

*Database Specification Document for*

## **Restricted Substances Database**

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### **Revision History**

<b>Rev.</b>	<b>Author</b>	<b>Date</b>	<b>Notes</b>
1	M Zier	12-03-09	



## 1. Overview

This document applies to the Restricted Substances database (MI\_RSDB\_v1) in version 2.1.4 of Granta MI. The database is stored in CONTENT\PROJECTS and is loaded on the virtual machine <http://ct-mi21/mi>.

It contains a table that provides information about legislations ordered by their geographical area, a table that contains all substances that are affected by one or more legislation, in alphabetical order, and the GRANTA MI MaterialUniverse and ProcessUniverse table.

This document provides information about the structure, content and development of that database.

## 2. Use models

### 2.1. Product Life Cycle Management

Data from the RSDB can be used to highlight restricted substances used in products over the whole life cycle. The PLM system would be able to get information about restricted substances in use and would provide a powerful tool to take appropriate steps for excluding phase-out substances in the early stage of product development. This would help with the increasing compliance burdens and costly materials substitution in the long-term.

### 2.2. Restricted Substance & MaterialUniverse as customer reference

Links between MaterialUniverse and the restricted substances would empower customers using MaterialUniverse as a reference for their own data to see, whether their in-house materials are likely to contain restricted substances. This database model is likely to be used by smaller companies who do not have their own materials database.

### 2.3. Substance declaration of supplied products

Customers using items from suppliers can use a substance declaration form. This form contains a list of chosen substances from the RSDB the supplier has to declare its delivered item against. This way, customers are able to get an overview of the restricted substances used in delivered articles.

### 2.4. MaterialUniverse for Eco Education with CES

In the long-term the GrantaMI implementation of the Restricted Substances in Material and ProcessUniverse could be used as a source for education in ecological issues in CES and would extend the Eco features of CES EduPack and CES Selector.

## 3. Data Structure

### 3.1. Tables & links

The RSDB\_v1 contains four main data tables and two additional tables as listed below. Two of these are Granta's standard MaterialUniverse and ProcessUniverse tables.

Essential parts of the database are the '*Legislation*' and the '*Restricted Substances*' table.

The Restricted Substances table is linked to the legislation and the MaterialUniverse table and may be further linked to customer tables. The schema diagram in Appendix A.9 will show the interacting of the tables that will be explained in the following part.

#### 3.1.1 The '*Legislations*' table

The legislation table contains specific legislations ordered by their geographical area. Amendments or a breakdown of Articles/Annexes of a legislation appears as a generic record containing its amendments/articles/annexes as descendant records. A list of the legislations covered in the RSDB can be found in the Content Documentation document of the RSDB.

The legislations in the database is basically determined by the members of the EMIT Consortium. Granta proposed a list of legislations that could be added in the next quarterly updates.

The ten priority legislations are:

geogr. Area	Legislation	Apr '09
<b>International</b>		
	Stockholm Convention on Persistent Organic Pollutants (POPs)	x
	PIC ('Prior Informed Consent') Convention	x
<b>Asia-Pacific</b>		
<i>Japan</i>	Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture	x
	Industrial Safety and Health Law: Prohibition of Manufacturing, Permission for Manufacturing, and others	x
<i>China</i>	China RoHS	x
	Provisions on the Environmental Management of the Import and Export of Toxic Chemicals	x
<i>Taiwan</i>	Toxic Chemical Substances Control Act	x
<b>Europe</b>		
	EU Directive 2006/122/EC usage of PFOS (perfluorooctane sulphonate)	x
	EU Directive 91/339/EEC usage of Ugilec 141, Ugilec 121, 21 and DBBT (Dibutylboron Triflate)	x
	EU Directive 2003/3/EC usage of azo dyes	x

#### 3.1.2 The '*Restricted Substances*' table

The restricted substances table contains all substances that are related to one or more legislation in form of one record per substance, ordered alphabetically. The number of substances is changing with every new legislation or with amendments made to the legislations. The first quarterly updates will include new legislations and will therefore entail additional substances and changes in the obtained substance rating (see 3.3 Attributes).

### 3.1.3 MaterialUniverse & ProcessUniverse

MaterialUniverse will have the same layout and content as it does in other standard MatUni versions. The same is for ProcessUniverse.

In the current RSDB, MatUni & ProcessUniverse tables are relatively old and will need to be replaced by a newer version at some update of the database

### 3.1.4 The 'Hazardous Symbols' table

This table contains a record that lists the most common, internationally standardized safety/hazard symbols with each hazard symbol being an attribute in the record.

Q: Do we still need this table/information? If so, it should be considered to create a record for each symbol and create links from the substances. That would require this information to be available in the substance records as well.

### 3.1.5 The 'Risk and Safety' table

This table is similar to the 'Hazardous Symbols' table, containing one record with all different Risk and Safety-Phrases as defined in 67/548/EEC.

Q: Do we still need this table/information? If so, it should be considered to have a single record for each R- and S-phrase and link them to the according substances. That would require this information to be available in the substance records as well.

### 3.1.6 Coatings table

A coatings table is not yet available. Many restricted substances are related to coating processes and coatings. It appears essential to have a table that contains coatings and the substances used within.

Q: What should a Coatings table look like? What should be the content of the table? Should it be part of the MatUni table rather than a separate table?

### 3.1.7 Custom tables (see schema diagram Appendix A.9)

#### 3.1.7.1 Custom legislation

Customers may have their own in-house restrictions in form of a custom legislation table. This table will be stored separately to Granta's Legislation table. As it will contain CAS#, the linking to the GDL Substances table will be done via CAS#. This way, the customer's legislation information will also appear in the substance records of the GDL substances table.

