

Free Lime & Cavity Drained Systems

Introduction

Free lime and mineral salts leaching from concrete walls and floors are one of the commonest causes of failure of a Type C, Drained Protection Systems. Reference BS 8102:2022 Section 10.2.1.2 Leachates and Free Lime.

Free lime and mineral salts leach from new construction by groundwater ingress, this then deposits itself within the cavity drainage system (behind and underneath membranes), within perimeter drainage channels and particularly within the sump chamber and around the sump pumps. The build-up of free lime within the Type C System will eventually cause a failure of the Waterproofing System.

Free lime build up with channel, pump systems and dry pack

Common causes of Free Lime

Free lime and mineral salts found in groundwater (particularly hard water areas) can enter a structure through construction joints and cracks in the building fabric. Free lime is particularly prevalent in new construction and retrofit construction as a by-product of the hydration process within concrete and particularly in unhydrated dry pack joints above concrete underpinning. As groundwater passes through the structure it picks up the free lime, it then deposits this, as it passes through the cavity drainage system to the point of discharge.

Minimising the impact of Free Lime

It is important when designing Type C, Drained Protection Systems that the issue of, and potential issue of, free lime is considered at the earliest stage.

Ways to reduce the impact of free lime on Cavity Drainage Systems

- Inclusion of crystallisation systems, as a primary waterproof coating to structure
- Detailing all construction and dry pack joints
- Application of an anti-lime coating
- Maintainability of Type C System and ongoing maintenance
- Inclusion of a Sump Pump Monitoring System



Crystallisation Systems

In depth crystalline active slurry systems or concrete admixtures aid reduction of free lime and its potential impact in Cavity Drainage Systems by reacting with the free lime in new concrete and masonry to form insoluble crystalline growths as part of the waterproofing process. The impact of using such systems is two-fold, primary resistance to the passage of water through the structure and reducing the levels of free lime available to impact on the Cavity Drainage System.



Free Lime From Construction Joint And Free Lime From Dry Pack

It is important that these potential weak points and generators of free lime are correctly detailed prior to the installation of the Cavity Drainage System. Joints should be addressed and detailed using suitable mortars and over-coating with a waterproof slurry system, such as Koster NB 1.

Dry pack joints should be detailed in a similar way, remove a minimum 50mm depth of dry pack and replace with a slightly expanding waterproof mortar such as, Koster Repair Mortar Plus. Overcoat the dry pack by minimum 150mm to either side with a suitable slurry system, such as Koster NB 1 (see Delta Detail DW-215-1-(c)).

Application of Anti Lime Coating

Anti-lime coatings such as Koster Polysil TG 500 should be applied over all new and existing structures prior to the installation of a Type C, Cavity Drained System. A Type C, Cavity Drained System cannot stop water picking up free lime as it passes through the structure, but it significantly reduces the amount of free lime picked up from the internal surfaces of the structure and reduces the amount of free lime impacting on the Type C System. Application of anti-lime coatings can reduce the frequency of future maintenance requirements.

Maintainability & Ongoing Maintenance

All cavity drainage systems must be designed to be maintainable to conform to the requirements within BS 8102 2022 Section 10.3 Servicing and Maintenance This includes access ports within the perimeter drainage channel, access to the sump pump systems but in addition the maintainability of the cavity created by the membrane(s) and structural elements. Access (or flushing/rodding) ports within the Cavity Drainage System are for inspection and testing of the installed system, these access ports whether within the perimeter drainage channel or providing access to the modular drainage system can also be provided within the membranes themselves thus enabling full access and maintainability of the installed system.

This particularly important within large floor areas and where drainage channel may be offset from the wall, or access runs within the base of internal walls are created below the membranes. These allow for lime dissolving solutions to be used in flush through and clean the systems ensuring long term success.

Frequency of planned maintenance and inspection of the installed Cavity Drainage Systems is important, as when not carried out with adequate frequency, free lime build-up can already be causing problems and potential failures in waterproofing systems. The minimum would be a planned visit at least every 12 months, with an initial visit after Completion of Installation within the first 3-4 months.



Based on the inspection on the first visit, a regular agreed strategy for frequency of maintenance should be set up. This may be more frequent than every 12-months. Addressing the potential causes of free lime generation will greatly assist in reducing the frequency of future maintenance visits.

Pump Monitoring Systems

With modern technology and advances within the industry it is now possible to monitor the health of a Basement Drainage System remotely and continually.

High Level Alarm and Monitoring

The Delta HLA Plus continually monitors the health of the installed sump pumps within the Cavity Drained System. The Delta HLA Plus monitors the frequency of pump cycles, the length of each cycle, along with the voltage and current being used by the sump pump. Notifications are sent through the free to use Delta Pumps App.



With the Delta HLA Plus the risk posed by free lime on a Cavity Drained System can be dramatically reduced further.

