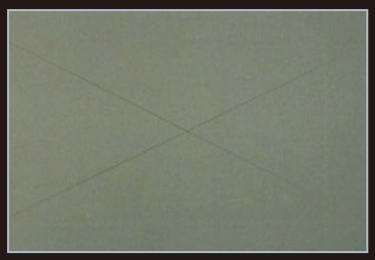
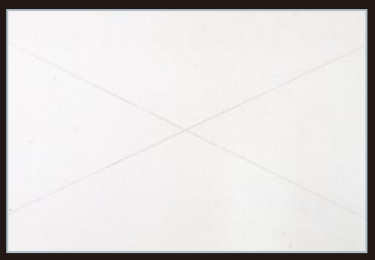
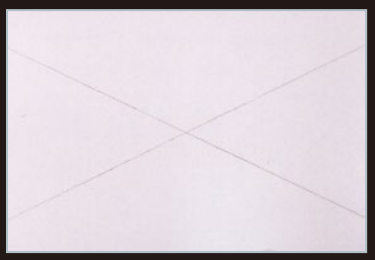
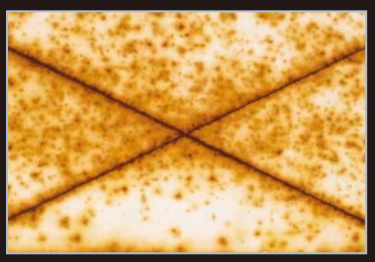
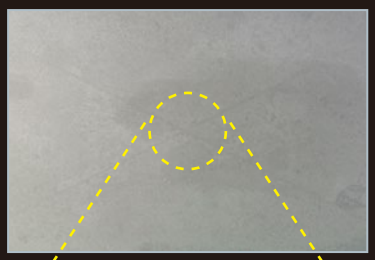
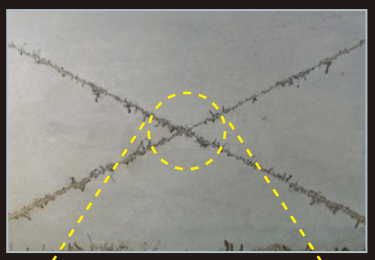
The difference of anti-corrosion mechanism

SINCE 1955
ROVAL

What is the difference between ROVAL and conventional paint?
A conventional paint film acts as a surface barrier to water and air. This is called “anti-corrosion by barrier protection.” But once the film is damaged or has deteriorated, rust develops in that area and begins to spread underneath the film.
ROVAL protects steel by the mechanism of electrochemical reaction, employing the self-sacrificing property of zinc.
In the case of steel only, the reaction between the anode and the cathode occurs on the surface of the steel and rust occurs. However, when steel and zinc in close contact, the zinc side becomes the anode, and the zinc protects the steel by rusting instead of the iron.
Even when a ROVAL film is damaged, rust will not spread due to the presence of the surrounding zinc particles.

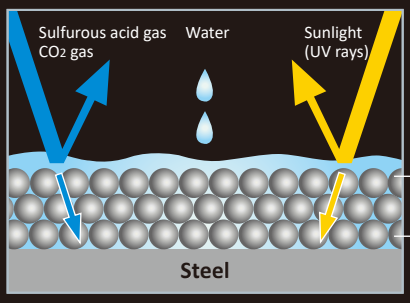
	ROVAL (80μm)	Epoxy paint + Urethane topcoat	JIS anti-corrosion paint + Phtalic topcoat
Before exposure			
After 36months exposure	 No rust is found.	 Rust from cross-cut.	 Rust spread over the substrate.
Expose the steel substrates	 Enlarged photo (cross-cut part)  Rust does not spread from cross-cut.	 Enlarged photo (cross-cut part)  Rust from cross-cut spreads.	 Enlarged photo (cross-cut part)  Rust is found other than cross-cut.

ROVAL vs Normal paints Anti-corrosion mechanism

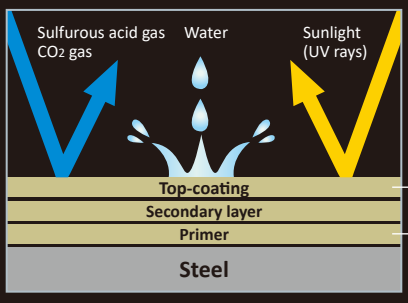
ROVAL
(Anti-corrosion by electrochemical reaction)

Normal paints
(Anti-corrosion by barrier protection)

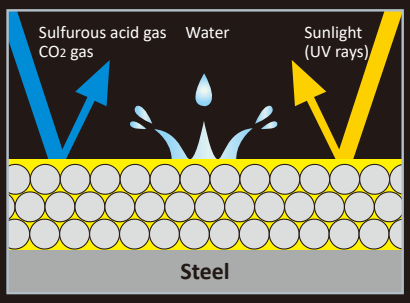
Mechanisms of Anti-corrosion



Water may penetrate through the zinc dusts on the steel surfaces, but the steel is protected by the electrochemical reaction of zinc.

