Topics

• What keeps us up at nights?
• Future Risks
• F-35 progress
The Unknown REACH

- SDS
- CoRAP
- Article Authorization
- Legacy Spare Parts
- Risk Mgmt Measures
- Article 66
- Unkown Chemicals
- CLP Reclass
- Defense Exemptions
- O5A
- Supply Chain Decisions
- Waste Regulation Database
- Article 33
- Unknown
- Defense Exemptions
- Authorization
- Reclass
- Regulation
- Measures
- Chemicals
- Exemptions
- Database
- 33
- Reclass
Once An Article Always An Article (O5A)

- May 2015 ECJ Decision that Candidate list materials exceeding thresholds at a piece part level must be reported via Article 33 even if included in Article
- Introduced ‘complex object’
- June 2017 guidance available
- Have you started preparing a total Article parts list?
Unknown Chemicals

- Supply Chains and CMRs/EDs/PB/vPvB/ELC etc. in typical multi-part Aerospace products

Diagram showing the supply chain for a typical Aerospace product, including:

- Base
- Curing Agent
- Diluent
- Prepolymer
- Proprietary Filler
- Other??
- Amine
- Company C
- Company B
- Company A

Chemicals of Concern:
- What is Chemical?
- Who Makes Chemical?
- Do they already have an alternative?
- Where is Chemical made (US/EU/other)?
Continuing REACH Chemical Risks

- In addition to hex chrome sunset dates, other potential aerospace impacts from:

  - Nonylphenol Ethoxylates and Octylphenol Ethoxylates - surfactants, emulsifies, solubilizers, precursors
    - Authorization Consortium formed
  - Hydrogenated Terphenyls – building block of most sealants
  - Bisphenol-A – adhesive films, epoxies, coatings
  - D4/D5 silanes – silicon precursors
  - Lead compounds – explosives, flares, dry film lubes, high temperature fabrics, solder
  - Heptylphenols – lubricant precursors
  - Hydrophthalic anhydride MHHPA/HHPA - epoxy resin hardener
  - Perfluorohexane sulphonic acids and Salts (PFHxS) – water proofing agents, metal plating, electronics
  - Microplastics - fillers
  - Refractory Ceramic Fibers(RFC) – high temperature coatings/insulations, moving toward OEL
  - Cadmium – focusing on intermediates
  - Expansion of Annex XVII restrictions for organic nickel compounds
Other Simmering REACH Issues

• 2018 Amendment of EU Waste Directive (2018/851/EC) requires public database of Article 33 submittals
  – Defense industry information generally not public (proprietary, competition sensitive, ITAR, etc)
  – Defense Exemption required

• 2015 Amendment to REACH Annex II eliminated allowance for proprietary information in safety data sheets (SDS)
  – Key materials impacted
  – No U.S. Legal or Contractual Authority to demand disclosure
  – Defense Exemptions required for each F-35 EU partner

• Potential Extension of Authorization to Articles
  – Offshoot of O5A and competitiveness concerns (EU vs US)

• European Defense Agency (EDA) and Defense Exemption
  – Released Defense Exemption Code Of Conduct
    • Essentially requires Authorization package for Annex XIV chemicals
F-35 Baseline Airframe Non-Chrome Primer

AF-1 First Flight

CF-1 First Flight

BF-1 First Flight

Airframe Interior*/Exterior
Over 180,000 Flight Hours
Enables Production Moving Line
Enables ‘Shirt Sleeve’ Maintenance

* Except fuel tanks
Chrome Replacement and Authorization?

- **Chromium Trioxide/Chromic Acid – Henkel Alodine 1200(S)RTU conversion coating**
  - Continuously testing new products for compatibility with non-chrome airframe primer, i.e. Surtec 650V

- **Chromium Trioxide Acids – Chromic Acid Anodize in supply chain**
  - Qualifying Boric/tartaric-sulfuric acid anodize ECD 2019
  - Qualifying TCP as anodize seal

- **Strontium Chromate – PPG 833K086/930K088 Fuel Tank Coating, 3M EC 3917 adhesive film, BR-127 adhesive bonding prime, MIL-PRF-23377 primer used by supply chain**
  - Neutral/SO2 salt fog testing completed, starting flight test demonstration of non-chrome fuel tank coating
  - Replaced BR-127 with 6747-1NC for titanium adhesive bonding, working on aluminum adhesive bonding
  - Continuously testing non-chrome -23377 formulations esp. Hentzen 16708TEP

- **Zinc Chromate – PPG 515x408/910x937 Super Koropon Quick Cure Touch-up Primer**
  - Lab testing several different alternatives

- **Sodium Dichromate – PPG PR-1425 B-1/2 Canopy Sealant**
  - B-2 with Calcium Dichromate no sunset date yet
  - PR-2061/PR-1861 adhesion promoter and other options in qualification/implementation ECD 2018
Cadmium P2 Projects

- Landing Gear, Leading Edge Flap, Arresting Gear
  - Landing Gear and Leading Edge Flap AFLCMC funded demonstration/validation projects for Dipsol IZ-C17+ LHE zinc-nickel to verify F-35 neutral/SO₂ salt fog corrosion resistance requirements, ECD 2018
  - Already implemented at OO-ALC landing gear depot
Summary

- **Proactive Management** – start looking for alternatives early
- **Monitor Regulatory Developments**
- **Stay engaged in your industry trade associations**
- **Monitor the chemical SIEFs**
- **Get Used to an Evolving Process**