

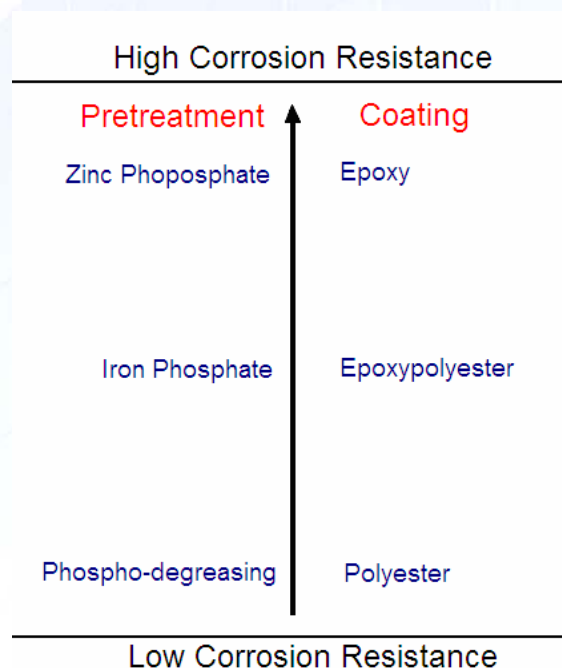
Product Highlights

Summary

- 1 – “COR-SHIELD” - Polyester Powder with High Corrosion Resistance.
- 2 – “COOL-POWDER” - Low Temperature Polyester Series.
- 3 – “GREEN-PLANET” - New Polyester Series “environmentally sustainable”.
- 4 – “EZ-658-7300-002” Zinc Rich Primer with improved interfacial adhesion:

1 – “COR-SHIELD” - Polyester Powder with High Corrosion Resistance.

As is well known, in order to adequately protect a steel item against corrosion, it is necessary to proceed both with a valid chemical conversion of the surface and a suitable finishing. The following image illustrates, schematically, the relationship between the main pre-treatments and coating systems versus corrosion resistance.



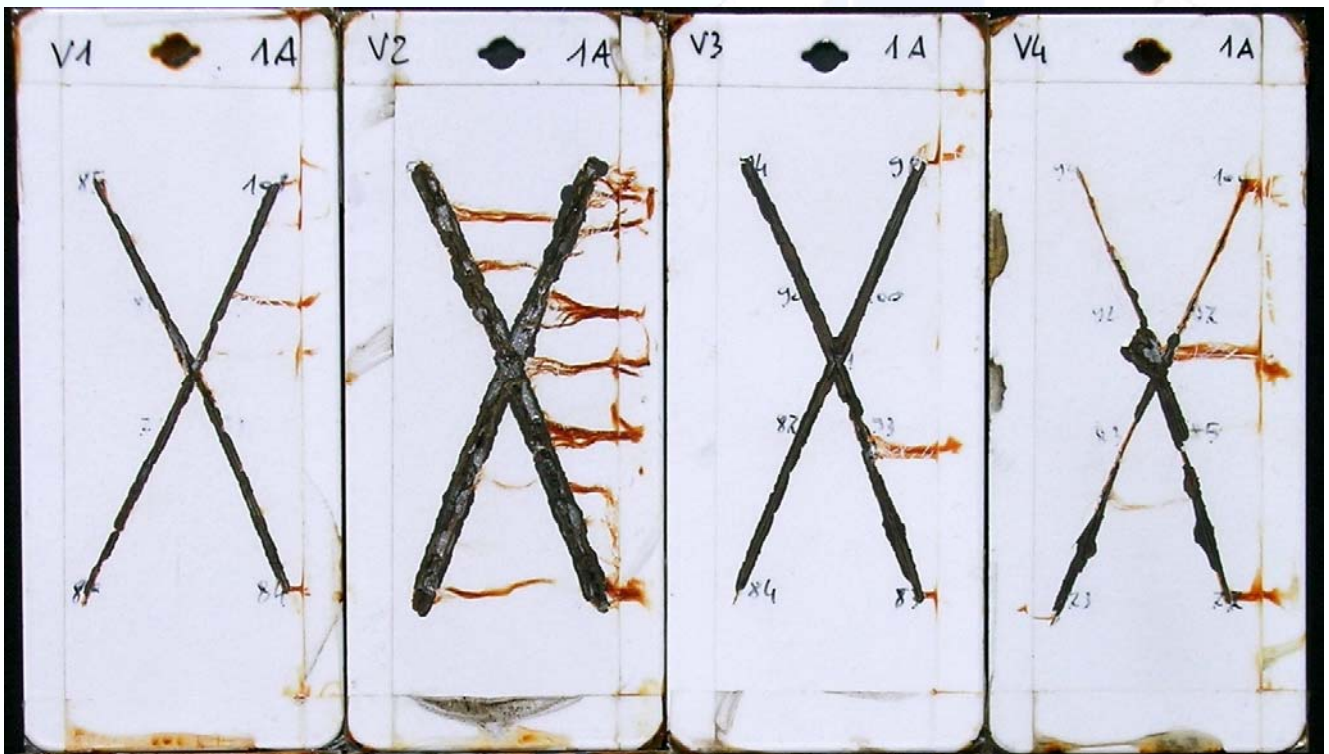
It is clear, therefore, that a polyester coating cannot provide a high corrosion resistance if the used pretreatment is phospho-degreasing. On the other hand, not all painting plants are equipped with modular treatment systems, to pass quickly from phospho-degreasing to iron or zinc-phosphating treatment.

