

COATINGS AND EPOXY NEWS FROM:

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PAUL OMAN ----- Progressive Epoxy Polymers, Inc.
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The Primer Primer

By Paul Oman
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The Primer Primer

PRIMERS: The definition of a primer is rather general. It is generally considered to be a coating that improves the adhesion of the topcoat coating. For the same of this 'Primer' we'll expand it even further to include products that help prevent premature coating failure (from the backside of the coating) or from tiny corrosion sites (from pin holes, scratches, etc.). Examples would be moisture migration through a concrete slab and soluble/insoluble salts on steel surfaces.

TIE COATS: A tie coat is basically a sticky bonding coat used when a very 'dry' coating is applied to a dry surface. For example, a very dry putty or filler - patching compound being applied to wood, fiberglass, metal, or concrete. Here we have 'dry on dry' and the ability of a very dry putty to stick to a dry surface is limited. A tie coat would probably be a wet, sticky, or still tacky coating of 'regular' epoxy applied to the surface with the putty or filler applied upon the still tacky epoxy tie coat. Stretching the term Tie Coat a bit, another use might be over weathered fiberglass or dusty, crumbling concrete.

PRIMER TYPES

SOLVENT FREE EPOXIES: For marine, boating, and commercial projects such as floors,

epoxies are a common coating. Most epoxies today are solvent free (0% VOC) and most manufacturers do not recommend any sort of primer under these epoxies. Indeed, epoxies, because they generally do bond so well, are often considered the primer under other kinds of coatings, especially urethanes and poly-urethanes.

PENETRATING EPOXIES AND EPOXIES WITH SOLVENTS ADDED (GENERALLY THE SAME THING): Despite what is written in the above it is not uncommon to find end users of modern solvent free epoxies to add some solvent (MEK, Acetone, etc) into their epoxy coatings, especially on the first coat of a multi coat system. It is assumed that the solvents help the epoxy 'soak' into the surface better, producing a better mechanical bond. The solvents also do other things: they thin the epoxy; they extend potlife, increase coverage (because the epoxy is thinner); let the epoxy flow off the brush or roller better (nicer). They also then to reduce the epoxies physical properties, especially hardness. In the "wood industries" such as boatbuilding/repair and building restoration solvent thinned epoxies are often labeled "penetrating epoxies" and may contain up to 70% solvent. Such penetrating epoxies can either be purchased or home grown by adding solvent to a thin marine type epoxy.

ZINC PRIMERS: Zinc primers generally fall into two types, organic or inorganic. Organic zinc primers are often something like a layer of zinc plated to the surface while inorganic zincs are more typically represented by zinc dust in some sort of paint (epoxy, urethane, etc.). Organic zinc primers have been used for many years below the waterline on ships. There is still some uncertainty about using inorganic zinc primers below the waterline, although that is probably based more upon the coating it is combined with rather than anything related to the zinc itself. Organic zinc primers are probably more durable and perhaps more effective, but inorganic zinc primers may be easier to apply.

Zinc primers are corrosion fighters and are used on steel surfaces, often under epoxy. While epoxies prevent corrosion by forming a barrier surface stopping moisture and oxygen from reaching the steel, zinc layers resist corrosion chemically/electronically. Thus, a zinc primer under an epoxy topcoat creates a system that fights corrosion by two different mechanisms.

MIO BASED COATINGS: For over a hundred years paints containing MIO (micaceous iron oxide) have been used to fight corrosion. They are more common in Europe than in the USA. The Eiffel Tower in Paris is often cited as poster child for MIO based coatings. Like inorganic zinc, MIO can be added to several different coating products. It is basically a plate like iron based pigment. These plates stack up on top of each other forming an extremely tough, non porous, protective boundary that improve the barrier affect of the coating. As you might expect, most MIO primers have that 'dark red/rust' color.

MCU: Moisture cured urethanes (MCU) are one part urethanes that cure by taking moisture from the air. These solvent based coatings have a tremendous bond and are often used by contractors as a primer on surfaces that have not received 'ideal' surface preparation. MCU coatings are available with zinc, aluminum, and MIO pigment providing the primer types mentioned above. I have personal experience with an MCU that used aluminum flake pigment that appears to work sort of like a hybrid between the zinc and MIO systems. This aluminum MCU (Aluthane) is an amazing product that can be used as a primer or topcoat with an attractive 'galvanized' look and amazing adhesion.

INTERNAL CONCRETE SEALERS: Concrete slabs located on the surface or below grade can be extremely difficult to permanently coat, especially if they do not have a vapor barrier. Moisture and soluble mineral salts can travel through the porous concrete and wreck havoc with coatings. Existing moisture in the concrete, and perhaps any moisture migrating through the concrete can cause bonding failure or weakening. Worse yet, dissolved mineral salts will reform the crystal structure when the moisture is removed (evaporated etc.) and these growing crystals can exert 1500 pounds or more of pressure as they grow. Few coating systems can resist this kind of prying pressure.

There is a class of concrete sealers that reduce the porosity and permeability of concrete by sealing them internally, rather than by some sort of surface film or coating. These water based coatings literally soak into the concrete and as the water evaporates, forms tiny crystals inside the pore spaces of the concrete. The method is that of 'clogging' up the concrete with the associated reduction of both porosity and permeability. It is the concrete equivalent of Gor Tex (tm) - a breathable, but water proof surface.

