

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

DoD Metal Finishing Workshop

Layton, UT

May 17, 2007

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# 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