

Ogden Air Logistics Center

Non-Chrome System Evaluation for Aircraft and Aerospace Applications

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Overview



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- **Organizations Involved**
- **The Problem (Chrome VI)**
- **Facts about Lab, OEM and ALC's**
- **Depot Chromated Conversion Coating Processes**
- **System Laboratory Testing**





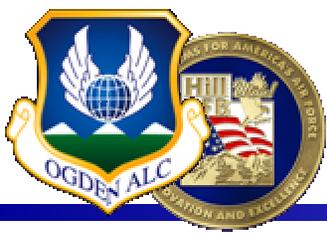
Organizations



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- **NASA**
- **Air Force**
- **KSC**
- **Boeing**





Hexavalent Chrome Cr(VI)



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- **Hexavalent Chrome INHIBITS CORROSION**
“Nothing performs like Cr(VI)”
- **Chromic Acid (CrO_3), is used in chromated conversion coatings (Alodine)**
 - Known carcinogen
 - Digest 1.5 grams of it and it will kill you
- **Strontium Chromate (SrCrO_4), is a hexavalent chromium salt that is used in aerospace primers**
 - Best inhibitor for Filiform Corrosion





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Present Consensus



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- **There is a need to reduce or eliminate the use of hexavalent chrome in the painting of aircraft**
- **Corrosion protection cannot be sacrificed**
- **Chromium is necessary in either the primer or the conversion coat**





Non-Chrome?



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- **Non-Chrome Primer or**
- **Non-Chrome Conversion Coating**
 - **Drop in Alodine (5200/5700)**
 - **Chrome Three**
 - **PreKote**
 - **Sol-Gel**





Reason for a Primer



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- The **PRIMER** is the **HEART** of the **PAINT SYSTEM** corrosion resistance properties
- For example: The correct formulation with Strontium Chromate will prevent Filiform Corrosion if the conversion coat
 - Is not too thick (Wash Primers)
 - Provides good adhesion





Chromated Conversion Coating (Alodine Process)



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- **Laboratory**
- **Original Equipment Manufacture (OEM)**
- **ALC's Depot and Field**



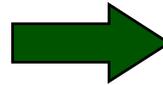


Laboratory Prep for Conversion Coatings



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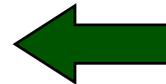
Solvent Wipe



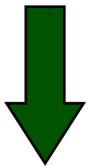
Corrosion Removing Compound (dip)



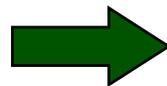
Rinse



Chromated Conversion Coating (dip)



