ARRIS GREEN PURCHASING

Material Declaration - *Introduction and Training*
28 MARCH 2014

GLOBAL CORPORATE CITIZENSHIP PROGRAM (EHS)

- Expectation for supplier of goods and services
- "As a condition of doing business with ARRIS, Suppliers will conform to these expectations and endeavor to have their sources in the supply chain do so as well"
- Outline of program
  - Compliance
  - Anti-Corruption
  - Unfair Business Practices
  - Anti-Discrimination
  - Forced Labor
  - Child Labor
  - Freedom of Association
  - Working Hours and Wages
  - Safe and Healthy Working Conditions
  - Environmental Sustainability

ENVIRONMENTAL SUSTAINABILITY

- Environmental Management System in accordance with ISO 14001
- Material Disclosure
  - Suppliers must provide Material Disclosure outlined in the Controlled and Reportable Materials Disclosure Process
- Ozone Depleting Substances
  - Eliminate products or components that contain, or that are manufactured with a process that uses any Class 1 ozone-depleting substance

MATERIALS DISCLOSURE OVERVIEW

- ARRIS Requirements
  - Full Material Disclosure (FMD) - Fully disclose material and substances of concern of each part
  - Reporting in accordance with ARRIS Controlled and Reportable Materials Disclosure Specification (ARRIS Materials Disclosure)
  - Compliance is required and where a non-compliance issue is identified, a resolution plan is essential
  - A complete Material Disclosure is required to qualify parts supplied to ARRIS

- ARRIS Controlled and Reportable Materials Disclosure Specification
  - The Specification sets forth materials and substances that must be reported to ARRIS on a general basis

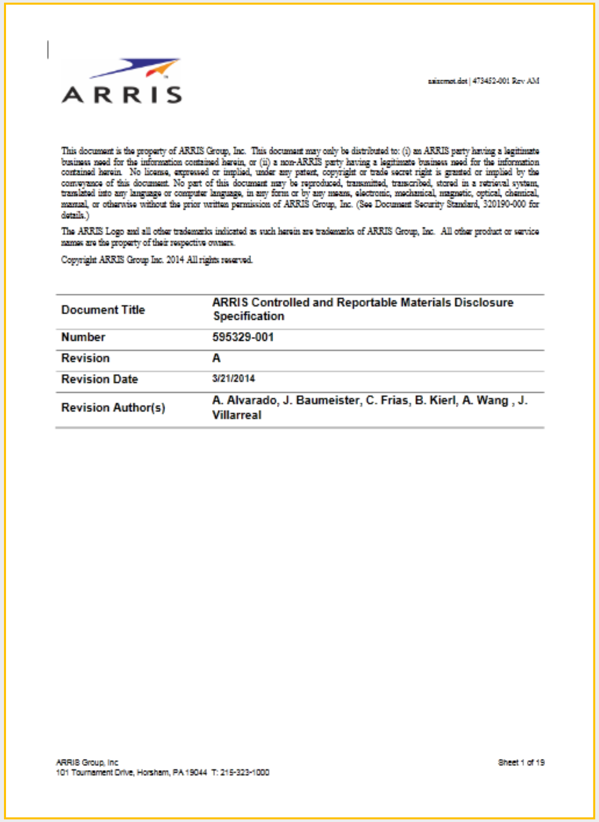
- FMD Electronic Reporting Tools
  - The primary tool for reporting FMD is the ARRIS IPC Creator. For Class A non-Homogeneous reporting, we recommend the ARRIS modified Scriba tool

SUPPLIER TRAINING PROGRAMS - *SUMMARY*

- In this training presentation, you will learn:
  - The reason why ARRIS is requesting material content information
  - How ARRIS intends to use the information
  - How to fill out a ARRIS FMD form (ARRIS IPC Creator)
  - When to apply appropriate exceptions (e.g. RoHS, General and Surface)
  - How to submit a completed declaration
  - Where to find help

MATERIAL DISCLOSURE TRAINING

- Material Declaration - Understanding ARRIS Controlled and Reportable Materials Disclosure Specification and Using it Effectively
  - — Key Message
  - — Homogeneous Material
  - — Example



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Revision Author(s)	A. Alvarado, J. Baumeister, C. Frias, B. Kierl, A. Wang , J. Villarreal

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Sheet 1 of 19

KEY MESSAGE OF FMD TO OUR SUPPLIERS

- ARRIS requires Suppliers to report full material data at the homogenous material level and eliminate banned substances from all products, components and materials sold to ARRIS
- Additionally, Controlled Substances need to be evaluated for compliance with ARRIS specification. Note exemptions may apply
- Reportable Substances are not currently banned or controlled for use but a ban or voluntary phase-out is likely or they have an impact on the end-of-life management of the finished product. These must be declared.
- Please refer to the most recent revision of the Specification for the current list of all Banned, Controlled and Reportable Substances

ARRIS MATREIALS DISCLOSURE SCOPE

- The ARRIS Controlled & Reportable Material Disclosure Specification:
  - Defines materials and substances that must be reported to ARRIS
  - Defines the process for reporting and returning the information to ARRIS
  - Contains the list of substances that ARRIS has targeted for exclusion, reduction or reporting (Appendix A)
  - Sets Part Acceptance Criteria based on global legislation (Appendix A)

