

New Developments in Hex-Chrome Free Coatings



DOD Metal Finishing
Workshop
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Presentation Outline

- A New High Performance Zinc Process:
ZinConium™: Carbon-Rich Zinc
Chromiting®: Cr(6) Free Passivation



ZinConium™ Process

- Uses conventional alkaline zincate electrolyte and plating equipment.
- Rack and barrel applications.
- One component additive.
- Uniform composition over a wide range of conditions.



ZinConium™ + Chromiting®



Direct plate on cast iron

ZinConium™
Alkaline Non-Cyanide Zinc

Direct Plating on Cast Iron

•Thickness distribution :

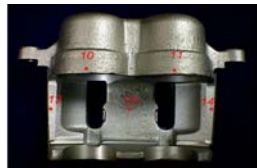
1 : 12.75 microns 2 : 16.31 microns
3 : 15.11 microns 4 : 15.02 microns
5 : 15.92 microns 6 : 15.48 microns
7 : 21.60 microns 8 : 20.59 microns
9 : 21.12 microns 10 : 16.85 microns
11 : 20.03 microns 12 : 15.42 microns
13 : 10.56 microns 14 : 16.36 microns

Average Thickness :

16.58 Microns

Target Thickness :

15 Microns



Passivation

Chromiting®

*The ultimate in Cr(6)-free
passivation for zinc and zinc alloys...*

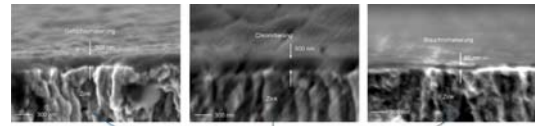
US Patent No. 6,287,704
Sep, 2001



Chromiting®

- Light green iridescent.
- Direct replacement for Cr(6) yellow passivation.
- Resistant to thermal shock.

