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## WATCH THAT FIRST STEP – IT’S A BIG ONE

By Bob Cusumano

There are many adages that refer to taking that first step, such as “Every journey starts with the first step” and Neil Armstrong’s famous first words on the moon “That’s one small step for man, one giant leap for mankind”. So too, when painting, the first step, that of selecting a primer, is crucial to the success of a coating system. Just selecting a primer isn’t enough. There are many different types of primers and selecting the correct primer to address the particular substrate and conditions encountered and selecting the proper primer is the key to a successful project.

One important property required of all primers is that they need to provide adhesion. They need to have the chemical and mechanical properties to bond to the surface and material to which they are applied and also must allow succeeding coats to adhere to them. Then, each primer must have additional properties tailored to the specific substrate to which they are applied.

New cementitious surfaces such as concrete, cement plaster, and concrete block are often alkaline and also may have high moisture content. This combination can lead to severe paint failures such as alkali burn, efflorescence, and saponification. Alkali burn occurs when the resin and or pigment in the paint degrades and "bleaches out". The area immediately adjacent to any cracks in the stucco is often unaffected because the moisture can easily escape through the crack rather than migrate through the stucco. This is the cause of the spider web appearance that often occurs as shown in photo 1. Efflorescence is the formation of crystalline salt deposits on a surface due to the migration of water through a cementitious substrate. The white vertical rundown pattern shown in photograph 2 is typical of this condition. If the paint is non-porous, then blistering will occur.



Photo 1



Photo 2

If the affected paint film is very permeable, or when voids exist in the coating film, then the occurrence of efflorescence does not cause delamination. Saponification is the chemical degradation of a coating due to high alkalinity and moisture. The coating becomes "sticky", then brittle when dried and loses its adhesion (photo 3). This phenomenon is a result of water intrusion and can be confirmed by measuring the pH on the rear of the paint. Therefore, primers used in these conditions must have a high permeability to allow water vapor to escape and must have a high tolerance for alkalinity. When painting new concrete block, the primer used is a blockfiller that will fill voids in the block and provide a more uniform surface.



Photo 3



Photo 4

When repainting exterior concrete, cement plaster, and concrete block, the existing paint is usually chalked. A cured paint film is composed of resin, the binder and film former, and pigment, the component that provides opacity and color. As the paint weathers, the resin degrades exposing the pigment as a "chalk" on the surface. Pressure cleaning does not remove all

of the surface chalk. In these circumstances, a primer that penetrates and binds the chalk is necessary and is commonly called a masonry conditioner. If such a primer is not used, then peeling results (photo 4).

Primers to be applied to wood need to have the ability stiffen the wood fibers so that they can be sanded to provide a smooth surface. Some wood primers are also designed to fill open grain in hard woods. Others are designed to prevent the leaching of unsightly tannin stains on exterior wood as shown in photo 5.



Photo 5

Non-flat finish paints often "flash" or show an uneven gloss when applied to drywall or gypsum board surfaces. Therefore, primers used on these surfaces must be able to equalize the different porosity and absorption of the drywall compound versus the face paper. If a texture has been applied to the drywall to achieve a level 5 finish, check to see if the surface is dusty. If it is, you'll need a primer that will bind the chalk and establish good adhesion. In some circumstances, a stain blocking primer must be used that will seal and isolate water soluble stains so that they do not migrate through succeeding finish coats.

When painting ferrous metal surfaces (steel and iron) that have been properly prepared to remove rust and mill scale, the primer serves a different purpose. In these instances, the primer is designed to prevent corrosion of the steel. This can be accomplished in two ways. In some instances, the primer contains pigments that chemically protect the steel and are self-sacrificing such as inorganic zinc primers. In other instances, the primer inhibits the corrosion by forming a physical barrier that does not allow moisture and oxygen to come in contact with the steel surface. Epoxy primers fall into this category.

It is sometimes not feasible to properly prepare steel by abrasive blasting. In these incidences, a primer designed for application to marginally prepared surfaces is required. These specialty primers are high solids, low viscosity primers that penetrate through loose rust and tenaciously bind it so that succeeding coats may be applied.

When painting nonferrous metals such as copper, aluminum, bronze, brass, the primer must have the ability to provide good adhesion to the particular metal encountered. Painting of galvanized surfaces can be particularly difficult.

Your paint suppliers are a vital source of technical information. Consult with them to determine which primer is best for the job at hand. Using a primer with the necessary properties and characteristics to match the particular materials and conditions encountered is required to avoid paint failures.