

Water soluble rust inhibitor

5K188

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Introduction

When transporting or storing steel and other metal materials and metal products, it is necessary to prevent the formation of rust. The method is specified in the JIS Z 0303 General rule for rust preventive packaging method. The rust inhibitor to be used should be applied considering the period of transportation and storage, and the environmental conditions during that period. Various types of rust inhibitors have been proposed, including rust inhibiting oils, rust inhibitors, rust inhibiting papers and films, inhibitors, chelating agents, and adsorbents. We will introduce our temporary rust inhibitors with a focus on our newly developed water-soluble rust inhibitor for steel, 5K188.

Product Summary

5K188 is a low-foaming, water-soluble rust inhibitor that provides excellent rust inhibiting performance on steel. It can be used not only for temporary corrosion prevention of steel, but also for corrosion prevention of non-plating areas such as pipe inner surfaces. In addition to 5K188, we also offer a lineup of other products according to the application and purpose. (Table 1)

Features

- A low-foaming, water-soluble rust inhibitor that dries quickly and produces a uniform appearance.
- Rust prevention for non-plating areas such as pipe inner surfaces
- Almost no effect on appearance and corrosion resistance of trivalent chromium conversion coatings

Table 1: Product Lineup of Major Water-Soluble Corrosion Inhibitors

Product name	Use	Purpose
5K188	Temporary rust inhibitors	Rust prevention for pipe inner surface, temporary rust prevention for steel
5A001		Rust prevention for pipe inner surface, temporary rust inhibitor for steel and various plating coatings
5G175		Rust prevention for pipe inner surface, temporary rust prevention for steel
GX-236		Low-foaming, cleaning and rust inhibitor for steel
GX-237		Temporary rust inhibitor for steel, rust inhibitor additive for water soluble cutting fluid
1B011		Cleaning and rust inhibitor for iron, zinc alloys, aluminum alloys, and copper alloys
M-194 improved	Neutralizing rust inhibitor	Neutralizing rust prevention after pickling

Treatment process

5K188 is used by adding 0.5 to 2 % to water. No special equipment is required, and the same processes and facilities can be used as in the past. (Figure 1, Table 2)

Table 2: Treatment Conditions of 5K188

Concentration	20 mL/L (5 to 20 mL/L)
Temperature	Room temperature (15 to 40 °C)
Treatment time	30 sec (10 to 60 sec)

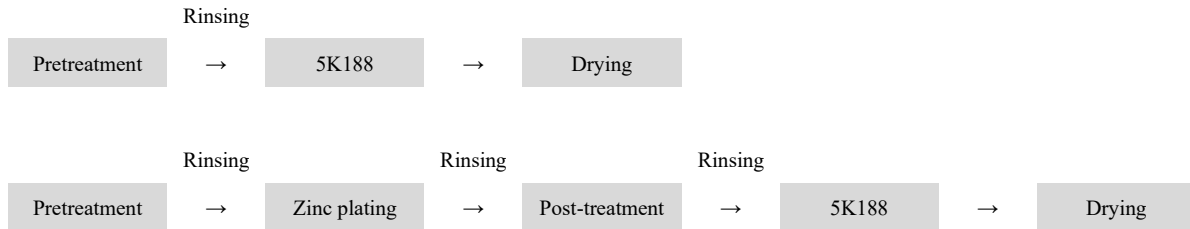


Figure 1: Example of Treatment Process

Mechanisms

Many metals, including iron, corrode under the action of water and oxygen. There are various theories on the corrosion prevention mechanism of water-soluble rust inhibitors, but they are divided into oxide film type and adsorption type (Figure 2), which protect base metals from corrosive environments by forming an oxide film or adsorbing on the metal surface.^{1,2} (Figure 3)

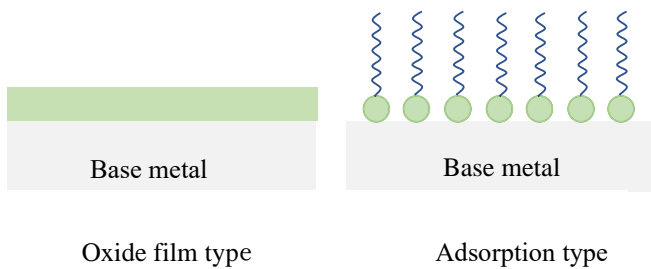


Figure 2: Type of Water-soluble Rust Inhibitors

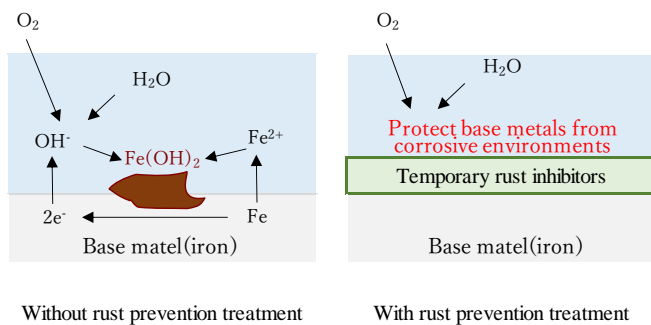


Figure 3: Rust Formation Mechanism and Effect of Water-soluble Rust Inhibitor

In closing

5K188 is a low-foaming, water-soluble rust inhibitor that provides excellent rust inhibiting performance on steel. It is used not only as a rust inhibitor for steel, but also as a temporary rust inhibitor for non-plating areas such as pipe inner surfaces. In addition to 5K188, we also develop and provide various other types of products according to the application and operating environment.

References

- 1: Masayoshi Kato et al., Kinzokuhyoumenkougyouzensyo (13), 48-64 (1973)
- 2: Nobuyoshi Hara, Fundamentals of Corrosion of Metals, J. Vac. Soc. Jpn. Vol.44, No.10, 2001