SUPPLIER'S RESPONSIBILITIES

- Comply with the reporting requirements of the ARRIS Materials Disclosure for all parts and assemblies sold to ARRIS
- Report Controlled and Reportable substances using the ARRIS IPC Creator or a comparable tool
- Cascade the requirements in this specification to its sub-tier suppliers
  - Sub-tier supplier data input is a must for complete material and substance data determination
- Report any change to the material content by resubmitting an updated report
- Completion of the report and submission to ARRIS constitutes a testament that all the information is true and correct to the best of the supplier's knowledge

EXTENT OF DISCLOSURE

- For every service and production part shipped to ARRIS, the following information must be reported:
  - Supplier Information
  - Complete Product Structure (all levels) or rolled up
  - 100% material composition disclosure
- Disclosure of controlled or reportable substances per ARRIS's Materials Disclosure Specification
- Non-listed substances can be reported as "MISC., NOT TO DECLARE"
- Disclosure of "Trade Secret" chemical substances is NOT required, unless these substances are listed as Banned, Controlled or Reportable, per ARRIS's Materials Disclosure Specification

PART ACCEPTANCE CRITERIA

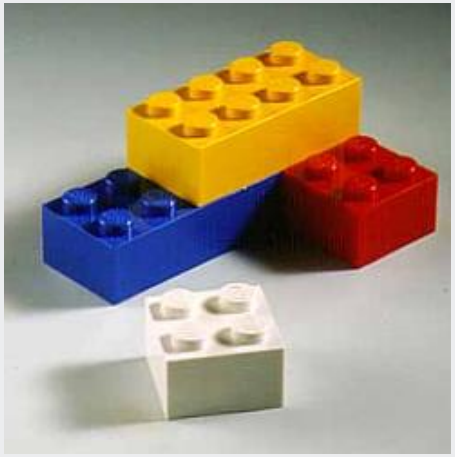
- ARRIS will not accept parts that do not meet the acceptance criteria (Appendix A)
- This applies to parts that reference this specification and the corresponding acceptance criteria of this specification
- Reporting per this specification is always required, whether or not the acceptance criteria is met

HOW TO GET MATERIAL DATA

- Engineering Calculation
  - Calculation based on the data from sub-supplier (source the supplier the receives their part or raw material from) or raw material manufacturer
- Lab Analysis
  - Analysis Method：
    When a lab analysis is used to determine the composition of a homogeneous material, it should be performed per international standards, such as those currently under development by the IEC.
  - What to analyze:
    - ARRIS Materials Disclosure banned and controlled substance list
    - RoHS six substances analysis is not enough

ENVIRONMENTAL TECHNICAL CONCEPTS

- Materials Background

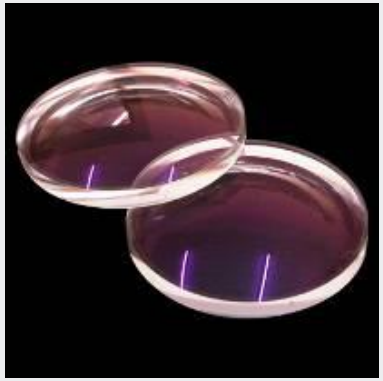


DEFINITION OF CERAMIC

- *A non-metallic crystalline material created by the process of heating*
- *Metallic elements (i.e. Lead) are added to create desired properties*

DEFINITION OF GLASS

- *An amorphous material usually created by the rapid cooling from molten state*
- *Usually the word 'glass' refers to a specific type: amorphous silica*



DEFINITION OF ALLOY

- A homogeneous mixture of two or more elements with metallic properties created to provide specific material properties

WHAT ARE HOMOGENEOUS MATERIALS?

A real life example

WHAT ARE HOMOGENEOUS MATERIALS

Definition:

- A material, as defined by the European Union Technical Adaptation Committee, that cannot be mechanically disjointed into different materials; homogenous materials are materials “of uniform composition throughout.” Ceramics, glass, metals, alloys, paper, board, resins, coatings are provided as examples. The term “mechanically disjointed” would mean “that the materials can be, in principle, separated by mechanical actions such as for example: unscrewing, cutting, crushing, grinding and abrasive processes.”

- ARRIS Requirement: the reporting of all inks, adhesives, plantings, and paints as homogeneous materials, regardless of the medium onto which they are printed

- That real life example has below homogeneous materials:
  - Bottle cap
  - Bottle cap plating
  - Bottle Glass
  - Label paper
  - Glue/adhesive
  - Yellow ink
  - Green ink
  - .....

EXAMPLE: GLASS IS HOMOGENEOUS MATERIAL

- Bottle of glass is supplied to ARRIS
- ARRIS Materials Disclosure report must be filled out for glass bottle
- Determine what substances go into glass
  - Siliciumdioxide (SiO2) 73%
  - Calciumoxide (CaO) 10%
  - Natriumoxide (Na2O) 14%
  - Aluminiumoxide (Al2O3) 2%
  - Leadoxide (PbO) 1%
- Use engineering calculation or chemical assay in labs

REPORTING & ACCEPTANCE

Report substances above threshold limit (e.g. 0,01% = 100ppm):

- Banned substances
  - No banned substances
- Controlled substances
  - PbO: 1% (=10,000ppm)
- Reportable substances:
  - SiO2: 73%
  - Na2O: 14%
  - CaO: 10%
  - Al2O3: 2%

- Part acceptance criteria
  - Appendix A of ARRIS Materials Disclosure
- Example
  - Lead and compounds
  - Cadmium and compounds
  - Etc
- Limits:
  - Pb: 1000ppm
  - Cd: 100ppm

