

SERDP/ESTCP Metal Finishing Workshop

Hex Cr Pre- & Post-treatments

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Current Uses

- Aluminum Finishing
 - Conversion Coating – Aluminum Alloys, IVD/CVD/Alumiplate on Steel
 - Immersion, Spray, Wipe/Brush Application
 - High Copper/Zinc Aviation Alloys
 - Armor/Ground Vehicle Alloys
 - Repair/Touch-up
 - Class 1A/Class 3
 - Anodizing & Anodize Sealing
 - Chromic Acid Anodize
 - DCA/Dichromate Sealing of Anodize

Current Uses

- Magnesium Finishing
 - Anodizing – Primarily New/OEM Assemblies
 - Conversion Coating, Pickling – Mixed metals processing
- Sacrificial Coating Post-treatment/Passivate
 - Zn, ZnNi, SnZn, Cd, Alloy Plating
 - Fasteners, Components, Aviation, Automotive
- Steel Finishing
 - Phosphating w/ Cr6+ Rinse
 - Hex Cr Wash Primer

Drivers

- OSHA PEL, EO 13148, EPA/DOT
 - PEL 25 $\mu\text{g}/\text{m}^3$ for Aerospace Only
- EU Directives – ELV, RoHS, WEEE
- Enhanced or Unique Performance
- NESHAPS – Cr
- Cost
- Availability

Barriers

- Funding, CBA (quantify data)
- Facilities/Process Impact
 - Not open to additional tanks, process steps, time, labor requirements
- Concurrent Operations
 - Running old/new technologies side by side
 - Legacy product support
- Changing Mindset
- Not willing to be first/High-risk Low-reward

Alternatives

- Limited/Application Specific Implementations
 - Non CAA processes authorized
 - Low criticality conversion coatings on Al
 - Non CAA for Mg
 - Tri Chrome processes transitioned
- More work needed to optimize/transition
 - Each application often different requirements

Requirements/Needs

- Equivalent performance a minimum
- Optimization/Process Understanding lacking
- Industrial/Manufacturing Environment
- Time/Energy Savings
- Electronics – High Temp Class 3
 - No secondary seals
 - Specialty Applications
- Removal/Rework Issues
- HCF Wash Primer/ZnPhos Alternative

Requirements/Needs

- Training/Logistics/Standardized Processes
- Hex Chrome Elimination Approach
 - NC Primer
 - Adhesives, Sealants, Dissimilar Metals Capability
 - Consideration of Entire System/Environment
- Lubricity/Torque Tension Effects of Alternatives
- Better Mechanistic Understanding
 - RDT&E – Multiple Inhibitors/Synergistic Affect
 - NC Active Inhibitors
- Storage/HAZMAT Issues