LIME IN RENDER PRODUCTS

Lime in Render:

Lime in cementitious products is hydrated lime (Calcium Hydroxide: $Ca(OH)_2$). It is added to cementitious render mixes to initially assist in improving the workability and the cohesiveness of the mix and subsequently to help reduce the amount of drying shrinkage; minimising the risk of cracking and fissuring.

Lime Bloom: is an occasional phenomenon particularly noticeable on coloured render and on coloured products made with Portland cement. It is a white deposit which is apparent either as white patches or as an overall lightening in colour. The latter effect is sometimes mistakenly interpreted as the colour fading or being washed out.

The cause of Lime Bloom lies in the chemical composition of Portland cement. When water is added to cement, a series of chemical reactions takes place which result in setting and hardening. One product of these reactions is 'lime' in the form of Calcium Hydroxide. Calcium Hydroxide is slightly soluble in water and under certain conditions it can migrate through the damp render to the surface, and there react with Carbon Dioxide crystals producing Calcium Carbonate. This surface deposit is similar to a very thin coat of Whitewash, and gives rise to the white patches, or lightening of colour mentioned previously. The surface deposit is normally extremely thin and this thinness is demonstrated by the fact that, when the render is wetted, the film of water on the surface usually makes the deposit transparent and the efflorescence seemingly disappears.

The appearance of Lime Bloom does not indicate any inherent problem with the render materials or the application technique. However, the tendency for Lime Bloom to appear is exacerbated by fluctuating temperatures and relative humidity.

The occurrence of Lime Bloom on render tends to be spasmodic and unpredictable; nonetheless an important factor is the weather. Lime Bloom forms most readily when render becomes wet and damp for several days, this is reflected in the fact that it occurs most frequently during the winter months. In particular, an extended period of rain or snow which lies for some time and damp foggy days are conditions most likely to bring on sever outbreaks. Although drying winds are often suggested as a likely cause, they are probably not a major factor. Lime Bloom is not visible on damp render and so only becomes apparent with the onset of drying weather. Thus the drying weather does not necessarily produce the Lime Bloom; it may only make visible a deposit which had already formed, but could not be seen because the render was damp.

Render is normally only liable to Lime Bloom early in its life. In general render which has been in service for a year without being affected can be considered immune. Lime Bloom is a temporary effect, and given time, usually disappears of its own accord. It is purely superficial and does not affect the durability or strength of the render.

Where the render is fully exposed to the weather, rainwater (which is slightly acidic) dissolves the deposit and the Lime Bloom typically disappears in about a year. In more sheltered locations, removal by natural means may take considerably longer.

Common advice includes washing with diluted acid; this can only offer **very limited effectiveness** and typically acts as a very temporary fix, usually reducing the appearance until the next shower of rain.

This is a relatively simple operation, but care should be taken on two accounts. Firstly, acids can be hazardous and appropriate safety precautions must be taken. Secondly, acid attacks render and over-application to a render surface can result in acid etching, which will alter the texture and appearance.

Generally, an 80% solution of commercial grade of hydrochloric acid is used. The acid concentration can be adjusted to suit individual circumstances: a less concentrated solution will require more applications to remove Lime Bloom, but will be less likely to result in acid etched appearance.

Before the acid is applied, the surface should be dampened with water to kill initial suction. This is best achieved by the use of a steam cleaner on cold, but pressurized spray (this prevents the acid from being sucked into the render before it has a chance to react with the surface deposit).

The acid is applied by spray using a garden spray and a typical application rate is one litre of acid 5-10m^2. Following application of acid, the surface is immediately power washed at approx 70°C. Often one wash with acid is sufficient; however in more stubborn cases the treatment is repeated as necessary until the Lime Bloom disappears.

When carrying out acid washing, always start with a trial on an inconspicuous area. Operatives should wear protective clothing, at the very least rubber gloves and goggles. Precautions should be taken to prevent acid from coming into contact with metals and other materials which may be adversely affected.

Acid is neutralized within seconds of coming into contact with render: consequently, when acid washing is used on render products, there is no risk of acid burns to users of such products. The attack on render by acid, even in the case of severe over-application, is limited to a thin surface layer and there need be no cause for concern that acid washing will affect properties of the render other than the surface appearance. Whilst there can be no guarantee, experience suggests that Lime Bloom is unlikely to recur following its removal with acid.