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BSI Standards Publication

Material declaration for products of and for the electrotechnical industry

Part 1: Guidance for the implementation of IEC 62474

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee GEL/111, Electrotechnical environment committee.

A list of organizations represented on this committee can be obtained on request to its secretary.

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TECHNICAL REPORT

colour inside

Material declaration for products of and for the electrotechnical industry – Part 1: Guidance for the implementation of IEC 62474

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ICS 01.110; 13.020; 29.100; 31.020

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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IEC TR 62474-1, which is a Technical Report, has been prepared by IEC technical committee 111: Environmental standardization for electrical and electronic products and systems.

The text of this Technical Report is based on the following documents:

Enquiry draft	Report on voting
111/359/DTR	111/369/RVC

Full information on the voting for the approval of this Technical Report can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62474 series, published under the general title *Material declaration for products of and for the electrotechnical industry*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

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MATERIAL DECLARATION FOR PRODUCTS OF AND FOR THE ELECTROTECHNICAL INDUSTRY –

Part 1: Guidance for the implementation of IEC 62474

1 Scope

This part of IEC 62474, which is a Technical Report, is a guidance document to help organizations that create tools for material data exchange and organizations that submit and receive material declarations to properly implement IEC 62474.

IEC 62474 specifies the procedure, content, and form relating to material declarations for products of companies operating in and supplying the electrotechnical industry.

This Technical Report:

- illustrates the flexibility and functionality of IEC 62474 using examples,
- supports organizations that create software to exchange substance and material data,
- supports users that submit and receive material declarations, and
- is designed to support consistent implementation of IEC 62474.

Clause 3 summarizes industry needs for material information and business benefits related to IEC 62474.

Clause 4 provides case studies that describe the functionality of IEC 62474.

Clause 5 provides detailed representations and XML files for the material declaration case studies included in Clause 4.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62474:2012, *Material declaration for products of and for the electrotechnical industry*

3 Industry needs and business benefits

3.1 Industry needs

Today, there are ever increasing legal regulations in many countries from around the world and supply chain requirements that may restrict the use of substances in products, require reporting and/or require notifications of substance uses.

To determine restricted substance compliance status, electrotechnical product manufacturers need information about restricted substances contained in supplied products that become part of the manufacturer’s products.

Electrotechnical product manufacturers also need data about materials used in products as one of the inputs in an environmentally conscious design process to improve environmental performance of products throughout their product life cycle.

Also, to make material declaration data readily available, the supply chain (including organizations providing products into the electrotechnical industry) needs a standardized method to exchange the data.

3.2 Business benefits

IEC 62474 was developed to standardize the multiple existing approaches into a single global approach for the electrotechnical industry.

Material declarations according to IEC 62474 provide all data needed to make a restricted substance compliance assessment. These material declarations according to IEC 62474 can be used to obtain the data needed to be included in the technical documentation file required to place products on the market in different regions. Examples are:

- The EU Restriction of Hazardous Substances (RoHS) Directive
- The China Administrative Measures on the Control Pollution Caused by Electronic Information Products (known as “China RoHS”).

IEC 62474 specifies the use of a dedicated database that lists substances and substance groups that require declaration. This provides certainty to suppliers regarding what data they need to provide, regardless of the customer. The IEC database also includes material classes that may be used as an input to environmentally conscious design, and a developers table and schema that specifies data exchange requirements. The IEC 62474 database is maintained and regularly updated by global experts to meet changing legislation and broad customer requirements. The database can be found at: http://std.iec.ch/iec62474.

Implementing IEC 62474 improves data quality and reduces cost, because it offers a standardized method to support material declaration data throughout the supply chain.

The data required about products, product parts and materials can be extensive, and the electrotechnical industry benefits from a standardized way to exchange this data as well as provides a defined list of declarable substances through the IEC 62474 database. This reduces the risk of data entry errors as well as unnecessary reporting of substances that do not apply to electrical and electronic products.

The standard is flexible, identifying base requirements, but also allowing all levels of additional reporting under defined rules, so that the data is properly exchanged through the supply chain. The data exchange format specification allows the supply chain to use a single format to exchange their data rather than replying to each customer’s custom format. The capability to send and receive data in the IEC 62474 format allows suppliers to provide data and customers to request data. How the data is stored remains independent of how it is exchanged.

IEC standards are recognized by the World Trade Organization (WTO), which means that IEC 62474 can be referenced as the global standard for material declarations applicable to the electrotechnical industry.

Broad implementation by electrotechnical industry organizations will result in:

- material declaration data being available as a condition to sell to the eletrotechnical industry,
- availability of material declaration data that is not dependent on an organization’s size or purchase volume,

- improvement of data quality, reduction of compliance costs and elimination of inefficiencies, and
- faster assessments of products/materials under review.

4 Material declaration approach and flexibility of IEC 62474

4.1 Material declaration approach

4.1.1 General

Subclause 4.1.1 builds on the content given in IEC 62474:2012, 4.1 (for example, by including the conceptual diagrams for base requirements and additional requirements), and addresses the following topics:

- base requirements;
- additional requirements;
- conditional requirements.

IEC 62474:2012, Clause 4 is organized in the order of the conceptual diagrams (see Figure 1 and Figure 2 below from IEC 62474) for ease of understanding. Mandatory information is shown with solid boxes and arrows. These represent the products, substance groups or substances with a mandatory reporting requirement in the IEC 62474 database.

Product parts, material classes, materials, and substance groups or substances without a mandatory reporting requirement in the IEC 62474 database are optional and represented with dotted boxes and arrows. Substance groups and substances not listed in the IEC 62474 database are also optional for declaring. Further mandatory reporting requirements apply without being displayed in the diagrams (e.g. mass or mass percent). When there is a substance group with a mandatory reporting requirement, one can declare only the substance group if there are no underlying declarable substances with a mandatory reporting requirement at or above the reportable threshold as specified in the IEC 62474 database.

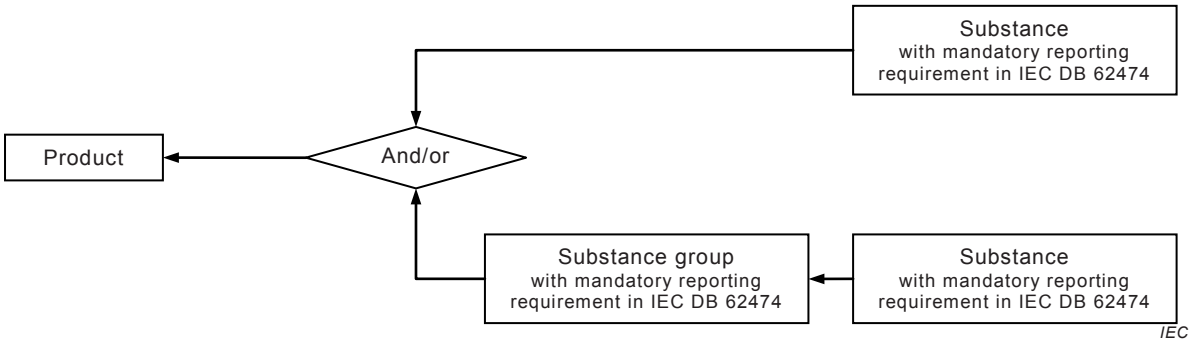
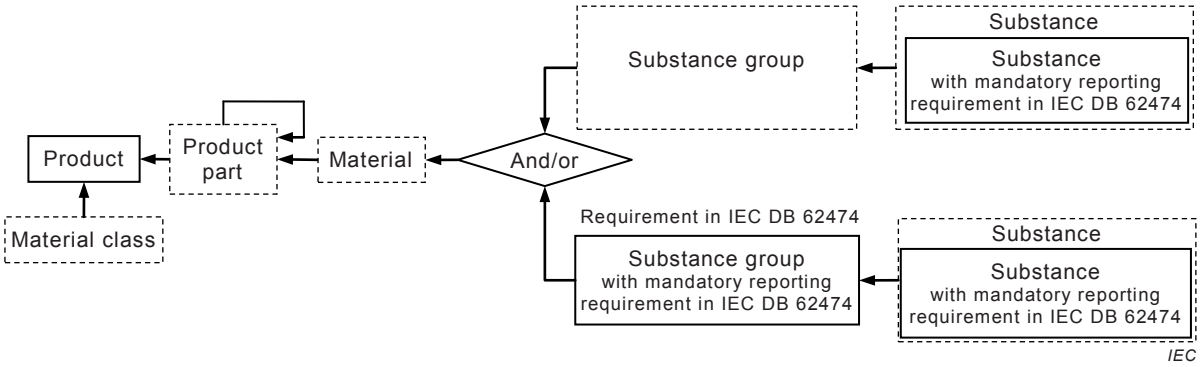


Figure 1 – Conceptual diagram for base requirements



Note The arrow around the product part indicates that any product part could be broken down into further product parts and thus it indicates that the product assembly is not just limited to two levels (product – product part) as displayed in this conceptual diagram.