#### 3.1.7.2 Custom substances

In addition to the customer's in-house legislation, there may be a custom substances table that will contain information about substances (and their CAS#) that are affected by the custom legislation. This table is separate from the GDL substances table and will be linked to the Materials table via the CAS# attribute. This way, the material records will show information about custom and GDL substances.

#### 3.1.7.3 Materials and processes

Customers may also have their own in-house preferred materials and processes. These customer tables could replace or augment MatUni and ProcessUniverse in the RSDB. To enable these tables to be linked to the rest of the RSDB the CAS# attribute will have to be added to the customer's tables.

#### 3.1.7.4 Bought-in articles

In addition to their own in-house articles, a customer may have a table of bought-in articles that contains information about restricted substances (and their CAS#) in the delivered articles. The information of the Substance declaration form will be imported into this table. It will be linked to the Custom substances and the GDL substances table and may be merged with the customer's In-house materials table. Based on these links, restricted substances of both - custom and GDL substances - will be shown in the bought-in articles table.

Q: Will the linking be based on CAS#? Do user databases have information upon CAS numbers of their materials?

### 3.1.8 Substances – Legislation links

The RSDB provides links as they are shown in the schema diagram in 3.1.

The first link group is the one that links substances to legislations affecting these substances. Each substance record has a list of all the Legislation-IDs of the legislations that affect it. All substances in the database can be traced back to at least one legislation, i.e. substances that are not affected by legislation are not in the database.

### 3.1.9 Material – Substances links

The links between MaterialUniverse and Restricted Substances are divided into two link groups:

- a) '*Restricted substances that may be used in the processing of the material*' - substances which can be used during the production of a material
- b) '*Restricted substances that may be found in this material*' - substances which can be found in a material

More link groups may be added to cover other situations.

At the moment, these link groups are populated with links that cover only a small amount of materials in MaterialUniverse as the research done to create these links is done manually. A list of the current record links can be found in Appendix A.5.

Q: How do we manage to get a comprehensive linking and how can we keep this up-to-date. What happens when MaterialUniverse gets updated?

## 3.2. Records & tree structure

### 3.2.1 Restricted Substances

The substances in the current database include the following:

- 1771 substances from the List of Lists (LoL)
- 2939 substances from SAE TR 9535 that are not covered by the LoL

- 15 substances of Very High Concern (SVHC – Annex XV of REACH).

More details of the above legislations can be found in Annex A.6.

The tree structure of the Restricted Substances is fairly simple and has a folder for each letter of the alphabet. These contain substances that begin with this letter and another folder '0-9' for substances that begin with a number.

A picture of the tree structure can be found in Appendix A.1.

### 3.2.2 Legislation

Based on area of influence, legislation records are ordered by their geographical origin. Each legislation is represented by at least one record. If legislations are amended, the main record will be converted to a generic record and the amendment added as its descendant. The same applies when a legislation (such as REACH) contains different Annexes or Articles that are essential parts of the legislation. Therefore the tree structure is as follows:

- first level: geographical origin
- second level: legislation record level
- third level: legislation record level if amendment or important article exists

Appendix A.2 shows a screenshot of the tree.

A full list of the legislations contained in the RSDB can be found in Appendix A.8

### 3.2.3 Hazardous symbols

One record in the first tree level containing all symbols in the form of different attributes.

### 3.2.4 R- & S-phrases

One record in the first tree level containing all phrases.

## 3.3. Attributes

A list of the attributes in the Restricted Substances and Legislation tables can be found in Appendix A.7.

### 3.3.1 Material Universe

The 'All Bulk Materials' layout in Material Universe contains substance related attributes in addition to MatUni's standard attributes:

CAS# attributes for each of the two link groups with meta attributes for substance name, weight% of the substance in the material and a Logical for Pre-Registration as shown in the following screenshot:

Restricted substance information	
<b>CAS Number 1</b>	7789062
Chemical name : strontium chromate	
Weight percent : 1.66%	
<a href="#">Alle Daten für CAS Number 1 anzeigen</a>	
<b>CAS Number 2</b>	78922
Chemical name : sec-Butyl alcohol	
Weight percent : 1.11%	
<a href="#">Alle Daten für CAS Number 2 anzeigen</a>	
<b>CAS Number 3</b>	64742956
Chemical name : Solvent naphtha (petroleum), light arom.	
Weight percent : 0.0555%	
<a href="#">Alle Daten für CAS Number 3 anzeigen</a>	
<b>Restricted Substances that may be found in this material</b>	3 verknüpfte Datensätze <a href="#">Alle zeigen</a>
 <a href="#">sec-Butyl alcohol [78-92-2]</a>	
 <a href="#">Solvent naphtha (petroleum), light arom.: Low boi [64742-95-6]</a>	

The record link group showing the linked substances

attributes for the import of a data from Granta's substance declaration forms (Company name, Request Date, Requester item number, Declaration number, Supplier item number, Supplier item name, Declaration prepared by, Weight of item (as delivered, excludes packaging), Total Wt%)

Items i) and ii) will be replaced by a tabular attribute when this becomes available in the software. The CAS# attribute, and its meta attributes will form the columns of the table, and the different instances of the CAS# attribute will form the rows. The link to the Substance table will be on the CAS# column as shown below

CAS #	Substance name	Amount (%)
<a href="#">1332-21-4</a>	Asbestos	20-40
<a href="#">50-00-0</a>	Formaldehyde	0.5

Items i) and ii) (or the tabular attribute) make up the 'core attributes'. These are the attributes that have to be added to the user Material and Process tables to ensure that the recors in these tables can link to the rest of the RSDB.

