Data Standardization to Support Safer Products

Green Chemistry & Commerce Council (GC3): A project of the Lowell Center for Sustainable Production, University of Massachusetts Lowell

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www.monicabecker.com
What is the GC3?

A cross sectoral, B-2-B network of more than 60 companies and other organizations formed in 2005 with a mission to promote green chemistry and design for environment (DfE) nationally and internationally.
What is the GC3? (cont.)

A dynamic forum for leading edge companies to:

• Share best practices and push the frontier of business practices that promote green chemistry

• Work collaboratively on projects to develop new business strategies, technologies, tools and information
GC3 Members

**Chemical/Specialty Chemicals**
- Alpha Chemical Service, Inc.
- BASF Corporation
- Bayer MaterialScience LLC
- The Dow Chemical Company
- Kluber Lubrication
- The HallStar Company
- Hubbard Hall
- ACS Green Chemistry Institute
- Diversey
- DuPont
- ecoSolv Technologies, Inc.
- Rivertop Renewables

**Apparel & Footwear**
- Anvil Knitwear
- Nike, Inc.

**Retail**
- Walmart
- Staples
- Target
- Green Depot

**Outdoor Industry**
- REI

**Consumer Products**
- Avon Products, Inc.
- Johnson & Johnson
- Henkel/Dial
- Method Products, Inc.
- Seventh Generation, Inc
- Colgate-Palmolive Company

**Office Furniture**
- Steelcase
- Herman Miller
- Designtex

**Building Products**
- Construction Specialties

**Aerospace**
- Lockheed Martin

**Electronics**
- Bose Corporation
- HP
- Intel
- Dell
- EMC Corporation

**Pharmaceutical**
- BWC Pharma Consulting
GC3 Members

**Software**
- Actio Software
- The Wercs

**Product Standards & Certification**
- Bureau Veritas
- Green Seal
- EPEAT, Inc.
- NSF International

**Consulting**
- Inside Matters
- Pure Strategies
- ToxServices, LLC
- Environmental and Public Health Consulting
- Daley International
- Sustainable Research Group

**Government**
- Minnesota Pollution Control Agency
- Environmental Protection Agency
- German Federal Environment Agency
- Mass. Toxics Use Reduction Institute
- Washington State Department of Ecology

**Non Governmental Organizations**
- Investor Environmental Health Network
- Center for Environmental Health
- Clean Production Action
- Cradle to Cradle Products Innovation Institute
- GreenBlue
- Environmental Health Fund
- Pacific Northwest Pollution Prevention Resource Center
Current Projects

• Facilitating Chemical Data Flow Along Supply Chains
• Retailer engagement to advance safer chemicals and products
• Business and Academic Partnerships
• Green Chemistry Education
GC3 Chemical Data Project Group

2007  Tools for chemical assessment

2008  Report on Restricted Substances Lists (RSL)

2009  In-depth case studies of Nike, HP and SC Johnson on:
       ▪ Gathering chemical data from supply chains
       ▪ Use of chemical data to develop safer products

2010  “Meeting Customers’ Needs for Chemical Data: A guidance document for suppliers”

2011  Chemical data standardization project

Documents available at:  http://www.greenchemistryandcommerce.org/publications.php
The Problem: Lack of Standardization*

Current methods for data requests:

- There are almost as many different types of forms as there are customers needing data
- Works against efforts to communicate chemical data in supply chains

*Adapted from Mark Frimann, TI
So many different systems... Which one and what data are we looking for?
**Solution: Standardization**

Using a standardized, XML based format allows 2 ways to exchange data:
- **Pull** = Customer sends the XML data request with criteria and Supplier sends XML data
- **Push** = Supplier publishes XML data for download by customers
- Automation possible by using it as a data transfer standard with any required translators feeds from the Supplier database and to the Customer database

*The electronic’s sector’s IPC175X Standard provides a framework for standardization in electronics and other sectors*

*Adapted from Mark Frimann, TI*
GC3 Chemical Data Standardization Project

Objective: To evaluate the feasibility & benefits of standardizing chemical data types/formats/collection systems across companies in supply chains

For the range of corporate programs that these data are needed for, including:

- Regulatory compliance
- Product design & selection
- Identification of chemicals of concern
- Chemical substitution
- Product certification programs
- Ingredient disclosure initiatives
- Chemical hazard assessments – using systems such as GreenScreen, GreenWERCS, SciVera Lens, etc.
- Alternatives assessment
- LCAs

Key question such data answers: What’s in it? Getting this right supports other questions such as How toxic is it? What are safer alternatives?