Figure 2 – Conceptual diagram for additional requirements

A user may only state that it is in conformance with IEC 62474 if it has:

- included all declarable substances and substance groups with a mandatory reporting requirement that are present in the product at or above the reporting threshold as per the IEC 62474 database, and
- followed the IEC 62474 XML data exchange (schema and developers table).

If a user is reporting more than the base data requirements, then conformance to IEC 62474 also includes:

- meeting all of the "additional requirements" associated with any optional information that is reported, and
- meeting all the detailed data requirements specified in the IEC 62474 XML schema and developers table.

IEC 62474 specifies that only substances that remain in the product may be declared in the material declaration file. IEC 62474 also requires that manufacturing chemicals that react, form other chemicals or otherwise do not remain in the product are not to be included. For example, for a resin and a hardener that are used to form epoxy in a product, the final epoxy substance should be declared if it is a declarable substance or as a voluntary declaration. The individual resin and hardener chemical could be declared only if a residual amount of these chemicals remained in the product.

The recursive nature of product parts (shown in Figure 2 above with the arrow back to product parts), allows the users flexibility to report multiple levels within a product's "Bill of Materials" (BOM) such that users are not just limited to only one part level under the product. For example, one can declare a personal computer (product) with a mother board (product part 1) with a coin cell battery (product part of product part 1). This flexibility enables all users within the electronic industry supply chain to be able to effectively utilize the IEC 62474 XML schema.

4.1.2 Guidance on use of conditional fields in the developers table

The IEC 62474 developers table includes a column (Obligation column) that indicates whether a specific data field (element or attribute) is mandatory or optional. Some data fields are listed as conditional. These fields are mandatory under certain material declaration conditions, optional under other conditions. A conditional obligation may also cause an element or attribute to become not applicable under certain conditions and therefore it may not be used in that particular instance.

For example, the “identifier” attribute within the ProductID class is listed with a conditional obligation. If the ProductID is used to identify the product at the top of the material declaration hierarchy, then the identifier information is mandatory and must be provided by the user in the material declaration. However, if the ProductID is used in declaring a product part that is lower in the declaration hierarchy, this identifier information is optional.

There are a few other data elements and attributes that are also listed with a conditional obligation. The Mass, MassPercent, and MatMassPercent elements have particularly complex conditional provisions that must be carefully reviewed to ensure correct implementation.

4.1.3 Guidance on use of mass and mass percent fields

IEC 62474 specifies that a declaration is required to report either mass or mass percent, but not both. This is important for data quality purposes as only one data field is variable and the second data field is a calculated value.

If both the mass percent and the mass are declared, but due to errors the calculation does not correspond to the reported mass, then the receiver of the material declaration will not know which number is the correct one to use.

A general rule of thumb is to report using mass percent when reporting product families (e.g. ICs, resistors, capacitors, etc) which contain multiple products in one declaration, but to use mass when reporting assemblies or finished goods when a single product is declared. Reporting concentrations (mass percent) for product families provides sufficient data for the receiver of the declaration to correctly calculate the mass of each product in the family in their IT software system tools, while streamlining the number of material declarations to be exchanged between the two companies.

4.1.4 Calculating mass percent

In the material declaration, either mass or mass percent for the substance, substance group, material or product part can be used.

Many laboratories report concentrations in ppm. One ppm means 1 part in 1 000 000 like parts, such as grams to gram basis. ppm is converted to mass percent for such cases by the formula Mass percent = X ppm / 10 000.

See Table 1 for conversion from ppm to mass percent.

Table 1 – Conversion table from ppm to mass percent

Percent (%)	ppm = (mg/kg)
0,000 1 %	1
0,001 %	10
0,01 %	100
0,1 %	1 000
1,0 %	10 000
10,0 %	100 000
100,0 %	1 000 000

With one justified exception, mass percent is always referring to the next higher level in the product hierarchy that is declared. This means that mass percent will refer to the material, product part or product. The exception is that if a substance is assigned to a substance group in the declaration (see IEC 62474:2012, 4.2.3 a), 4.3.4 a) and 4.3.5 a)), the mass percent refers to material (if declared), product part (if declared) or to the product. The mass percent of a substance is never calculated based on the mass of the substance group. Declaring a

substance as a mass percent of the substance group can cause errors and therefore it is not allowed in IEC 62474. This is stated in the relevant requirements included in IEC 62474:2012, 4.2.3 c), 4.3.4 c) and 4.3.5 c).

This deviation from the generic rule ensures that the recipient of a material declaration is able to interpret the data correctly under any combination of base and optional reporting. This is necessary to cope with situations where a declarable substance group has a reporting requirement that is based on materials (e.g. homogeneous material). The situation is further complicated when only a part of the compound (e.g. the lead in lead/lead compounds) is to be declared. As some substances within the substance group may be unknown, the information on percentage of the declared substances within the substance group cannot be unambiguously correlated to the mandatory material mass percent declaration, and as a consequence a further transfer of this information would not be of use.

As a consequence, the declaration of mass percent of a substance within a substance group is not allowed in IEC 62474. To secure that the voluntarily provided declaration of a substance is useful for any follow-up declarations, its mass or mass percent of the material (if declared), product part (if declared) or product is needed.

To convert from mass to mass percent, one divides the mass of the substance or substance group by the mass of the product, product part or material and then converts to percent.

Mass percent = mass of substance/mass of product, part or material $\times$ 100 percent.

The only time the MatMassPercent data field is used in the XML file is when the IEC 62474 database has a mandatory reporting threshold at the material level. For all other instances, either the Mass or the MassPercent data field should be used in the XML file.

4.1.5 Interpretation of reporting threshold for declarable substances and declarable substance groups

For most of the declarable substance and declarable substance group entries in the IEC 62474 database, the reporting threshold is based on the mass percent of the product. This is represented by a reporting threshold that is listed as "0,1 mass percent". The reference to the mass of the product that is declared is implied in this threshold. However, there are declarable substances and declarable substance groups that have a reporting threshold with a different calculation basis. The EU RoHS declarable substance groups are examples that use the mass of the homogeneous material as the basis for calculation. If the reporting threshold refers to something other than the product (such as a material or a product part like a battery), this is indicated in the IEC 62474 database.

4.1.6 Guidance on declaring a substance that belongs to two different substance groups

A material declaration that conforms to IEC 62474 requires that a declared substance with a mandatory reporting requirement must be assigned to its respective declarable substance group with a mandatory reporting requirement, if the declarable substance group is declared. The requirement “such substances shall be assigned to the substance group”is specified in IEC 62474:2012, 4.2.3 a) and 4.3.4 a).

In most material declarations this is straightforward. However, since the establishment of IEC 62474, several corner cases have emerged with a declarable substance fitting into two declarable substance groups. For example, the REACH SVHC substance “Lead sulfochromate yellow” creates such a situation. The declarable substance groups “Lead/Lead Compounds” and “Chromium (VI) Compounds” are both relevant. "Lead/Lead Compounds” and “Chromium (VI) Compounds” need to be declared if they are present at or above the reporting threshold for each homogenous material. However, it is not possible in an XML file (by the design of the XML schema) to assign the same occurrence of “Lead sulfochromate yellow” to both substance groups simultaneously even if the Lead sulfochromate yellow triggered the

declaration of both declarable substance groups. Reporting this occurrence under both Lead/Lead Compounds" and "Chromium (VI) Compounds" would incorrectly double the total amount of Lead sulfochromate yellow and should be avoided, too.

