Using Surface Treatment Specification Databases to Anticipate and Accelerate Response to Regulatory Changes

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Using Surface Treatment Specification Databases to Anticipate and Accelerate Response to Regulatory Changes
Overview

• Introduction to Granta & EMIT

• Drivers for Managing Restricted Substances

• GRANTA MI: Restricted Substances

• Assessing compliance and obsolescence Risk of STS in CAD

• Summary & Conclusions
Granta Design – history

- Founded in 1994 from the University of Cambridge
  - Professors Mike Ashby & David Cebon
  - Owners: Cambridge Univ, ASM International, Founders, Employees
- Technology firsts include:
  - Materials selection (Ashby charts, performance indices…)
  - Integrated materials data management
  - Software-based teaching of materials engineering

The materials information technology experts

- **Software** – manage materials information, selection…
- **Data products** – specialist materials data libraries
- **Services** – implement, configure, apply…

Customers

- Boeing, Emerson Electric, EADS Astrium, Eurocopter, GE, Honeywell, IHI, Moen, NASA, Raytheon, JLR, TRW Automotive…
- 800+ universities and colleges worldwide
## Consortia

<table>
<thead>
<tr>
<th>MDMC.net</th>
<th>MIT Consortium</th>
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<tbody>
<tr>
<td>AWE</td>
<td>Lockheed Martin</td>
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<td>Boeing</td>
<td>NASA</td>
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<td>Honeywell Aerospace</td>
<td>NPL</td>
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<td>GE - Aviation</td>
<td>Rolls-Royce</td>
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<td>GE - Energy</td>
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<td>Los Alamos Nat Labs</td>
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<td>US Navy</td>
<td>Embracer</td>
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<td>US Army Research Labs</td>
<td>Moen Inc. (Fortune Brands)</td>
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<tr>
<th>MATERIALS STRATEGY SOFTWARE CONSORTIUM</th>
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<tr>
<td>Baker Hughes</td>
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<td>DePuy</td>
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<td>Emerson Electric</td>
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<td>Ethicon Endosurgery</td>
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Drivers for managing restricted substances

Regulatory compliance
Environmental risk
Brand image
Marketing / Market share / Customer requirements
Security of supply

Cost

Chemical management

With our longstanding belief in the precautionary principle, eliminating and minimizing the use of hazardous substances in our products and production processes has been one of our priorities since the start of our environmental activities more than three decades ago. It’s also an important part of our EcoDesign process.

Tesco and China in conflict over rare earths

The Guardian

HONG KONG — The Chinese government is continuing to block shipments of crucial strategic minerals to Japan, according to industry executives, analysts and a Japanese official.

Tin Whisker Growth on Pure Tin
Focus on REACH – driving substitution

<table>
<thead>
<tr>
<th>Phase of the REACH Process</th>
<th>Years from the start of the REACH process</th>
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</thead>
<tbody>
<tr>
<td>Pressure</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
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<tr>
<td>Proposed</td>
<td>A ~ 3000</td>
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<tr>
<td>Candidate</td>
<td>B 91</td>
</tr>
<tr>
<td>Recommended</td>
<td>C 84</td>
</tr>
<tr>
<td>Annex XIV</td>
<td>D 38</td>
</tr>
<tr>
<td>Sunset</td>
<td>E 14</td>
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<td></td>
<td>F 0</td>
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</table>

A: Pressure groups lobby for particular substances: substance starts to feel regulatory and/or supply chain pressure. E.g. SIN List, ETUC.

B: List of proposed ‘Candidate List substances’ is issued. Substance manufacturers may decide to withdraw from market.

C: Substances added to Candidate List. Legal obligations apply if any of these substances are present in products > 0.1 wt% (Article 33, Article 7).

D: Recommendation for substances to move from Candidate List to Annex XIV list. Users need to lobby hard for continued use of the substance.

E: Substances on Annex XIV list. Users must apply for authorisation to continue use. This will be application specific and for a defined sunset period (usually < 4 years).

F: End of Sunset period for substance. Substance cannot be placed on market within EU.
Registration Risks

Registration Fees (up to €31k)

- Cost of admin, Cost of analysis, Chemical Safety Report, MSDS.

→ Risk that supplier may not:
  - Register at all
  - Carry out wrong type of registration
  - Not Register for your Use

Risk of Supply Chain Disruption

- Pre-Registration
- >1000 tpa / CMR
- >100 tpa
- >1 tpa
• Control material selection to avoid problems
• Incorporate compliance & risk assessment workflows into design process (e.g., Gate assessments in CAD)

Restricted substances risk cycle

- Assess environmental risk
  - Where are substances used?
  - Are there alternatives?
  - Update system as legislation changes

- Develop strategies
  - Fight for business critical substances
  - Develop obsolescence plan for impacted product

- Deploy

- Maintain

Compliance  Industry activity  Horizon issues  Customer reqs.
GRANTA MI: Restricted Substances

1. Materials information management system

2. Restricted Substances Data Module

3. Tools

- REPORT
  Substances in article, Article 33 ...
- SUBSTITUTION
  Find material alternatives
- SELECTION
  Design to avoid restrictions (SVHC free…)
- RISK ASSESSMENT
  ‘Where Used’ Data

INPUT
Substance declarations, MSDS data, specifications

INTEGRATE, ACCESS from:
PLM, CAD, ERP

Quarterly update
Inside the Restricted Substances Data Module

Expert Reference Data Provided by Granta
Inside the Restricted Substances Data Module

Populate System with:
- Supplier declarations
- Other substance data (MSDS)
- Customer / Internal Lists
- Material & Process Specifications

Database container for customer data...

...including augmenting Granta data
Core use cases

Use ‘Predictive Lists’ to prioritise resource on high risk materials.

Target resource to:
- Mitigate undocumented reformulation risk
- Initiate substitution plans with suppliers
- Gain assurance of continuity of supply
Demonstration

Assigning STS in CAD environment

Carrying out Compliance & Risk Assessments
Conclusions

A manual, reactive approach to REACH & similar regulation driving change is unsustainable long term

Granta & EMIT are building tools to:

- Enable proactive risk assessment of specifications, materials & processes for regulatory impact & obsolescence risk
- Use existing infrastructure (e.g. CAD, PLM) to deploy strategy into engineers everyday workflows
- Apply datasets built in collaboration with leading experts. E.g. Rowan Technology Group to address engineering problems
- Capture ‘horizon issues’: rare earth metals, geo-political risk factors, nano materials etc
Questions?