

# TANNIC ACID AS A RUST CONVERTER

## TECHNICAL SHEET

### GENERAL INFORMATION

For centuries the bark of different plants has been used to control the rusting process in the iron manufacturing industry. Science has shown that this protection is due to one of the bark's components: Tannin or Tannic acid.

Tannic acids are substances of natural origin, extracted using particular solvents obtained from different plant species.

### MECHANISM OF ACTION

Tannic acid is an essential element in a rust converter. It reacts with iron oxides converting them into iron tannate, a bluish-black stable compound.

If a tannin solution is placed in contact with a rusty surface it reacts with the iron present in the rust in the form of  $Fe^{2+}$  and  $Fe^{3+}$ , producing a very insoluble complex which binds strongly to the surface. This process allows the protection of the iron surface from ulterior air contact.

### FORMULATION

The main function of a rust converter is its application before the final varnish coat.

The presence of tannin is indispensable to stop the growth of rust that might be present, even in very small amounts, onto the surface to treat.

The most common formulae are based on aqueous solutions.

The percentage of tannic acid used is about 5% of the finished product. Occasionally a small amount of acid (phosphoric, formic or acetic) is added in order to keep the pH between 2 and 3 which is necessary for an optimal rust conversion.

Tannic acid recommended presented as a light beige powder both water and solvent soluble

*N.B.: All suggestions and recommendations in this data sheet are given in good faith and are based on results gained from tests and experience. However, although the Company guarantees the quality of its product, it cannot and does not assume any risks or liabilities which may result from the use thereof, since the conditions of use are beyond the Company's control.*

### **Example of formulation of a rust converter (percentage in weight)**

Water	11.84%
Antifoam	0.2%
Thickening agent (ex. Xantham gum)	0.2%

Stir at high speed until the gum gel consistency develops

Tannic Acid	4.05%
Dispersing agent	0.10%

Add while stirring. It is better to dissolve the tannic acid with water at 50% before adding it. In this case subtract the water used from the recipe.

Barium sulphate (spread)	25.92%
Buthylglycol (coalescence solvent)	2.22%
Acrylic vinyl copolymer	55.47%

Add while stirring at low speed

### **APPLICATION CONDITIONS**

In order to use a rust converter correctly some conditions are required: Even if it is not necessary to rub the rusty part until the undamaged metal is reached a minute surface preparation is important. The rust converter will inactivate every rust particle at contact if the next directions are carefully followed:

Remove cautiously the part of the rust that tends to attach using a metal spatula

Clean by aspiration or any other equivalent method that part

Eliminate any trace of salts with water (ex. Salts coming from antifreeze treatments or condensation residues in coastal zones).

Degrease using a solvent

The rust converter is applied by spaying or with a brush. The temperature of the metal should range between 10 and 35°C and the surface should not be wet or come in contact with rain or condensation in the following 24h. Twenty minutes after the application the rusty parts start to blacken and the whole reaction ends within 24h. Longer times will be required if the air humidity exceeds 75-80%.

Due to the presence of water soluble components in the rust converter it is recommended, after the treatment, a varnish coating to improve the protection, specially in onerous conditions such as rain, humidity etc.

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