Several possibilities arise for assigning the substance group in such situations. In the case of Lead sulfochromate yellow, the responder (supplier filling out the material declaration) needs to select one of the respective declarable substance groups and assign the substance to it. Regardless of which declarable substance group is selected, the responder still needs to state the presence of the other declarable substance group if it exceeds the threshold.

4.2 Flexibility of IEC 62474

4.2.1 Overview of material declaration features

Beyond the minimum declaration requirements specified in IEC 62474:2012, 4.2, base data requirements and detailed data requirements as per the IEC 62474 XML schema, users have significant flexibility in providing additional information that is useful in material declaration exchanges up and down the supply chain.

4.2.2 Flexibility of declaring substances and substance groups at different levels within the declaration

Users have flexibility as to how substances and substance groups are declared within the hierarchy of the material declaration created in the XML file. For example, a user may voluntarily declare the material for some substances; whereas other substances (such as EU REACH SVHCs) may be represented as reporting directly into the product. This flexibility is illustrated in Example 6 (see 5.7). If there are any restrictions on how a declarable substance or declarable substance group is to be reported; this information will be provided in the reporting threshold on the IEC 62474 database.

4.2.3 Declarable substances in a material declaration

4.2.3.1 General

The declarable substances and declarable substance groups in IEC 62474 are central to the declaration. If they are present in the product, and meet or exceed the reporting threshold for that particular application, it is required that these substances and substance groups are identified in the material declaration if they have a mandatory reporting requirement. Otherwise the declaration does not fulfil the requirements of IEC 62474. There are two specific situations that are sometimes overlooked and deserve additional discussion in this guidance document. These are trade secrets and substances with a CAS number that contains other substances, which are discussed below.

4.2.3.2 Trade secret

Suppliers might have special alloys or compounds that are central for the function and where the supplier does not want to disclose the exact composition.

For materials that are considered as a "trade secret", IEC 62474 specifies that any declarable substances or substance groups contained in such a material need to be declared if they have a mandatory reporting requirement and are present in the product at or above the reporting threshold for its associated reportable application.

4.2.3.3 Substances with a CAS-number that contains other substances

Some mixtures and materials have been assigned CAS numbers. Examples include:

- Steel with CAS number 12597-69-2
- Brass with CAS number 12597-71-6

Each of these mixtures and materials may or may not include a substance (e.g. lead) that is a declarable substance or declarable substance group. Declaring only “Steel” does not give information if lead is a part of the alloy or not. Declarable substances and declarable substance groups clearly need to be disclosed.

Many declarable substances are compounds which must be reported as listed in the IEC 62474 list of declarable substances. It is not permissible to report the separate elements that make up the compound. For example, diboron trioxide (CAS number 1303-86-2) consists of Boron and Oxygen, with CAS-numbers 7440-42-8 and 7782-44-7. In this example, the declaration of these elemental CAS-numbers will hide the existence of the declarable substance and does not meet the reporting requirement of IEC 62474 because it does not properly represent the substances actually contained in the product.

4.2.3.4 Description of UVCB substance which constitutes ceramic/glass

Ceramic/glass used as constituent materials of electronic components has a complex chemical composition when formed from various metal oxides (or nitrites, carbides, etc.). In addition, they also show completely different chemical characteristics compared to simple mixtures of metal oxides, etc. It is subsequently very difficult to describe precisely the exact chemical composition of the glass or ceramic due to its complex and variable nature. IEC 62474 can support different methodologies for reporting UVCBs (Unknown or Variable composition, Complex reaction products or Biological materials).

The U.S. Toxic Substances Control Act (TSCA) considers “ceramic”, “inorganic glass”, “frits”, etc. as legal mixtures as it is difficult to identify their composition, and so they appear in the TSCA inventory as substances of UVCB. On the other hand, the EU REACH Regulation in Point 11 of Annex V exempts ceramic frits and glass from specified regulations (Title II Registration of substances, Title V Downstream users and Title VI Evaluation) unless they meet the criteria to be classified as dangerous according to Regulation (EC) 1272/2008 and provided that they do not contain constituents meeting the criteria to be considered dangerous in accordance with Regulation (EC) 1272/2008 present in concentrations at or above the specified concentration limits. This concept is chemically accurate because ceramic or glass is a simple UVCB where constituent substances are dissolved and homogenized during the manufacturing process. For example, diboron trioxide (B2O3) is a common substance used in the production of borosilicate glass. Diboron trioxide is designated as a REACH SVHC. However, during the glass formation process the diboron trioxide is transformed to a different boron substance. This transformation renders the boron in the glass to be non-hazardous and thus no longer qualifies it as an SVHC. Technically, it is not possible to assign a unique chemical formula to the boron containing substance due to its complex and variable nature.

For glass or ceramics that are considered dangerous, as defined by Regulation (EC) 1272/2008, declaring the hazardous substance (such as Pb in glass) is problematic since it is not possible to precisely identify the Pb containing substance. Various industry groups have devised their own declaration protocols for addressing this issue. Presently, there is no single method that is without limitations. It is not the intent of this guidance document to prescribe a particular methodology. Rather, examples of reporting methodologies for substances in glass and ceramic are contained in Annex A. It is at the discretion of the user to determine which, if any, of the methodologies best fit their own reporting requirements. For the purposes of the detailed examples shown in Clause 5, this Technical Report shows constituents using a modified International Material Data System (IMDS) method. This method describes substances as a more general substance instead of selecting a specific chemical substance to represent the actual substance present or to describe constituents used in the manufacturing process that no longer exist in the product.

4.2.4 Additional guidance on declaration of material classes

Material declarations are not only used to determine regulatory status, but as an input for environmentally conscious design, where it helps to inventory product-related environmental aspects and give information to determine which of these aspects is significant to a specific product.

Material classes represent categories of materials, so that an electrotechnical equipment manufacturer may determine the materials contained in their products, and use these as one of the inputs to life cycle assessments. It allows:

- an inventory of materials contained in the product that can be assessed for significance;
- determination of which materials are dominant in the product that may be used for material efficiency goals; and
- analysis of energy used to obtain and manufacture the materials, as an input that may be used for energy efficiency goals.

Material classes are not related to hazards or regulations, and do not represent any kind of recommendation related to hazards or regulations.

4.2.5 Absence declaration

In addition to conforming to IEC 62474 requirements to provide information about any substances and substance groups that are present in the product at or above threshold levels, the user can also provide an absence declaration stating that the IEC 62474 declarable substances and substance groups are not present, at or above threshold for the reportable application in the product, or that additional substances and/or substance groups are not present at or above a user defined threshold and reportable application.

An absence declaration should not be interpreted as a “free of…” statement, as it is used in ISO 14021. In the context of IEC 62474, the absence declaration only means that the concentration of the substance is not higher than the specified reporting threshold.

The absence declaration (which is sometimes also referred to as a negative declaration) can provide confidence to downstream manufacturers and/or enforcement authorities that the supplier has assessed the product for these substances and is reporting that they are not present at or above the reporting threshold.

To indicate an absence declaration, the responder would set the "aboveThresholdLevel" flag for the substance or substance group in the XML file as false. IEC 62474:2012, 4.3.6 b) also specifies that an absence declaration must include information about the absence criteria (such as reporting threshold and reportable application). The reportable application and reporting threshold should be taken from the IEC 62474 declarable substance list where available. If a substance being reported is not contained within the IEC 62474 database, then it is suggested the 0,1 mass percent threshold at the product level be used as a baseline, as it is suggested as the default threshold level for declarable substances listed based on criteria 3 in IEC 62474.

An absence declaration is not allowed for a declarable substance that is contained at or above the reporting threshold, even if an exemption is applicable.

4.2.6 Material names

If one or more materials are declared in the material declaration, a name for the material is mandatory and a UniqueID of the materials is optional. This material name is the name of the material within the product. Material name may describe the material and/or describe the use or location of the materials in the part. The UniqueID field in material can be used to identify a declared material based on specifications defined in a standard (e.g., ISO 1043, Parts 1 through 4 for plastics).

When declaring a material in the declaration, it is necessary to specify the material class that the material is part of using the "materialClassID" field. This is mandated in IEC 62474:2012, 4.3.3 d).

