

Decorative Sealed Units

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TECHNICAL HELP

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Twinseal Limited

Unit 20, Green Park Business Centre
Sutton On Forest, York, YO61 1ET
Tel 01347 811773 Fax 01347 811774



GUARDIAN

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The Oxidation of Lead

Lead profile is manufactured from refined lead ingots; in such a manner that the metallic composition of the product is guaranteed a minimum of 99% lead content. However, as with all lead products i.e. lead sheet, pipes, flashing, etc., it is subject to an oxidation (weathering) process and will form a natural protective patina when exposed to the atmosphere.

This patina briefly, is a layer of highly insoluble lead salts, which gradually form on the lead surface to eventually give the familiar, traditional grey lead appearance. Good examples are church windows and the old leaded lights where the lead has oxidised and formed its natural patina.

During the initial stages of the oxidation process, lead can display various colours including blue, bronze and even green. This effect is perhaps best described as optical, as these colours are mainly determined by the angle of the reflected light and will fade away as the oxidation process continues.

When lead comes into contact with moisture: rain water, condensation, etc., at an early stage, discoloration, spotting and white powdery deposits (usually basic lead carbonate) can form and may 'run-off'. The degree to which all these effects occur is governed by the environmental conditions, but with longer term weathering the lead will take on its familiar appearance. Investigations have shown that the patina formation follows the route: lead, lead oxide, basic lead carbonate, normal lead sulphite, and normal lead sulphate.

The 'run-off' stage occurs when non-adherent basic lead carbonate is formed, usually through contact with moisture. Each of the other stages in patina formation is adherent, highly insoluble lead salts and in practice, as these salts develop with weathering; they stifle the basic lead carbonate release. The final patina being approximately 30% normal lead sulphite, 60% normal lead sulphate and 10% normal lead carbonate. However, this can vary dependent upon location, time and airborne impurities.

The above effects only occur intermittently and will eventually disappear.

After glazing, the lead should not be cleaned with solvent based or abrasive cleaners, as this may cause the oxidation process to begin again on any re-exposed 'fresh' surface.

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