

Protective treatments applied to the exposed surface of masonry are designed to provide a first line of defense against moisture intrusion. With the exception of single wythe masonry, sealing and coating treatments should not be expected to provide the sole line of protection but should be part of a redundant system incorporating drainage provisions as well as water resistant backups. Protective treatments may take the form of clear water repellents for brick and coloured concrete masonry units, or water repellent stains, paints and high build coatings (such as elastomerics) for plain concrete masonry units.

In selecting a suitable coating and sealing treatment, several questions need to be answered. They include:

- Are all flashings properly installed and functioning?
- How is water drained from the envelope assembly?
- Has allowance been made for movement and deflection?
- How are the interface between masonry and other materials detailed?
- What are the exposure requirements of the assembly?
- What aesthetic concerns must be considered?
- How is vapour diffusion handled across the wall assembly?
- Are substances other than water to be resisted by the masonry?

## **1. Coating Categories**

There are a number of ways to categorize masonry wall coatings. One could use "breathability" as a category. Vapour impermeable coatings are usually intended only for application to the interior surface of masonry. Application of these types of coating to exterior surfaces can lead to moisture and efflorescence entrapment, potential spalling and delamination, as well as surface and coating degradation. By contrast, "breathable" coatings allow the diffusion of vaporous water through the surface treatment to the exterior environment.

Another form of coatings classification would be on the basis of opacity. Clear water repellents are intended to provide little or no change in masonry appearance. By contrast, pigmented coatings (stains and paints) are intended to significantly alter the colour and appearance of

the masonry surface. Aesthetic concerns will play a major role when opacity is used as material selection criteria.

Coatings may also be classified according to their ability to resist hydrostatic pressure. While clear water repellents may resist significant wind driven rain loads, high build coatings are usually required should masonry be exposed to prolonged hydrostatic pressure (such as below grade, fountains, etc.). For plain concrete masonry units exposed to above-grade wind driven rain (and where control of water ingress is paramount), the use of an elastomeric coating system is recommended.

Within each category of products, sub-classifications can be employed on the basis of such factors as chemical make-up, environmental impact, application conditions, longevity, and life-cycle cost to name a few. The designer must consider these different qualities when developing project specifications.

## **2. Clear Repellents**

The use of masonry water repellents helps to prolong the satisfactory performance of masonry wall systems. The reduction in water absorption provided by water repellent treatments offer the following advantages:

- Maximize moisture resistance
- Reduction in efflorescence potential
- Reduction in algae and vegetative growth build up on masonry
- Maintenance of "natural" appearance of masonry during exposure to rain
- Reduction in absorption of rain borne contaminants
- Reduction in staining of masonry

### **3. Water Repellent Stains**

Water repellent stains yield water repellency (like clear treatments) but also impart colour to the substrate. These materials are suited for use on concrete masonry units where a specific colour is desired, but the natural texture of the masonry is to be maintained. They are intended to provide the appearance of an integrally coloured block (including some tonal variations), but avoid the pore filling properties of paints and high build coatings. Water repellent stains furnish all of the properties of clear water repellents with the added feature of colour control.

### **4. Paints and Coatings**

Paints and coatings are intended to alter the appearance of the masonry by the use of colour as well as texture (pore filling). They also provide a higher level of wind driven rain protection than clear water repellents. For single wythe plain concrete masonry units, where resistance to wind driven rain is a primary concern, it is recommended that a three coat elastomeric system be used. This involves the application of a coating of elastomeric primer (not just block filler) followed by two coats of an elastomeric finish with the intent of achieving a pinhole free coating on the masonry.

### **5. Surface Preparation**

The successful performance of any coating depends greatly on the attention to surface preparation. Masonry should be carefully inspected prior to treatment. Cracks, voids and openings should be properly treated to prevent points for significant water ingress. Clear water repellents are not intended to bridge cracks.

Surfaces to be treated must be clean and free of dust, dirt, oil, grease, efflorescence, or any other substance that could prevent the penetration of the treatment or compromise its long term performance. Mechanical

and/or chemical cleaning may be required to suitably prepare the surface for treatment (see section 1.6.1 in this manual). Should washing occur, sufficient drying time must be provided before coating application. Detailed instructions for surface preparation are provided by coating manufacturers and these should be followed carefully.

## **6. Performance Criteria**

Although different categories of products utilize diverse testing procedures, the standard test method for water permeance of masonry is ASTM E-514 and products to be used on masonry should have been tested by the coating manufacturer to this standard. This procedure simulates a wind driven rain condition on a masonry assembly (joints and masonry units) and measures the relative resistance of the assembly to water leakage. While this procedure is particularly effective from a laboratory standpoint, the use of moisture absorption (R.I.L.E.M.) tubes provides portable field-testing of applied treatments. Testing undertaken by the Masonry Institute of B.C. has shown a close correlation of ASTM E-514 test results (in the laboratory) and moisture absorption tube values (in the field).

Coatings that remain on the surface of treated masonry (opaque coatings) that will be exposed to sunlight and weathering cycles should be tested in an accelerated weathering apparatus. Several ASTM procedures exist for this purpose (D-822 and G-26 in particular). While no direct correlation of hours of exposure to years of service life is possible, relative performance can be established.