

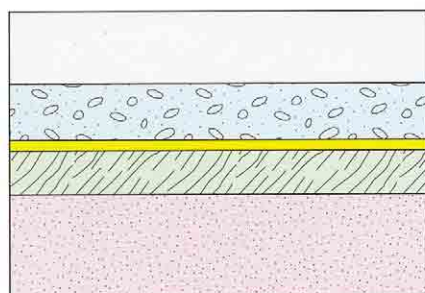
RUSPERT[®] Patent No.1526310 and 1570203

RUSPERT metal finish is a high-grade metal surface processing technology that prevents corrosion. It consists of three layers: the 1st layer; a metallic zinc layer, the 2nd layer; a high-grade anti-corrosion chemical conversion film, and a 3rd outer layer; baked ceramic surface coating. The distinguishing feature of RUSPERT is the tight joining of the baked ceramic surface coating and the chemical conversion film. These layers are bonded together through chemical reactions, and this unique method of combining layers results in a rigid combination of the coating films. RUSPERT treatment does not attribute its anti-corrosion properties to merely a single material, but the synergy of these three layers, which combined have superb rustproof qualities.

Benefits of RUSPERT treatment

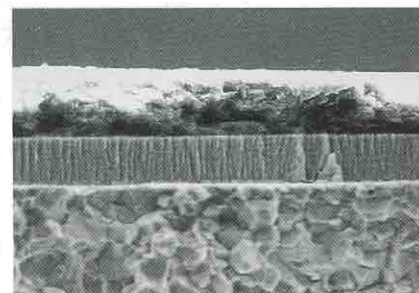
1. **Superior corrosion resistance** Superior performance against salt water, gas, weathering and others
2. **Corrosion resistance against scratches** Minimal surface scratches due to composite layers
3. **Electrolytic corrosion resistance** Less contact corrosion with other metals
4. **Low processing temperature** The drying temperature below 200°C(392°F) protects the products from metallographic changes
5. **Color variation** Various colors suit different purposes

Film structure and the corrosion prevention mechanism



Cross section of RUSPERT (type 2)

← Baked ceramic surface coating layer (approx. 10 μ m) →
← Chemical conversion coating layer } →
← Metallic zinc layer (approx. 5 μ m) } →
← Steel substrate →



Microscope view (×1000)

Coating layers		Corrosion prevention mechanism
3rd layer	Baked ceramic surface coating layer	corrosive elements are intercepted by the strong paint film made of ceramic materials.
2nd layer	Chemical conversion coating layer	Rustproof performance is improved as the chemical conversion inactivates the zinc plated surface and creates a tight adhesion between the chemically converted layer and the paint-layer.
1st layer	Metallic zinc layer	The steel/iron substrate is protected from corrosion by the self-sacrificial galvanic effect of the zinc coating.

Treatment process

Zinc treatment

Chemical treatment

RUSPERT coating

Baking

Corrosion resistance test results

Test items	RUSPERT	Zincelectro-plating (Colored Chromate)	Hot dip galvanizing
Before tests			
Salt Spray Test After 1,000 hours Test method: 5% concentrated salt mist continuously sprayed in accordance with the JIS Z 2371 standard			
Combined Corrosion Test After 200 cycles Test method: Repeat a series of cycles, each cycle consists of 2 hours of salt spraying, 4 hours of drying at 60°C (140 °F) and 2 hours of exposure to humidity of 95% R.H. at 50°C (122°F) in accordance with the JASO M609-91 standard			
Cass Test After 10 cycles Test method: Repeat a series of cycles, each cycle consists of 16 hours of exposure and 6 hours of non-exposure to an acetic acid solution of 5 % concentration with its pH adjusted between 3.0 and 3.1			
Sulfur Dioxide Gas Corrosion Test After 15 cycles Test method: Repeat a series of cycles, each cycle consists of 8 hours of exposure to a condensation of gas under 98% R.H. at 40°C (104 °F) after supplying sulfur dioxide gas (SO ₂) of 2.0 ltr to a tightly sealed chamber of 300 ltr and 16 hours of drying at 75% R.H.			

Performance

Test items	Test methods	Test results
Hardness	Peeling test by pencil hardness	Over 4H
Adhesion	Peeling test by adhesive tape on cross scribed test piece in 1mm width	Nothing abnormal
Acid resistance	Immersion in 5% sulfuric acid solution for 24 hours	Nothing abnormal
Alkali resistance	Immersion in 5% sodium hydroxide solution for 72 hours	Nothing abnormal
Heat resistance	Exposure to 250°C (482°F) heat for an hour	Nothing abnormal
Accelerated weathering	Sunshine weather-0-meter test for 1,000 hours	Free from red rust
Contact corrosion with other metals	Corrosive investigation after Salt Spray Test (JIS Z2371) done comparatively on surface-treated steel bolts/nuts tightened on a stainless steel plate	Clearly superior to zinc electro-plating (colored chromate) and hot dip galvanizing

Type of Processing

Type	Performance	Availability of Color
RUSPERT type 1	SST 500 hours DIN 50018 (0.2 ltr) 15 Cycles	Silver
RUSPERT type 2	SST 1,000 hours DIN 50018 (0.2 ltr) 15 Cycles	All available
RUSPERT type 3	SST 1,000 hours DIN 50018 (0.2 ltr) 15 Cycles 2.0	Gray
RUSPERT treatment on hot dip galvanizing	SST 1,500 hours DIN 50018 (0.2 ltr) 15 Cycles	All available

A Variety of Colors

Basic Colors



Silver



Gray



Black



Blue



Light-green



Green



Medium-brown



Brown



Gold



Copper

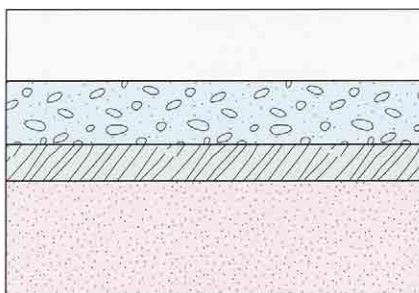
Examples of made-to-order colors

RUSPERT treatment over Hot Dip Galvanizing

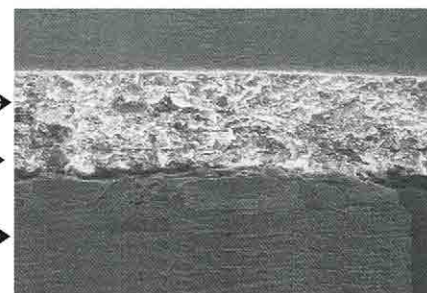
Benefits

1. **Superior corrosion resistance** Remarkable improvement of general rustproof performance of hot dip galvanizing
2. **Pollution resistance** Suppression of rapid discoloration by corrosive gasses
3. **Electrolytic corrosion resistance** Less contact corrosion with other metals
4. **Color variation** Various colors to suit different purposes

Film structure and the corrosion prevention mechanism



Cross section



Microscope view (×1000)

Coating Layers	Corrosion prevention mechanism
Baked ceramic surface coating layer	Corrosive elements are intercepted by the strong paint film made of ceramic materials.
Special rustproof coating layer	Intrusion of corrosive elements is impeded by the pliability of the RUSPERT organic paint that follows the expansion /contraction of the substrate materials and also by its strong adhesion to the zinc plated surface
Passivated layer	Rustproof pigment contained in the RUSPERT paint produces an inactive film over the galvanized surface by chemical reaction. Thus the galvanized surface is sufficiently passivated.