To solve this issue, the ST Powder Coatings laboratories have developed a new polyester series (Cor-Shield) with improved corrosion resistance, even in presence of non-optimal pretreatments.

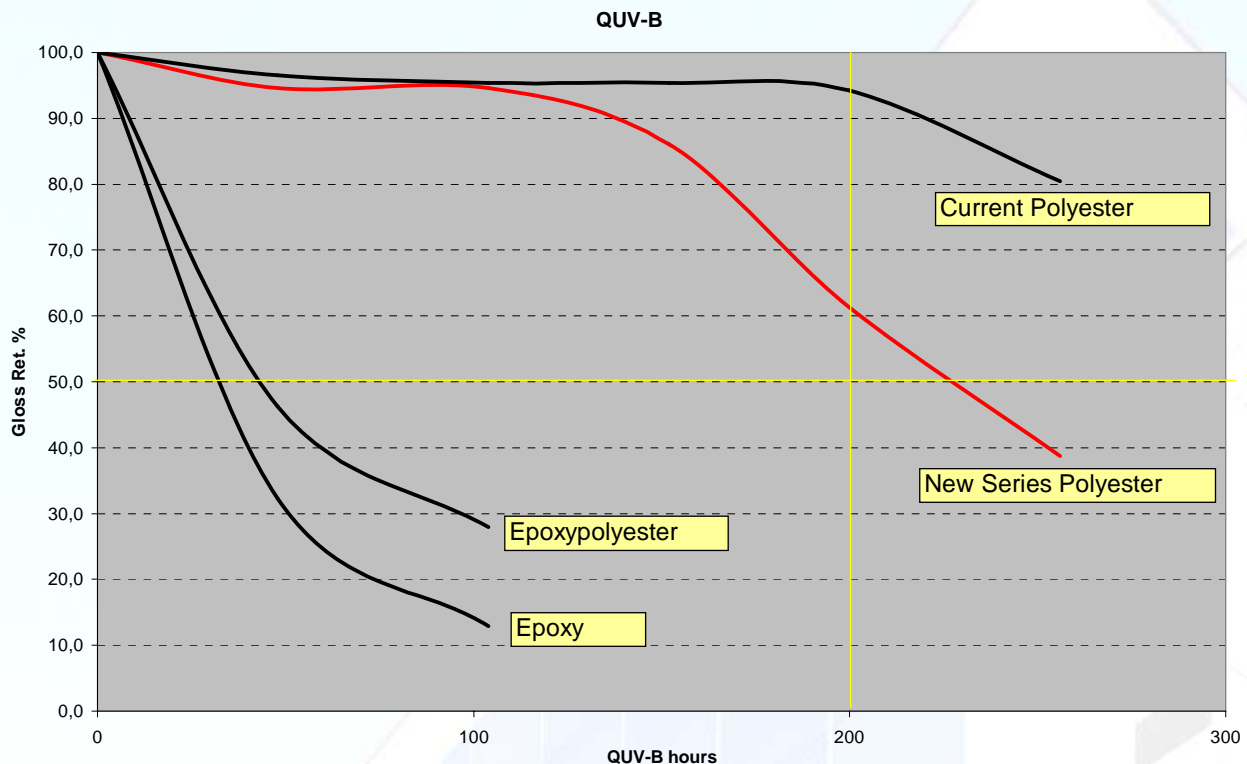
The following image shows four steel panels without any pre-treatment, respectively coated with:

- New Series Polyester System “Cor-Shield” (V1);
- Typical Polyester System (V2);
- Epoxy-polyester System (V3)
- Epoxy System (V4).

