



## Q 2

Recently, progress has been made in the quality and application technology of surface coatings for steel protection. However, problems associated with surface preparation before painting have grown worse. With modern coating systems, the lifetime of the protection is more dependent on surface preparation than the hostility of the environment. Even the best paint will not give full protection when applied on a steel surface that is not entirely rust free.

In case of heavily rusted steel, blast cleaning the surface to white metal provides an excellent surface for paint but the freshly exposed surface is highly reactive and bare steel exposed to atmospheric humidity, dew or rain will rust quickly. Even when top coated immediately, the corrosion process may have already begun at the molecular level. And, for all its acknowledged advantages as a preparation for paint, sandblasting is often ruled out due to cost, environment protection, inconvenience of rigging, dust and spark potential, limited size of areas to be cleaned, difficulties of arranging blasting/painting cycles, etc.

With most mechanical surface treatments such as scraping, hand brushing or power cleaning it is impossible to remove all of the rust from cavities of the surface and the presence of this residual rust encourages constitution of the corrosion process under the paint films subsequently applied.

Similarly, acid based surface pre-treatments for the corroded steel surfaces have shown limited advantage in relieving the problem. Removal of the rust is extremely difficult under temperature, concentration and application conditions existing under field conditions. Also, in many situations residual acid salts left in the pores of the rust have caused failure by osmotic blistering. Even

under the best of field conditions, the use of conventional phosphoric acid based pre-treatments is also unsatisfactory. Such products do not accomplish a true passivation of the metal surface, and their reaction with the different rust layers is not homogeneous.

Since residual rust can encourage the formation of further rust under the film, and since removal by acid in the field is unsatisfactory, an ideal solution would be to completely passivate the tightly bound rust remaining, chemically preventing it from participating in further corrosion. **Q 2** has been developed with this principle in mind.

Problems exist with many of the current chemical treatments. They fail to address the heterogeneous nature of rust. The rusting of iron occurs as the steel surface is exposed to oxygen and humidity. Through an electro-chemical reaction, ferrous hydroxides are formed. From this, a series of oxidation reactions are possible. Rust cannot be defined simply by a single chemical formula. Often, rust is made by the superposition of several layers of different chemical composition. To effectively deal with the problem, a satisfactory treatment must address the heterogeneous nature of rust.

Due to the high molecular weight of **Q 2** and its complex molecular structure, each molecule of **Q 2** can attract and incorporate several iron atoms. In addition, each single iron atom can be linked to three different molecules within **Q 2**. The result of this attraction is that **Q 2** envelopes the rust at the molecular level, developing into a neutral layer which exists between the steel surface and the atmosphere. The neutral layer prevents the migration of ions so that no chemical reaction can occur on the metal surface.

Excellent results have been achieved using **Q 2** in conjunction with light sandblasting. Used in this method, **Q 2** enables the user to eliminate the cost of heavy sandblasting without sacrificing the integrity of the paint system, resulting in significant savings for the user.