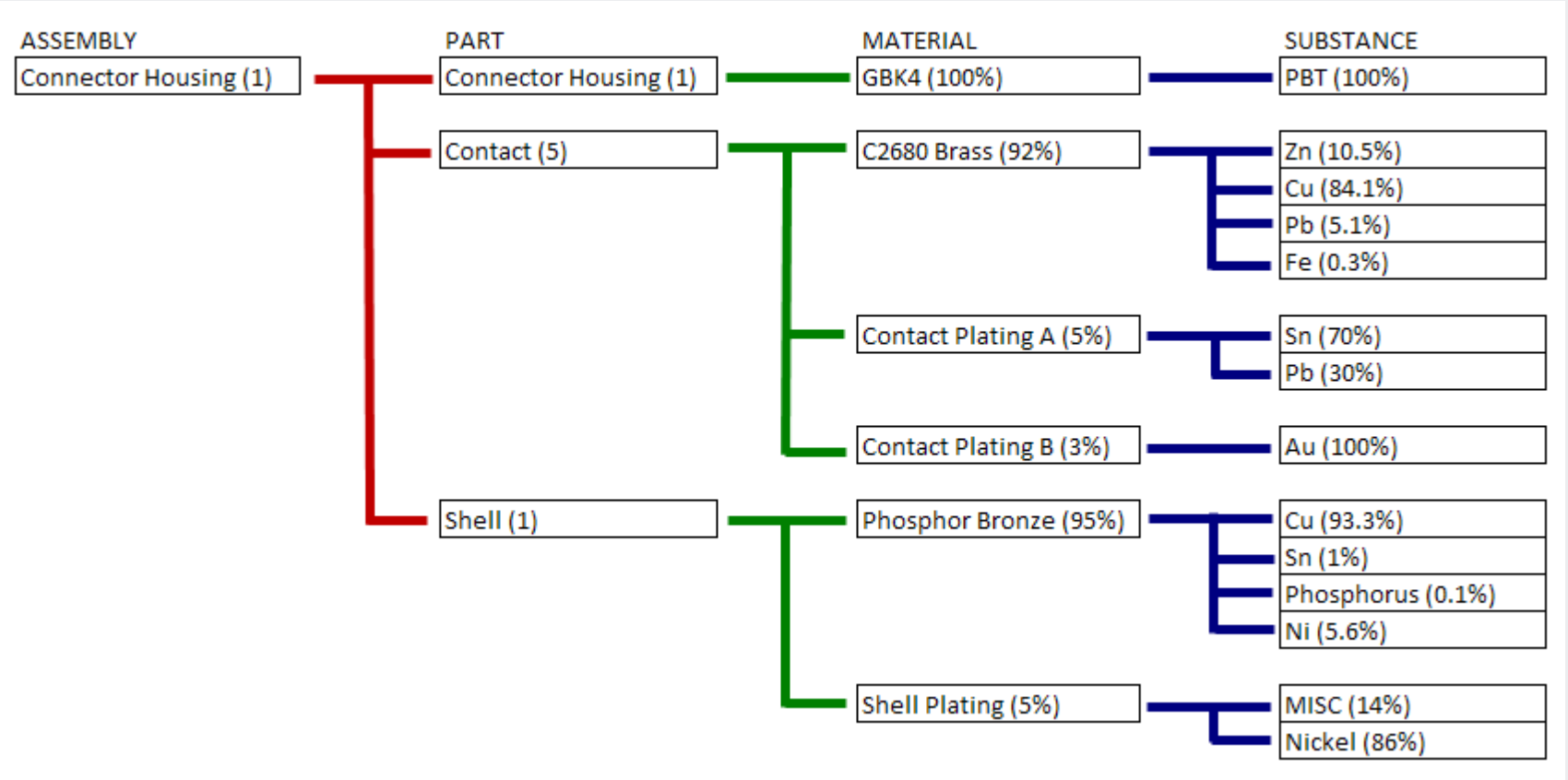
Bottle does not meet acceptance criteria of ARRIS

Need to get rid of PbO!

ARRIS IPC CREATOR BREAKDOWN OF A CONNECTOR

- The purpose of this is to show the proper FMD breakdown of a hypothetical connector
- It diagrams the links between the sections of the main areas of the IPC Creator form
- It also shows an example of each section

CONNECTOR BREAKDOWN



CREATING MATERIAL DECLARATIONS

- ARRIS recommends the use of the ARRIS IPC Creator tool to generate your Material Declarations. Detailed training material is available on our ARRIS Corporate Responsibility website under the Material Disclosure Process and Tools section at:
  http://phx.corporate-ir.net/phoenix.zhtml?c=87823&p=irol-govresponsibility

