INTRODUCTION
1. Clear water repellents for application to concrete and masonry encompass a wide range of products, but generally only a few raw materials.

2. Clear water repellents are typically formulated from one of the following chemicals/chemical combinations:
   • Acrylics
   • Stearates
   • Mineral gum waxes
   • Urethanes
   • Silicones
   • Silanes
   • Siloxanes
   • Silicates
   • Methyl siliconates

3. The type of active ingredients used in water repellents can be characterized broadly as either film formers or penetrants.
   a. Film formers are materials that deposit their primary water-repellent component on the surface of the substrate.
   b. Penetrants enter the pore structure of the substrate and deposit their primary water-repellent component on the walls of the pores and/or in the pores themselves.

FEATURES AND BENEFITS
1. Water repellents are designed to reduce the absorption of moisture into the substrate which can lead to reduction in:
   • Freeze-thaw damage
   • Efflorescence
   • Dirt pick-up
   • Mildew and algae growth on substrates
   • Carbonation

2. The reduction of the above problems will lead to a more durable and cleaner substrate.

DESIGN CONSIDERATIONS
1. Generally, there is not a single water repellent formulation that will give optimum performance on all masonry and concrete substrates.

   Manufacturers design their products for a particular type of substrate. Some products are designed for concrete masonry units that tend to be porous or precast concrete which is denser. Some natural stones are not as reactive as manmade masonry and may be softer. All these factors affect the selection of a clear water repellent.

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2. Water repellents cannot solve deficiencies such as leakage through cracks, missing or damaged sealants and debonded mortar joints as these deficiencies are typically outside the performance attributes of most water repellents to correct.
   a. It is recommended to make all necessary repairs to the structure before applying a clear water repellent.
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TECHNICAL BULLETIN 5
CLEAR WATER REPELLENT FOR MASONRY

<table>
<thead>
<tr>
<th>RAW MATERIAL/ACTIVE INGREDIENT (GENERAL CLASS)</th>
<th>TYPICAL SOLIDS CONTENT</th>
<th>RECOMMENDED SUBSTRATE</th>
<th>EFFECT ON MOISTURE VAPOR TRANSMISSION</th>
<th>APPEARANCE OF SUBSTRATE</th>
<th>RESIDUE ON GLASS OR METAL</th>
<th>EXPECTED LIFE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACRYLICS (FILM FORMER)</td>
<td>10–15%</td>
<td>concrete, brick, block masonry</td>
<td>reduces MVT</td>
<td>sheen or gloss</td>
<td>yes</td>
<td>1–2 years</td>
</tr>
<tr>
<td>STEARATES (FILM FORMER)</td>
<td>5–8%</td>
<td>concrete, brick, block masonry</td>
<td>reduces MVT</td>
<td>none</td>
<td>yes</td>
<td>&lt; 1 year</td>
</tr>
<tr>
<td>MINERAL GUM WAXES (FILM FORMER)</td>
<td>8–12%</td>
<td>brick, block masonry</td>
<td>reduces MVT%</td>
<td>sheen</td>
<td>yes</td>
<td>1–2 years</td>
</tr>
<tr>
<td>URETHANES (FILM FORMER)</td>
<td>10–15%</td>
<td>concrete, brick, block masonry</td>
<td>reduces MVT</td>
<td>sheen or gloss</td>
<td>yes</td>
<td>2–3 years</td>
</tr>
<tr>
<td>SILICONE RESINS (FILM FORMER)</td>
<td>5–8%</td>
<td>brick, block masonry</td>
<td>reduces MVT</td>
<td>none</td>
<td>yes</td>
<td>2–5 years</td>
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<tr>
<td>SILANES (PENETRANT)</td>
<td>10–100%</td>
<td>concrete, brick</td>
<td>no effect</td>
<td>none</td>
<td>some no</td>
<td>3–10 years</td>
</tr>
<tr>
<td>SILOXANES (PENETRANT)</td>
<td>5–20%</td>
<td>concrete, brick, block masonry</td>
<td>no to slight</td>
<td>none</td>
<td>yes</td>
<td>2–10 years</td>
</tr>
<tr>
<td>SILICATES (PENETRANT)</td>
<td>3–12%</td>
<td>concrete</td>
<td>reduces</td>
<td>none</td>
<td>etches glass</td>
<td>&lt; 1 year</td>
</tr>
<tr>
<td>SILICONATES (PENETRANT)</td>
<td>3–8%</td>
<td>block, concrete</td>
<td>no effect</td>
<td>none</td>
<td>etches glass</td>
<td>&lt; 1 year</td>
</tr>
</tbody>
</table>

3. Water repellents are not intended for below grade waterproofing where hydrostatic pressure is a concern.
4. Check the compatibility of the clear water repellent with other building materials such as sealants, paints, repair mortars and window units.
5. Mock-ups: It is always advisable to perform a mock-up with the manufacturer and/or applicator to determine application rates, potential changes in the aesthetics (color and/or texture and sheen) of the substrate.
   a. It is recommended that tests be performed in more than one lacation of each substrate as absorption/application rates may vary.
   b. RILEM tube water absorption testing can be easily run in the field to verify that the water repellent is meeting the required performance requirements.

INSTALLATION CONSIDERATIONS

1. Ambient Conditions
   a. Most manufacturers require a minimum ambient and surface temperature of between 40 and 90 degrees F without threat of freezing temperatures for 12-24 hours after application.
   b. Humidity should be below 90% (or less – refer to manufacturers recommendations) to encourage drying and curing.
   c. Water repellents should not be applied to substrates with frost, condensation or water on the surface.

2. Substrates
   a. Existing cracks should be repaired prior to the water repellent application.
   b. Porous substrates will require different application rates than smooth or dense substrates.