## PF SPECIAL NEW PRODUCT REPORT

## Non-Metal Conversion Coating

Typical phosphate and chromate applications prepare metal for painting by modifying the metal with another inorganic coating. Conventional conversion coatings are applied to steel and zinccoated steels to inhibit corrosion and provide an effective bond with paints, lacquers and other topcoats.

Recent advances in pretreatment have been limited to conversion coatings contrived from solutions containing a minimum of three metal cations. In each of these solutions, the crystalline structure, morphology, density and composition produce an anchor-like barrier that promotes adhesion. Smaller, tighter conversion coatings provide the best adhesion and corrosion resistance.

A new approach from Man-Gill Chemical Co., Cleveland, Ohio, involves preparing a metal surface for paint by bonding a reactive organic conversion coating, ROCC, to the metal substrate. The coating serves a dual function by creating a conversion coating on the metal substrate and by reacting with the organic topcoat. The result is a continuous film that prevents the oxygen migration that can occur under paint films, which can cause hydroxyl-induced corrosion, poor salt-fog resistance and lack of adhesion. (See Figs. 1,2,3)

1. CONVENTIONAL iron phosphate on cold-rolled steel. (scanning electron microscope [SEM] 1000x)

2. ROCC on cold-rolled steel (SEM 1000x)



## TABLE I—Typical ROCC Process

Stage	Temperature	Time
Clean Rinse ROCC Rinse Non chrome seal DLrinse (ontional)	120-160F Overflowing tap water Ambient Overflowing tap water	1-10 min 1-2 min 1-3 min 1-2 min 30 sec-1 min 10-20 seconds



## CONVENTIONAL iron phosphate vs. ROCC in ASTM B-117 salt spray test

This ultra-thin, functional organic coating has a molecular layer of 50 to 300 nanometers deep with a total coating weight of 30 to 60 mg per sq ft. The non-metal conversion coating produces a pleasing optical appearance that ranges from a uniform blue to purple.

Reactive organic coatings are complex. They have proven to be an excellent pretreatment for steel and galvanized substrates. Work is in progress to evaluate their use on non-ferrous surfaces. The ROCC application process is adaptable to most pretreatment operations without any modifications. It can be applied by both spray and immersion.

The product contains no heavy metals, is easily treated using conventional waste treatment, contains biodegradable organic components and results in reduced worker exposure to hazardous chemicals. **PF** 

*Source:* Man-Gill Chemical Co., Cleveland, Ohio.

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