4.2.7 Use of the query list features

Query lists are used to provide additional information about the product. Query lists can be used in a response mode to request information from the supplier or in a distribute mode for the supplier to provide key information to their customers. For example, a query list can be used to provide information on whether or not the product contains a battery, uses RoHS exemptions, or conforms to an industry standard such as IEC61249-2-21 for low halogen concentrations in a printed circuit board laminate.

The query list XML contain two parts: 1) a statement with a true/false response and 2) the identity which is a code that identifies the list or group of queries (see Table 2).

Table 2 – Use of query list

Query List	Statement	Response
ABC CompanyList-001	This product contains a battery	TRUE
	This product meets IEC 61249-2-21 low halogen definition for PCB laminate	FALSE

This is shown in XML format below:

<QueryList identity="**ABC CompanyList-001**">
<Query response="**True**" statement="**This product contains a battery**" />
<Query response="**False**" statement=" **This product meets IEC 61249-2-21 low halogen definition for PCB laminate**" />
</QueryList>

NOTE **Bold text** shows the supplier added information and the regular text is the XML code.

4.2.8 Declaring exemptions

This guidance document recommends that material declarations include any regulatory exemptions that are applicable to the use of declarable substances and declarable substance groups. Once declared, IEC 62474:2012, 4.3.4 f) requires that information about exemptions must be carried through the supply chain. Users should check the reportable application to assess whether an exemption is applicable or not to a given application.

IEC 62474 is very flexible in allowing users to specify exemptions from one or a multiple of exemption lists. For example, a material declaration may specify both an EU RoHS exemption and simultaneously an EU ELV exemption for a given use of lead. Exemptions may be specified for a substance, a substance group or at the level of the entire product. In most cases, exemptions will be associated with the substance or substance group. The IEC 62474 XML schema does not currently allow exemptions to be associated with product parts or materials.

Examples of declaring such exemptions are provided in Clause 5. Within the material declaration file, each exemptions entry has data fields for "UniqueID" (provides information about the exemption list used) and "Exemption" which identifies the specific exemption that is applicable. The UniqueID field will include the authority -- use the exact text string provided by the authority (e.g. IPC or JAMP) -- and the specific exemption list that is used (e.g. “EL2011/534/EU” for IPC and “EU_RoHS_1.02” for JAMP). The "Exemption" field will include the identity of the exemption (e.g. “1(a)” for IPC 1752A and “0201” for JAMP) and the text based description of the exemption.

Users should use exemptions from a recognized and maintained list that is readily available and commonly accepted throughout the electrotechnical industry and supply chain. This is necessary to allow computer processing of the exemptions in the material declaration XML file. Examples of such maintained lists include the IPC 1752A standard and the JAMP material

declaration system. Please see the examples below of the IPC 1752A and JAMP exemption lists.

Example 1: IPC 1752A

The IPC material declaration system contains lists of EU RoHS exemptions and EU ELV exemptions. The IPC exemptions lists are revised whenever the EU Commission publishes an official amendment. When using an IPC exemption list in a material declaration, the user will set the UniqueID.authority to 'IPC'. The UniqueID is set to the version of the IPC exemption list and is taken from the EU official document:

UniqueID.Authority = IPC

UniqueID = EL2010/571/EU

Within the EU RoHS exemption list, 2 fields are identified.

1) The identity of the exemption
2) Description of the exemption

An example of the fields used within the IPC EL2010/571/EU list is shown in Table 3.

Table 3 – IPC 1752A exemption specification example

Identity	Description
1 (a)	Mercury in single capped (compact) fluorescent lamps not exceeding (per burner):For general lighting purposes less than 30 W: 5 mg
1 (b)	Mercury in single capped (compact) fluorescent lamps not exceeding (per burner):For general lighting purposes greater than or equal to 30 W and less than 50 W: 5 mg

<Exemption identity="1(a)" description="Mercury in single capped (compact) fluorescent lamps not exceeding (per burner): For general lighting purposes less than 30 W: 3,5 mg"/>

<Exemption identity="1(b)" description="Mercury in single capped (compact) fluorescent lamps not exceeding (per burner): For general lighting purposes greater than or equal to 30 W and less than 50 W: 3,5 mg"/>

Example 2: JAMP

The JAMP material declaration system has an "Application List" that clarifies the effective date and expiration date of both RoHS exempted use and ELV exempted use. JAMP adds a unique code to each exempted use and updates its "Application List" on a regular basis.

The exemption list released by JAMP is organized by legislation (e.g. EU RoHS Directive, EU ELV Directive). The contents of the exemption are specified in this list. This enables specifying the exemptions without having to describe the contents, thereby reducing the volume of information communicated in XML.

An example of the JAMP application list for the EU RoHS exemption list is shown in Table 4 below. Besides IEC 62474 fields, JAMP has fields for an exemption, application code and expiry date. The JAMP term “Identity” maps to the IEC 62474 XML attribute “”Identity” and the JAMP term “Description” on the JAMP Application List maps to the IEC 62474 XML attribute “Description”.

– UniqueID.Authority＝JAMP
– UniqueID＝EU_RoHS_Ver._1.02

Table 4 – JAMP application list for RoHS exemption list example

"Description" on the JAMP Application List	Identity	Exemption
EU_RoHS_0201	0201	Mercury in single capped (compact) fluorescent lamps for general lighting purposes <30 W:not exceeding (per burner) 5 mg

An example of the JAMP application list for the EU ELV exemption list is shown in Table 5 below.

– UniqueID.Authority=JAMP

– UniqueID=EU_ELV_Ver._1.02

Table 5 – JAMP exemption specification example

"Description" on the JAMP Application List	Identity	Exemption
EU_ELV_0058	0058	Lead in high melting temperature type solders (i.e. lead-based alloys containing 85 percent by weight or more lead)

In XML, these examples are shown as:

RoHS:
- <Exemptions>
<Exemption description=" EU_RoHS_0201" identity="0201" />
<UniqueID.authority="JAMP" identity=" EU_RoHS_Ver.1.02" />
</Exemptions>

ELV:
- <Exemptions>
<Exemption description=" EU_ELV_0058" identity="0058" />
<UniqueID.authority="JAMP" identity=" EU_ELV_Ver.1.02" />
</Exemptions>

All of these fields should be copied word-for-word from the maintained exemption list that is used. Detailed XML examples of exemptions are provided in Clause 5.

4.2.9 Using the reportingThreshold, aboveThresholdLevel and the reportableApplication fields

The Substance and SubstanceGroup classes include a class reference to the Threshold element. The data in this element provides the downstream recipient of the material declaration with important information about whether the substance is present in the product at or above, or below, a reporting threshold that is specified in the IEC 62474 declarable substance list. The Threshold element includes three individual attributes for the reporting threshold, the reportable application, and true/false information about whether the substance or substance group in present at or above the reporting threshold. For declarable substances and declarable substance groups the reporting threshold and reportable application fields should be copied directly from the IEC 62474 declarable substance list – copy/paste of the text directly from the IEC 62474 declarable substance list is important so that the information can be checked and processed by computer software tools without manual intervention. It is not sufficient for a supplier to provide just the above threshold value given that multiple reporting thresholds may be applicable to a substance group or substance. The reporting threshold needs to be provided and it may be helpful also to provide the reportable application.

The declaration of the Threshold element in Substance and SubstanceGroup is optional; however, it is strongly recommended that this information is included in the declaration. The multiplicity of 0:* for this element, means that multiple reporting thresholds may be provided by the supplier. This may be useful in circumstances where multiple reporting

threshold/reportable application combinations are applicable. The supplier can provide information on which of these are at or above threshold and which are below threshold.

For most of the declarable substance and declarable substance group entries in the IEC 62474 database, the reporting threshold is based on the mass percent of the product. This is represented by a reporting threshold that is listed as “0,1 mass%”. The reference to the mass of the product that is declared is implied in this threshold. However, there are other many declarable substances and declarable substance groups that have a reporting threshold that has a different calculation basis. The EU RoHS declarable substance groups are examples that use the mass of the homogeneous material as the basis for calculation.

