Breakout Session 3
Non Hex Cr Treatments for IVD/Electroplated Al, Zn, Zn Alloy Coatings

By:
Steve Gaydos
And
Lorraine Wass
May 17, 2007
# Non Hex Cr Treatments for IVD/Electroplated Al, Zn, Zn Alloy Coatings

## Authors

Strategic Environmental Research and Development Program (SERDP), Environmental Security Technology Certification Program (ESTCP), 4800 Mark Center Drive, Suite 17D08, Alexandria, VA, 22350-3605

## Distribution/Availability Statement

Approved for public release; distribution unlimited

## Abstract

DoD Metal Finishing Workshop - Chromate Alternatives for Metal Treatment and Sealing, May 15-17, 2007, Layton, UT. Sponsored by SERDP/ESTCP.

## Subject Terms

Security Classification: unclassified

| b. ABSTRACT       | Unclassified |
| c. THIS PAGE      | Unclassified |

Limitation of Abstract: Same as Report (SAR)

Number of Pages: 10

Name of Responsible Person: 

---

Form Approved OMB No. 0704-0188

Standard Form 298 (Rev. 8-98)

Prescribed by ANSI Std Z39-18
Treatments for IVD/Electroplated Al

• Metalast TCP HF Qualified on Alumiplate
  – 25 to 50% at RT
  – 25% at 90 F

• All MIL-DTL-81706, Ty II TCP Materials Should Work on Al Coatings
  – Pure (99% Aluminum) to Treat with TCP
    • Henkel
    • CST SurTec
    • Luster-On
    • Metalast
Treatments for IVD/Electroplated Al

• Other Non TCPs That Offer Corrosion Resistance
  – Iridite NCP (Meets Ty II, Class 3)
  – Alodine 2000 (TD-3095 Seal)
  – Sanchem 3300 + 3400 Permanganate – Silicate Process

• Other Non-TCPs With Good Paint Adhesion Only
  – Boegel, Alodine 5700, PreKote

• Anodize or Oxide Coatings
  – Ty IC (BSAA), II (SAA), IIB (TSAA)
  – EC2
MIL-DTL-5541 Issues for Al Coatings

• MIL-DTL-5541 Still Required 2024 for Monthly Salt Spray
• Need to Change 5541 to Read Like MIL-A-8625 for Anodize
  – Corrosion Test with 2024 or Predominant Alloy Used That Month
Zn – Zn Alloy Coatings

• Many To Choose From – Mature Technology
  – Generations
    • I – Inorganics (Good for Zn Alloys)
    • II – III – Organics w/ wo Cobalt
    • IV – Nanoparticles – Silica
  – Taylor for Needs – DoD Needs to Specify What They Want
    • Thickness, Elec Properties, Lubricity, Corrosion
  – Technology is Off the Shelf
    • Work with Vendors
      – SERDP – ESTCP Projects
Zn – Zn Alloy Coatings

• No Mil Spec Needed for These Treatments
  – Cd Plate Spec Required 96 hr SS
  – Need to Specify Additional Requirements

• DoD Should Select Non-Cobalt Versions for Evaluation
  – Avoid Future regs
Installation of Non Hex Cr Systems

• Tighter Controls
  – pH, Temp, Concentration

• Process Less Forgiving
  – Pay Attention to Details

• Contamination
  – Remove Old Cr Tanks and Systems

• Non Hex Cr Costs Are Higher
  – Chemical Costs are Higher
    • Need to Use Technology to Extend Bath Life
      This Exists for Zn Alloy Systems
Issues for Insert of NonHex Into DoD

• Non-Cr Primer
  – Need Hex Cr Surface Treatments to Make Non-Cr Primer Work
    • Progress Being Made But Not There Yet
Reliability of Non Hex Treatments

- **Zn Alloys Treatments Very Reliable**
  - Long History With Automotive Industry
- **Al Coating Treatments Very Reliable (Not 2024)**
- **Touch-Up**
  - **Zn Alloy Coatings**
    - Not Typically Done But Possible (Check with Brush Platers)
  - **Al Coatings**
    - Metalast is Brushable
    - CST SurTec Has Pen Applicators for Their Version
    - Henkel is Qualifying Alodine 871 Touch-N-Prep Pens
What Needed to Implement

• Al Coatings
  – Drop-In Replacement
  • Use MIL-DTL-81706, Ty II
  • Check out Non-Cr Primers

• Zn Alloy Coatings
  – Need to Repeat All Work Done with Hex Cr on Zn-Ni
  • Corr, Galvanic, HE, Re-HE, Paint, Fatigue??, . . .