Data Standardization to Support Safer Products

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

Joel Tickner/Monica Becker

Lowell Center for Sustainable Production, UMASS Lowell

www.greenchemistryandcommerce.org

Monica Becker & Associates Sustainability Consultants

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

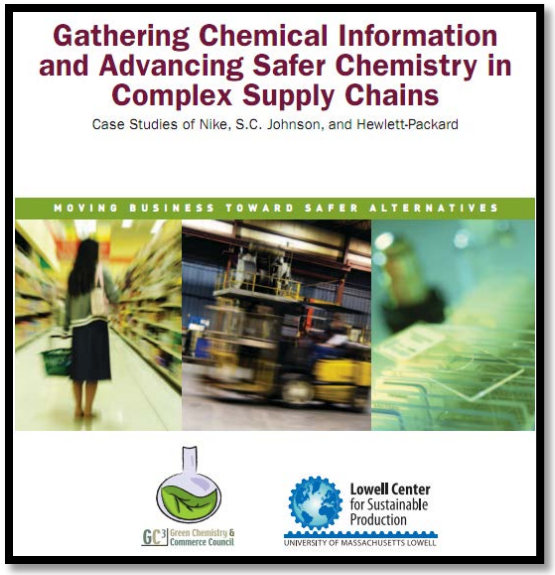
GC3 Chemical Data Project Group

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

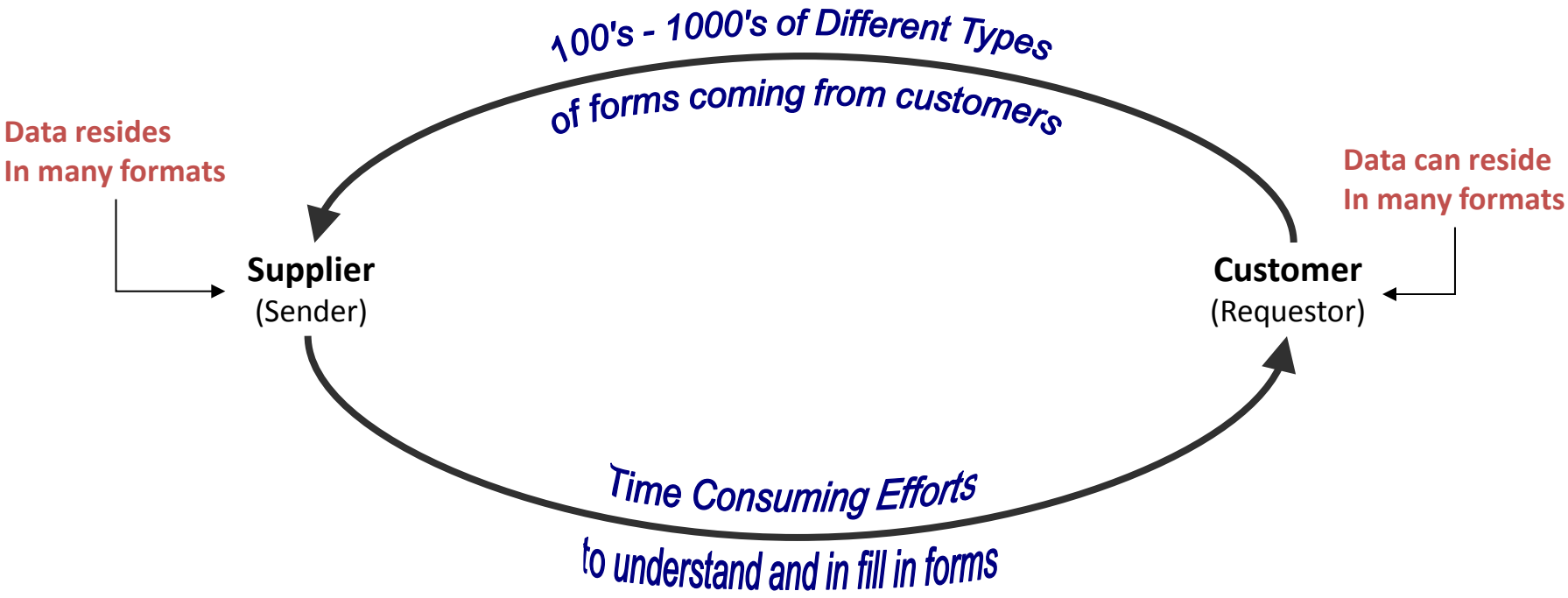


2010 "Meeting Customers' Needs for Chemical Data: A guidance document for suppliers"