4.2.10 How to declare a product that does not have a fixed mass

To make a declaration for a product that does not have a fixed mass one shall specify the unitType (for example, cm, m, cm^2, m^2, cm^3, l, m^3, etc) and provide the mass of 1 unitType of the product. For example, the mass of 1 m of copper wire, the mass of 1 m^2 of steel sheet, the mass of 1 litre of paint. For discrete parts (e.g. resistors, capacitors, screws, housings), one should set the unitType to 'each'.

5 Material declaration examples

5.1 General

Clause 5 illustrates several examples of material declaration. For presentation purposes, these declarations are separated into i) business information (mandatory and optional information), ii) product part/material/substance group/substance declaration (mandatory and optional information) and iii) a declaration of the material classes (entirely optional). XML editor programs are commercially available that can show XML files in a more readable format.

This guidance document provides examples of IEC 62474 material declarations. For a complete list of information required for material declaration according to IEC 62474, see IEC 62474:2012, Clauses 4 and 6 and the developers table and XML schema in the IEC 62474 database. The examples provided in this guidance document are based on substance list version D7.00 and XML schema version X5.00, which are the most current versions of the IEC 62474 database at the time of this Technical Report’s publication.

Footnotes in the Tables shown in Clause 5 are repeating requirements from IEC 62474 and do not introduce any new requirements.

5.2 Example 1 – An electronic component

5.2.1 General

An electronic component weighing 0,12 grams consists of six materials. Two of these materials contain ‘Lead/Lead Compounds’ at or above the reporting threshold level. The termination glass contains 9,3 percent material mass percent of lead which is exempt from the RoHS substance restrictions under exemption 7(c)-I of Annex III of the RoHS2 Directive (as amended by Decision 2011/534/EU) and is exempt from the ELV substance restrictions under exemption 10(a) of Commission Directive 2011/37/EU. The termination metal solder contains 97,0 percent material mass percent of lead which is exempt from the RoHS substance restrictions under exemption 7(a) of Annex III of the RoHS2 Directive (as amended by Decision 2011/534/EU) and is exempt from the ELV substance restrictions under exemption 8(e) of Commission Directive 2011/37/EU.

Base data requirements example:

Subclause 5.2.2 and Tables 6, 7 and 8 illustrate the material declaration based on the “base data requirements” given in IEC 62474:2012, 4.2. The declarable substance group “Lead/Lead Compounds” shall be declared separately for each homogenous material that contains

“Lead/Lead Compounds” at or above the reporting threshold level, but the base requirements do not require declaration of the materials themselves; thus two declarations of “Lead/Lead Compounds” are shown. Figure 3 provides the XML file for this material declaration based on “base data requirements”.

Additional requirements example:

Subclause 5.2.3 illustrates a material declaration with optional additional data fields to provide information on material and exemption information for RoHS, and optional declaration of brominated flame retardants (other than PBBs, PBDEs, or HBCDD). Material information can be reported as mass or mass percent, but cannot use both. This example reports material information as mass percent.

Subclause 5.2.4 illustrates a material declaration reporting optional information that goes beyond the base requirements. This declaration is based on “additional requirements” given in IEC 62474:2012, 4.3 and provides information on materials, substance groups and substances for 100 percent of the product composition. IEC 62474:2012, 4.3.2 d) recommends that material classes declared represent at least 95 percent of the product. In this example, the information is more precise and 100 percent of the product composition is declared (see Table 9). Material and substance information can be reported as mass or mass percent, but cannot use both. This example reports material and substance information as mass percent.

Information in this example is provided as mass percent except those substance groups where IEC 62474:2012, 4.2.3 c) requires declaration of material mass percent. For the two occurrences of lead present in different materials, the information on applicable exemptions is provided (see Tables 9 and 11).

Figure 4 provides the XML file for this material declaration based on “additional requirements”.

Confidentiality Example:

Subclause 5.2.4 illustrates a material declaration reporting where the supplier chooses not to disclose the presence of Manganese Oxide (Mn_3O_4) in the active part ceramic on the grounds of confidentiality.

The three examples demonstrate the functionality of the following subclauses of IEC 62474:2012:

- Subclause 4.2.1 related to product, and product identification and mass;
- Subclause 4.2.3 related to assigning declarable substances and declarable substance groups to a product part, declarable substance and declarable substance group naming as per the IEC 62474 database, and reporting as mass percent of the product part or product;
- Subclause 4.2.3 related to declaring substance groups separately for each occurrence that exceeds a threshold;
- Subclause 4.2.4 related to reporting business information and use of SI units;
- Subclause 4.3.2 related to reporting material classes as named by the IEC 62474 and assigned to the product, accounting for 95 percent as mass percent of the product;
- Subclause 4.3.3 related to optional reporting of materials as mass percent of a material class or product part;
- Subclause 4.3.4 f) for reporting of exemptions.

5.2.2 Material declaration reporting "base data requirements"

Table 6 – Base data requirements – Business information

BusinessInfo	Business information is provided as specified in IEC 62474:2012
Authoriser name	John Doe
Authoriser title	Quality Assurance Manager
Authoriser phone	301-555-2345
Authoriser email	John.doe@supco.com
Contact name	Fred Smith
Contact title	Quality Assurance Assistant
Contact phone	301-555-2345
Contact email	Fred.smith@supco.com
SupplyCompany name	Supco
SupplyCompany UniqueID authority	DUNS
SupplyCompany UniqueID identity	987654321

Table 7 – Base data requirements – Product information

ProductID	Product information is provided as specified in IEC 62474:2012
ProductID.identifier	ABC4523
ProductID name	Electronic component
ProductID effectiveDate	2012-11-23
ProductID.Mass	0,12 (g)
unitType	Each

The example given in Table 8 and Figure 3 shows reporting each instance of lead and lead compounds within a reportable application contained in materials. The materials themselves are not declared under the IEC 62474 base requirements.

Table 8 – Base data requirements – Substance group/substance information

Substance group[a]				Substance[a]			
Name	**Mass[b] (g)**	**Mass[b] (percent)**	**Material mass[b] (percent)**	**Name**	**Mass (g)**	**Mass[b] (percent)**	**Material mass[b] (percent)**
Lead/Lead Compounds[c]			9,30				
Lead/Lead Compounds[c]			97				

[a] Substance groups or substances with mandatory reporting requirements shall be reported.

[b] See IEC 62474:2012, 4.2.3 c) for details on reporting requirements.

[c] The declarable substance group 'Lead/Lead Compounds' shall be declared separately for each homogenous material that contains lead or lead compounds at or above the reporting threshold level; thus two declarations of 'Lead/Lead Compounds' are shown, (see IEC 62474:2012, 4.2.3 d)).

```
<?xml version="1.0" encoding="utf-8"?>
<Main xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://std.iec.ch/iec62474" schemaDatabaseVersion="X5.00" substanceDatabaseVersion="D7.00" xsi:schemaLocation="http://std.iec.ch/iec62474 IEC62474_Schema_X5.00_20140924.xsd">
  <BusinessInfo fieldLock="false" mode="Distribute">
    <Response date="2014-11-08">
      <Authorizer email="john.doe@supco.com" name="John Doe" phone="301-555-2345" title="Quality Assurance Manager"/>
      <Contact email="fred.smith@supco.com" name="Fred Smith" phone="301-555-2345" title="Quality Assurance Assistant"/>
      <SupplyCompany name="Supco">
        <UniqueID identity="987654321" authority="DUNS"/>
      </SupplyCompany>
    </Response>
  </BusinessInfo>
  <Product unitType="each">
    <ProductID effectiveDate="2012-11-23" identifier="ABC4523" name="Electronic component">
      <Mass mass="0.12" unitOfMeasure="g"/>
    </ProductID>
    <SubstanceGroup name="Lead/Lead Compounds">
      <MatMassPercent massPercent="9.3"/>
      <Threshold aboveThresholdLevel="true" reportableApplication="All, except for batteries, cables and children's articles/toys" reportingThreshold="0.1 mass% of total Pb in homogenous material"/>
    </SubstanceGroup>
    <SubstanceGroup name="Lead/Lead Compounds">
      <MatMassPercent massPercent="97.0"/>
      <Threshold aboveThresholdLevel="true" reportableApplication="All, except for batteries, cables and children's articles/toys" reportingThreshold="0.1 mass% of total Pb in homogenous material"/>
    </SubstanceGroup>
  </Product>
</Main>
```