Rinse



Dry

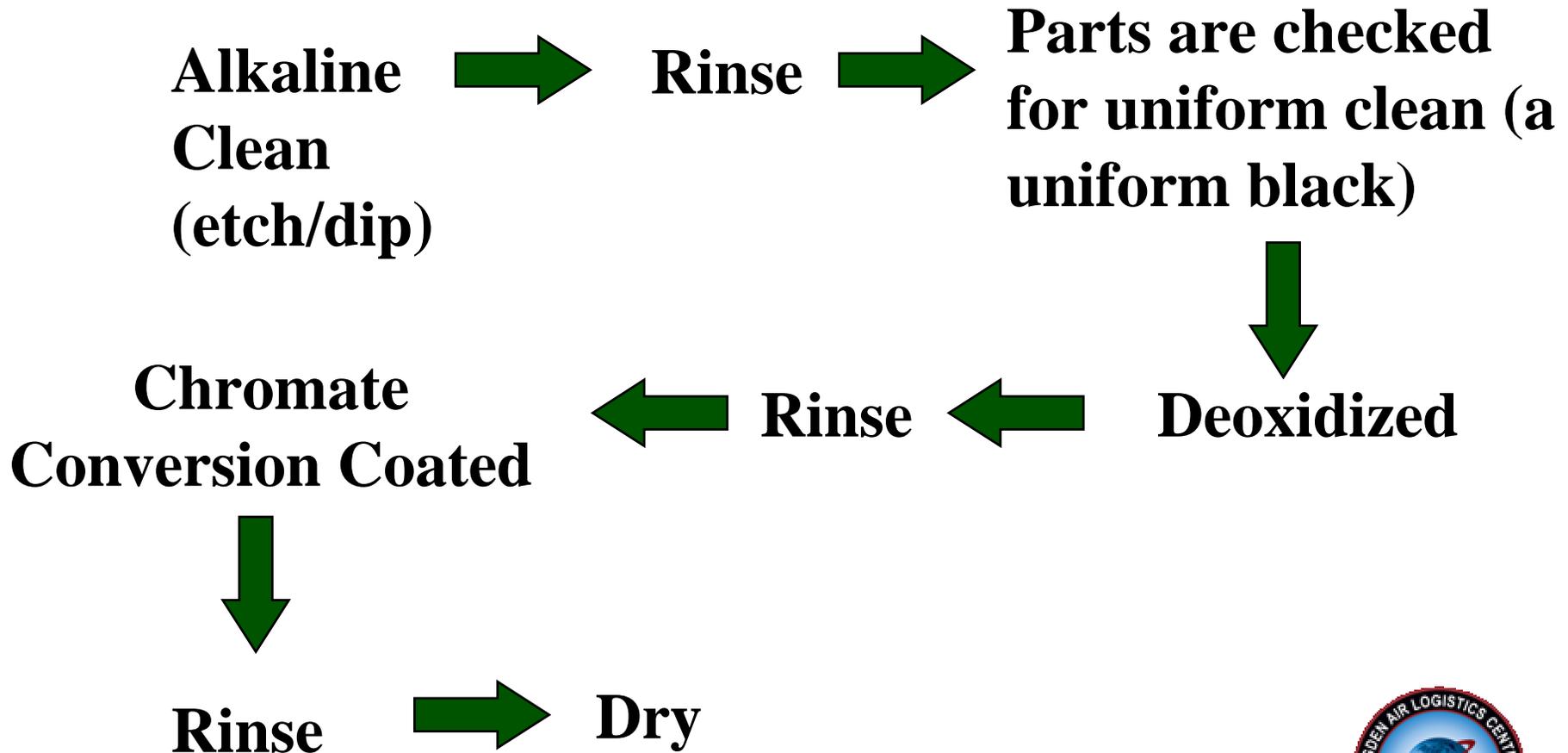




OEM Process



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Controls for the Process



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- **Checked daily/weekly**
 - pH within 0.2 units
 - Material concentration.
 - Bath temperature maintained at $\pm 5^{\circ}\text{F}$
- **Checked monthly**
 - Corrosion resistance