Potential benefits of standardization:

- Increased data availability
- Reduced cost of data gathering/communication
- Improved quality of data
GC3 Chemical Data Standardization Project

Approach:

- Conduct a pilot in the electronics sector -- with engagement of companies in an actual supply chain
- Ensure that results are value-add for all GC3 members, in all sectors

Focus for Pilot:

Phase I. Chemical content information – now
Phase II. Chemicals used in manufacturing - ?

Electronics Pilot Workplan:

Task 1: Create chemical data “superset” – a set of chemical data that will satisfy the needs of all/most companies in a supply chain

Task 2: Select a simple component; collect and format data

Task 3: Evaluate data/gaps

Task 4: Develop and disseminate GC3 Report on the Pilot
GC3 Chemical Data Standardization Project

Electronics Supply Chain Pilot

Suppliers → Texas Instruments → Seagate → HP → STAPLES

Pilot Team Members

Mark Frimann, Texas Instruments
Brian Martin & Bill Haas, Seagate
Lyndsey Ridgeway, HP
Roger McFadden, Staples
GC3 Chemical Data Standardization Project

What makes this project unique

Focus on chemical flow in entire whole supply chain, in particular downstream users – not just first link in chemical chain

Focus on robust, consistent information on product content data can flow through supply chain

Focus on all standardized information on all chemicals, not just chemicals of concern.

Example: Chemical Mixture becomes a plastic which becomes a product component which becomes a product which is then sold in retail
Task 1: Create chemical data “superset” – a set of chemical data that will satisfy the needs of all/most companies in a supply chain

Data “Modules” for Electronics Sector (Draft)

1. Requestor (i.e., Customer) Information
2. Supplier (i.e., Sender) Information
3. General Component Information
4. Component Compliance Declarations
5. Chemical Substance Information
6. Substance & Material Group Information
1. **Requestor (Customer) Information**

   - Company Unique ID (DUNS or equivalent)
   - Company Name
   - Company address
   - Contact Name
   - Contact Title
   - Contact Email
   - Contact Phone Number
   - Division Name
   - Business Unit

2. **Supplier (Sender) Information**

   - Company Unique ID (DUNS or equivalent)
   - Company Name
   - Company Address
   - Contact Name
   - Contact Title
   - Contact Email
   - Contact Phone Number
   - Division Name
   - Business Unit
3. **General Component Information**

Request Date
Need Date
Requestor Component Name
Response Date
Supplier Component Name
Component Build Site
Component Mass
Unit of Measure (mg, gram)
Unit Type (each)
4. Component Compliance Declarations

Component/ Device Status - REACH
Component / Device REACH Availability Date
Component / Product Status - RoHS
EU RoHS Exemption (if applies)
Component / Product RoHS Availability Date
5. **Chemical Substance Information**

CAS Number or Other Unique Chemical ID No.

Substance Name

Amount in Component (mg, grams or kg)

Substance Concentration in component – ppm and/or %

[calculated from *Component Mass* and *Amount in Component* above]

Description of Chemical Use/Function
6. Substance & Material Group Information*

EU RoHS Substance Category
For IPC 1752 Class B (when updated from IEC 62474)
  Material Class ID (Number)
  Material Class (Name)
IPC 1752 Class C
  JIG 101 threshold for substance [taken from JIG
  Below threshold?
REACH
  Substance on ECHA Substance List? (released and proposed Candidate List)
JAMP**
  Material Name
  Material Group ID
  Material Group
  Use Category

* IPC 1752 and other chemical data programs in the electronics industry have created groupings of substances and materials, selected because of their importance to legislative, economic, environmental, or other management concerns.
** JAMP - Joint Article Management Promotion - electronics consortium; mainly in Japan & South Asia; developed platform for exchanging information through SC; some electronics companies have to report to customers using JAMP format
# Task 2: Select a simple component; collect and format data