Figure 3 – Base data requirements – XML

5.2.3 Material declaration reporting base data requirements with optional additional data fields to provide information on material and exemption information for RoHS substances

In the example given in Table 9, the identical business information and product information as under the base requirements is provided. (See Tables 6 and 7)

Table 9 – Additional requirements – Material information and exemptions

Material				Substance group [a]					Substance [a]			
Name	Class ID	Mass[b] (g)	Mass[b] (percent)	Name	Mass[c] (g)	Mass[c] (per-cent)	Material mass[c] (per-cent)	Exemption [d] (simplified for illustration, see xml for full details)	Name	Mass[c] (g)	Mass[c] (per-cent)	Material mass[c] (per-cent)
Termination glass	M-010		0,02	Lead/Lead Compounds			9,3	See footnote [e] below for exemption text for cited exemption 7(c)-I				
Termination metal solder	M-009		1,0	Lead/Lead Compounds			97,0	See footnote [f] below for exemption text for cited exemption 7(a)				
Encapsulation organic polymer	M-014		20	Brominated flame retardants (other than PBBs, PBDEs, or HBCDD)			53,3[g]					

[a] Substance groups or substances with mandatory reporting requirements shall be reported; reporting of all other substance groups or substances is optional

[b] See IEC 62474:2012, 4.3.3 c) for details on reporting requirements.

[c] See IEC 62474:2012, 4.3.4 c) and 4.3.5 c) for details on reporting requirements.

[d] See IEC 62474:2012, 4.3.4 e) for details on reporting exemptions.

[e] Exemption information

UniqueID authority=IPC

UniqueID Identity=EL2011/534/EU

Exemption identity=7(c)-I

Exemption description= Electrical and electronic components containing lead in a glass or ceramic … (see xml for full description)

UniqueID authority=IPC

UniqueID Identity= EL2011/37/EU Exemption identity=10(a)Exemption description= Lead and lead compounds in components: …(see xml for full description)

[f] Exemption information

UniqueID authority=IPC

UniqueID Identity=EL2011/534/EU

Exemption identity=7(a)

Exemption description= Lead in high melting temperature type solders (i.e. lead-based alloys containing 85 percent by weight or more lead)

UniqueID authority=IPC

UniqueID Identity= EL2011/37/EU Exemption identity=8(e)

Exemption description= Lead and lead compounds in components: Lead in high melting temperature type solders (i.e. lead-based alloys containing 85 percent by weight or more lead)

[g] Reporting threshold is for Bromine content only and not full BFR compound.

Assuming that the material is made of 100 % of the substance Tetrabromobisphenol A diglycidyl ether – tetrabromobisphenol A copolymer (CAS 70682-74-5), we need to calculate the Bromine content of this substance in order to determine the material mass %

http://www.guidechem.com/cas-706/70682-74-5.html

so we have 79,9×8/1200 = 53,3

5.2.4 Material declaration reporting additional information for 100 percent of the product composition

In the example given in Table 10 and Table 11, the identical business information and product information as under the base requirements is provided.

Table 10 – Additional information – Material class information for 100 percent of the product composition

Material class	Material class ID	Mass g	Mass percent
Copper and its alloys	M-004		72
Precious metals	M-008		0,48
Other non-ferrous metals and alloys	M-009		1,00
Ceramics/glass	M-010		6,52
Other plastics and rubber	M-014		20

Table 11 – Additional information – Product material/substance group/substance information for 100 percent of the product composition

Material				Substance group[a]					Substance[a]			
Name	Class ID	Mass[b] (g)	Mass[b] (percent)	Name	Mass[c] (g)	Mass[c] (per-cent)	Material mass[c] (per-cent)	Exemption [d]	Name	Mass[c] (g)	Mass[c] (per-cent)	Material mass[c] (per-cent)
Active part ceramic	M-010		6,50						Manganese Oxide, (Mn3O4)		60	
									Nickel(II) Oxide (NiO)		20	
									Cobalt Oxide, (Co3O4)		20	
Termination metal plating	M-008		0,48						Silver		100	
Termination glass	M-010		0,02						Silicon oxide (SiO2)		90,7	
				Lead/Lead Compounds			9,3	See footnote [e] below for exemption text for cited exemption 7(c)-I	Lead		9,3	
Termination metal solder	M-009		1,0	Lead/Lead Compounds			97,0	See footnote [f] below for exemption text for cited exemption 7(a)	Lead		97	
									Tin		1	
									Silver		2	
Termination metal leads	M-004		72,00						Copper		100	
Encapsulation organic polymer	M-014		20	Brominated flame retardants (other than PBBs, PBDEs, or HBCDD)			53,3[g]		Tetrabromo-bisphenol A diglycidyl ether – tetrabromobisphenol A copolymer		100	

a	Substance groups or substances with mandatory reporting requirements shall be reported; reporting of all other substance groups or substances is optional
b	See IEC 62474:2012, 4.3.3 c) for details on reporting requirements.
c	See IEC 62474:2012, 4.3.4 c) and 4.3.5 c) for details on reporting requirements.
d	See IEC 62474:2012, 4.3.4 e) for details on reporting exemptions.
e	Exemption information UniqueID authority=IPC UniqueID Identity=EL2011/534/EU Exemption identity=7(c)-I Exemption description= Electrical and electronic components containing lead in a glass or ceramic … (see xml for full description) UniqueID authority=IPC UniqueID Identity= EL2011/37/EU Exemption identity=10(a)Exemption description= Lead and lead compounds in components: …(see xml for full description)
f	Exemption information UniqueID authority=IPC UniqueID Identity=EL2011/534/EU Exemption identity=7(a) Exemption description= Lead in high melting temperature type solders (i.e. lead-based alloys containing 85 percent by weight or more lead) UniqueID authority=IPC UniqueID Identity= EL2011/37/EU Exemption identity=8(e) Exemption description= Lead and lead compounds in components: Lead in high melting temperature type solders (i.e. lead-based alloys containing 85 percent by weight or more lead)
g	Reporting threshold is for Bromine content only and not full BFR compound. Assuming that the material is made of 100 % of the substance Tetrabromobisphenol A diglycidyl ether – tetrabromobisphenol A copolymer (CAS 70682-74-5), we need to calculate the Bromine content of this substance in order to determine the material mass % http://www.guidechem.com/cas-706/70682-74-5.html so we have 79,9×8/1200 = 53,3