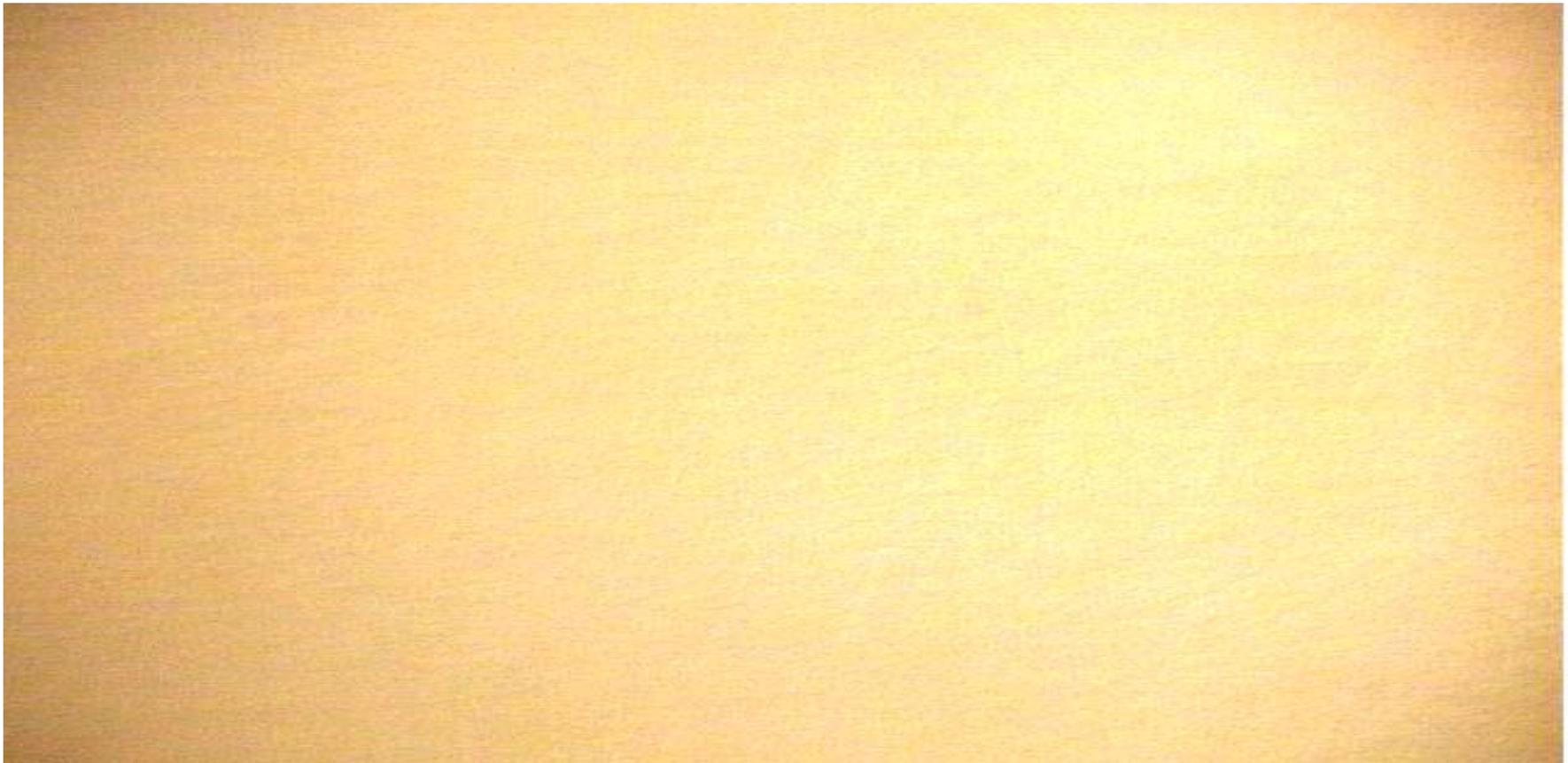




Prep for Paint

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- **Original Equipment Manufacture (OEM)**
- **Laboratory Test Panel**