SOLUBLE (INSOLUBLE) SALT REMOVERS: Cutting edge research shows that salt ions form a special, hard to remove attachment to steel surfaces even after they have been sand (abrasive) blasted clean or even water jetted down to bare metal. These ions are hydrophilic and attract moisture which creates a tiny electric cell that forms a corrosion site and leads to premature coating failure. Special wash products are available that remove these invisible 'soluble' salts. The problem can also be present on concrete, fiberglass and other surfaces. Visit our site at: www.epoxyproducts.com/salt.html for more information.

WATER-BASED EPOXIES: Water based floor epoxy systems for concrete surfaces are becoming more common and are now sold in the 'Big Box' hardware superstores. Being water based they tend to 'soak into' the concrete surface to some degree, thus resulting in an outstanding mechanical bond and few coating failures for 'Do It Yourselfer' coating their garages and basements. While these coatings are 'stand alone' for light traffic situations, commercial users are beginning to see these 'thin' water based floor coatings as ideal primers under more traditional, often solvent free, industrial grade floor epoxies.

CLEAR ACRYLIC SEALERS: Solvent or water based clear acrylics are inexpensive sealers of wood and concrete (probably fiberglass too). User under paint on wood surfaces and as an inexpensive topcoat on concrete to reduce dust and make cleaning/sweeping easier.

APPLICATION SURFACES

CEMENT (PRIMING OPTIONS): salt removers; internal concrete sealers; water-based epoxies; solvent thinned epoxies.

Should you prime your concrete with a water based epoxy primer? It will probably help adhesion and reduce the risk of coating failure, especially if the concrete in question is 'less than perfect' (weak, dirty, stained, damp, etc.). Still, it is not all that commonly done. Some contractors will 'surface seal' areas of freshly de-greased concrete with a water based epoxy primer to 'lock in' any remaining grease or oils that still might be present from migrating back to the surface and causing adhesion problems. Right or wrong, this sounds like a smart extra

step to take considering the huge downside that results when a floor coating fails do to adhesion problems. Note that our water based floor epoxy (Aqua - Rock) is used as both a floor coating (color is light gray only) and concrete sealer. A solvent based, or solvent thinned epoxy might also work in this situation. My concern would be that the solvents might actually help release more of the trapped oils and greases instead of sealing them in place.

Another situation where concrete might be primed is to strengthen the surface of concrete before coating with other products. An extreme example might be old, crumbling concrete but a more common and modern example might well be gunite - plaster - cement swimming pools. This type of pool always seems to have coating bonding problems because, I think, surface concrete damage due to pool chemicals and the often low quality of the gunite, plaster etc. to start with. In my very limited experience, priming the gunite, plaster, etc. with solvent thinned epoxy before applying the swimming pool paint, seems to greatly reduce or eliminate pool paint adhesion problems. A favorite epoxy for this seems to be our Low V thin, clear epoxy cut about 10-20% with zylene, although I think some of our other epoxies might work as well, including our water based epoxy.

FIBERGLASS (PRIMING OPTIONS): salt removers; solvent thinned epoxies (same as penetrating epoxies); moisture cured urethanes MCU (i.e. our Aluthane); solvent free epoxies (i.e. bottom barrier coat).

STEEL (PRIMING OPTIONS): salt removers; aluminum filled moisture cured urethane (Aluthane); MIO (iron filled) epoxies; zinc primers; solvent thinned (penetrating) epoxies; solvent free epoxies.

WOOD (PRIMING OPTIONS): clear acrylic sealers, aluminum filled moisture cured urethane (Aluthane); solvent thinned (penetrating) epoxies.

PRODUCTS OFFERED BY PROGRESSIVE EPOXY POLYMERS - visit our site for more information, data sheets, msds, and online purchasing.

Aluthane - aluminum filled moisture cured urethane (MCU)
 Agua Rock - gray water-based floor epoxy
 Bio Vee Seal - internal concrete sealer
 CM 15 - solvent based ivory colored epoxy paint
 ESP 155 - clear penetrating epoxy
 Glaze Coat - solvent based acrylic sealer
 Low V - low viscosity solvent free clear epoxy
 MIO 151 - solvent based MIO epoxy paint
 Salt Remover - soluble salts removing liquid
 Zinc Primer - moisture cured urethane (MCU)

SOLVENT FREE EPOXY PAINTS: Watergard 300/NSP 120; FC 2100, Industrial Floor Epoxy

Only the following products are "non hazmat" to ship and may be shipped outside the USA:
 Agua Rock; Bio Vee Seal; Salt Remover; Watergard 300/NSP 120; FC 2100.

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LINKS

- Aluthane (www.epoxyproducts.com/aluthane.html)
- Primers (www.epoxyproducts.com/primer.html)
- Wood sealing tests (www.epoxyproducts.com/woodseal.html)
- Data/MSDS (www.epoxyproducts.com/datamsds.html)

 NOTE; ONLY THE NONHAZMAT VERSIONS OF ANY OF THE PRODUCTS MENTIONED ABOVE ARE SHIPPED OUTSIDE THE USA

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