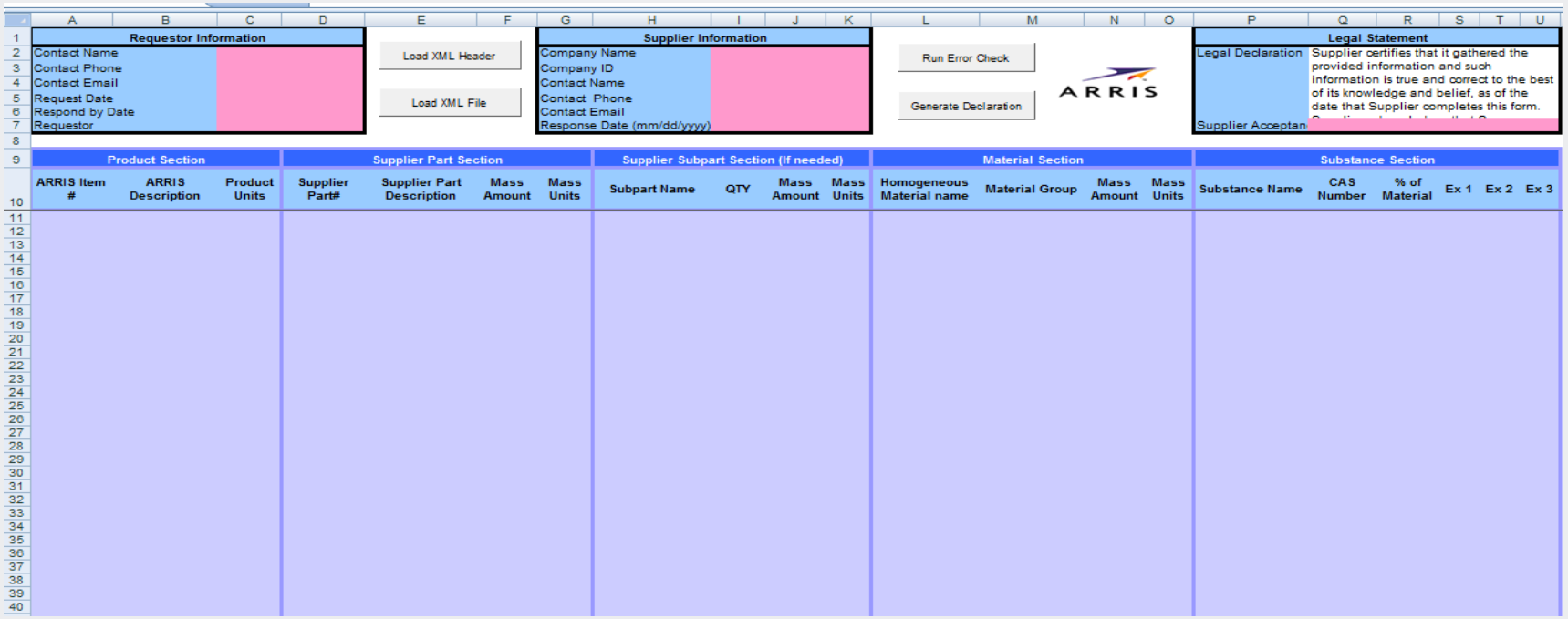
- If you are preparing a Class A non-homogeneous declaration, you can utilize the ARRIS Scriba tool, which has been modified to allow full compatibility with ARRIS Environmental Data Management System. This can be downloaded our ARRIS Corporate Responsibility website under the Material Disclosure Process and Tools section at: http://phx.corporate-ir.net/phoenix.zhtml?c=87823&p=irol-govresponsibility

- Any valid IPC 1752A Class D (homogeneous material) declaration generated from another tool is also acceptable

- ARRIS also accepts Material Declarations in the form of IPC 1752-2 XML, PDF or XDP. *Note - these forms do not support the new RoHS exemptions, and do not support the use of multiple exemptions*

POPULATING THE IPC CREATOR

- Previously Suppliers had to populate multiple pages of a form to provide Material Declaration information. This has been greatly simplified with a one sheet form. All material is entered in one place:



POPULATING THE IPC CREATOR, CONTINUED

- The **ARRIS IPC Creator** can be downloaded from the ARRIS Corporate Responsibility website under the Material Disclosure Process and Tools section at:
  http://phx.corporate-ir.net/phoenix.zhtml?c=87823&p=irol-govresponsibility

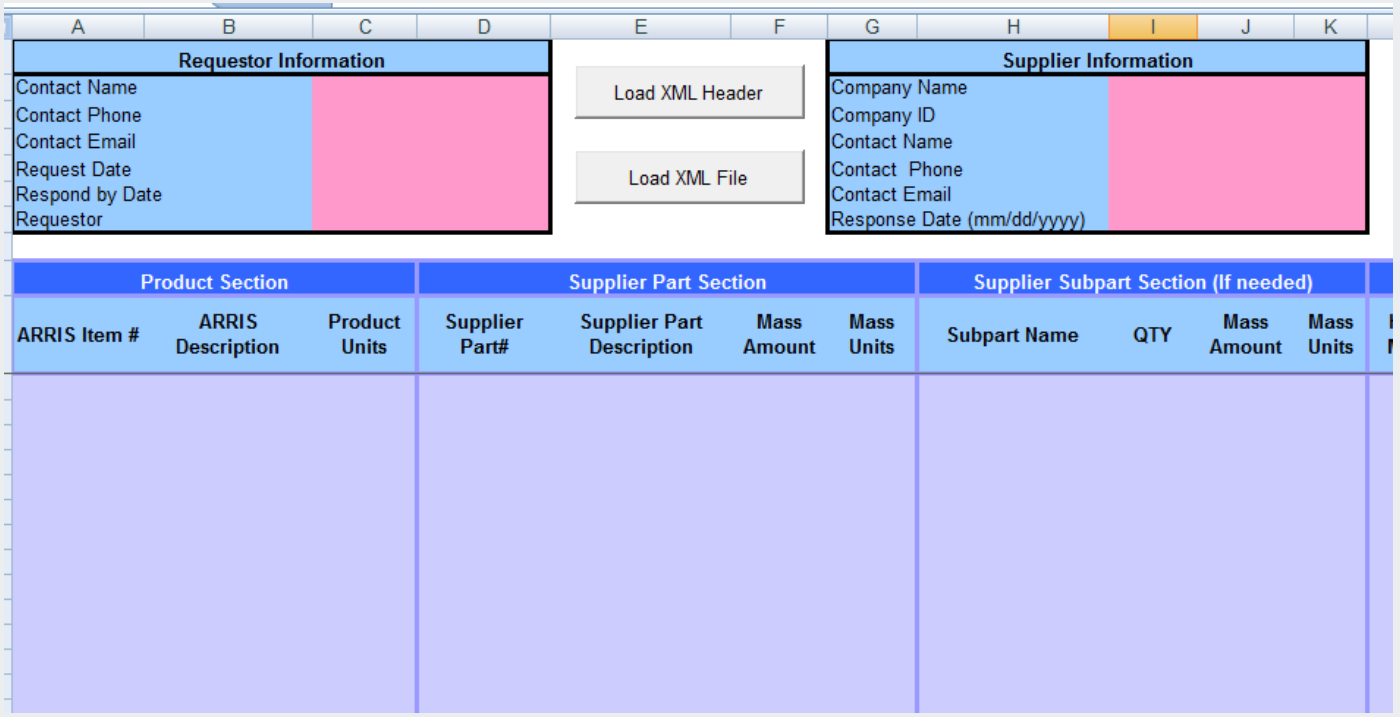
- Detailed instructions are provided in the ARRIS Supplier training material
  http://phx.corporate-ir.net/phoenix.zhtml?c=87823&p=irol-govresponsibility

