1927

CAST STONE INSTITUTE℠

Care & Maintenance

Technical Bulletin #33

EFFLORESCENCE

Efflorescence is a calcium or alkaline salt, which forms as a blotchy, powdery or crystalline deposit on the surface of masonry walls and concrete products. It is due to moisture entering through the walls or the surface of the Cast Stone, combining with the calcium hydroxide in the cement, and bringing the hydroxide to the surface in a solution which forms crystals when it combines with the carbon dioxide in the air. Efflorescence has no structural or durability significance and does not by itself constitute a cause for rejection according to ASTM C 1364, Standard Specification for Architectural Cast Stone.

Efflorescence is unsightly and is usually a source of disagreement between builders and architects as to why it occurs and what should be done about it when it appears. It is not always possible to predict whether masonry will effloresce. Soluble salts and moisture must be present for efflorescence to occur. These salts may be present in the concrete, mortar, brick or Cast Stone. They may be carried into the wall with rainwater or absorbed by groundwater. Planter areas and watertable sections must be properly dampproofed (see section on dampproofing) to prevent wicking of groundwater. Improper ground storage is a common cause of salt contamination. There is some evidence which suggests that salts can be interjected with admixtures, deicers or with masonry cleaners. While acids are frequently used to remove efflorescence, they can contain chlorides which contribute to efflorescence. This is one reason why many buildings show signs of efflorescence shortly after washdown.

ASTM C 67 - Standard Test Methods of Sampling and Testing Brick and Structural Clay Tile, includes a wick test for ascertaining whether a brick is liable to cause efflorescence. Small specimens or cubes either molded or saw cut from Cast Stone may be evaluated by this test.

Common installation problems which can cause or enhance efflorescence include the improper use of through-wall flashing, lack of sufficient weep holes, use of Cast Stone without ventilated wythe, use of Cast Stone below grade or at planter type areas without proper moisture barrier, failure of joint materials which allow water entry and the use of hard mortar joints where sealant joints should be used. Soffit stones are particularly susceptible to efflorescence from masonry walls above and should be designed to prevent from become the “gutter” of the wall.

Most efflorescence is temporary and, as such, should be left alone. It most commonly occurs shortly after building washdown and in the fall and winter months when vapor transmission slows down and masonry stays damp for extended periods of time. Acid rain is a natural remover of efflorescence since most salts are highly soluble in water.

If necessary environmental considerations are taken, a dilute solution of muriatic acid (5-10%) will remove common efflorescence as well as any carbonate of lime which may be present. Manual washing can often draw additional salts to the surface and repeat washing may be necessary, but when all of the salts have come to the surface naturally and been washed off there will be no more trouble from this cause.

This Technical Bulletin is provided by the Cast Stone Institute℠, and is intended for guidance only. Specific details should be obtained from the manufacturer or supplier of the Cast Stone units.

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