In addition to the base data requirements, materials, substances and exemptions are declared in this example (see Figure 4).

```
<?xml version="1.0" encoding="utf-8"?>
<Main xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://std.iec.ch/iec62474" schemaDatabaseVersion="X5.00" substanceDatabaseVersion="D7.00" xsi:schemaLocation="http://std.iec.ch/iec62474 IEC62474_Schema_X5.00_20140924.xsd">
  <BusinessInfo fieldLock="false" mode="Distribute">
```

```
<Response date="2014-11-08">
  <Authorizer email="john.doe@supco.com" name="John Doe" phone="301-555-2345" title="Quality Assurance Manager"/>
  <Contact email="fred.smith@supco.com" name="Fred Smith" phone="301-555-2345" title="Quality Assurance Assistant"/>
  <SupplyCompany name="Supco">
    <UniqueID identity="987654321" authority="DUNS"/>
  </SupplyCompany>
</Response>
</BusinessInfo>
<Product unitType="each">
  <ProductID effectiveDate="2012-11-23" identifier="ABC4523" name="Electronic component">
    <Mass mass="0.12" unitOfMeasure="g"/>
  </ProductID>
  <MaterialClass id="M-004" name="Copper and its alloys">
    <MassPercent massPercent="72.00"/>
  </MaterialClass>
  <MaterialClass id="M-008" name="Precious metals">
    <MassPercent massPercent="0.48"/>
  </MaterialClass>
  <MaterialClass id="M-009" name="Other non-ferrous metals and alloys">
    <MassPercent massPercent="1.00"/>
  </MaterialClass>
  <MaterialClass id="M-010" name="Ceramics / glass">
    <MassPercent massPercent="6.52"/>
  </MaterialClass>
  <MaterialClass id="M-014" name="Other plastics and rubber">
    <MassPercent massPercent="20.00"/>
  </MaterialClass>
  <Material materialClassID="M-010" name="Active part ceramic">
    <Substance name="Manganese Oxide, (Mn3O4)">
      <MassPercent massPercent="60"/>
      <UniqueID identity="339311-30-7" authority="CAS"/>
    </Substance>
    <Substance name="Nickel(II) Oxide">
      <MassPercent massPercent="20"/>
      <UniqueID identity="1313-99-1" authority="CAS"/>
    </Substance>
    <Substance name="Cobalt Oxide, (Co3O4)">
      <MassPercent massPercent="20"/>
      <UniqueID identity="1308-06-1" authority="CAS"/>
    </Substance>
    <MassPercent massPercent="6.5"/>
  </Material>
  <Material materialClassID="M-008" name="Termination metal plating">
```

```
        <Substance name="Silver">
          <MassPercent massPercent="100"/>
          <UniqueID identity="7440-22-4" authority="CAS"/>
        </Substance>
        <MassPercent massPercent="0.48"/>
      </Material>
      <Material materialClassID="M-010" name="Termination glass">
        <SubstanceGroup name="Lead/Lead Compounds">
          <Exemptions>
            <Exemption description="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" identity="7(c)-I"/>
            <UniqueID authority="IPC" identity="EL2011/534/EU"/>
          </Exemptions>
          <Exemptions>
            <Exemption description="Lead and lead compounds in components: Electrical and electronic components which contain lead in a glass or ceramic, in a glass or ceramic matrix compound, in a glass-ceramic material, or in a glass-ceramic matrix compound. This exemption does not cover the use of lead in: – glass in bulbs and glaze of spark plugs, – dielectric ceramic materials of components listed under 10(b), 10(c) and 10(d)." identity="10(a)"/>
            <UniqueID authority="IPC" identity="EL2011/37/EU"/>
          </Exemptions>
          <MatMassPercent massPercent="9.3"/>
          <Substance name="Lead">
            <MassPercent massPercent="9.3"/>
            <UniqueID identity="7439-92-1" authority="CAS"/>
          </Substance>
          <Threshold aboveThresholdLevel="true" reportableApplication="All, except  for batteries, cables and children's articles/toys" reportingThreshold="0.1 mass% of total Pb in homogenous material"/>
        </SubstanceGroup>
        <Substance name="Silicon oxide (SiO2)">
          <MassPercent massPercent="90.7"/>
          <UniqueID identity="7631-86-9" authority="CAS"/>
        </Substance>
        <MassPercent massPercent="0.02"/>
      </Material>
      <Material materialClassID="M-009" name="Termination metal solder">
        <SubstanceGroup name="Lead/Lead Compounds">
          <Exemptions>
            <Exemption description="Lead in high melting temperature type solders (i.e. lead-based alloys containing 85 % by weight or more lead)" identity="7(a)"/>
            <UniqueID authority="IPC" identity="EL2011/534/EU"/>
          </Exemptions>
          <Exemptions>
            <Exemption description="Lead and lead compounds in components: Lead in high melting temperature type solders (i.e. lead-based alloys containing 85 % by weight or more lead)" identity="8(e)"/>
```

```
            <UniqueID authority="IPC" identity="EL2011/37/EU"/>
          </Exemptions>
          <MatMassPercent massPercent="97.0"/>
          <Substance name="Lead">
            <MassPercent massPercent="97.0"/>
            <UniqueID identity="7439-92-1" authority="CAS"/>
          </Substance>
        <Threshold aboveThresholdLevel="true" reportableApplication="All, except  for batteries, cables and children's articles/toys" reportingThreshold="0.1 mass% of total Pb in
homogenous material"/>
      </SubstanceGroup>
      <Substance name="Tin">
        <MassPercent massPercent="1"/>
        <UniqueID identity="7440-31-5" authority="CAS"/>
      </Substance>
      <Substance name="Silver">
        <MassPercent massPercent="2"/>
        <UniqueID identity="7440-22-4" authority="CAS"/>
      </Substance>
      <MassPercent massPercent="1.00"/>
    </Material>
    <Material materialClassID="M-004" name="Termination metal leads">
      <Substance name="Copper">
        <MassPercent massPercent="100"/>
        <UniqueID identity="7440-50-8" authority="CAS"/>
      </Substance>
      <MassPercent massPercent="72"/>
    </Material>
    <Material materialClassID="M-014" name="Encapsulation organic polymer">
      <SubstanceGroup name="Brominated flame retardants (other than PBBs, PBDEs, or HBCDD)">
        <MatMassPercent massPercent="53.3"/>
        <Substance name="Tetrabromobisphenol A diglycidyl ether – tetrabromobisphenol A copolymer">
          <MassPercent massPercent="100"/>
          <UniqueID identity="70682-74-5" authority="CAS"/>
        </Substance>
      </SubstanceGroup>
      <MassPercent massPercent="20"/>
    </Material>
  </Product>
</Main>
```

Figure 4 – Additional information – XML for 100 percent product information

5.2.5 Material declaration reporting additional information with one undeclared substance

If material classes are reported, the additional requirements specified in IEC 62474:2012, 4.3.2 must be met. In the example given in Table 12, Table 13 and Figure 5, the identical business information and product information as under the base requirements is provided.

Table 12 – Additional information – Declaration of material class information with one undeclared substance and statements about RoHS substance levels

Material class	Material class ID	Mass g	Mass percent
Copper and its alloys	M-004		72,00
Precious metals	M-008		0,48
Other non-ferrous metals and alloys	M-009		1,00
Ceramics/glass	M-010		6,52
Other plastics and rubber	M-014		20,00

Table 13 – Additional information – Product material/substance group/substance information with one undeclared substance

Material				Substance group[a]					Substance[a]			
Name	Class ID	Mass[b] (g)	Mass[b] (percent)	Name	Mass[c](g)	Mass[c] (per-cent)	Material mass[c] (per-cent)	Exemption[d]	Name	Mass[c] (g)	Mass[c] (percent)	Material mass[c] (percent)
Active part ceramic	M-010		6,5						See footnote [a] below		60[a]	
									Nickel(II) Oxide (NiO)		20	
									Cobalt Oxide, (Co3O4)		20	
Termination metal plating	M-008		0,48						Silver		100	
Termination glass	M-010		0,02						Silicon oxide (SiO2)		90,7	
				Lead/Lead Compounds			9,3	See footnote [f] below for exemption text for cited exemption 7(c)-I	Lead[i]		9,3	
Termination metal solder	M-009		1,00	Lead/Lead Compounds			97,0	See footnote [g] below for exemption text for cited exemption 7(a)	Lead		97	
									Tin		1	
									Silver		2	
Termination metal leads	M-004		72,00						Copper		100	
Encapsulation	M-014		20	Brominated			53,3[a]					

Material				Substance group[a]					Substance[a]			
Name	Class ID	Mass[b] (g)	Mass[b] (percent)	Name	Mass[c](g)	Mass[c] (per-cent)	Material mass[c] (per-cent)	Exemption[d]	Name	Mass[c] (g)	Mass[c] (percent)	Material mass[c] (percent)
Organic polymer				flame retardants (other than PBBs, PBDEs, or HBCDD)					Tetrabromo-bisphenol A diglycidyl ether – tetrabromo-bisphenol A copolymer		100	

[a] Substances are not required to add up to 100 % of the material or product; there are some proprietary substances not declared in this example.

[b] Substance groups or substances with mandatory reporting requirements shall be reported; reporting of all other substance groups or substances is optional.

[c] See IEC 62474:2012, 4.3.3 c) for details on reporting requirements.

[d] See IEC 62474:2012, 4.3.4 c) and 4.3.5 c) for details on reporting requirements.

[e] See IEC 62474:2012, 4.3.4 f) for details on reporting exemptions.

[f] Exemption Information –

UniqueID authority=IPC

UniqueID Identity=EL2011/534/EU

Exemption identity=7(c)-I

Exemption description= Electrical and electronic components containing lead in a glass (see XML for full description)

UniqueID authority=IPC

UniqueID Identity= EL2011/37/EU Exemption identity=10(a)

Exemption description= Lead and lead compounds in components: Electrical and electronic components which contain lead in a glass or ...(see XML for full description).