2011 Chemical data standardization project

Documents available at: http://www.greenchemistryandcommerce.org/publications.php

*The Problem: Lack of Standardization**

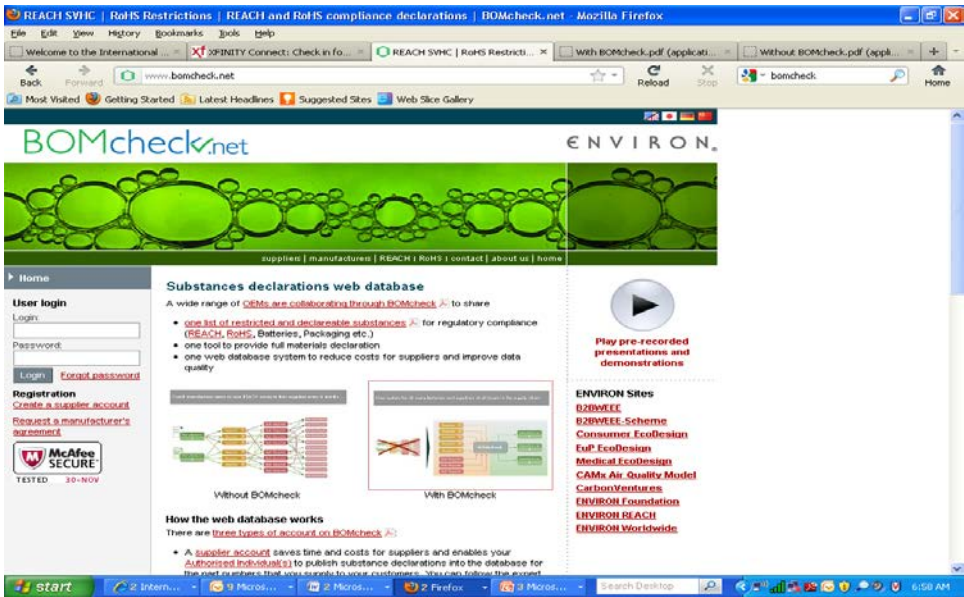


*Adapted from
Mark Frimann, TI

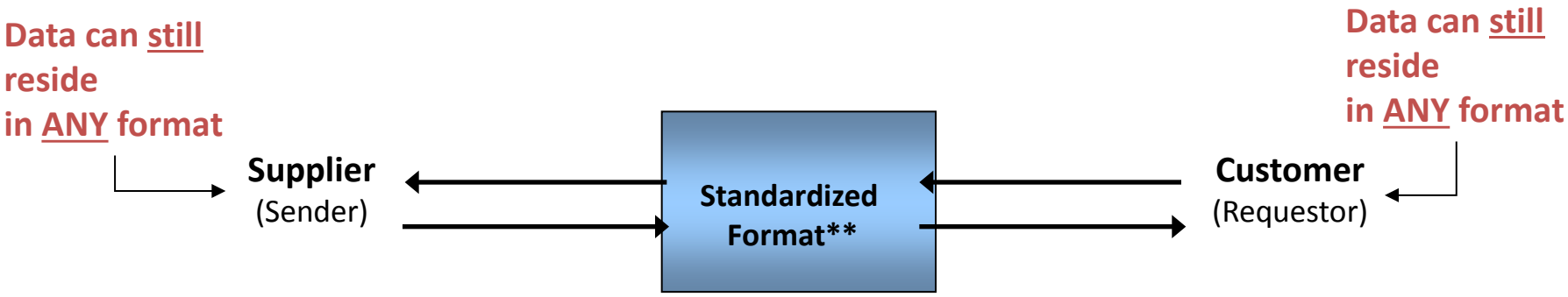
Current methods for data requests:

- 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

So many different systems… Which one and what data are we looking for?