After 210 hours of neutral salt spray test (ISO 9227), the film detachment of the new polyester system (first on the left) was very similar to the film detachment of the epoxy system (last on the right), and significantly lower than the detachment of the standard polyester system (second on the left).



In addition to its high corrosion resistance, the new polyester series still maintains a good resistance to weathering. The image below shows the trend in gloss retention after accelerated aging test (QUV-B).



The UV resistance features of to the new Polyester Series “Cor-Shield” are suitable for outdoor industrial applications.

2 – “COOL-POWDER” - Low Temperature Polyester Series.

Powder coatings users, more and more often, ask for polyester powders with curing temperature of 10 or 150°C instead of the traditional 180° C. The two main reasons for this growing demand are:

- 1) Economical reason: a low polymerization temperature allows energy saving in curing operations;
- 2) Environmental reason: electricity or gas fuel reduction means to reduce the carbon dioxide emissions (this gas is considered, by most of the experts, the primary responsible of the greenhouse effect and, therefore, of the global warming).

Polyesters systems for low temperature currently on the market are mostly based on toxic (TGIC) or irritants hardeners and their use is not well accepted by the coaters.

Recently, ST Powder Coatings has developed a new series of polyester powders (glossy and semiglossy) crosslinkable at 150°C x 20' (in some cases, depending on the general characteristics of the product and its color, the cure cycle can be reduced at 140°C x 20').

The name of the new series is “Cool-Powder”.

3 – “GREEN-PLANET” - New Polyester Series “environmentally sustainable”.

Sustainable development is a form of development (including economic development, cities, communities, etc.) that does not compromise the possibility of the future generations to last in the development, protecting the quality and the quantity of the natural reserves. The goal is to maintain an

economic development compatible with social equity and ecosystems, operating therefore in an environmental equilibrium.

Traditional powder coatings, although considered "green" because totally free of emissions, do not belong to the "environmentally sustainable" category, because most of the components are directly derived from oil. The main component of a powder coating system is the polyester resin: by itself accounts for about 50-70% of the paint and is totally derived from oil.

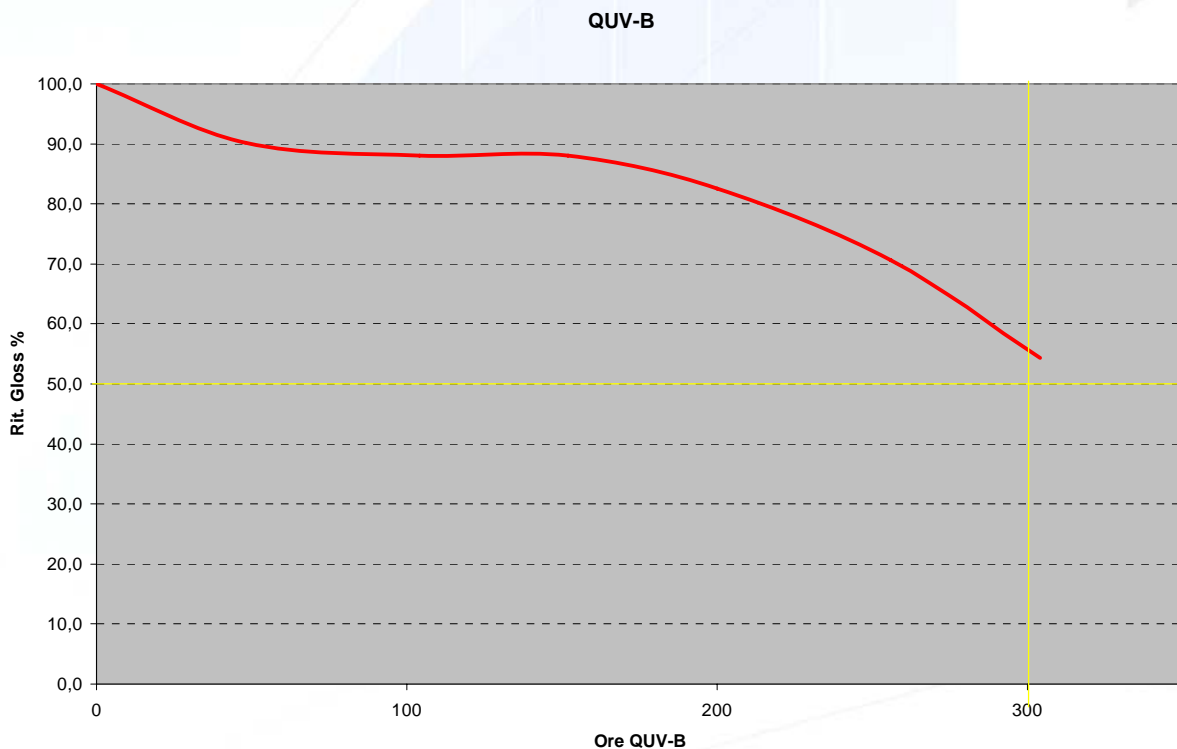
The replacement of this component with a new product of new conception, not deriving from the oil, would represent a big step towards sustainable development.