- Suppliers will load the XML header they received from ARRIS, which auto-populates the Requestor and Supplier Information

- Suppliers shall type “Accepted” in the Supplier Acceptance field, signifying their legal compliance

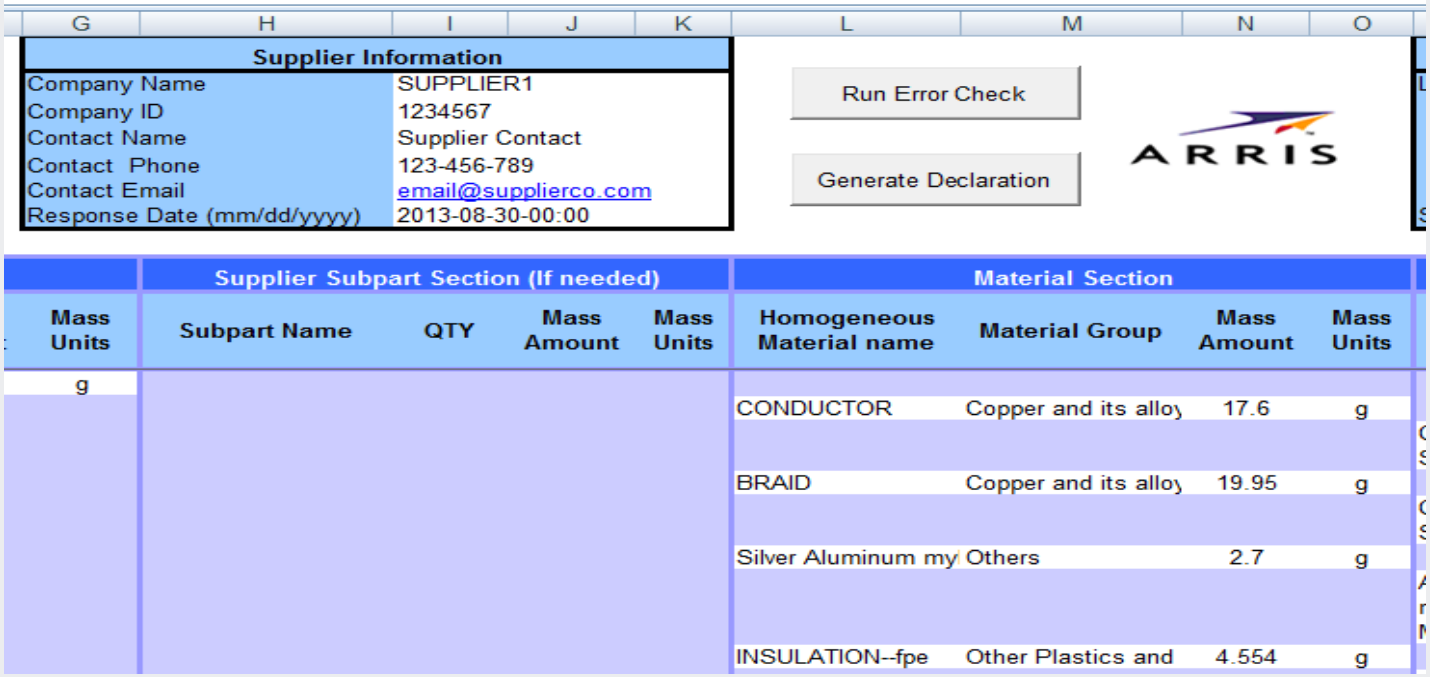
PRODUCT AND SUPPLIER PART SECTION:

- The ARRIS Item Number, Description, Product Units and Supplier P/N are auto-populated when loading the request header. <u>These fields must not be changed!</u>
- In the same row, populate the Supplier Description, Mass Amount and Mass Unit



SUB-PARTS AND MATERIALS

- Supplier Subpart is entered in its section on a new row, populating Name, QTY, Mass Amount and Mass Units
- Material Section is entered in its section providing the Homogeneous Material Name, Material Group (from a dropdown list), Mass Amount and Mass Units



