

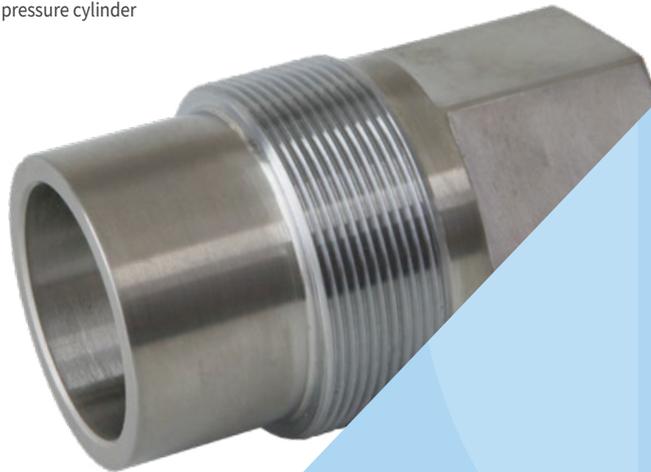
# Chromium Plating



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 Decorative chromium plating
- ② Hard chromium plating
- ③ Chromium plating for inside of long shaft high pressure cylinder
- ④ High corrosion resistant chromium plating
- ⑤ Trivalent chromium plating
- ⑥ Chromium plating over plastics
- ⑦ Chromium plating over various materials
- ⑧ (Corrosion resistant steel, Inconel, Titanium, Castings, Aluminum, Copper)



## Production items and applications

Department / Material		High pressure cylinder for long shaft, Aircraft parts, General industrial machine, Ship, Mold and dies and other steel materials	
Usage		Resistant to wear, Heat, Corrosion and chemicals, Lubrication, Decoration and Special shape	
Thickness		0.25~1000µm	
Applied specifications	National defense 0115-0011 AMS QQ-C-320 P.S 13118 IFC 40-834-01MD FEIS 106 BPS4517, AMS2460 AMS2438, PCS2110 PCS2111, KS W 1123	Thickness	Type 1 : 0.25µm or thicker ↑, Type 2 : 51µm or thicker ↑
		Adhesiveness	No trace of separation after bending
		Hardness	Hv850 ↑
		Stress relief	At 191±14°C, for more than 3 hours
		Hydrogen embrittlement relief	Depending on product's microstructure and hardness, relief time differs. 191±14°C, for more than 3 hours (HRC 32~39) 191±14°C, 1for more than 12 hours (HRC 40~47) 191±14°C, for more than 22 hours (HRC 48 or over)
Acceptance		External	BOEING, MBD, NADCAP, CHAVERHAM, PARKER, HS, AH
		Internal	HYUNDAE WIA, HANWHA, KAI, KAL, ADD

## Equipment condition

COTEC	
4,000 × 1,200 × 2,000 mm	3,000 × 1,200 × 3,000 mm(2 Units)
3,000 × 1,200 × 2,000 mm	3,000 × 1,200 × 4,000 mm



# Chromium Plating

Capable of coating complex parts

## Our technologies and their applications

### Decorative chromium plating

#### Characteristic

- Beautiful color and excellent resistance to tarnish.
- Good durability and resistance to wear and corrosion.
- Susceptible to pinholes and cracks. As it is difficult to completely coat the base metal, products are based coated with copper or nickel before coating a thin layer of 0.05 to 0.5 $\mu$ m over it.
- It is used for decoration or protection against tarnish.

#### Applicable parts

- General decorative accessories, Automotive trims, Cosmetics case accessories and industrial products

### Hard chromium plating

#### Characteristic

- Hardness of Hv 600 to 1,000 is possible with fine crystalline particles and high internal stress.
- It has excellent resistance to wearing and heat as well as a low friction coefficient.
- Good lubricity preventing adhesion by other materials; frequently applied to tools and dies.
- As there are cracks inside the coating layer and the lubricant can penetrate through the cracks for increasing lubricity, the plating is adapted for pistons and cylinders.
- Current efficiency is at 10-20% compared to other platings, adhesiveness, coverage, uniformity, bath conditions are very poor.

#### Applicable parts

- Tools and dies, Automotive parts, Aircraft parts, Ship parts, Parts for equipment used in the tool textile, Printing, Chemical industry, Heavy equipment parts, Nuclear power generation parts, General pistons and cylinders and others

### Chromium plating for the interior of long shaft high pressure cylinders

#### Characteristic

- It has the properties of hard chromium plating.
- As it has the increased adhesiveness, it is excellent in heat and pressure resistance it can withstand an instant temperature of around 3,000°C and pressure of around 110,000 psi.
- It is applied to long shaft products having a cylinder length of 7,000mm, coating thickness of 120-150 $\mu$ m and deviation of 20 $\mu$ m.

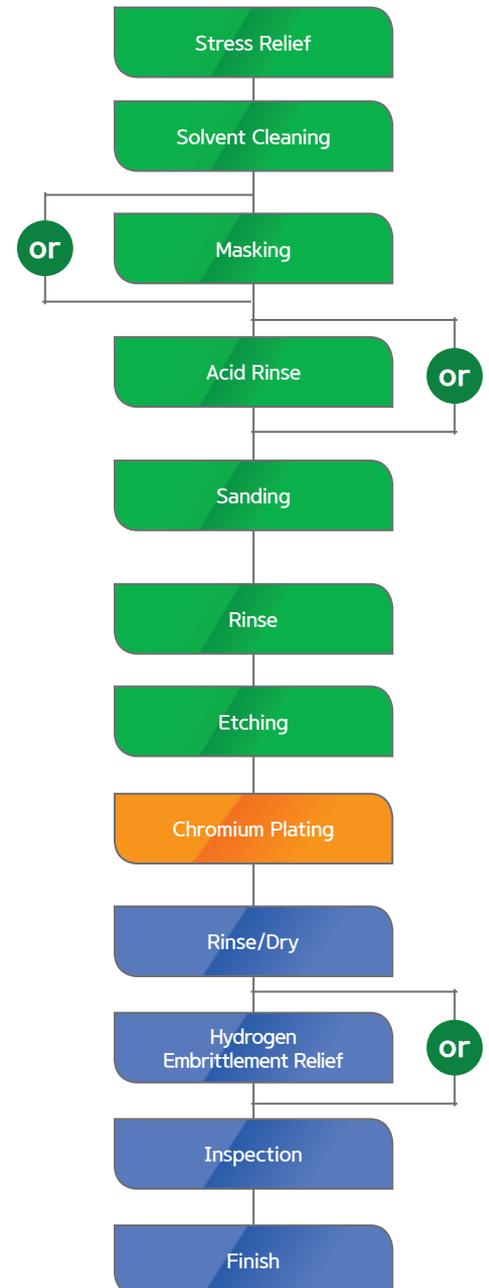
#### Applicable parts

- Interior of the long shaft high pressure cylinder, Defense equipment, Long shaft cylinder and piston, etc.

## COTEC Plating Process



## Process



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