REACH Material Substitution Issues for a US-Based Company

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Is Lockheed Martin affected by this EU Law called REACH?

• Primarily United States-based company
  – Only 19% of our sales are international
  – Most of our suppliers are domestically-based

• Manufacturer of primarily ‘articles’, not of ‘chemicals’

• Minimal Lockheed Martin legal entities located in the EU
  – Most manufacturing is done in the United States
  – Rarely ‘Importer of Record’ into the EU
    • Many programs sell through the US Government first (FMS)
    • The customer in Europe is many times the ‘importer’ of our article

• We’re a defense company – aren’t there defense exemptions?
But... We Make HUGE Articles!
F-35’s Global Supply Chain

The Netherlands
- Dutch Aerospace
- Aeronamics
- DAP
- ATS Kleizen
- Sun Electronic
- Philips Aerospace
- Eurocast
- Thales Cyrogenics
- PHM Group
- Fokker - Elmo
- Fokker - SP
- Fokker - Defense
- Brookz
- Axxiflex
- Fokker - Aerostructure
- Thales Nederlands

Australia
- GKN
- Micreo LTD
- Varley
- BAE Australia
- Partech
- Goodrich Services Production Parts
- Hawker de Havilland
- Marand
- Cablex
- Lovitt
- Ferra
- Adacel
- Thales
- Metaltech
- Aerostaff
- Broens
- Goodrich Services

Canada
- Howmet
- ASCO
- DSY
- Mindready
- Cyclone
- Honeywell Eng Sys
- DRS Technologies
- Avcorp
- CMC Electronics
- Magellan-Chicopee

United Kingdom
- Smiths Aerospace
- Microfiltrex
- Helmut Integrated Systems
- Beaufort
- BAE SYSTEMS
- Goodrich
- Hamble Structures
- GKN
- Martin Baker

Denmark
- Systematic Software Engineering
- GPV
- IFAD
- HiQ Wise
- Danish Aerotech
- Terma
- Maersk Logistics
- Corena
- Bruel & Kjaer

Italy
- Aermacchi
- Alenia
- York
- Galileo
- Aerea
- Moog - SBC
- Oto Meleraia
- Marconi Selenia
- Segundo Mona
- Cusinetti
- Mecanet
- Datamat
- Marconi Sirio Panel
- Piaggio
- Umbra
- UoP
- Logic Magnaghi

Australia
- Microe LTD
- Varley
- BAE Australia
- Partech
- Goodrich Services

Turkey
- Kalekaliip
- Havelsan
- TAI
- ALESAN
- Gate Electronic

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Supply Chain Complexity is a Major Issue with REACH

- Long/Complex Supply Chains, 8+ layers
- No direct relationship between top and bottom
- Many mid-chain players are small with low understanding
- Full chemistry is not available in many cases - Formulators and Design suppliers
- REACH depends on good communication through supply chains

Source: © 2013 AeroSpace and Defence Industries Association of Europe
F-35 Material Obsolescence Example

• Dow Corning DC1200/1204
  – CLP Regulation Table 3.1 Changed Ethylene Glycol Methyl Ether (EGME) to CAT 1B Reproductive Carcinogen in August 2009
  – Toluene CAT 2 Reproductive Carcinogen

• DC1200/1204 Reformulation Announced November 2009
  – Alternatives are PR1200/1204 and water-based PR5200
  – Dow Corning Qualified DC1200/1204 Using Metal Test Samples, but not the rubber test samples required of F-35

• F-35 Immediately Started Testing PR1200/1204 in 2010
  – Initially, New Formulations Failed, Baseline DC1200/1204 Also Failed
  – PR1200/1204 Qualification Complete March 2011

Experience Similar Issues when Attempting to Reformulate Other Legacy Materials – We Cannot Anticipate Quick Reformulation Qualification
F-16 Material Obsolescence Example

• MIL-DTL-81706 Type I Chemical Conversion Coating
  – Used as a pretreatment for aluminum surfaces prior to priming
  – Provides superior adhesion characteristics for the other finish layers as well as enhancing the corrosion protective properties of the finish system
  – Chemical conversion coating is formulated with chromic acid and chromium trioxide, both of which are on the REACH authorization list (sunset date of September 21, 2017)
  – Work to identify a replacement material has been conducted in the aerospace industry for over 25 years. To date, no drop-in replacement has been developed, although progress has been made.

Replacement may be Different Depending on Type of Alloy Used, Application Method, Location on Aircraft, etc
The Need for Material Declaration Standards

- We have a good handle on what chemicals we use in-house that are affected by REACH
- Standardization of declarations up and down the A&D supply chain would assist immensely with knowledge and disclosures