

Brick Technical Bulletin - Efflorescence & Colour Integrity

BTB 7

Over a number of decades Marshalls has been at the forefront of improvements into the performance of concrete masonry bricks and through research and development the products now exhibit superiority in both performance and appearance.

To explain the mechanism whereby efflorescence is minimised and colourfastness secured it is important to understand the principles which caused certain concrete bricks built in previous years to look somewhat pastel in shade.

COLOUR INTEGRITY

In the early days of concrete brick production in the UK there was a tendency to use liquid or inferior, often carbon based pigments. Ultimately these leached out due to natural weathering to leave just the base colour of the aggregate brick. Hence there are examples of concrete brick buildings from the 1960s and 1970s which appear 'washed out' or 'faded'.

Since the early 1990s however, Marshalls bricks have been produced using synthetic iron oxide pigments from the major industrial, multi-national chemical companies. These pigments are high quality powders which retain their colour under all circumstances. All pigments used by Marshalls are 100% Synthetic Iron Oxide and are, by definition, lightfast. Additionally, all pigments are manufactured to the latest BS EN 12878: 2014 standard and this allows each of the products to carry the CE mark. Within this standard there are various tests, including weathering trials, to which each pigment has to be subjected and therefore, if the pigment is CE marked, the pigment has been determined as being resistant to weathering and is lightfast. However, even products made with these colourfast pigments can appear to fade, not due to colour loss of the pigment, but due to lime bloom on the surface of the brick which masks the true colour. This can appear to be more prevalent on darker colours.

EFFLORESCENCE

The phenomenon of efflorescence or lime bloom on all concrete products is derived from the leaching of the free calcium ions which are present in solution during the hydration of the cement matrix within the bricks. As this calcium rich solution migrates to the surface of the brick the calcium crystallises on the surface and exhibits itself as a milky white deposit. In time this deposit will weather off due to environmental effects but it could return on an on-going basis, albeit less and less over the years.

Unless an inhibitor is incorporated into the face or within the matrix of the brick then it could appear to lose its intensity of colour due to bloom, although this would eventually weather off by the acidity of rainfall.

Due to these issues, Marshalls, in conjunction with specialised chemical companies, derived a number of systems and treatments to inhibit efflorescence.

The longevity of these treatments is tried, tested and evidenced on buildings constructed for many decades. However, the main effect of inhibiting efflorescence is best demonstrated at the primary stages of a brick's life, because as the brick gets older the amount of free calcium ions reduces due to the continued hydration of the cement. Additional carbonation of the brick surface reduces the permeability and any likelihood of efflorescence. Hence Marshalls facings bricks look good from initial construction through the life of the building.

However, it is important that good practice, in terms of design and protection during construction, is followed to minimise the risk of efflorescence, not only from the bricks but also from the mortar where unsightly staining can occur if adequate measures are not taken to protect uncompleted brickwork.