

# **HONEYWELL COATINGS FOR OIL AND GAS**



**Honeywell**



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The oil and gas industry faces unique challenges to protect drilling tools, production equipment and valves from premature failure due to corrosion, abrasion or erosion.

To avoid such failure, downtime and high maintenance costs associated with these problems, surface treatments such as hard chrome (Cr) applied via electroplating or tungsten carbide (WC) coatings applied by certain types of thermal spray processes such as High-Velocity Oxy Fuel (HVOF) are used.

## THE SHORTCOMINGS OF LEGACY APPROACH

HVOF-WC coatings have high hardness but are expensive, and may be prone to failure due to low impact resistance. Also, most thermal spray processes are not suitable for non-line of sight (NLOS) applications. On the other hand, hard chrome coatings are less expensive than HVOF-WC but prone to microcracks which can initiate corrosion and erosion. In addition to such mechanical property shortcomings, there are increasing environmental concerns regarding the use of chrome plating.

## The Honeywell approach

Honeywell is using its long history in electroplating to develop advanced technologies which address the drawbacks of these current solutions. Honeywell, a Fortune 100 company, invents and manufactures technologies that address some of the world's most critical challenges, and we look forward to helping you overcome your toughest coating needs.

## BENEFITS TO CUSTOMER:

- High hardness
  - 600-1,100 Hv / 55-67
  - HRC Customizable by application
- Excellent Corrosion Resistance
  - Passes 1,000 hr salt fog test (ASTM B117)
  - Passes 500 hr Copper Accelerated salt spray (ASTM B368)
  - Passes >7 days of immersion in 7.5 wt% NaCl brine solution
- Excellent Wear Resistance
  - <25mg loss/1,000 cycles in ASTM G65 Sand Abrasion
  - 2-3x outperforms Hard Chrome in various wear tests (ASTMG65 & ASTM D4060)
- Exceptional Surface Finish
  - 4µin/0.1µm Ra minimum (Outer Diameter)
  - 16µin/0.4µm Ra minimum (inner diameter)
- Ideal for Oil and Gas Application
  - High wear & corrosion resistance
  - Suitable for Non-Line of Sight (NLOS)
  - High ductility offers protection from handling and impact damage
- Backed by Honeywell
  - A Fortune 100 company





## CORROSION TEST

### Exposed to 15WT% HCL

Honeywell Advanced Electroplating significantly outperforms Hard Chrome and stands up to the harshest environment without attack.

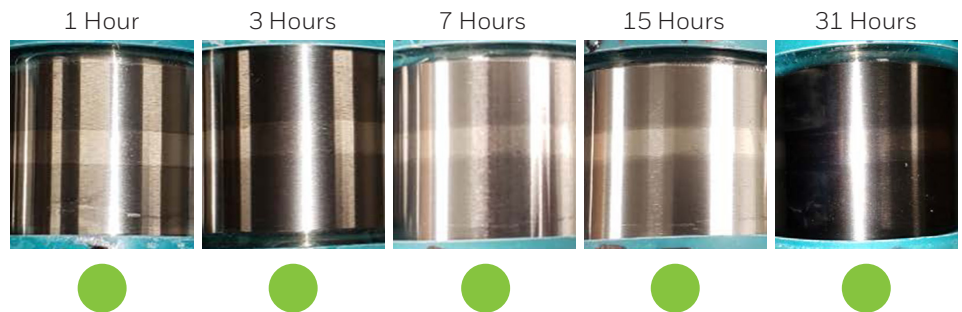


Pass

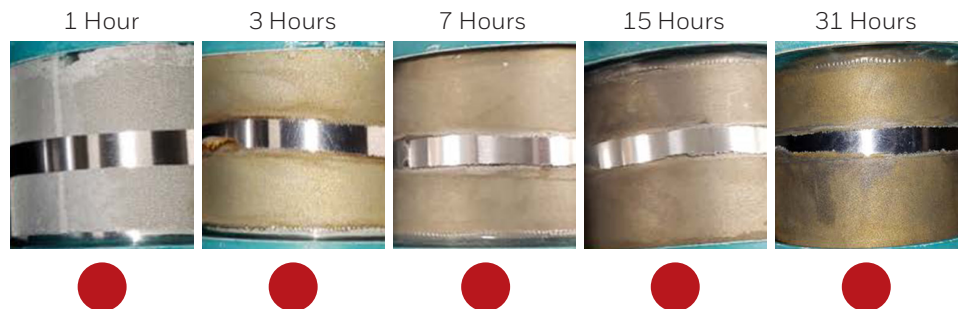


Fail

### Honeywell Advanced Electroplating



### Hard Chrome



## FIELD TRIAL SUMMARY - PISTON HOUSINGS

SAMPLE	1	2	3	4
<b>Chloride Level</b> (ppm)	23,000	24,000	80,000	80,000
<b>Measured Wear</b>	0.001in	0.001in	None	None
<b>Operating Hours</b> (still accumulating hours)	135+	130+	360+	385+
<b>Drilling Runs</b> (still in operation)	4+	4+	5+	5+
<b>versus. Hard Chrome</b>	4x	4x	5x	5x

Increases Oil Field Drilling Capacity More Than 4x as Compared to Hard Chrome.

**For more information:**

Contact us at  
[advancedplating@honeywell.com](mailto:advancedplating@honeywell.com)

**Honeywell Aerospace**

1944 East Sky Harbor Circle  
Phoenix, Arizona 85034  
[aerospace.honeywell.com](http://aerospace.honeywell.com)

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**THE  
FUTURE  
IS  
WHAT  
WE  
MAKE IT**

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