Supplier Information	
Company Name	SUPPLIER1
Company ID	1234567
Contact Name	Supplier Contact
Contact Phone	123-456-789
Contact Email	email@supplierco.com
Response Date (mm/dd/yyyy)	2013-08-30-00:00

Run Error Check

Generate Declaration

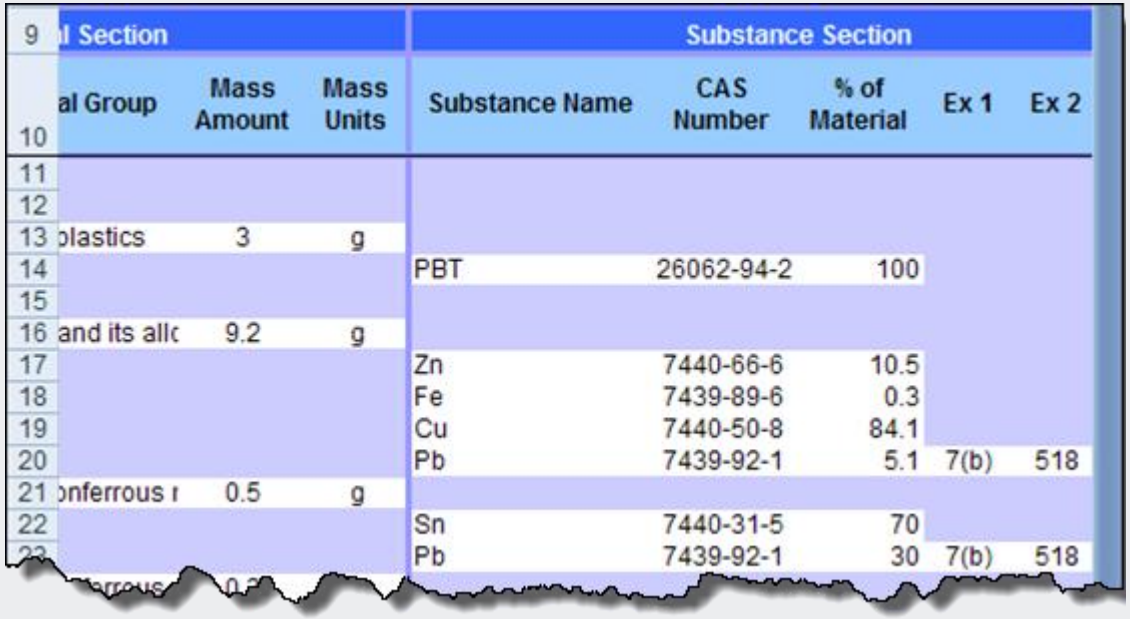
	Supplier Subpart Section (If needed)				Material Section			
Mass Units	Subpart Name	QTY	Mass Amount	Mass Units	Homogeneous Material name	Material Group	Mass Amount	Mass Units
g					CONDUCTOR	Copper and its alloy	17.6	g
					BRAID	Copper and its alloy	19.95	g
					Silver Aluminum my	Others	2.7	g
					INSULATION--fpe	Other Plastics and	4.554	g

IMPORTANT NOTES REGARDING HOMOGENEOUS MATERIALS

- If the product being declared has identification markings (eg: Ink), the markings must be declared as a separate homogeneous material
- All platings must be declared as separate homogeneous materials
- All labels, ink on labels and label adhesive must be declared as separate homogeneous materials

ENTERING SUBSTANCE INFORMATION

- Substance Section provides the chemical breakdown, CAS#, and % of Material fields
- Additionally, Suppliers should provide all the appropriate exemptions where applicable
- ARRIS Exemptions are provided as a tab of the tool



9	l Section			Substance Section				
10	al Group	Mass Amount	Mass Units	Substance Name	CAS Number	% of Material	Ex 1	Ex 2
11								
12								
13	plastics	3	g					
14				PBT	26062-94-2	100		
15								
16	and its allc	9.2	g					
17				Zn	7440-66-6	10.5		
18				Fe	7439-89-6	0.3		
19				Cu	7440-50-8	84.1		
20				Pb	7439-92-1	5.1	7(b)	518
21	onferrous r	0.5	g					
22				Sn	7440-31-5	70		
23				Pb	7439-92-1	30	7(b)	518

APPLYING SUBSTANCE EXEMPTIONS

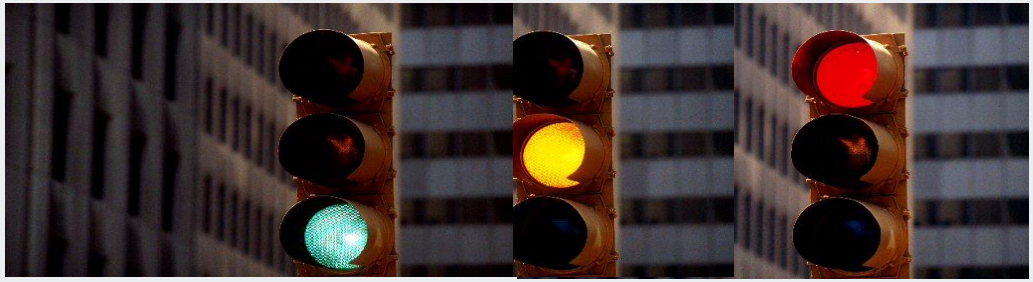
- Exemptions are provided for all Controlled substances, and are categorized by RoHS, ARRIS General and ARRIS Surface
- Exemptions should be populated by the Supplier
- Up to three exemptions can be provided for a Substance

