the total cost of renovation is saved. As a result, significant overall savings can be made with Active Cool paint.

Proportion of costs per renovation

Material (e.g. paint):	**17 %**
Payroll and operating expenses:	**52 %**
Substrate preparation:	**12 %**
Scaffolding or lifting platform:	**15 %**
Other:	**4 %**

Material costs account for only a small percentage of renovation costs. The durability of the coating is the major cost- 83 % saving factor.

Weathering Resistance

Paint pigments have to be extremely resistant to weathering and light. This is why Active Cool paint contains special selective inorganic pigments, which are firmly anchored in the Si-O-Si backbone of the silicone resin. The high resistance of silicone resins to weathering and to the ultraviolet and infrared components of sunlight prevents the pigments from fading, yellowing or being washed out by rain. The high abrasion resistance of the coating makes it color-fast.

A permanently attractive facade

Dirty facades are caused by the dry deposits of dirt particles that are subsequently held in place by rain and which then dry out. Silicone resins are resistant to dilute alkalis and acids (acid rain) and to the ultraviolet and infrared components of sunlight. Active Cool is therefore highly resistant to weathering, industrial emissions and microbial attack. Rain drops bead off facades. In the process, dirt particles are removed, too. Thanks to the beading effect, even dirt particles in the rain itself can no longer be deposited. Additionally, binders have no adhesive action. Tests have shown in practice that dirt does not penetrate the coating because it can simply be wiped off. The coated facade thus stays clean for a long time.

Nothing shows through

On account of the excellent pigment-binding power and the very high overall pigment content, Active Cool paint has very good hiding power. At the same time, the surface texture of the substrate is retained.
A chalky-matte, mineral appearance is typical. Self-priming paint is a particularly cost-efficient and labor-saving form of facade protection. In this case, a special silane/siloxane-containing emulsion is added to the Active Cool paint so that the primer and base coat can be applied in one operation. Thanks to the paint's good hiding power, the final coat will still produce a perfect result.

Easy to overpaint

Active Cool unique binder technologies are the only class of silicone products that can be painted. This distinguishes them from silicone fluids and silicone elastomers. Active Cool can readily be overpainted with paints from the same product family or with other coating systems. However, we do not recommend the use of other coating systems if the properties of water repellency and water-vapor permeability are to be retained.

Fast and efficient

Active Cool paint can be applied readily to almost any kind of substrate, irrespective of whether it is damp or dry or has heated up. All standard processing equipment can be used, and the coating can be easily applied without any inconsistencies in shade or show-through of the base color. Active Cool paint have so far proved very effective when processed in combination with high-performance airless spray guns.

Ecologically more sound

The special properties of Active Cool paint makes it suitable for all types of EIFS: Active Cool paint enhances the effectiveness of EIFS in terms of the energy-saving potential. They avoid system-related disadvantages - such as cracks or mechanical damage and different surface and air temperatures - that permit moisture ingress. These disadvantages cause EIFS to form condensation on the surface. Consequently, EIFS are prone to algae and mold formation.

Retains the surface texture of the wall material

Active Cool unique binder's technology forms a network with a mineral appearance similar to that of quartz and water glass. The surface texture of the wall material is retained because the silicone resin emulsion paint does not form a film on the substrate, but instead lines the pores, making them water-repellent and permeable to water vapor. A facade coated or glazed with Active Cool paint thus retains its chalky-matte, mineral appearance. Active Cool paint show the characteristic porosity of mineral systems, but at the same time have extremely low water-absorption coefficients.

Abolin special primers ensure optimum weather protection

Priming the substrate with a compatible primer aids the protective function and prolongs the durability of the coating. The functional effectiveness and durability of the entire coating system depend to a large extent on the correct choice of primer. This is because the primer protects the paint from aggressive constituents in the wall material. These include alkalis and salts. Examples of Abolin Co available primers include consolidation, impregnating and penetration primers. There are differently formulated products to suit the various types of substrate, so you can always choose the right primer for the job at hand. They combine the following properties, which may be more or less pronounced:

- Consolidation of old, friable substrates
- Good penetration
- Regulation of absorbency
- Adhesion promotion for subsequent coatings
- Pigmentation
- Insulation against aggressive constituents in the wall material
- Creation of a hydrophobic zone under the coating

You can choose between aqueous and solvent-based primers. Aqueous primers are better for the environment, but usually do not penetrate as deep into the pores of mineral substrates. This is because of the water's surface tension and the binder particles contained in the water.

Simple and universal application

Active Cool paint can be used on almost all types of walls. Before the paint is applied, it is essential to assess and test the substrate for defects.
Suitable substrates for Active Cool paint include:

- Mineral plasters: MG P I, MG P II, repair plaster
- Fair-faced masonry: natural stone, concrete, cellular concrete, sand-lime brick, bricks, half-timbered constructions
- Old coatings: emulsion paint, silicate paint, polymer plaster
- EIFS: polymer plaster, silicate plaster, mineral plaster

Important substrate preparation measures:

- The substrate must be clean, dry and intact.
- Clean old silicate coatings, stripping them if necessary.
- Strip off emulsion paint to allow water-vapor permeability, and clean the surface with a steam jet.
- Consolidate friable plaster with a solve

PROSESSING INFORMATION

Easy To Process

Active Cool paint is easy to process, and problems are rarely encountered. However, there are a few points to note:

- First dilute the paint to the correct processing consistency.
- Then apply the product directly from the container.
- Use a brush, roller, or spray gun to apply the paint.
- The paint will dry as the water evaporates.
- Protect windows, window sills and adjacent parts of the building with adhesive tape.
- Dilute the paint for the base coat and for the topcoat with the amounts of water specified by the manufacturer.
- Observe the specified drying times.
- Because the paints are slightly alkaline, protect skin and eyes during processing.
- During processing and drying of the paint, the air temperature, tools and plaster base should not be colder than 5° C..
- Spot repairs that blend perfectly into the original paintwork are easily performed.

Substrate assessment and treatment

Uncoated Mineral Substrates		
Criterion	**Test method**	**Remedial action**
Strength	Scratch test	Remove or consolidate any loose, friable plaster
Silting	Wipe by hand	Remove any loose material, dry-clean, consolidate
Absorbency	Moisten with water	Non-absorbent/poorly absorbent: sand the surface or apply an adhesion promoter; absorbent: apply a primer
Moisture	Visual inspection, moisture meter	Eliminate cause, allow to dry out
Salts	Visual inspection	Prevent further moisture, allow to dry out, brush off salts, apply a solvent-based primer
Non-uniform structure	Visual inspection	Apply a slurrified smoothing coat
Fine cracks, impact and course joint cracks, structural cracks	Visual inspection, visual inspection after wetting, visual inspection of course joints for cracks	Apply a slurrified smoothing coat, apply a crack-bridging coating; widen and fill cracks. Cracks cannot be repaired permanently with crack-bridging coatings
Mold, algae	Visual inspection	Remove using suitable means; if necessary, apply an algicidal/fungicidal coating

Substrates with Old Paint Coatings		
Criterion	**Test method**	**Remedial action**
Load-bearing capability, adhesive strength, adhesive strength	Scratch test, adhesive tape test	Remove loose paint coatings
Dirt pick-up	Visual inspection	Clean with high-pressure water jet/steam jet
Chalking	Wipe by hand	Remove powdery substances with high-pressure water jet/steam jet
Mold, algae	Visual inspection	Remove using suitable means; if necessary, apply an algicidal/fungicidal coating
Salts	Visual inspection	Brush off dry substrate; remove loose paint coatings

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