If the customer doesn't have CAS# information on his in-house materials he may use Granta's MaterialUniverse to link his substances to MatUni that is linked to the Restricted Substances. No extra core attributes would be necessary for linking to the Restricted Substances table.

### 3.3.2 Substance rating attribute

The '*Substance Rating*' discrete attribute was originally based on Sam Higuchi's scheme that is similar to the Submarine Materials Board scheme. It has five values: "Banned", "Phased-out", "Regulated", "Caution – Concern but unregulated" and "Unregulated".

As the RSDB does not contain any unregulated substances following discrete

values were used for the Substance Rating: "Banned", "To be phased-out", "Very high concerned", "Regulated", "Caution".

The amount of attributes in the Restricted Substances table could increase based on EMIT decision on substance related information needed. The crucial attributes are CAS#, substance name and synonyms (where available).

Q: What information (in addition to CAS#, substance name, synonyms) would be important for the users? Can we provide that data for the majority of substances? (--> sources?)

### 3.4. Subsets & layouts

The Restricted Substances related information in MaterialUniverse is only visible when working with the 'All Bulk Materials' layout.

The Legislation table doesn't have any specific subsets or layouts to choose from yet. Different subsets will be set up, showing records based on geographical area. So the "US-legislation" subset would only show legislations effective in the US. As the legislation table does not contain any attributes that are depending on geographical area, only entire records would be affected. The layout would be the same for different subsets.

## 4. Other Features

### 4.1. Report/search/selection templates

No templates prepared, yet.

### 4.2. Homepages

Standard MI:Viewer welcome homepage is included at the moment.

For reasons of demonstrations and marketing a new homepage needs to be developed showing the usability and functions of the database.

Q: What should a new homepage look like? Should it contain the EMIT logo?

### 4.3. Import templates

A substance declaration template has been developed, based on the SAE TR9536 Substance Declaration template. The template is populated with a list of substances of interest. The supplier then indicates which of these substances are present in the materials, and how much. This data can then be imported directly into the materials table

There are two demo files using the substance declaration form. One concerns a primer that can be applied to metal sheets. The other one is an aluminum sheet coated with that primer. Both spreadsheets and their contents as well as points of interest for a demo of the RSDB are described in the 'RSDB\_content&demo\_information.doc' in [\\CONTENT\Transfer\DatabaseforMartin\RSDB\\_v1\Jan 09](#)

A screenshot of the two worksheets of the Declaration Form for the primer are shown in Appendix A.3.

## 5. Data sources & import method

### 5.1. Legislation sources

A reliable and comprehensive source for legislation updates is still being searched for. A professional service could be taken into account.

Current sources are:

- The website of the Environmental Protection Agency (EPA) of the United States
- The website of the Federal Register of the United States
- The website of the European Commission
- The website of the European Chemicals Agency (ECHA), responsible for REACH
- Other REACH related websites
- The website of Environmental Intelligence Analysis (EIATRACK), electronics related
- The website of the EC Joint Research Centre, Institute for Health & Consumer Protection
- Various Blogs about international legislation topics
- The Website of RoHS international

A review of these sources will be done in the next month, and recommendations made on what the best sources are to update the database.

Once most of the important legislations have been added to the database, it will be mainly necessary to receive regular updates on amendments of the legislations in the database. As new legislations do not emerge out of the blue it should be possible to be informed about upcoming legislations by drilling down on provided web pages quarterly.

A spreadsheet is provided to guarantee a uniform import of legislation data. It is shown in Appendix A.4.

### 5.2. Substances sources

New substances should only be added to the database if they are mentioned in a legislation (each substance should have be linked to at least one legislation. This will keep the amount of substances relatively small and avoids gapes in the traceability of where substances came from. Before adding substances it should be checked whether the substance does exist already in the database under a different name (the CAS# is the critical attribute).

The substances currently in the database are either from the List of Lists published by the EPA, from the SAE TR9536 Technical Report or from REACH Annex XV.

Substance name, CAS# and rating will always be obtained from the according legislation web pages.

A source for further information such as synonyms or EC# number is being gathered from different electronic sources:

- The website of The Physical and Theoretical Chemistry Laboratory – Oxford University - Chemical and Other Safety Information (used for extracting data via an Excel Web Query)
- The website of Chemicaland21
- The website of JtBaker Material Safety Data Sheets
- The website of Scorecard
- The website of EnvironmentalChemistry

A review of these sources will be done in the next month, and recommendations made on what the best sources are to update the database.

Excel based Web Queries might be used to get data from different websites. When using free source information one should be aware of copyright issues.

A spreadsheet will be provided to guarantee uniform import and to avoid duplicates of substances.

A list of sources of where substances are used and what materials are affected will have to be created.

### 5.3. Imports and updates

All imports will be done via Excel import. An according procedure for update, import and linking methods will be generated.

The EMIT members agreed on a quarterly update schedule. In case unpredictable, immediate changes occur in legislation the schedule will be adjusted.

The dates might be slightly postponed if there is a big change happening shortly after the regularly scheduled update (e.g. publishing of a restricted substances list 14 days after scheduled update).

A procedure for the updating of Material Universe links hasn't yet been sorted.

[Q: How do we update links when legislation and substances get updated \(as long as links are still static\)?](#)

## 6. Quality plan

The quality management is a main concern. As legislation data and related substances are mainly provided by public governmental websites this data is regarded as correct.

[Q: Do we need to do a further source data check e.g. by comparing to a second source?](#)

Often data has to be altered to conform to database requirements (creating names, adding leg-ID, Ranking, Amount, delimiting cells). This process may inhere errors that need to be checked.