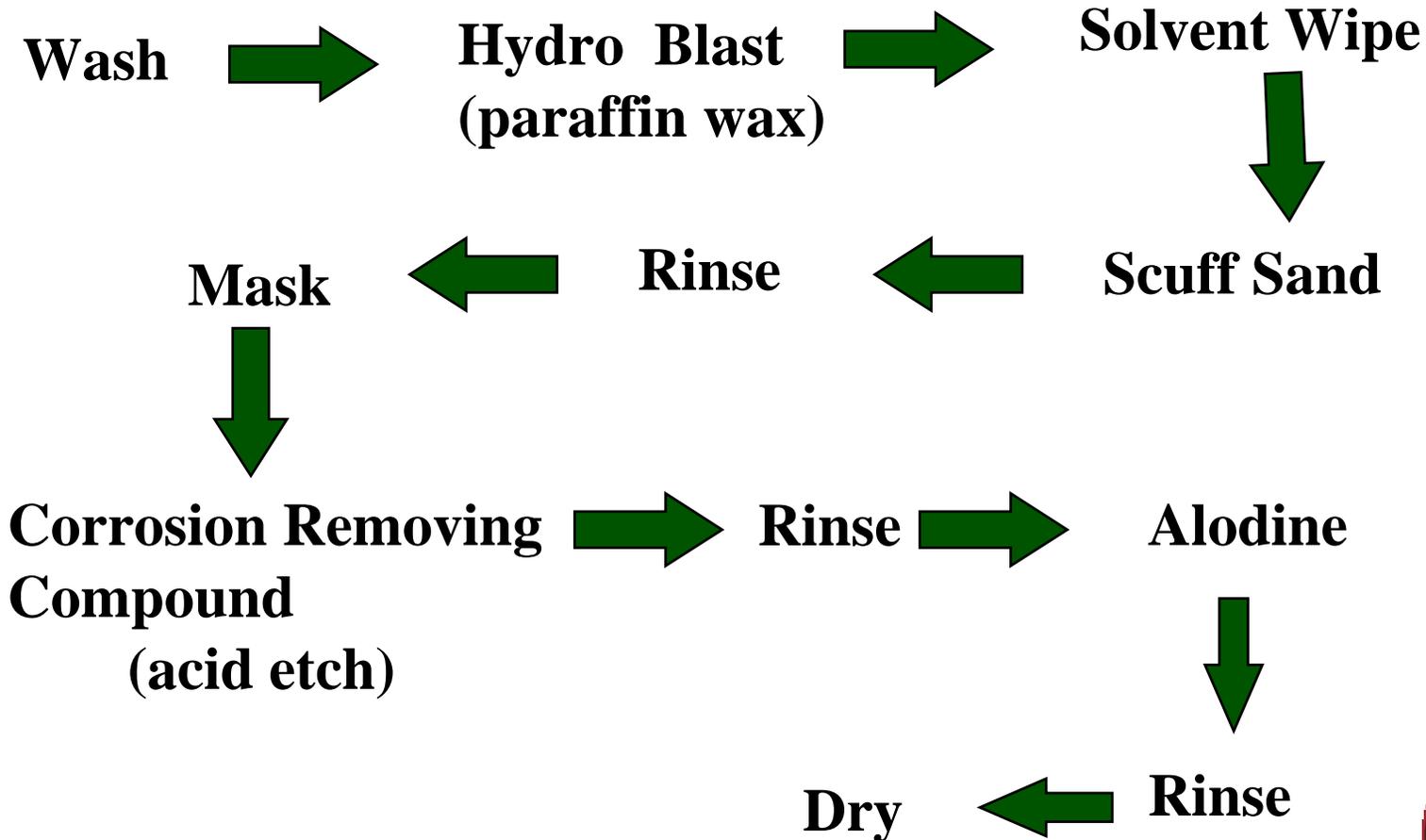




Ogden's Cr Conversion Process for F-16s



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ALC's Depot and Field Cr Conversion Process



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- **The chromated conversion coating comes in a drum which may be 3,6,9,12 months old before used**
 - **NO pH adjustments**
 - **NO testing of the product**
 - **NO checks of any kind to verify corrosion resistance**
- **Surface must be pristine clean**
 - **Water Brake Free Test may not be effective**
 - **In sufficient rinsing (soap residue)**
 - **Painters just not paying attention**















Summary for Corrosion Protection



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- Chromium is necessary in either the primer or the conversion coat
- Chromated conversion coatings gives **very little** protection for ALC's Depot and Field use.
- **Chromated PRIMERS** gives the best protection for ALC's Depot and Field use





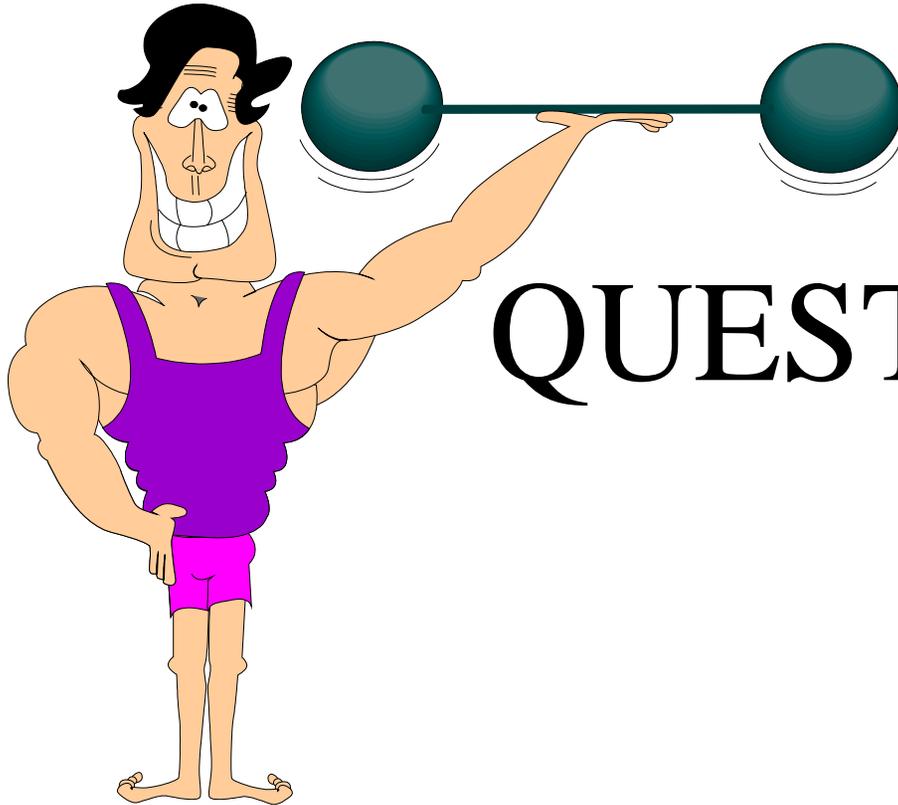
System Evaluation



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- **Primers**
 - **Mg Rich Primer**
 - **Developed by North Dakota State Univ.**
 - **Sicopoxy**
 - **Deft -----**
- **Conversion Coats**
 - **Alodine 5700**
 - **Boe-Gel**
 - **Pre-Kote**





QUESTIONS