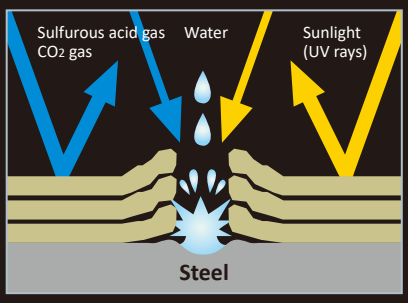


Paint film provides protection to a metal surface by shielding it from water/air.

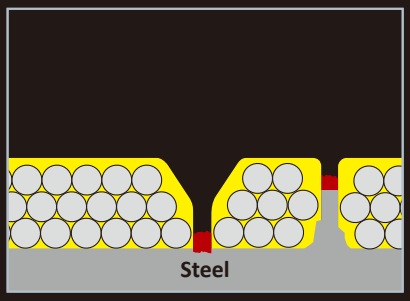


The oxidization of zinc forms corrosion products which act as a protective barrier against air and moisture improving anti-corrosion performance.

Corrosion product

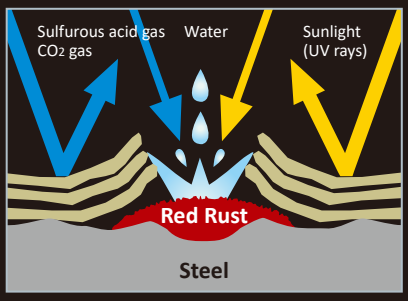


A protective barrier deteriorates with exposure.



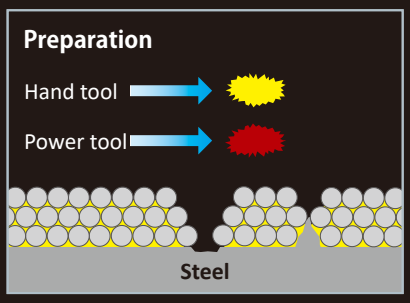
If rust should develop on damaged or thinly covered surfaces, electrochemical reaction prevents rust from creeping under the paint film.

Rust



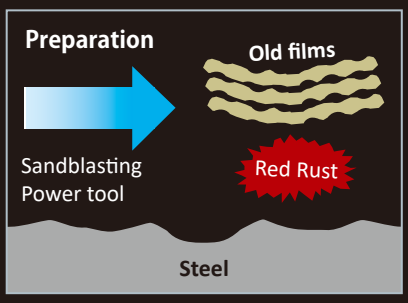
Rust will develop and creep under the paint film.

Maintenance



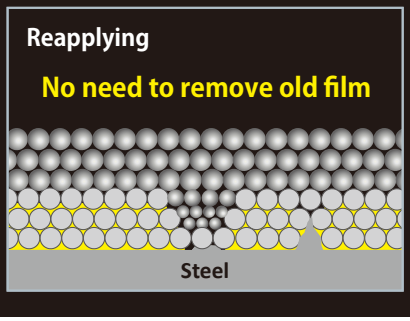
After removing white rust with hand tools, reapply ROVAL to the existing film.
(In case of red rust, remove with power tools.)

Low cost



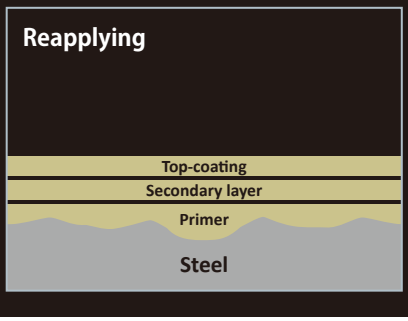
After completely removing all old film and red rust with sandblast or power tools, apply primer, intermediate coat, and topcoat.