[Q: How can systematic checks be done?](#)

Quality checks can be done with random samples. For example checking whether the number of substances affected by a legislation is equal the number of links in the record. But this needs to be done carefully as some legislations affect substances like specific forms of matter or radiation that are not listed as a substance in our database.

The excel import spreadsheet will provide a chance of coarse checking whether restricted amounts are corrupt.

If phase-out schedules are given in the legislation, all of the linked substances should comply with that schedule (can be easily noticed with tabular attribute).

Errors in naming of substances and CAS numbers may be revealed when importing. A regular expressions check on attributes like CAS# and RecordName would point out errors beforehand.

The comparison table functionality of MI:Viewer should be considered as way of checking data that is already in the database. This way crucial attributes could be checked against legislation text.

## 7. Questions raised in this document (highest priority first)

Q: What should a Coatings table look like? What should be the content of the table? How will a coatings database be linked to the restricted substances? Should each coating record contain a list of substances with their CAS# to enable smart linking?

Q: Links to MaterialUniverse: How do manage to get a comprehensive linking and how can we keep this up-to-date? What happens if MaterialUniverse/Substances table gets updated; how can we update the linking (so far only static links!)?

Q: Do we need to do a further source data check for information provided on governmental websites?

Q: Links to user-specific databases: Will the linking be based on CAS#? Do user databases have information upon CAS numbers of their materials?

Q: What further substance information (in addition to CAS#, EC#, substance name, synonyms) would be important for the users? Can we provide that data for the majority of substances? (--> sources)

Q: How can systematic data checks be done in the database?

Q: What should a new RSDB homepage look like? Should it contain the EMIT logo?

Q: should the Excel substances import spreadsheet do an import of the entire substances even if the majority of them has not changed? This would save time of picking out unchanged substances.

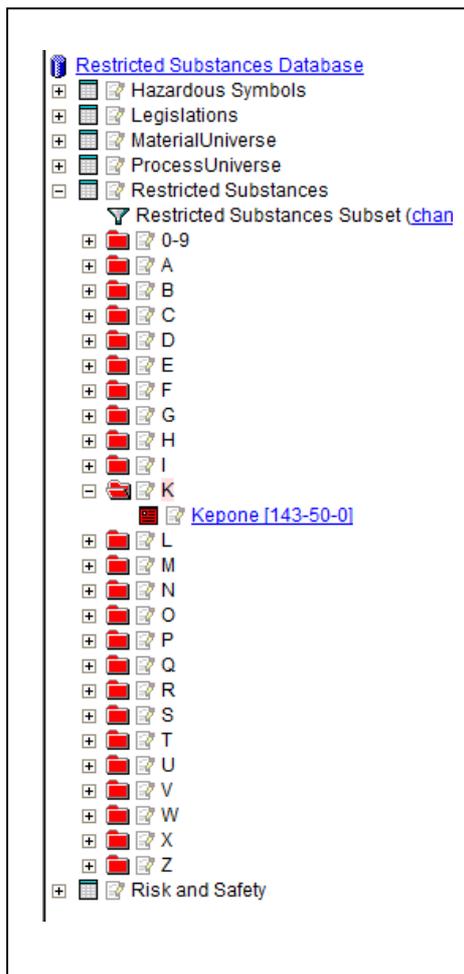
Q: Are there other use cases of subsets and layouts for the legislation and substances table?

Q: Do we still need this the Hazardous Symbols table?

Q: Do we still need this R- & S-phrases table?

## Appendix A

### A.1 Substances Tree



## A.2 Legislation tree

- Restricted Substances Database
  - Hazardous Symbols
  - Legislations
    - Legislations - all Subset ([change](#))
    - Asian Directives
    - EU Directives
      - [EC Regulation 2037/2000 on substances that deplete the ozone layer](#)
      - [EU Directive 1996/82/EC \(Seveso II\)](#)
      - [EU Directive 1999/13/EC \(Solvent Emissions Directive - VOC\)](#)
      - [EU Directive 2000/53/EC \(ELV\)](#)
      - [EU Directive 2002/95/EC \(RoHS\)](#)
      - [EU Directive 2002/96/EC \(WEEE\)](#)
      - [EU Directive 2005/32/EC \(EuP\)](#)
      - [EU Directive 96/62/EC Ambient Air Framework](#)
      - [EU Proposed directive COM2004\(320\)](#)
    - REACH ([Registration, Evaluation and Authorisation of Chemicals](#))
      - [Annex XIV - The Authorisation List](#)
      - [Annex XV - Substances of Very High Concern](#)
      - [Annex XVII - Restrictions](#)
      - [EINECS - substances eligible for pre-registration](#)
      - [ELINCS - Substances that don't need to be registered](#)
      - [Pre-registration](#)
    - REACH related legislations
      - [EU Directive 67/548/EEC The "Dangerous Substances Directive"](#)
      - [EU Directive 76/769/EEC The "Limitations Directive"](#)
        - [EU Directive 2003/11/EC](#)
      - [Registry of intentions](#)
      - [The Candidate List](#)
  - International Protocol
  - US Directives
  - MaterialUniverse
  - ProcessUniverse
  - Restricted Substances
  - Risk and Safety

