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Advice Sheet 2 Exterior Use of Armourcoat Polished Plaster

1 Suitable environments and building details

Lime based plasters have been used in exterior situations for many centuries. The products themselves are more suitable for use in Mediterranean type climates but have been used successfully throughout the world.

The durability of these exterior plasters depends on many factors including environment, building details, bond between render and background, the level of exposure and the standard of workmanship.

Careful attention needs to be paid to the building design and details. Polished plaster is suitable for application on verticle surfaces only. If maintenance is to be kept to a minimum it is essential that adequate drainage from all gutters, down pipes and waste pipes is available to ensure that there is no accumulation of water on or adjacent to the building. Polished Plaster should never be applied down to ground level, it should always stop above the damp course. It is important that the roof has an overhang, which protects the walls from straight falling rain. In very wet climates elements such as sills and eaves should project well beyond the face of the wall and be provided with ample drip grooves to ensure that water is thrown clear of the wall face.

In climates that are exposed to temperatures which fall below freezing regularly, additional protection can be gained by using Armoursil Impregnator once the plaster has fully carbonated.

2 Suitability of products

2.1 P01, P20, P30, P66

All Armourcoat base plasters contain a mixture of lime, coloured marble and cement and are suitable for use in both interior and exterior situations.

Textured finishes such as Pitted, Dragged and Travertine are more suitable finishes for exterior applications. A textured surface tends to shed water running down the face, and distribute it giving a more evenly weathered appearance.

If applying Smooth or Cloudy finishes, it is advisable not to polish the surface too greatly, as the more the surface is compacted, the lower the water vapour permeability of the surface and the more prone to efflorescence it is.

For exterior use, Armourcoat recommends using the base plasters in their natural colours. If pigmented plasters are required it is recommended that inorganic powder pigments be added to the dry mix, as these are the only ones which are fully stable to both ultraviolet light and high levels of alkalinity found in lime and cement. Obey the following guides:

- Create only light pastel colours for exterior use. Do not exceed 1% pigment addition by weight. Care should be taken in ensuring that the level of addition does not create too dark a colour as certain pigments will be more efficient than others.
- Do not use micronised grades of pigments, as these are difficult to disperse completely and uniformly.
- Do not combine the powder-based product with pigment dispersions for external use as the surfactants in the pigments promote the likelihood of bloom from the cement and lime.

2.2 Armuralia and Spatulata

Both Armuralia and Spatulata are premixed products made from ultra-fine putty lime and crushed marble powder.
Armuralia and Spatulata contain no cement and can be pigmented with powder pigments or Armourcoat's inorganic metal oxide pigment dispersions. However, we only recommend light or pastel colours be used with maximum addition levels of 5 shots per Kg or less.

Please note that the addition of any pigment dispersion will increase the likelihood of efflorescence bloom.
Dark colours are not recommended for exteriors.

3 Curing

In order for Armourcoat polished plaster to achieve optimum exterior performance it is important the product is properly cured. There are two quite distinct aspects to the curing process, and these are full and complete hydration of the cement (powder products) and the carbonation of the lime (powder products, P80, P50) and the soluble lime content of the cement. Both of these processes require the presence of water in the form of either moisture in the substrate or atmospheric moisture in the air.

It is important that all exterior plasters are protected from rain for the first 48 hours. Provided there is a reasonable level of atmospheric moisture/humidity, then the curing process will continue gradually and the majority of the curing process will have completed within 30 days.

In particularly hot and dry environments where there is little or no atmospheric moisture, it is advisable to lightly mist the entire surface with water for the first few days. Do not let the water run down the surface as this may lead to streaks in the surface, and apply only enough water to dampen the surface. Alternatively, saturate the entire surface, and then remove all excess water with a towel or squeegee.

Until the curing process is complete, there is always a risk of efflorescence occurring on the surface of the material.

4 Efflorescence

Efflorescence is an unsightly white residue of soluble salts (calcium hydroxide & calcium sulphate) deposited on the surface of a lime or cement-based coating carried to the surface by the migration of water. All renders, stuccos or surface coatings that contain cement and / or lime are prone to efflorescence under the right circumstances. As water migrates to the surface of the coating it will take with it any soluble calcium salts, which are then deposited on the surface as the water evaporates off. In good drying conditions, the water turns to vapour below the actual plaster surface and the free lime remains within the coating rather than being deposited on the surface (open textured surfaces will allow water to evaporate further below the surface than surfaces which have been polished smooth). This soluble calcium hydroxide deposit then reacts with the carbon dioxide in the atmosphere to leave a fine residue of calcium carbonate on the surface of the coating (Lime-scale on your taps or in your kettle or the formation of stalactites and stalagmites are all caused by this same phenomenon).

Whilst the process of weathering may gradually remove this deposit from the surface, it can look quite unsightly for a long period, and the darker the colour of the coating, the more pronounced the effect appears to be.

4.1 Removing Efflorescence

As efflorescence is primarily a mixture of calcium hydroxide, calcium carbonate and calcium sulphate, it can be dissolved by a mild acidic solution. However, the rest of the coating is also made up primarily of calcium carbonate and calcium hydroxide, and therefore great care must be taken when using an acidic solution to remove the efflorescence. It is vital to use a very dilute solution in combination with a mildly abrasive kitchen-scouring pad or wet and dry sandpaper finer than 500 grit. In the UK we have used Viacal (limescale remover) diluted with water at a ratio of 1:50. Work on an area of no more than 2-3 sq.m or (20-30 sq. ft) at a time and as soon as the area is finished, flush the surface with water using a hosepipe. Run a cloth or rubber squeegee over the surface to remove the excess water.

Always do a trial area first to make sure the acid solution is not too aggressive and the end result meets with expectation.

5 Armoursil Impregnator

For all exterior applications in climates subject to severe freeze thaw we recommend the use of Armoursil Impregnator. Armoursil Impregnator is solvent free silane/siloxane based water repellent. The active ingredients penetrate readily into the surface of the plaster and then react chemically with the plaster, converting to a hydrophobic layer. It will protect the surface without clogging the pores or capillaries and thereby retaining the water vapour permeability of the finish.

Armoursil Impregnator can be applied to Armourcoat Polished Plaster 48 hours after completing the plaster application, however longer curing is preferable as it allows the surface to carbonate further.

Best results are achieved when the plaster has been allowed to weather in mild conditions for 30 days.

6 Expectations

Armourcoat Polished plasters are natural mineral materials and will age naturally. If your requirement is for a surface with monotone and uniform colour that will not change over time, then you should use a synthetic polymer finish. If however you seek the soft tonal variations and natural mineral quality of walls such as those seen in Venice and Rome, and you can accept and appreciate the charm of walls that reflect the age of the building, then Armourcoat Polished Plaster is the natural choice.

Semi-external & protected areas such as under soffits will age differently to directly exposed areas and streaking will occur if water is allowed to run down localised areas of the surface. If water permeates through from behind the plaster, it can lead to darkening and staining of the finish.

7 Application Methods

For application procedures and substrate guidelines for plasters in an external environment please consult Armourcoat Specification Sheet ‘SSS10 - Exterior application of Armourcoat Polished Plaster’.