Cadmium Plating

COTEC

COTEC has various surface treatment technologies and the company concentrates on products development and quality control to develop various surface treatment items

Our technology

1. Alkaline cadmium plating
2. Low stress cadmium plating
3. Low hydrogen embrittlement plating

Production items and applications

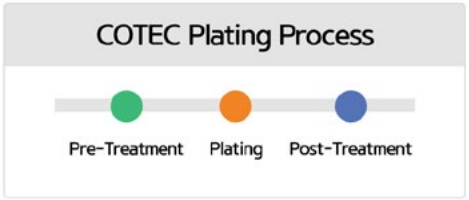
Department / Material		Aircraft, defence, ship and marine structure / Fe, STS, Al	
Usage		Corrosion resistance, Malleability, Conductivity and solderability	
Thickness		3~13㎛	
Applied specifications	QQ-P-416 AMS-QQ-P-416 PCS 2101 IFMA 817 KS W1124 KS D 0231 National defense 0115-0014 FEIS 102	Thickness	13㎛ or thicker for Type 1, 8㎛ or thicker for Type 2
		Adhesiveness	No trace of separation after bending
		Corrosion resistance	No white rust is allowed after 96 hours of salt spray test
		Stress relief	At 191±14℃, 3 to 4 hours depending on the requirements of specification
		Hydrogen embrittlement relief	Depending on product's microstructure and hardness, relief time differs. 191±14℃, for more than 3 hours (HRC 32~39) 191±14℃, for more than 12 hours (HRC 40~47) 191±14℃, for more than 22 hours (HRC 48 for more than)
Acceptance		External	MBD, BOEING, AH, HS, NADCAP, CHAVERHAM
		Internal	ADD, KAI, HANWHA, HYUNDAE WIA, KAL, LIG NEX 1, DOOWON

Equipment condition

COTEC	1,500 ×700 ×1,200 mm
	800 ×800 ×800 mm

Cadmium Plating

Capable of coating complex parts



Our technologies and their applications

Characteristic

Cadmium has similar properties as zinc, but its color is similar to silver rather than zinc.
The standard electrode potential of cadmium is -0.402 while that of iron is -0.44. As for the galvanic electrode potential, iron is high while cadmium is low. Cadmium corrodes because it becomes anodic.

Tooling

With a Mohr's hardness of 2.0, it is a little softer than pure iron. It has very good malleability and good bend-ability after coating. Since it has good ductility compared to zinc coating, it is better than zinc in nut coating.
In addition, its rust can be easily separated from steel parts compared to zinc coating.

Electro conductivities

As the electric resistance of cadmium plating is 7.3 x 10-6 Ωcm, it is a little lower than that of iron of 9.8 x 10-6 Ωcm but a little higher than that of zinc. Its conductivity is maintained for a long time and does not go down even during chromating.

Hydrogen embrittlement

Hydrogen embrittlement of cadmium is much better in comparison with zinc, making it highly recommended for aerospace products. Hydrogen embrittlement occurs during acid bath or plating process causing hydrogen to penetrate product's surface, making it brittle. Embrittlement is affected by surface roughness. rougher the surface, easier for hydrogen to penetrate and to be released. Removal of hydrogen is usually done by oven depending on part's condition, time and temperature may be differ. Average range of heat treatment is done within 4hr of previous treatment, for about 3hrs at around 191'C.

Solderability

It has good solderability compared to zinc plating hence, it is suitable for electric parts. In addition, the post treatment of chromating damages the soldering capability.

Ease of application

Cadmium plating is easy to work compared to others. It is because there are many plating baths for it and it can be operated under a wide variety of conditions along with its fast plating speed (24μm at 1A hd/dm²). Generally, it can be directly plated on the surface of metals, especially on steel.

Corrosion resistance and other characteristics

Cadmium is easy to tarnish since it is a basic carbonate. With zinc, a whitish rust grows and damages the Mechanical and electric capability. But with cadmium, the corrosion process is slow. It has good capacity when it is used for steel parts, when they are not used for lubrication, and to electric contacts.
In addition, it has much better capability for rust prevention under seawater than zinc. Its corrosion resistance improves even more when the coating is chromium.

Process