*Solution: Standardization**



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** *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

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

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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

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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

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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

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

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Chemical data “superset” for electronics - draft

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 Availabilty 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

Chemical data “superset” for electronics – draft

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**

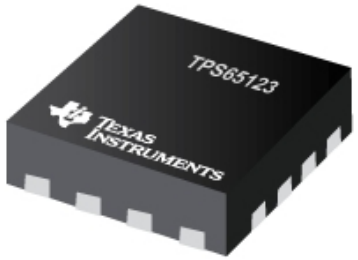
- Material Name
- Material Group ID
- Material Group
- Use Category

* 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

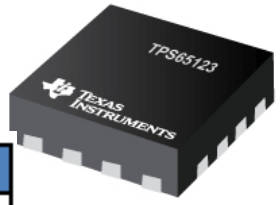
Task 2: Select a simple component; collect and format data

Input			
Requestor Information			
~~Requestor Company Unique ID (DUNS or equiv):~~	~~98533326~~	~~Requestor Company Name:~~	~~SEAGATE TECHNOLOGY~~
		~~Requestor Company Address:~~	~~10200 S. De Anza Blvd, Cupertino, CA 95014, USA 95014~~
Requestor Contact Name:	Brian Martin	~~Requestor Contact Title:~~	~~Sr. Director, Product Environmental Compliance~~
		Requestor Contact email:	brian.martin@seagate.com
		~~Requestor Contact Phone Number:~~	~~831 439 2460~~
		~~Requestor Division Name:~~	~~Corp. Compliance~~
		~~Requestor Business Unit:~~	~~Supply Chain Management~~
Supplier Information			
Supplier Company Unique ID (DUNS or equiv.):	101345692	Supplier Company Name:	TEXAS INSTRUMENTS INCORPORATED
		Supplier Company Address:	12500 TI Boulevard, Dallas, Texas 75243
Supplier Contact Name:	Mark Frimann	Supplier Contact Title	TI SC Product Stewardship Mngmt
		Supplier Contact	m-frimann@ti.com
		Supplier Contact	214-567-6354
		Supplier Division Name:	Supply Chain Mgmt
		Supplier Business	Corp. Compliance



IC Package 16 pin RGT
(TI integrated circuit (IC))

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



Chemical Substance Information							
Component Name	CAS Number or Other Unique Chem ID No.	Substance Name	Amount (mg)	Component Level Substance Concentration		Description of Chemical Use	
	Choose from Dropdown List - See CAS Number Worksheet for List of Unique IDs and Chem Names	Confirm Chemical Name. If no CAS or other Unique Chem ID, enter Substance Name		%	ppm	Choose from Dropdown list of REACH Descriptors or fill in as needed (see REACH worksheet for defn's of Use Cat.)	If "other" is indicated in column F, type in function
SH6855ABA0RGTR G4 - IC Package 16 pin RGT	7440508	Copper	8.248668	37.9511865	379,511.87	Conductive agents	
	7440315	Tin	0.020778	0.0955972	955.97	Conductive agents	
	7440666	Zinc	0.019946	0.0917693	917.69	Conductive agents	
	7440020	Nickel	0.14268	0.6564545	6,564.55	Plating agents and metal surf	
	7440213	Doped Silicon	0.90801	4.1776511	41,776.51	Conductive agents	
	60676860, 14464461	Fused Silica	10.776338	49.5807097	495,807.10	Conductive agents	
	7631869	Silica	0.005555	0.0255579	255.58	Conductive agents	
	7440417	Beryllium	0.000002	0.0000092	0.09	Other	blah blah
	7440702	Calcium	0.000002	0.0000092	0.09	Conductive agents	
	7440473	Chromium	0.021609	0.0994206	994.21	Conductive agents	
	7440746	Indium	0.000006	0.0000276	0.28	Conductive agents	
	1333864	Carbon Black	0.059538	0.2739276	2,739.28	Colouring agents, pigments	
	7440575	Gold	0.181781	0.8363538	8,363.54	Conductive agents	
	7440053	Palladium	0.00615	0.0282955	282.95	Conductive agents	
	7440224	Silver	0.191651	0.8817645	8,817.65	Conductive agents	
		Epoxy	1.152227	5.3012658	53,012.66	Binding agents	
Total			21.734941	100.0000000	1,000,000.00		

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

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