

**PURPOSE**

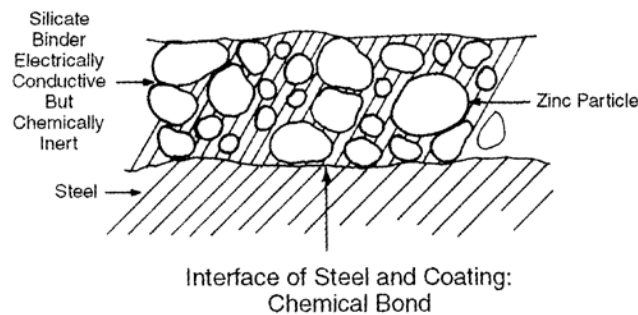
This section provides information on some of the characteristics and potential application problems of zinc silicates.

**PROPERTIES OF INORGANIC ZINC-RICH COATINGS**

Inorganic zinc rich coatings afford superb corrosion resistance, they are also rock hard and very abrasion resistant. They make some of the best anti-corrosive primers available. Ethyl silicate based inorganic zincs (Galvit ES600 & Galvit ES510) should be applied at 75 microns (dft). Because they have a tendency to grip unlike most other coatings, they may be applied to the faying surfaces of bolted steel joints. Inorganic zinc-rich primers have excellent resistance to temperatures up to the melting point of zinc (above 400°C).

Inorganic zincs should not be exposed to acids and alkalis. However, their resistance to organic solvents and organic chemicals is excellent.

The term “zinc-rich” refers to the percent by weight of metallic zinc in the cured coating film, which may range from 50% to 90%. The film is a hard, adherent coating composed of metallic zinc powder suspended in a silicate matrix (*Diagram 1*).



**Diagram 1- Zinc particles embedded in a silicate matrix**

**CURING MECHANISM**

These coatings cure by hydrolysis or reaction with moisture following the evaporation of solvent. These coatings are typically resistant to rain showers in one hour or less. High humidity conditions usually accelerate the cure of ethyl silicates. When the relative humidity is less than 40%, water may be sprayed on the coating surface to complete the curing process.

**FILM CURE**

To determine if a film has cured a clean cloth soaked in methyl ethyl ketone (MEK) is rubbed over the coating. A properly cured film should have no zinc transfer onto the cloth.

**Bubbling/Pinholes**

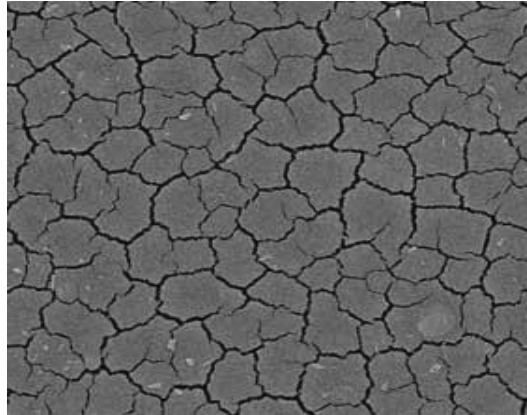
The zinc silicate matrix film is quite porous, which can result in bubbling or pinholes when a subsequent coating is applied. To overcome bubbling and/or pinholes excessive film builds and overspray should be avoided and/or removed prior to topcoating. For best control over the spray application conventional spray is preferred over airless equipment.

When topcoating, apply a mist/tack coat of suitable product, thinned approximately 25% to seal off the zinc prior to application of a full coat.

**Mud Cracking**

Mud cracking (*Diagram 2*) can occur due to a number of reasons, these include:

- Low blast profiles
- Excessive film build
- Poor ambient drying conditions
- Old Product
- Insufficient ventilation, which is pronounced in concave corners and cavities



*Diagram 2- Mud cracking*

#### **Zinc Salts**

Zinc salts are the natural decomposition product of zinc as it oxidises to protect the steel. These salts also act as a physical barrier by clogging up the porous zinc silicate film – thus reducing the ingress of water. High pressure washing, scrubbing with a nylon brush and water, mechanical cleaning using a green scouring pad or sweep blasting (not generally used) are methods for the removal of these salts. Removal of all zinc salts is near impossible and not necessary.

#### **TOUCH UP/REPAIRS**

Touch up or repairs of inorganic zincs are normally done with two pack epoxy zincs. This is because it is often difficult to blast clean only the area needing repair and recoat only the area blasted. Invariably the coating applied will need to overlap onto the existing inorganic zinc. If an inorganic zinc is used for this purpose adhesion will be compromised.



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**132 101**  
**[www.wattylpc.com](http://www.wattylpc.com)**

**New Zealand**  
**0800 735 551**  
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