High cost



Easy application

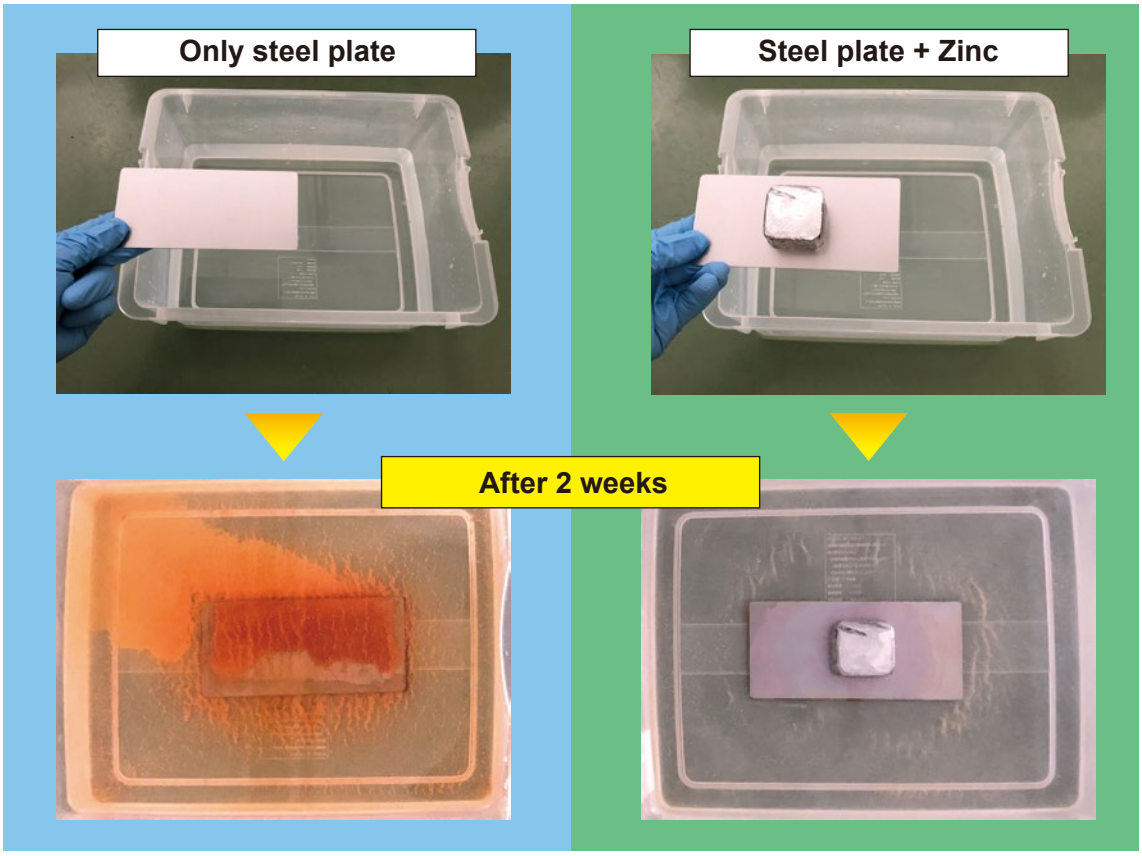
New ROVAL film
Old ROVAL film



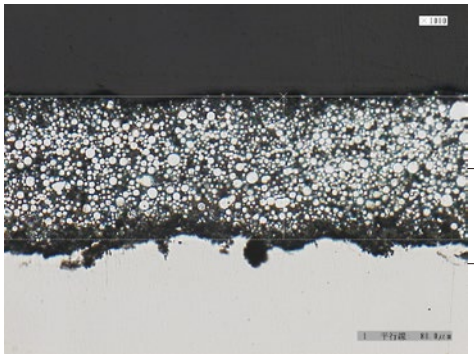
Complex application

The zinc protects the iron by rusting instead of the iron

Prepare two steel plates and immerse one in salt water. On the other steel plate, put a slab of zinc and immerse in salt water.
After 2 weeks, only the steel plate without zinc has rusted. On the other hand, the steel plate carrying a slab of zinc has not rusted.
This experiment shows the zinc protects the iron by rusting instead of the iron.



We succeeded in raising the dry film zinc content to 96% by mixing a large amount of zinc powder into a special resin.
Our competitors usually use around 70 to 80% zinc in their products, but we use a staggering 96%.
ROVAL is a paint that can make the most of the anti-corrosion ability of zinc.



Cross-sectional photograph of the ROVAL coating film (x1000)

Cold Galvanizing Compound

ROVAL

Zinc Content 96%