Passivation Film Thickness

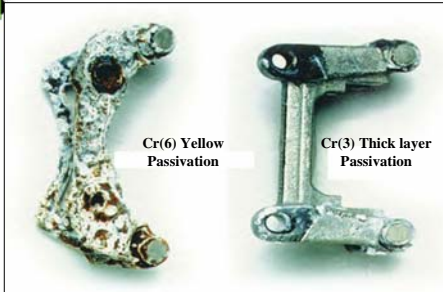


Cross section
40,000 X

Chromate
Yellow

Chromiting
Thick Layer

Chromite
Thin Layer



240 hrs NSS testing
After heat treatment at 200 C



1000 hrs NSS

Zn-C Rich Plate
+ Cr(3) passivation
Thick Layer
- No Sealer -



1000 hr NSS

Zn-C Rich Plate
+ Cr(3) passivation
Thick Layer
+ Sealer



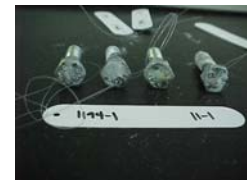
ZinConium™ + Chromiting®

After 192 hrs

After 480 Hrs




No WR



No RR


**ZinConium™ + Chromiting®
+ ProTek™ 200**

After 192 hrs



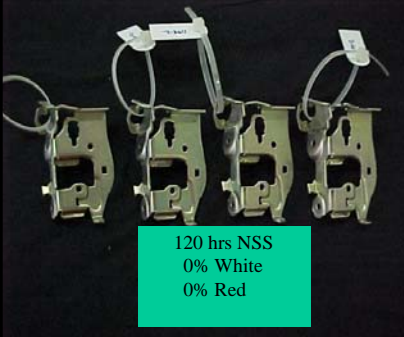
No WR

After 480 hrs




No RR
< 1% WR

Door Latch Components

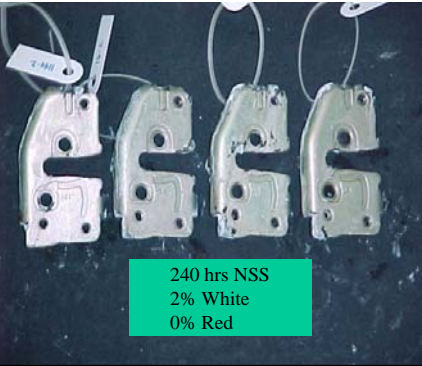


120 hrs NSS
0% White
0% Red

1-ZinConium™
2-Chromiting®




Door Latch Components

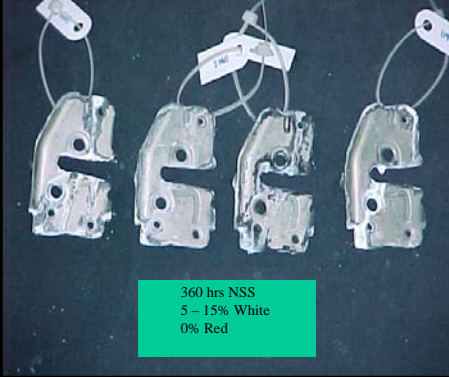


240 hrs NSS
2% White
0% Red

1-ZinConium™