### A.3 Substance Declaration Form

	1. Delimited CAS No.	2. CAS No.	3. EU Index Number	4. Chemical Name
1				
2	120-12-7	120127	204-371-1	Anthracene
3	56-35-9	56359	200-268-0	Bis(tributyltin) oxide
4	84-74-2	84742	201-557-4	Dibutyl phthalate
5	7646-79-9	7646799	231-598-4	cobalt dichloride
6	7789-12-0	7789120		Sodium dichromate, dihydrate
7	85535-84-8	85535848	287-476-5	Alkanes, C10-13, chloro; (Short chain chlorinated paraffins )
8	101-77-9	101779	202-974-4	4,4'- Diaminodiphenylmethane
9	1303-28-2	1303282	215-116-9	Diarsenic pentaoxide
10	1327-53-3	1327533	215-481-4	Diarsenic trioxide
11	81-15-2	81152	201-329-4	5-tert-butyl-2,4,6-trinitro-m-xylene (musk xylene)
12	117-81-7	117817	204-211-0	Bis (2-ethyl(hexyl)phthalate) (DEHP)
13	25637-99-4	25637994	247-148-4	Hexabromocyclododecane (HBCDD)
14	7784-40-9	7784409	232-064-2	Lead hydrogen arsenate
15	15606-95-8	15606958	427-700-2	Triethyl arsenate
16	85-68-7	85687	201-622-7	Benzyl butyl phthalate
17	7789-06-2	7789062	232-142-6	strontium chromate
18	78-92-2	78922	201-158-5	sec-Butyl alcohol
19	64742-95-6	64742956	265-199-0	Solvent naphtha (petroleum), light arom.

Substance Declaration Form						
Record Name		Polyamide epoxy primer		Validate Form		Click 'validate' button after having completed the form
<b>Requester Information</b>						
Company Name		Granta				
Request Date		30/12/2008				
Requestor Item #		815				
Declaration #		0815-0815				
<b>Supplier Information</b>						
Supplier Item #		44GN011				
Supplier Item Name		Polyamide epoxy primer				
Prepared by		Member of staff				
Date of declaration		31/12/2008				
Weight of Item, as Delivered, excludes packaging (Actual weight, not shipping weight - J)		74.91				
Unit (lbs / kg)		kg				
<p>All substances with a partial weight of &gt; 0.1% of the item and substances intended for release have to be declared in the list below.</p> <p>The content of the drop down boxes is derived from the 'detailed chemicals list' worksheet. The list will be generated from the declarable substances list in the Granta Restricted Substances database. It can be of any length and its contents will be defined company policy.</p> <p>Choosing the content of one drop down box will automatically synchronise the other drop down boxes, text box 6 and check box 7 (if information is available). Adding a chemical clicking the button will add the information in column A to H to the table below.</p> <p>Name and an amount of the substance is at least required to complete the disclosure</p>						
1. Delimited CAS No.	2. CAS Number (preferred) Enter number without dashes	3. EC (EINECS or ELINCS) Number (If CAS is not available) Enter number without dashes	4. Chemical Name	5. Weight Percent (For ranges, report typical (mode) value, NOT the range)	6. Registration Number (if available) To be filled in by supplier	
Add a chemical				Total Wt %		
7789-06-2	7789062	232-142-6	strontium chromate	1.66		
78-92-2	78922	201-158-5	sec-Butyl alcohol	1.11		
64742-95-6	64742956	265-199-0	Solvent naphtha (petroleum), light arom.	0.06		

### A.4 Legislation import template

**Data worksheet**

Name	Title	Legislation ID	Substances impacted (summary)	Substances impacted	Implementation Date
China RoHS	China RoHS	China RoHS	Effective dates for substance restri	Toxic and hazardous substances or elements sha	
CERCLA hazardous subst	CERCLA hazardous	CERCLA Sec. 104	This legislation affects 464 substai	Acetic acid ethenyl est	11-Sep
Clean Air Act, Section 112	Clean Air Act, Secti	CAA Sec. 112	This legislation affects 252 substai	Acetaldehyde; Acetic a	01-Jan
NTP - Report on Carcinoge	NTP - Report on Car	NTP RoC	This legislation affects 253 substai	Acetaldehyde; 2-Acetyl	01-Jan
EPA Priority List	EPA Priority List	EPA PCs	This legislation affects 34 substani	1,2,4-Trichlorobenzene; 1,2,4,5-Tetrachlorobenzer	
Persistent Organic Polluta	Persistent Organic P	POPOP-12	This legislation affects 12 substani	aldrin; chlordane; dichlc	23-May
DHS - Chemicals of Conce	DHS - Chemicals of	DHS - CoC	This legislation affects 293 substai	1,1,3,3,3-pentafluoro-2-f	22-Jan
Severely restricted pestic	Severely restricted p	PIC	This legislation affects 64 substani	ALDRIN; ARSENIC OXIDE (3); ASBESTOS (FRIA	
US EPA 33/50 Program	EPA 33/50 Program	EPA 33-50	Benzene ; Carbon tetrachloride ; Chloroform ; Dichloromet		01/01/1!
EU Directive 1996/82/EC	Control of major-acci	SEVESOII	Ammonium nitrate, Arsenic pentoxide, arsenic (V) acid an		03/02/1!
EU Directive 2002/95/EC	Restriction of the use	RoHS	Lead (Pb), cadmium (Cd), mercury (Hg), hexavalent chrom		01/07/2!
EU Directive 2003/53/EC	Restrictions on the r	2003/53/EC	Nonylphenol (NP), nonylphenol ethoxylate (NPE), hexaval		17/07/2!
Montreal Protocol	The Montreal Protoc	Montreal	Chlorofluorocarbons (CFCs), Hydrochlorofluorocarbons (HC		01/01/1!
EU Proposed directive CO	Proposal for a Direct	COM2004	Toluene and trichlorobenzene (TCB)		
EU Directive 2002/96/EC	Waste Electrical and	WEEE	Some waste electrical and electronic equipment (WEEE) i		05/01/2!
EU Directive 2002/32/EC	Framework for the s	EuP	The EuP Directive requires producers to evaluate ecologica		01/07/2!
EU Directive 2000/53/EC	The End-Of-Life Vehi	ELV	This legislation affects at least 4 s	prohibits the use of lead, mercury, cadmium and f	
EU Directive 1999/13/EC	Limitation of emissio	VOC	*a halogenated VOC which is assigned or needs to carry t		31/10/2!