	Exemption Color Codes:	RoHS Substance Exemptions
		ARRIS General Substance Exemptions
For Overlapping categories, supplier must apply applicable exemptions in each exemption class. E.g. RoHS + ARRIS General + ARRIS Surface		ARRIS Surface Substance Exemptions

Controlled Substance Category	PPM	Exemption Number	Expiration Date	Exemption Description
ANTIMONY/ANTIMONY COMPOUNDS	0	528		Part contains Antimony but will not have prolonged contact with skin (i.e. surface mount parts)
ANTIMONY/ANTIMONY COMPOUNDS	0	529		Part contains Antimony but the manufacturer certifies it meets ASTM F963-03
ARSENIC AND ARSENIC COMPOUNDS	0	502		Arsenic NOT in wood products as a preservative per 2003/2/EC
AZO DYES	30	517		Usage of azodyes is NOT in leather and/or textiles per EU Directive 2002/61/EC
BARIUM AND BARIUM COMPOUNDS	0	524		Part contains Barium but will not have prolonged contact with skin (i.e. surface mount parts)
BARIUM AND BARIUM COMPOUNDS	0	525		Part contains Barium but the manufacturer certifies it meets ASTM F963-03
CADMIUM AND CADMIUM COMPOUNDS	100	13(b)		Cadmium (and lead) in filter glasses and glasses used for reflectance standards
CADMIUM AND CADMIUM COMPOUNDS	20	500		Cadmium not in batteries or packaging covered by EU RoHS
CADMIUM AND CADMIUM COMPOUNDS	100	8(b)		Cadmium and its compounds in electrical contacts
CHROMIUM(III) AND CHROMIUM(III) COMPOUNDS	0	522		Part contains Chromium but will not have prolonged contact with skin (i.e. surface mount parts)
CHROMIUM(III) AND CHROMIUM(III) COMPOUNDS	0	523		Part contains Chromium but the manufacturer certifies it meets ASTM F963-03

TECHNICAL CONCEPTS

- Specific Exemptions



ARRIS MATERIALS DISCLOSURE EXEMPTIONS

- Different exemptions in the ARRIS IPC Creator
  - EU RoHS Exemptions
  - ARRIS Specific Exemptions
- Based on different reasoning
  - Time until implementation
  - No better alternative is available in the industry
  - Some for specific businesses or use
  - Hazardous substance is not damaging in this certain use
- Must be provided if a compliance threshold is exceeded. This may also require multiple exemptions to be applied to one substance category has overlapping restrictions in different specifications (ex: RoHS, Surface, ARRIS General)
- Please refer to ARRIS Exemptions listed in the ARRIS Materials Disclosure Specification and the guidance document posted at: http://phx.corporate-ir.net/phoenix.zhtml?c=87823&p=irol-govresponsibility

EXEMPTIONS APPLIED TO LEAD IN METAL ALLOYS

- Lead is often used as an alloying element to obtain specific properties of a metal alloy
- This exemption applies to the use of lead in:
  - steel up to 0.35% by weight,
  - aluminum up to 0.4% by weight
  - copper alloys up to 4% by weight
- In the context of this exemption, 'percentage by weight' has to be interpreted as 'the percentage of lead per homogeneous material per discrete part'
- For example, if the steel housing of a computer consists of two separate parts, each part is considered separately, and can contain up to 0.35% lead by weight for their respective homogeneous materials

EXEMPTIONS APPLIED TO LEAD IN METAL ALLOYS -*CONTINUED*

These are examples of appropriate exemptions to apply:

- Lead in steel up to 0.35% by weight
  - RoHS exemption - 6(a) – "Lead as an alloying element in steel containing up to 0.35% lead by weight"
  - ARRIS General - 518 – "Lead NOT in cable jackets or packaging; covered by RoHS"
  - ARRIS Surface - 538 – "Part contains Lead but will not have prolonged contact with skin (i.e. surface mount parts)"
- Aluminum up to 0.4% by weight
  - RoHS exemption - 6(b) – "Lead as an alloying element in aluminum containing up to 0.4% lead by weight"
  - ARRIS General - 518 – "Lead NOT in cable jackets or packaging; covered by RoHS"
  - ARRIS Surface - 538 – "Part contains Lead but will not have prolonged contact with skin (i.e. surface mount parts)"
- Copper alloys up to 4% by weight
  - RoHS exemption - 6(c) – "Lead as an alloying element in copper containing up to 4% lead by weight"
  - ARRIS General - 518 – "Lead NOT in cable jackets or packaging; covered by RoHS"
  - ARRIS Surface - 538 – "Part contains Lead but will not have prolonged contact with skin (i.e. surface mount parts)"

EXEMPTIONS APPLIED TO LEAD IN ELECTRONIC COMPONENTS (RESISTORS AND CAPACITORS)

- Ceramic and glass materials are used in a variety of electronic devices including capacitors and resistors.
- Some of these ceramic and glass materials contain lead, for example lead zirconate titinate, lead magnesium niobate and lead oxide.
- The specific chemical composition and manufacturing process of these materials determine their electrical parameters, such as dielectric constant and the dissipation that is essential for the functioning of the component in which they are used.
- Hence, lead used in the ceramic parts of electronic components in electrical and electronic equipment is exempt from these RoHS.
- In the context of this exemption, it is critical to note that lead must be part of a homogeneous ceramic substance within an electronic part and NOT part of the metal matrix which serves as a termination to the part.

