# Surface Preparation and Application of Ethyl Silicate Coatings

Technical Support Procedure TP-9204-18



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### Introduction

Inorganic Zinc Silicate coatings are composed of two components (Ethyl Silicate and Zinc Powder) that undergo a chemical reaction once they have been combined. This chemical reaction happens between the two components, moisture, as well as the metal or steel substrate that the coating is being applied on. Ethyl Silicate coatings form a highly durable film which is extremely resistant to corrosion and heat. Due to the nature of these coatings, it is very important to observe the following surface preparation and application guidelines.

Please refer to the product's technical datasheet (TDS) for more information.

## **Surface Preparation**

Prior to application of the coating, the substrate (Steel or Metal) should be completely clean and free of all possible contaminations and grease. Prepare the surface according to Swedish STD. Sa. 3 and use compressed air or a vacuum cleaner to remove any contaminants that are left behind from blasting.

### **Mixing Ratio and Instructions**

Please refer to the specific product's technical datasheet (TDS) for specific mixing ratios and instructions.

Mix component A well before using and according to the code and technical specifications of the product, then add the component B slowly to it and continue to mix with electric or pneumatic mixer until you are left with a completely uniform mixture. Use the prepared mixture according to the Pot Life (the time allowed for color consumption after mixing the components) specified in the technical specifications.

After mixing the components, wait for the initial reaction time (pre-reaction Time) for 5-10 minutes. Once the prereaction period has passed, you may thin down the mixture using 3 – 5% T-767 (Ethyl Silicate Thinner) by weight if required. Do not thin down each component separately.

## **Application Conditions**

Prior to applying the coating, observe weather conditions, the speed and direction of wind, ambient temperature and ambient humidity. Apply the coating using an airless or conventional spray system. Due to the nature of the coating and the tendency of zinc power to settle in the coating, it is highly recommended to continue to mix the coating during application.

## **Conditions for Completing the Reaction (Curing)**

In Ethyl Silicate coatings, the chemical reaction that occurs between the coating's components and the metal substrate requires the absorption of humidity within suitable ambient conditions to complete its curing process. Therefore, if there is not enough moisture present, or if the ambient conditions are not suitable, the chemical reaction speed will be very slow. In these unsuitable conditions, it will be required to place the painted part in artificially created conditions where the reaction's moisture and temperature requirements are met.

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In suitable conditions, the reaction complete after 24 hours, resulting in a durable film.



## **Important Considerations**

- Due to the nature of the coating and the tendency of zinc power to settle in the coating, it is highly recommended to continue to mix the coating during application.
- Observe the coating's pot life (the time allowed for coating consumption after mixing the components) specified in the product's technical datasheet.
- Prior to the application of the next layer, ensure that the chemical reaction between the components has ended. It is necessary to complete the curing test to determine the progress of the reaction. Instructions on completing a curing test can be found in the following section.

# **Curing Test**

Film formation for Zinc Silicate primers occurs through a chemical reaction between the coating's components and moisture. Relative moisture and ambient temperature and directly correlated to the speed of the chemical reaction, and as stated, it is very important to ensure that the chemical reaction has completed before the next layer is applied. To determine the chemical reaction's progress, use the following test method (this method can be used in laboratory and non-laboratory settings).

#### **Required Equipment and Materials**

- Methyl Ethyl Ketone (MEK) Solvent adhering to specifications set in ASTM D-740
- 100% cotton cloth
- Eye Dropper
- Personal protection equipment including solvent-resistant gloves, facemask and protective eyewear equipment
- MSDS for Methyl Ethyl Ketone (MEK)

#### Test Method

- Once application of the Zinc Silicate coating has been completed, place the test plate in the required ambient conditions for the determined time period (curing time).
- Once the curing time has completed, place the test plate under a water faucet, gently wash and dry the surface, and measure film thickness according to ASTM Test Method D-1400, D-1186 and D-1005.
- Mark a rectangle on the test panel using a pencil or soluble marker.
- Fold the cotton cloth and immerse the cloth into MEK solvent until it is completely soaked. Take the cloth out of the solvent and wait for a maximum of 10 seconds.
- Place your index finger on the center of the cloth and hold the remainder of the cloth with your other fingers. Place your index finder at an angle of 45° against the test plate and applying moderate pressure, rub the cloth back and forth. Every movement back and forth should take approximately 1 second.
- Continue rubbing until the surface of the substrate becomes exposed, or until 50 movements (back and forth cycle) is completed. Once complete, observe the area that has been rubbed as well as the cloth and compare the results with the chart on the next page.

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#### Scale for Resistance Rating

Description of Surface Condition after Rubbing	Resistance Rating
After 50 movements (complete cycles back and forth), no changes to the film is observed and there is no Zinc present on the cloth	5
After 50 movements (complete cycles back and forth), the painted surface has been polished and there is some Zinc present on the cloth.	4
After 50 movements (complete cycles back and forth), some damage on the painted surface is observed.	3
After 50 movements (complete cycles back and forth), serious damage to the film and loss of film thickness is observed.	2
After 50 movements (complete cycles back and forth), serious damage to the film is observed, however the layer of paint is not completely removed.	1
After 50 movements (complete cycles back and forth), the layer of paint is completely removed.	0

#### Reporting

Please report on the following information as you complete the curing test:

- Solution Dry Film Thickness (DFT) in the marked area prior to and after the test has been completed
- Time passed between coating application and the start of the curing test
- Ambient conditions (temperature, humidity) during the curing period for the test plate or steel structure
- Number of cycles (complete back and forth movements) completed in the test
- Evaluation of the test results and assessed resistance rating (see table above)

For more information, please refer to the technical specifications of the products you intend to use.

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