2-Chromiting®




Door Latch Components




360 hrs NSS
5 - 15% White
0% Red

1-ZinConium™
2-Chromiting®




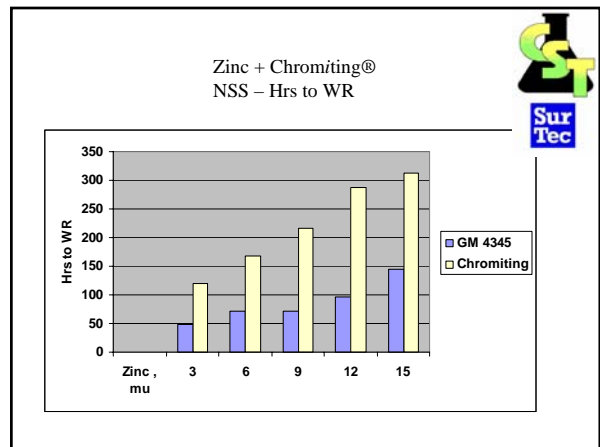
Door Latch Components

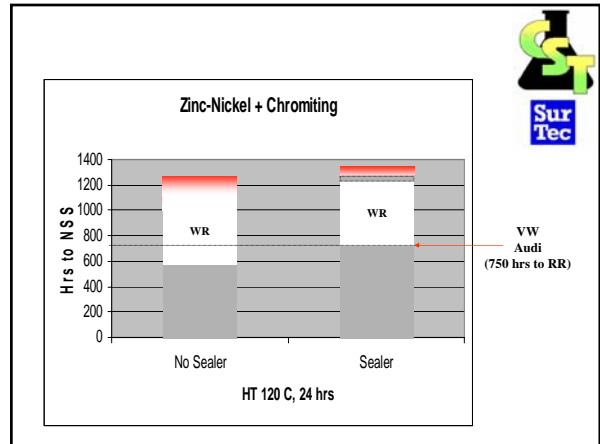
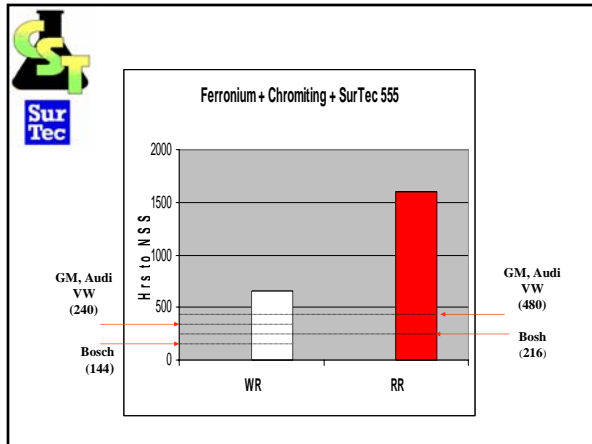
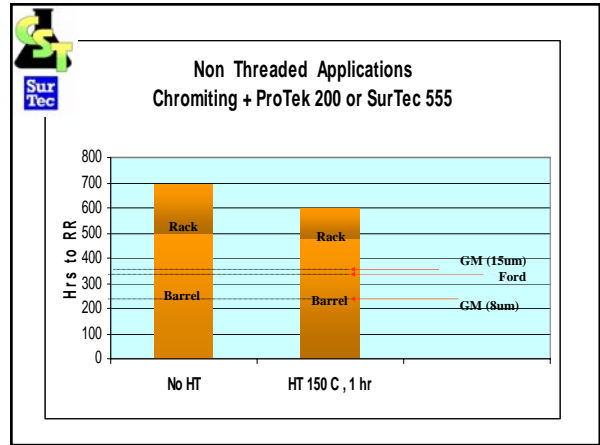
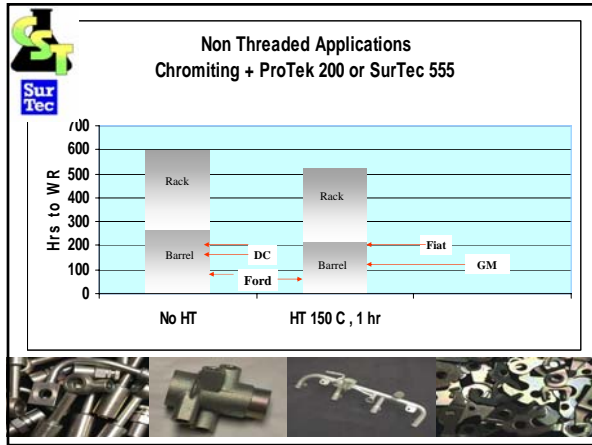
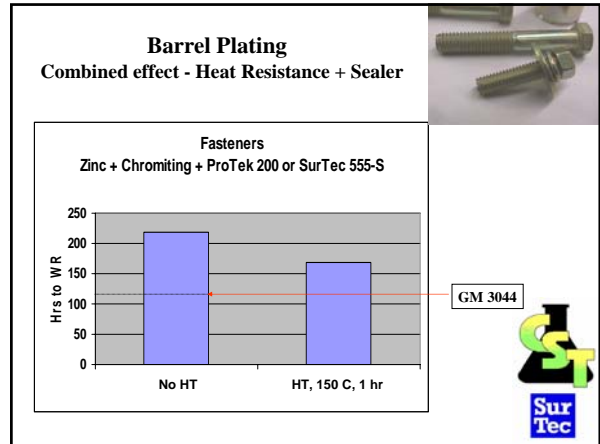
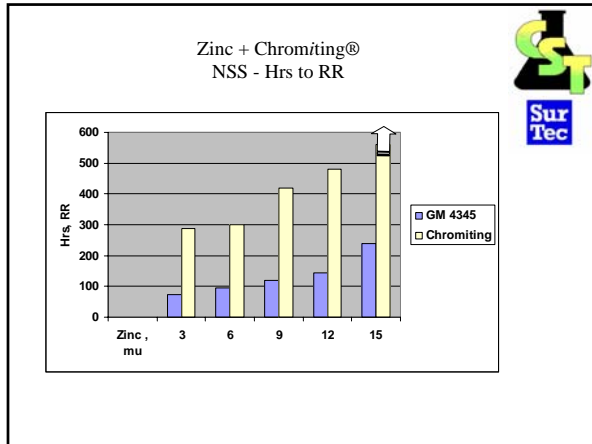


648 hrs NSS
1% White
0% Red

1-ZinConium™
2-Chromiting®
3-ProTek™ 200









Conclusion

ZinConium is a carbon-rich alkaline cyanide free zinc process with unique properties.

- It plates directly on cast iron and provides high corrosion resistance.
- Combined with Chromiting, Cr (6)-free passivation, it exceeds ELV requirements.
- Applications include automotive components such as brake parts, fuel rails and fasteners.