TECHNICAL INFORMATION SHEET **B1**

Site practice & troubleshooting

EFFLORESCENCE

What is efflorescence.

The appearance of salt deposits on the surface of brickwork. They can derive from the brick body, mortar or contamination from other materials or ground water.

Cause & effect.

Salts within brickwork are dissolved by water which is introduced during construction or from rain. Shrink-wrapped packs of bricks can develop efflorescence if in contact with damp ground and condensation forms within packs. As the brick or brickwork begins to dry out the solution of salts will be drawn to the surface where the salts become more concentrated as moisture evaporates. This tends to be most prevalent when temperatures reach optimum levels for drying, i.e. Spring onwards.

Efflorescence is most prevalent in the early life of the building, particularly the first year. In many areas it will not reappear after the first year, and in those situations where it does, it will be less evident than the initial occurrence.

It commonly occurs in spring, following wet winter working conditions, when the building dries out for the first time.

Visible as a harmless deposit of soluble material on the surface of brickwork, its texture may vary from light and fluffy to hard and glassy depending on its composition. The deposits consist of natural occurring soluble salts which vary considerably throughout the country, not only within the clays used for the manufacture of bricks but also in the constituents necessary for the production of the mortar i.e. sand and cement.

Apart from the salts derived from the bricks and mortar, almost any salt can form efflorescence if it is introduced as a contamination from external sources. The quantities of salts involved are small and a tiny percentage of soluble sulfates in the bricks or the cement is sufficient to account for the amount of efflorescence usually seen.

Prevention.

Little, if any, masonry is immune from the potential effects of efflorescence. Factors that influence the occurrence of efflorescence are:

- *Design and detailing, e.g. lack of protection from sills and copings.*

- *Site practice, e.g. failure to protect unused bricks and newly built brickwork e.g. not affixing gutter downpipes, leaving cavities open to the elements.*

- *Site inadequacies -failure to observe design requirements e.g. inadequate formation of d.p.c detailing.*

- *Site exposure - specific building elevations can be more at risk than others by their position in relation to prevailing wind and rain conditions. Also particular areas of exposed brickwork, e.g. parapets.*

Attention must be given to these aspects in order to minimise the risk of efflorescence. Guidance on detailing and protection is given in the Design of masonry structures: EN 1996 and Recommendations for the design of masonry structures: PD 6697.

Efflorescence during construction can be minimised by maintaining a high standard of workmanship. Items for particular consideration include the following:

Bricks should be stacked onto, a clean, firm level surface. They should be protected from rain, mud splashes etc. by covering with waterproof sheeting.

Turn back the scaffolding board closest to the brickwork at all interruptions to construction.

The first 3 to 5 days after laying (dependent on season), brickwork is most vulnerable to the elements as mortar is still undergoing the hardening process. Newly erected masonry should be covered by waterproof sheeting to protect fresh mortar and open cavities to stop masonry becoming saturated. Hessian is not waterproof. Once the structure is watertight, i.e. roof and windows in place, the building can commence the drying process.

Unless instructed, the method of "dipping" or “docking” bricks prior to laying should be avoided if possible.

Equally important is the incorporation of the appropriate d.p.c.'s, copings and sills at the design stage. No amount of good site management can alleviate efflorescence from badly designed construction.

Remediation.

In considering remedial treatments, efflorescence is a transitory effect which should preferably be allowed to weather away naturally.

Its removal can be accelerated by replicating weathering conditions for example;

- dry-brushing with a soft to medium nylon/bristle brush (a wire brush should not be used). The residue should be collected and removed so that it does not re-enter the brickwork at a lower level.
- using a sponge dampened with clean water to draw out salts. Excessively wetting brickwork may force some re-dissolved salts back in to the brickwork which will re-appear as it dries.

The use of a silicone waterproofing treatments should be avoided since this may result in more permanent problems.

The majority of efflorescence concerns relate to newly constructed brickwork. Recurrent efflorescence on older established brickwork can often be taken as an indication that water is entering the masonry as a result of failure of design detailing or other protective measures, e.g. faulty gutters, tanking materials etc .

TIS B15- Minimising the risk of efflorescence and vanadium may also be of assistance.