A further step towards sustainability concerns the temperature of polymerization: classic polyester powder coatings have a cure cycle of 170-180°C x 20 min. The reduction of the polymerization temperature at 150°C would further reduce the environmental impact of the product.

Following this policy, ST Powder Coatings has developed a new polyester coating that allows:

- a) Consumption reduction of non renewable resources;
- b) Reduction of the curing temperature at 150°C X 20' with consequent reductions in emissions of CO₂.
- a) Obtain the same aesthetic and protecting qualities of the current industrial polyester powder coatings.

The good UV resistance of this new series, called "Green-Planet" series, is shown in the following graph (accelerated aging test, QUV-B).



4 – EZ-658-7300-002 - Zinc Rich Primer with improved interfacial Adhesion.

The anti-corrosive primer currently produced by ST (EZ-658-7300-010 and EY-658-7300-001), while being excellent in terms of corrosion resistance, may experience some problems in intercoat adhesion under certain conditions of polymerization. For this reason, in order to ensure good interfacial adhesion between primer and finishing, it is not convenient to cure completely the primer but it is recommend to perform only a fusion by heating, for example 180°C for only 5 minutes or 120°C x 20 minutes. The primer is then completely cured in the subsequent stage, after the application of the second layer.

Apparently, the melting stage of the primer seems to be profitable operation because it means energy saving (you need less heating power). With a more careful analysis, however, one realizes that it is not a simple operation. The speed of the chain, for example, should be increased by at least 4 times to reduce the residence time to 5 minutes and not all the plants can do that. On the other hand, to increase and decrease periodically the temperature of the oven between 120 and 180°C reduce the production of the plant because of time loosing.

To solve this issue, ST Powder Coatings has developed a new zinc-rich primer, which reduces the problems of interfacial adhesion related to the cure cycle of the primer.

Interfacial adhesion tests performed in the laboratory gave optimal results, also after a cure cycle of the primer at 180°C x 20'. The code of the new zinc-rich primer is EZ-658-7300-002.

Even the neutral salt spray test (ISO 9227) has given satisfactory results, as you can see from the pictures below: in the first picture are shown the panels pre-treated with heavy iron phosphate (Gardabond WH/60/OC - Chemetall) and painted with EY-658 - 7300-001 (on the left), EZ-658-7300-010 (center) and EZ-658-7300-002 (on the right). The three panels were then overpainted with the polyester code P2-168-7116-003. The test duration was 2.020 hours.



Gardabond WH/60/OC		
EY-658-7300-001	EZ-658-7300-010	EZ-658-7300-002

In the second picture are shown the panels pre-treated with zinc phosphate (Gardabond 26S/60/0C - Chemetall). The panels were painted with EY-658-7300-001 (on the left), EZ-658-7300-010 (center) and EZ-658-7300-002 (on the right) and overpainted with the polyester code P2-168-7116-003. The test duration was 5.000 hours.



Gardabond 26S/60/0C		
EY-658-7300-001	EZ-658-7300-010	EZ-658-7300-002