

# White Deposits on Windows

## What are they and how do you prevent them?

### **White Deposits on Windows – Silicates are the Problem!**

White deposits on glass are sometimes a problem with concrete buildings, especially precast panels with flush mounted windows. The problem occurs after several years and is characterized by “white water spots” or white powder on the windows. The residue is very difficult to remove requiring proprietary cleaners and excessive man-hours.

### **Is Efflorescence the Problem?**

No. Efflorescence is water-soluble salts in solution that are brought to the surface of the substrate and deposited there by evaporation. Although efflorescence can occur with concrete, it is not as common as with masonry. Efflorescence can also be caused by water-soluble alkalis (from the cement) that are leached out of the concrete to form water insoluble carbonates. Because carbonate deposits are soluble in acidic water efflorescence is relatively “easy” to remove. To help mitigate this problem water repellents designed for concrete are recommended. If your structure has efflorescence problems use Protectosil® CHEM-TRETE® BSM 40 VOC, Protectosil® BH-N or Protectosil® AQUA-TRETE® BSM 20.

### **What is the Real Problem?**

The tenacious white residue on the glass is tiny concrete particles that are dissolving from the concrete surface. These deposits are composed of silicate anions. The silicates are transported onto the windows by rain water and as the water evaporates the deposits chemically bond to the glass. The reactivity of silicate anions can change simply by they way they hydrate and dehydrate. During wet-dry cycles the orientation of the anions is altered and bonding to other silicates surfaces (glass!) can occur. Compounding the situation is that contaminants associated with the concrete or atmosphere such as aluminum and calcium will also make the silicate deposits insoluble.

## How Can Silicate Deposits be Prevented?

There are three basic strategies to mitigate silicate deposits:

- Redirect water runoff: primarily by installing drip edges around windows.
- Cleaning windows frequently and using a glass protector treatment.
- Painting or sealing the concrete.

Drip edges have mixed effectiveness especially during wind driven rain. Frequent cleaning of the windows to remove the deposits is costly. Plus, repeated aggressive cleaning techniques make the glass progressively harder to clean. Painting the concrete will be effective, but it becomes a long-term maintenance issue. Sealing the concrete with a silicone or penetrating type product is normally effective for only one to two years.

## Evonik's Experience and Solution

Silane and siloxane sealers work against traditional efflorescence, but have limited effectiveness against silicate deposits. These products penetrate into the substrate and prevent water absorption, but the materials on the concrete's surface will breakdown via UV radiation (in 2 years). Moisture can then contact the silicates to be absorbed and deposited onto the glass.

Products based on our Sivento Silanes® silicon nanotechnology are effective in mitigating silicate rundown. Protectosil® AQUA-TRETE® SG provides excellent surface repellency and has the advantage of being inherently UV resistance. In addition, it is breathable, and does not change the natural appearance of the concrete.

It is recommended to perform a test area to verify the effectiveness of the treatment. Our representatives can supply the expertise and free material to run the test areas. It is recommend to first clean the concrete surface by pressure washing and if needed cleaning agents. Keep in mind that the cleaning process may rinse additional silicates onto the windows. Rinse the windows also to remove any loose silicates before they dry and bond to the glass. Allow 24 to 48 hours or dry weather for the concrete to dry.

For porous concrete first, apply one of our standard water repellents, Protectosil® CHEM-TRETE® BSM 40 VOC or Protectosil® CHEM-TRETE® BSM 400 to the concrete surfaces at the recommended application rate. Allow a minimum of 24 hours for the Protectosil® CHEM-TRETE® to cure before applying the Protectosil® AQUA-TRETE® SG.

Secondly, apply the Protectosil® AQUA-TRETE® SG by roller (1 inch nap) or low pressure spray until the concrete surface is saturated. Coverage rates are typically 125 to 150 square feet per gallon. The product will leave a residue on glass and other non-porous surfaces. Either protect these areas or immediately wipe off any access with a clean rag.