<table>
<thead>
<tr>
<th><strong>Input</strong></th>
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<tr>
<td><strong>Requestor Information</strong></td>
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<tr>
<td>Requestor Company Unique ID (DUNS or equiv.):</td>
<td>98533326</td>
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<tr>
<td>Requestor Company Name:</td>
<td>SEAGATE-TECHNOLOGY</td>
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<tr>
<td>Requestor Company Address:</td>
<td>10200 S. De Anza Blvd, Cupertino, CA-95014, USA-95014</td>
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<tr>
<td>Requestor Contact Name:</td>
<td>Brian Martin</td>
</tr>
<tr>
<td>Requestor Contact Title:</td>
<td>Sr. Director, Product Environmental Compliance</td>
</tr>
<tr>
<td>Requestor Contact email:</td>
<td><a href="mailto:brian.martin@seagate.com">brian.martin@seagate.com</a></td>
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<tr>
<td>Requestor Contact Phone Number:</td>
<td>831-439-2460</td>
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<tr>
<td>Requestor Division Name:</td>
<td>Corp. Compliance</td>
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<tr>
<td>Requestor Business Unit:</td>
<td>Supply Chain Management</td>
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<table>
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<tr>
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<tr>
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<tr>
<td>Supplier Company Name:</td>
<td>TEXAS INSTRUMENTS INCORPORATED</td>
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<tr>
<td>Supplier Company Address:</td>
<td>12500 TI Boulevard, Dallas, Texas 75243</td>
</tr>
<tr>
<td>Supplier Contact Name:</td>
<td>Mark Frimann</td>
</tr>
<tr>
<td>Supplier Contact Title:</td>
<td>TI SC Product Stewardship Mngmt</td>
</tr>
<tr>
<td>Supplier Contact email:</td>
<td><a href="mailto:m-frimann@ti.com">m-frimann@ti.com</a></td>
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</tr>
</tbody>
</table>
Task 2: Select a simple component; collect and format data

Our Rules:

- No de minimis level for reporting - if you know the chemical is in the component, it should be reported (and you should know!)

- No Zeros (they cause confusion). If a chemical is present, report it and carry the number through no matter how low the concentration

- Report any contaminant that you know about, particularly if it’s on a restricted list

<table>
<thead>
<tr>
<th>Component Name</th>
<th>Amount (mg)</th>
<th>%</th>
<th>ppm</th>
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</thead>
<tbody>
<tr>
<td>7440508 Copper</td>
<td>8.249689</td>
<td>37.951665</td>
<td>379,511.87</td>
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<tr>
<td>7440315 Tin</td>
<td>0.020779</td>
<td>0.0955972</td>
<td>955.37</td>
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<tr>
<td>7440666 Zinc</td>
<td>0.019946</td>
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<td>7440020 Nickel</td>
<td>0.14268</td>
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<tr>
<td>7440213 Doped Silicon</td>
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<td>60676860, 14464461 Fused Silica</td>
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<td>7631969 Silica</td>
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<td>7440417 Berglium</td>
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<tr>
<td>7440702 Calcium</td>
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<td>0.03</td>
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<tr>
<td>7440473 Chromium</td>
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<td>934.21</td>
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<tr>
<td>7440746 Indium</td>
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<td>Epoxy</td>
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Total | 21.734941 | 100.0000000 | 1,000,000.00
Task 3: Evaluate data/gaps

Standardization requires unique chemical and material identifiers

Gap: Lack of unique chemical identifiers (i.e., numbers) for chemicals and materials (a key enabler of data standardization)

Problems that Pilot Group members have identified:
• Reliance on CAS numbers
• Some chemicals have multiple CAS numbers
• Some chemicals have no CAS numbers
• Some CAS numbers do not map on EC numbers

Enablers of Chemical Data Standardization:
• A single, standardized, universally accepted set of unique chemical and material identifiers
• A curated, database of identifiers, on the web
Lessons learned

• Standardized chemical ingredient data is critical for:
  – Understanding what chemicals are in what components/products
  – Feeding into chemical hazard assessment and substitution processes
  – Ultimately regulatory compliance and design of safer products
  – Efficiency and comparability across sectors
• This is not easy and lots of limitations
• There are lots of data collection tools that are not consistent.
• Lessons from the electronics model can be extracted to other sectors
• Standardization makes lots of sense at this stage. Little debate over basic data parameters