**Attribute lookup worksheet**

Attribute Name	Data Type	Units	Parent Attribute	Worksheet	Specimen	Data Range	Parameter 1 Range	Parameter 1 Name	Param
Record Name	RCN			Import	Row	MI_RECORDNAME			
Aim of the Amendment	LTXT			Import	Row	AIM_OF_THE_AMENDMENT			
Alternatives Solutions	LTXT			Import	Row	ALTERNATIVES_SOLUTIONS			
Amendment	LTXT			Import	Row	AMENDMENT			
Application	DCT			Import	Row	APPLICATION			
Complete Text of the Summ	LTXT			Import	Row	COMPLETE_TEXT_OF_THE_SUMMARY			
Exclusions	LTXT			Import	Row	EXCLUSIONS			
Geographical Area	DCT			Import	Row	GEOGRAPHICAL_AREA			
Implementation Date	DAT			Import	Row	IMPLEMENTATION_DATE			
Legislation ID	STXT			Import	Row	LEGISLATION_ID			
Reference 1	HYP			Import	Row	SOURCE1			
Reference 2	HYP			Import	Row	SOURCE2			
Reference 3	HYP			Import	Row	SOURCE3			
Substances impacted (sum	LTXT			Import	Row	SUBSTANCES_IMPACTED_SUM			
Substances impacted	LTXT		Substances impac	Import	Row	SUBSTANCES_IMPACTED			
Summary of legislation	LTXT			Import	Row	SUMMARY			
Title	LTXT			Import	Row	TITLE			
Date of last update	DAT			Import	Row	DATE_OF_UPDATE			

**Documentation worksheet**

1	<b>The legislation import is a workbook designated to update the legislation records in the Restricted Substances (MI_RSDB_v1) database.</b>
2	
3	The 'Export' worksheet can be used to get the latest legislation related data from the database if changes have been made independently from this workbook.
4	
5	Copying the whole content of the 'Export' worksheet to the 'Import' worksheet makes it possible to alter legislation data in the 'Import' worksheet.
6	
7	Reimport with MI:Toolbox into the legislation table can be made to update the legislation records. Auto Placement is based on the "Legislation ID" attribute. So if a new record needs to be created, it can be created blank in the database only containing the "Legislation ID" for importing data.
8	
	Care should be taken for the "Date of last change" attribute in the last column of the Import worksheet. This should be

## A.5 Links between MaterialUniverse and the Restricted Substances

*The following substances are linked to some records in Material Universe:*

<u>4,4'- Diaminodiphenylmethane</u>	used in production of Epoxy and as a crosslinking agent in Epoxy resins
<u>Aniline</u>	used to produce 4,4'- Diaminodiphenylmethane
<u>Formaldehyde</u>	used to produce 4,4'- Diaminodiphenylmethane
<u>Octabrominated diphenyl ether (octaBDE); Diphenyl ether, octabromo derivative</u>	used used as flame retardant in conjunction with antimony trioxide
<u>Antimony trioxide</u>	used as a flame retardant in conjunction with OctaBDE

*and the following are contained in linked material records:*

Cadmium

Lead

Arsenic

Chromium

*Linked MaterialUniverse records are:*

<b>Record Name</b>
Epoxy SMC (Carbon Fibre)
Epoxy Resin (Cycloaliphatic)
Epoxy Resin (Flexibilized)
Epoxy Resin (Unfilled)
Epoxy Resin (High Heat)
ABS/PC (Flame Retarded)
ABS/PVC (Flame Retarded)
ABS (Flame Retarded, Molding and Extrusion)
Lead-based Babbitt Metal (Alloy 13)
Lead-based Babbitt Metal (Alloy 15)
Lead-based Babbitt Metal (Alloy 7)
Lead-based Babbitt Metal (Alloy 8)
Tin-based Babbitt Metal (Alloy 1)
Tin-based Babbitt Metal (Alloy 2)
Tin-based Babbitt Metal (Alloy 3)

