

Breakout Session

“Cr⁶⁺ Pre- and Post-Treatments Breakout Session.”

Uses

The biggest uses for hex chrome are in structural components (e.g., electrical boxes). Chrome rinses are also used for phosphates

For Class 1A and Class 3 classifications, it is important to distinguish between low and high copper alloys. High copper (and zinc) alloys are more difficult to protect. Also, non-chrome finishes do not offer much corrosion protection in bare metal-metal contacts.

High temperature conversion coatings are becoming necessary. Thermal breakdown does occur when the coatings are exposed to 100+ degree temperatures for a sustained amount of time (2-3 months).

Uses and applications:

- Aluminum finishing (conversion coating, aluminum alloys, IVD/CVD/Alumiplate on steel, anodizing, and anodizing sealing)
- Magnesium finishing
- Sacrificial coating post-treatment/passivate
- Steel finishing

Technical Needs and Requirements

How realistic are accelerated tests? Materials that perform better in accelerated tests tend to do better in the field, but that should not imply a correlation.

Better optimization and understanding are needed for real world application issues and how to apply them feasibly. A better mechanistic understanding often results in extra expenditures and testing times.

Better understanding is also needed in shops where relatively untrained personnel are applying these coatings to aircraft. Personnel training is important with new processors and equipment. Training is usually low as a priority and, when funding is tight, often gets cut or curtailed.

Inhibitors are not currently part of a long-term solution. One goal should be a chromium-free actively inhibited system.

Needs:

- High temperature conversion coatings (no secondary seals)
- Removal/rework issues
- Training/logistics/standardized processes
- Better mechanistic understanding

- Hex chrome elimination approach
- Lubricity/torque tension effects of alternatives
- Storage/HAZMAT issues
- Equivalent performance
- Optimization/process understanding (currently lacking)
- Industrial/manufacturing environment
- Time/energy savings
- HCF wash primer/zinc phosphate alternative

Drivers

Important environmental drivers include: OSHA PEL, European directives (there are also individual restrictions in some countries), waste water concerns, Executive Order 13148.

Metal finishing waste products are automatically classified as hazardous materials. There are storage issues for hazardous versus non-hazardous materials.

Drivers:

- OSHA PEL, Executive Order 13148, EPA/DOT
- European directives
- Enhanced/unique performance
- NESHAPS – Cr
- Cost
- Availability

Barriers

A reliance on cost-benefits analysis will not have positive results and is difficult to quantify.

It is difficult to change mindsets from old and understood processes to a new technology. Also, it is difficult to agree on priorities and what trade-offs are acceptable.

Transitioning to a new technology can be disruptive. Old and new technologies are often run simultaneously. A universal drop-in replacement process would be helpful.

Barriers:

- Funding, lack of cost-benefit analysis
- Facilities/Process impact (not open to additional tanks, process steps, time, labor requirements)
- Concurrent operations (old and new technologies running side-by-side, Legacy support)
- Changing mindset
- Many facilities are not willing to be first (high risk, low reward)

Alternatives

How many of the alternatives can be used to pretreat steel and galvanized steel through a spray application in a small workshop environment? This would not be possible with PreKote, but other alternatives should be fine.

Alternatives:

- TCP (Class 3)
- Alodine 5700 (chemically similar to TCP, reacts with any metal surface)
- AC 130/131
- ECM
- PreKote (good adhesive base)
- Safeguard (CC-3400)
- Oxsilan AL-0500/Chemidize/BI-K Akclimate
- MacDermid Iridite NCP (Class 3 only)
- Nalco nonchrome alternative (requires bake at 200 degrees Fahrenheit)
- Boric-sulfuric anodize
- Thin film sulfuric anodize
- PAA/sealed - corrosion
- Mg-Rare Earths
- Henkel/Micro-Arc Additive Anodizer (something to keep on the horizon)
- Tagnite (anodizing – can do larger parts than Keronite)
- Anomag (anodizing)
- Keronite (anodizing)
- Zinclad, Hyproblue, Bondlerite Steel

Discussion Topics from May 23, 2006

- Magnesium anodizing alternatives have equivalent or better corrosion control. There is not a way to inspect materials after they return post-resin coat application. A portable hand-held NDI device could be very useful for this.
- What is the status for qualifying TCP as a sealant? Waiting on fatigue data.