

Breakout Session
Pretreatment of Al and Mg Alloys
– Structural and Electronic

DoD Metal Finishing Workshop

Layton, UT

May 17, 2007

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE 17 MAY 2007		2. REPORT TYPE		3. DATES COVERED 00-00-2007 to 00-00-2007	
4. TITLE AND SUBTITLE Pretreatment of Al and Mg Alloys - Structural and Electronic				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Strategic Environmental Research and Development Program (SERDP), Environmental Security Technology Certification Program (ESTCP), 4800 Mark Center Drive, Suite 17D08, Alexandria, VA, 22350-3605				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES DoD Metal Finishing Workshop - Chromate Alternatives for Metal Treatment and Sealing, May 15-17, 2007, Layton, UT. Sponsored by SERDP/ESTCP.					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 11	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

Scope

- Focus on pretreatments
 - Primers and inhibitors are related but not specific to discussion
- Applications on structural alloys and castings
- OEM and depot/repair/rebuild operations

Magnesium Alloys

- Castings
 - AZ91, ZE41, ???
- Current processes are common for all alloys
 - Dow 7 for mfg, Dow 19 for repair/rework
- Requirements:
 - Corrosion protection
 - Standalone
 - Needed for “in process” protection of parts
 - Painted/coated
 - scribed
 - Paint adhesion
 - Performance of parts in service

Alternative processes

- Tagnite and Kironite are OEM processes
 - Brush Tagnite is a difficult process
 - Performance equivalent to Dow 19
- Tagnite + Rockhard performs well on selected parts
 - Barrier coating important for corrosion protection
- Aluminum cold spray or electroplate for protection and galvanic protection?
 - By design
 - Process used in repair/rework
 - TCP as conversion coating for both Mg and Al??

Needs for Mg

- Mg specific resin systems for barrier properties
 - Nonchromate inhibitors for Mg and barrier
 - Damage resistant coating
 - Powder coat?
 - “panther grip” + barrier system?
- Aluminum on Magnesium by design
- High strength aluminum casting materials

Aluminum Alloys

- Structural and components
 - 6061
 - 7075 (7050)
 - 2024 (22219,2124), LiAl (2219,2195)
 - 3xxx, 5xxx
 - A356, A380
- CrCC used for all alloys
 - No alloy specificity
 - OEM and repair/touchup
 - Detail parts and assemblies

Categories of Use

- Component parts and assemblies
 - Immersion tankline
- Large assemblies, mold line/exterior
 - Paint/repaint of aircraft, ships, vehicles
 - Shuttle external tank
 - Etc.

Conversion Coating Requirements

- Adhesion
 - Organic coatings to Aluminum
- Corrosion protection
 - Standalone for process and some applications
 - Class 3 for low electrical resistance
 - Standalone corrosion resistance implied
- Compatible with mixed metal assemblies
 - Minimizes masking and/or removal
- Process controls
 - Which alloys? Procedures?

NonChromate Conversion Coatings

- Alternatives
 - TCP (NAVAIR, 4 vendors)
 - NCP/IrTCP (not for all alloys)
 - Boegel (3 vendors)
 - Prekote
- Application methods
 - All can be sprayed
 - All but Boegel can be used in immersion tanks
- All require chromated primer when painted

Needs for NonCrCC

- Gain understanding of interaction of cleaning and deoxidation with TCP and others
 - Interest in all alloys including LiAl and 7xxx
- Interaction between NCr inhibitors and coatings with NCrCC

Critical for DoD Implementation

- Develop strategies for implementing new technologies
 - Needs to be at least service wide
 - AF, Navy, Army
 - Support incremental technology insertion
 - Define classes of applications where performance requirements are met