Tin-5%Antimony Solder
Zinc-Aluminium Forming Die Alloy A (Kirksite I)
Zinc-Aluminium Forming Die Alloy B (Kirksite II)
Zinc-Aluminium General Casting Alloy, ZA-12
Zinc-Aluminium General Casting Alloy, ZA-27
Zinc-Aluminium General Casting Alloy, ZA-8
Zinc-Aluminium Pressure Die-Casting Alloy, "Alloy 2"
Zinc-Aluminium Pressure Die-Casting Alloy, "Alloy 3"
Zinc-Aluminium Pressure Die-Casting Alloy, "Alloy 5"
Zinc-Aluminium Slush Casting Alloy A
Zinc-Aluminium Slush Casting Alloy B
Zinc-15%Aluminium thermal spraying wire ("85/15 wire")
Zinc-2%Aluminium solder wire
Zinc-4%Aluminium solder wire
Zinc-22%Aluminium Superplastic Alloy, Wrought (Rolled)
Zinc-Aluminium Alloy, ZA-27, Wrought (Extruded)
Zinc Anode, Type I
Zinc Anode, Type II
Zinc Metal, High Grade (min. 99.9% Zn)
Zinc Metal, Prime Western (min. 98% Zn)
Zinc Metal, rolled
Zinc Metal, Special High Grade (min. 99.99% Zn)
Zinc Metal, thermal spraying wire
Zinc-0.8%Copper Alloy, Wrought (Rolled)
Zinc-1.0%Copper Alloy, Wrought (Rolled)
Zinc-Copper Alloy, Fastener Wire
Zinc-Copper-Magnesium Alloy, Wrought (Rolled)
Zinc-Copper-Titanium Alloy, Fastener Wire
Zinc-Copper-Titanium Alloy, Wrought (Rolled)
Zinc-0.08%Lead Alloy, Wrought (Rolled)
Zinc-Lead-Cadmium High Alloy, Wrought (Rolled)
Zinc-Lead-Cadmium Low Alloy, Wrought (Rolled)
Zinc-Lead-Cadmium-Iron Alloy, Wrought (Rolled)
Palladium-40%Copper Electrical Contact Material, hard
Palladium-40%Copper Electrical Contact Material, soft
Silver, Fine, hard (cold worked)
Silver, Fine, soft (annealed)
Coin Silver Electrical Contact Alloy, hard (cold worked)
Coin Silver Electrical Contact Alloy, soft (annealed)
Silver, Sterling, 2.3mm dia. wire, hard (cold worked)
Silver, Sterling, 2.3mm dia. wire, soft (annealed)
Silver-Copper eutectic alloy, hard (cold worked)
Silver-Copper eutectic alloy, soft (annealed)
Silver-Copper-Nickel Electrical Contact Alloy, hard
Silver-Copper-Nickel Electrical Contact Alloy, soft
Lead-Tin 20-80 solder (ASTM Alloy Sn20B)
Polyurethane Foam: Flexible, Closed Cell (0.08)
Polyurethane Foam: Flexible, Closed Cell (0.16)
Polyurethane Filter Foam: Open Cell (0.019)
Polyurethane Filter Foam: Open Cell (0.022)

## A.6 SVHC, The List of Lists and SAE TR9536

### The List of Lists (LoL)

The EPA (Environmental Protection Agency) is an US governmental agency that is charged with regulations and laws to protect environment and mankind

The "List of Lists" is a consolidated list of chemicals that are regulated under different legislations. It was first published in November 1986. The latest version has been released in October 2006 and contains 1770 entries (same CAS# may appear for different materials as names of materials can be different on different lists)

The primary reference for restricted substances is the "Title III Consolidated List of Lists", published by EPA/CEPP in 2006 with doc reference EPA 550-B-01-003. The four key source documents for this consolidated document are:

- Emergency Planning and Community Right-To-Know Act of 1986 (EPCRA, also known as SARA Title III)

Section 302 Extremely Hazardous Substances (EHSs)

Section 304 Emergency Release Planning and Reporting

Section 313 Toxic Chemical Release Inventory (TRI)

- Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA, but also known as Superfund, which was subsequently amended by SARA in 1986, Title III of which is EPCRA)

Section 103 Hazardous Substances

- Clean Air Act (CAA)

Enacted in 1975 and amended in 1990 to require EPA to issue emission standards and requirements for 189 toxic air pollutants, the "NESHAP 189" (National Emissions Standards for Hazardous Air Pollutants)

Section 112(r) Regulated Chemicals For Accidental Release Prevention

- Resource Conservation and Recovery Act (RCRA) of 1976, amended in 1986 to give EPA the authority to control hazardous waste from the "cradle-to-grave."

Section 3001 Identification and listing of hazardous waste

More detailed information is available in the preface of 'Title III – the list of list' I shortened to a summary pdf "LoL\_summary.pdf" on [Jupiter](#).

### SAE TR9535 & TR9536

This list of substances was developed for use by members of the aerospace and defence industries in order to assist in making product and process decisions to support compliance with regulatory requirements, as well as to meet customers and other third party obligations.

This is not necessarily a list of substances that should be removed from the aerospace and defence industries. Despite the fact that some of the substances contained on this list are not currently used within the aerospace and defence industries, they may be used at some point in the future. This use will be of interest to customers or the sector to be tracked for appropriate management.

Some of the substances within this list are either currently regulated or may be regulated when the assessments on the substances are completed. ASD-STAN, in partnership with the Aerospace and Defence Industries Association of Europe (ASD) and Aerospace Industries Association (AIA) compiled the list of all the substances that are known as being officially classified as:

- Carcinogens, Mutagens or Reproductive Toxins [CMRs] category 1 and 2, according to Annex 1 of Directive 67/548/EEC (as amended)
- Carcinogens, class 1 and 2A, according to IARC (International Agency for Research on Cancer)
- Persistent, Bioaccumulative and Toxic [PBT], per the Convention for the Protection of the Marine Environment of the North-East Atlantic (known as the "OSPAR Convention") - Chemicals for Priority Action (Marine Pollutants of the North-East Atlantic) (as amended through HSC(1) 2007)
- Substances defined as Persistent, Bioaccumulative and Toxic [PBT] or very Persistent, very bioaccumulative [vPvB] according to REACH regulation No. 1907/2006 Annex XIII; List obtained from ESIS (European chemical Substances Information System)
- Substances called out in REACH Annex XVII
- "Other" chemicals of concern to the aviation sector (Ozone Depleting Substances [ODS] as defined by Montreal Protocol and Persistent Organic Pollutants [POP] as defined by the Stockholm Convention.

Many of the substances called out in the reference regulations are actually families of substances, rather than discreet chemicals. The list included in this standard is directly derived from the above sources. However, to facilitate the identification of those substances which fall into these families being used in the supply chain, the list has been further populated with the detailed EU index numbers of the substances belonging to these referenced families.