EXEMPTIONS APPLIED TO LEAD IN ELECTRONIC COMPONENTS (RESISTORS & CAPACITORS)

These are examples of appropriate exemptions to apply:

- Lead in the glass layer of a resistor
  - RoHS exemption - 7(c)-I – "Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronic devices, or in a glass or ceramic matrix compound"
  - ARRIS General - 518 – "Lead NOT in cable jackets or packaging; covered by RoHS"
  - ARRIS Surface - 538 – "Part contains Lead but will not have prolonged contact with skin (i.e. surface mount parts)"

- Lead in the ceramic dielectric of a high voltage capacitor
  - RoHS exemption - 7(c)-II – "Lead in dielectric ceramic in capacitors for a rated voltage of 125 V AC or 250 V DC or higher"
  - ARRIS General - 518 – "Lead NOT in cable jackets or packaging; covered by RoHS"
  - ARRIS Surface - 538 – "Part contains Lead but will not have prolonged contact with skin (i.e. surface mount parts)"

EXEMPTIONS APPLIED TO LEAD IN SOLDER

- Lead is used in a variety of solders to produce alloys with specific melting temperatures and strength.

- As there are no alternatives to lead in key applications of low and high melting temperature solders, they are exempted by RoHS in specific solder formulations and applications.

- The presence of Lead must be confirmed to be part of a solder alloy and the weight % of the Lead must be understood to apply an appropriate exemption. (e.g. Pb 88%, Sn 12%; or Pb 86%, Sn 10%, Sb 4%)

EXEMPTIONS APPLIED TO LEAD IN SOLDER -*CON'T*

These are examples of appropriate exemptions to apply:

- Lead in Solder (less than 85%)
  - RoHS exemption – 7(b) – "Lead in solders for servers, storage and storage array systems, network infrastructure equipment for switching, signaling, transmission as well as network management for telecommunications"
  - ARRIS General - 518 – "Lead NOT in cable jackets or packaging; covered by RoHS"
  - ARRIS Surface - 538 – "Part contains Lead but will not have prolonged contact with skin (i.e. surface mount parts)"

- Lead in Solder (greater than 85%)
  - RoHS exemption – 7(a) – "Lead in high melting temperature type solders (i.e. lead based solder alloys containing 85% by weight or more lead)"
  - ARRIS General - 518 – "Lead NOT in cable jackets or packaging; covered by RoHS"
  - ARRIS Surface - 538 – "Part contains Lead but will not have prolonged contact with skin (i.e. surface mount parts)"

ARRIS ONLY EXEMPTIONS

As previously discussed, some substances are only controlled by ARRIS, or ARRIS controls them at a lower threshold. For these substances, we have ARRIS General exemptions. Some examples are:

- Nickel – that does not have prolonged contact with skin
  ARRIS SURFACE Exemption - 501 – "Part contains Nickel, but will not have prolonged contact with skin (i.e. surface mount parts)"

- Lead (>70 PPM, <1000 PPM) – where above ARRIS threshold, but below RoHS threshold
  ARRIS General Exemption – 518 – "Lead NOT in cable jackets or packaging; covered by RoHS"
  ARRIS SURFACE Exemption – 538 – "Part contains Lead but will not have prolonged contact with skin (i.e. surface mount parts)"

- Lead in a cable jacket (<300 PPM)
  ARRIS General Exemption – 513 – "Lead in cable jackets only, up to 300 PPM per California Prop 65"
  ARRIS SURFACE Exemption – 538 – "Part contains Lead but will not have prolonged contact with skin (i.e. surface mount parts)"

HOW TO SUBMIT A DECLARATION TO ARRIS

- Create one email
- Attach the XML file which was generated by the ARRIS IPC Creator
- Send the email to: Env.Comply@ARRISI.com
  - Note: If multiple files are being submitted, a zip file can be sent, but it must include “1752” in the zip file name
- If any error messages are received, view the ARRIS Error Code Resolution Guide at the ARRIS Corporate Responsibility website under the Material Disclosure Process and Tools section at:

  http://phx.corporate-ir.net/phoenix.zhtml?c=87823&p=irol-govresponsibility

FREQUENTLY ASKED QUESTIONS

- What file formats are acceptable by Env.Comply@ARRISI.com?
  - XML and ZIP (xml files compressed in a .zip file) Please make sure “1752” is in the zip or file name!

- Send supporting documentation to the EDM, or send email to EnvInformation@ARRISI.com

- For more information, please visit:

  http://phx.corporate-ir.net/phoenix.zhtml?c=87823&p=irol-govresponsibility

WHERE CAN I FIND HELP?

For any queries in the use of the ARRIS IPC Creator and Material Declaration requirements, please contact:

- Relevant EDM team, or
- EnvInformation@ARRISI.com

FREQUENT MATERIAL DECLARATION ERRORS

- Below are common reasons ARRIS may reject your Material Declaration
  - Incomplete Material Declaration
  - Misc=100% without supporting documents
  - Non-homogeneous Material
  - Volatiles >10% in one homogeneous material

SUMMARY

In this training presentation you learned:

- The reason why ARRIS is requesting material content information
- How ARRIS intends to use the information
- How to fill out a ARRIS material disclosure form (ARRIS IPC Creator)
- When to apply appropriate ARRIS and RoHS Exemptions
- How to submit a completed declaration
- Where to find help