

# The causes of paint failure; adhesion testing

## *What usually causes a coating to fail?*

The most frequent causes for premature paint failure are as follows: insufficient surface preparation; low film build; improper coating was used; multi-layer peeling; product not applied as directed; the substrate was wet or contained a contaminant, or environmental conditions (moisture, fumes, chemicals, etc.). Many factors come into play. When in doubt make sure the surface is clean, dry and in sound shape prior to painting.

ing from the substrate or previous coating and rated.

The cross-hatch tape test is typically for use on coatings less than 5 mils thick. Using a sharp blade cut a cross-hatch pattern rather than the X pattern. Masking tape is placed over the X-cut and then removed rapidly. After the tape has been pulled off, the cut is then inspected and rated. A standard method for the application and performance of these tests is available in ASTM D3359.

A more quantitative test for adhesion is the pull-off test, where a loading fixture (commonly called a dolly or stub) is attached by an adhesive to the coating. By use of a portable pull-off adhesion tester, a load is increasingly applied to the surface until the dolly is pulled off. The force required to pull the dolly off yields the tensile strength in pounds per square inch (psi) or mega Pascals (Mpa). Failure will occur along the weakest point in the system comprised of the dolly, adhesive, coating system and substrate. This test method maximizes the tensile stress as compared to the shear stress applied by other tests and the results may not be comparable. A standard method for the application and performance of this test are available in ASTM D4541. **PPC**



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## *Why does latex paint peel off days after it is dry?*

Sometimes we hear that “my latex paint is peeling off when we dig our thumbnail into it.” There are many recognized ways to determine how well a coating has bonded to the surface; however, the infamous “thumbnail test” is not a recognized method. Coatings must have sufficient time to dry and cure prior to using a standard test method for adhesion as described below. Coatings must be completely cured to achieve accurate results.

The X-cut tape test is typically used at job sites. Using a sharp blade, two cuts are made into the coating down to the substrate to form an X. Masking tape is placed over the X-cut and then removed rapidly. The X-cut area is then inspected for removal of the coat-

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