#### REACH Annex XV – Substances of Very High Concern (SVHC)

In the framework of the authorisation process, Member States Competent Authorities or the European Chemicals Agency (ECHA) may prepare Annex XV dossiers for the identification of substances of very high concern (SVHC).

Substances of very high concern are defined in Article 57 of Regulation (EC) No 1907/2006 ("the REACH Regulation") and include substances which are:

- Carcinogenic, Mutagenic or toxic to Reproduction (CMR), meeting the criteria for classification in category 1 or 2 in accordance with Directive 67/548/EEC,
- Persistent, Bioaccumulative and Toxic (PBT) or very Persistent and very Bioaccumulative (vPvB) according to the criteria in Annex XIII of the REACH Regulation, and/or

- Identified, on a case-by-case basis, from scientific evidence as causing probable serious effects to human health or the environment of an equivalent level of concern as those above (e.g. endocrine disrupters)

The outcome of the Annex XV dossiers for identification of SVHCs is a list of substances ("The Candidate List") that are candidates for eventual inclusion in the list of substances subject to authorization (Annex XIV).

## A.7 Attributes in the Database

The following are a list of attributes that are populated in the database

### A.7.1 Legislation table

Category	Attribute Name	Comments
General Information	Title	
	Substances impacted (summary)	Quantity of affected substances
	Substances list	List of all affected substances by name
	Implementation Date	
	Summary of the legislation	Picture can be added as well
	Exclusions	
	Complete text of the summary	More detailed description
	Legislation text	File of the legislation text
	Geographical area	US EU Asia Rest of the world
	Date of last update	
Amendment	Parent legislation	Link group to parent record
	Amendment/Sections of the legislation	Link group to descendant records
	Amendment	
	Aim of the amendment	Picture can be added
Detailed list of substances affected	Substances affected	Links to all the substance records
Further information	Reference	Websource etc.
	Reference	Record link group to Reference table

**A.7.2 Restricted Substances table**

<b>Category</b>	<b>Attribute Name</b>	<b>Comments</b>
General Information	Chemical Name	
	Rating	Banned To be phased-out Very high concern Regulated Caution Unregulated Not concerned
	CAS number	CAS# without hyphens
	CAS number (delimited)	CAS# with hyphens
	EC No	
	Chemical Family	According to SAE TR9536
	Last Updated	
	Has that substance been pre-registered?	If 'YES' - Registration date
	Is this substance a SVHC under Annex XV?	If 'YES': - Authority proposed - Date of publication - Reason for proposing
Legislation affecting this substance	Obtained rating	= worst rating
	Legislations restricting it's use	Legislation and additional information - Amount (lb) - Form - Rating - Date of ban
Materials containing this substance	Materials that may contain this substance	
	Materials the substance may be used to process	
	Materials the substance may be used to coat	
Processes using this substance	Processes that use this substance	

## A.8 List of Legislations Covered

The following list of legislation is covered within the current version of the RSDB.

### Europe

- EC Regulation 2037/2000 on substances that deplete the ozone layer
- EU Directive 1996/82/EC (Seveso II)
  - EU Directive 2003/105/EC
- EU Directive 1999/13/EC (Solvent Emissions Directive - VOC)
  - Directive 2004/42/EC (Article 13 of the Paints Directive)
- EU Directive 2000/53/EC (ELV)
- EU Directive 2002/95/EC (RoHS)
- EU Directive 2002/96/EC (WEEE)
- EU Directive 2005/32/EC (EuP)
- EU Directive 96/62/EC Ambient Air Framework
- EU Proposed Directive COM2004(320)
- REACH (Registration, Evaluation and Authorisation of Chemicals)
  - Annex XIV - The Authorisation List
  - Annex XV - Substances of Very High Concern
  - Annex XVII - Restrictions
  - EINECS - substances eligible for pre-registration
  - ELINCS - Substances that don't need to be registered
  - Pre-registration
  - Registry of intentions
  - The Candidate List
  - REACH related legislations
    - EU Directive 67/548/EEC The "Dangerous Substances Directive"
    - EU Directive 76/769/EEC The "Limitations Directive"
    - EU Directive 2003/11/EC

### USA

- Clean Air Act (CAA), List of Substances for Accidental Release Prevention
  - The Phaseout of Ozone-Depleting Substances Program
    - Phaseout of Class I Ozone-Depleting Substances
    - Phaseout of Class II Ozone-Depleting Substances
  - US Air Toxics Regulations (NESHAP)
    - NESHAP for Stationary Combustion Turbines
    - NESHAP for Stationary Reciprocating Internal Combustion Engines
- Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) or Superfund
  - Superfund Amendment and Reauthorization Act (SARA) -Title III (EPCRA)

- Emergency Planning and Community-Right-to-Know Act (EPCRA), Section 302, EHS TPQ
  - Emergency Planning and Community-Right-to-Know Act (EPCRA), Section 313 TRI
  - Emergency Planning and Community-Right-to-Know Act (EPCRA),Section 304, EHS RQ
- National Toxicology Programm (NTP) - Report on Carcinogens (RoC)
  - National Waste Minimization Program - Priority Chemicals
  - Persistant Organic Pollutants List (POP)
  - Severely restricted pesticides, The Prior Informed Consent (PIC)
  - US Department of Homeland Security (DHS) - Chemicals of Concern (CoC)
  - US EPA 33/50 Program (EPA 17 materials)

### **Asia**

- China RoHS

### **Other**

- ASD-STAN 9536 Declarable Substances Recommended Practise, edition 1
- Montreal Protocoll
- Kyoto Protocol

## A.9 Database schema diagram