[g] Exemption Information

UniqueID authority=IPC

UniqueID Identity=EL2011/534/EU

Exemption identity=7(a)

Exemption description= Lead in high melting temperature type solders ...(see XML for full description)

UniqueID authority=IPC

UniqueID Identity= EL2011/37/EU Exemption identity=8(e)

Exemption description= Lead and lead compounds in components: Lead in high melting temperature type solders ...(see XML for full description)

[h] Reporting threshold is for Bromine content only, not full BFR compound.

Assuming that the material is made of 100 % of the substance Tetrabromobisphenol A diglycidyl ether – tetrabromobisphenol A copolymer (CAS 70682-74-5) we need to calculate the Bromine content of this substance in order to determine the material mass %

http://www.guidechem.com/cas-706/70682-74-5.html

so we have 79,9×8/1200 = 53,3

[i] This material is a glass handled as UVCB, and multiple declaration methods may be used to describe the substances contained. See 4.2.3 and Annex A. However, in this example, the RoHS substance group of lead/lead compounds shall be declared as specified in the IEC 62474 database.

```
<?xml version="1.0" encoding="utf-8"?>
<Main xmlns="http://std.iec.ch/iec62474" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" schemaDatabaseVersion="X5.00" substanceDatabaseVersion="D7.00" xsi:schemaLocation="http://std.iec.ch/iec62474 IEC62474_Schema_X5.00_20140924.xsd">
  <BusinessInfo fieldLock="false" mode="Distribute">
    <Response date="2014-11-08">
      <Authorizer email="john.doe@supco.com" name="John Doe" phone="301-555-2345" title="Quality Assurance Manager"/>
      <Contact email="fred.smith@supco.com" name="Fred Smith" phone="301-555-2345" title="Quality Assurance Assistant"/>
      <SupplyCompany name="Supco">
        <UniqueID identity="987654321" authority="DUNS"/>
      </SupplyCompany>
    </Response>
  </BusinessInfo>
  <Product unitType="each">
    <ProductID effectiveDate="2012-11-23" identifier="ABC4523" name="Electronic component">
      <Mass mass="0.12" unitOfMeasure="g"/>
    </ProductID>
    <MaterialClass id="M-004" name="Copper and its alloys">
      <MassPercent massPercent="72.00"/>
    </MaterialClass>
    <MaterialClass id="M-008" name="Precious metals">
      <MassPercent massPercent="0.48"/>
    </MaterialClass>
    <MaterialClass id="M-009" name="Other non-ferrous metals and alloys">
      <MassPercent massPercent="1.00"/>
    </MaterialClass>
    <MaterialClass id="M-010" name="Ceramics / glass">
      <MassPercent massPercent="6.52"/>
    </MaterialClass>
    <MaterialClass id="M-014" name="Other plastics and rubber">
      <MassPercent massPercent="20.00"/>
    </MaterialClass>
    <Material materialClassID="M-010" name="Active part ceramic">
      <Substance name="Nickel(II) Oxide">
        <MassPercent massPercent="20"/>
        <UniqueID identity="1313-99-1" authority="CAS"/>
      </Substance>
      <Substance name="Cobalt Oxide, (Co3O4)">
        <MassPercent massPercent="20"/>
        <UniqueID identity="1308-06-1" authority="CAS"/>
      </Substance>
      <MassPercent massPercent="6.5"/>
    </Material>
    <Material materialClassID="M-008" name="Termination metal plating">
```

```
<Substance name="Silver">
<MassPercent massPercent="100"/>
<UniqueID identity="7440-22-4" authority="CAS"/>
</Substance>
<MassPercent massPercent="0.48"/>
</Material>
<Material materialClassID="M-010" name="Termination glass">
<SubstanceGroup name="Lead/Lead Compounds">
<Exemptions>
<Exemption description="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" identity="7(c)-I"/>
<UniqueID authority="IPC" identity="EL2011/534/EU"/>
</Exemptions>
<Exemptions>
<Exemption description="Lead and lead compounds in components: Electrical and electronic components which contain lead in a glass or ceramic, in a glass or ceramic matrix compound, in a glass-ceramic material, or in a glass-ceramic matrix compound. This exemption does not cover the use of lead in: – glass in bulbs and glaze of spark plugs, – dielectric ceramic materials of components listed under 10(b), 10(c) and 10(d)." identity="10(a)"/>
<UniqueID authority="IPC" identity="EL2011/37/EU"/>
</Exemptions>
<MatMassPercent massPercent="9.3"/>
<Substance name="Lead ">
<MassPercent massPercent="9.3"/>
<UniqueID identity="1317-36-8" authority="CAS"/>
</Substance>
<Threshold reportableApplication="All, except for batteries, cables and children's articles/toys" reportingThreshold="0.1 mass% of total Pb in homogenous material" aboveThresholdLevel="true"/>
</SubstanceGroup>
<Substance name="Silicon oxide (SiO2)">
<MassPercent massPercent="90.7"/>
<UniqueID identity="7631-86-9" authority="CAS"/>
</Substance>
<MassPercent massPercent="0.02"/>
</Material>
<Material materialClassID="M-009" name="Termination metal solder">
<SubstanceGroup name="Lead/Lead Compounds">
<Exemptions>
<Exemption description="Lead in high melting temperature type solders (i.e. lead-based alloys containing 85 % by weight or more lead)" identity="7(a)"/>
<UniqueID authority="IPC" identity="EL2011/534/EU"/>
</Exemptions>
<Exemptions>
<Exemption description="Lead and lead compounds in components: Lead in high melting temperature type solders (i.e. lead-based alloys containing 85 % by weight or more lead)" identity="8(e)"/>
```

```
            <UniqueID authority="IPC" identity="EL2011/37/EU"/>
          </Exemptions>
          <MatMassPercent massPercent="97.0"/>
          <Substance name="Lead">
            <MassPercent massPercent="97.0"/>
            <UniqueID identity="7439-92-1" authority="CAS"/>
          </Substance>
          <Threshold reportableApplication="All, except for batteries, cables and children's articles/toys" reportingThreshold="0.1 mass% of total Pb in
homogenous material" aboveThresholdLevel="true"/>
        </SubstanceGroup>
        <Substance name="Tin">
          <MassPercent massPercent="1"/>
          <UniqueID identity="7440-31-5" authority="CAS"/>
        </Substance>
        <Substance name="Silver">
          <MassPercent massPercent="2"/>
          <UniqueID identity="7440-22-4" authority="CAS"/>
        </Substance>
        <MassPercent massPercent="1.00"/>
      </Material>
      <Material materialClassID="M-004" name="Termination metal leads">
        <Substance name="Copper">
          <MassPercent massPercent="100"/>
          <UniqueID identity="7440-50-8" authority="CAS"/>
        </Substance>
        <MassPercent massPercent="72"/>
      </Material>
      <Material materialClassID="M-014" name="Encapsulation organic polymer">
        <SubstanceGroup name="Brominated flame retardants (other than PBBs, PBDEs, or HBCDD)">
          <MatMassPercent massPercent="53.3"/>
          <Substance name="Tetrabromobisphenol A diglycidyl ether – tetrabromobisphenol A copolymer">
            <MassPercent massPercent="100"/>
            <UniqueID identity="70682-74-5" authority="CAS"/>
          </Substance>
        </SubstanceGroup>
        <MassPercent massPercent="20"/>
      </Material>
    </Product>
</Main>
```

Figure 5 – Additional information – XML with one undeclared substance

5.3 Example 2 – A product family of capacitors

5.3.1 General

Example 2 illustrates how product families which use like materials, but with differing masses, could be defined in a single declaration. The use of percentage of the product mass for each substance and the total mass for the product provide the capability to calculate the specific mass for each substance in each product.

Base requirements example:

Subclause 5.3.2 and Table 14 illustrate the material declaration based on the “base data requirements” given in IEC 62474:2012, 4.2. This product family does not contain any declarable substances or substance groups specified in the IEC 62474 database at or above the reporting threshold level. Figure 6 provides the XML file for this material declaration based on “base data requirements”.

Additional requirements example:

Subclause 5.3.3 and Table 15 and Table 16 illustrate the material declaration reporting optional information that goes beyond the base requirements. This declaration is based on the “additional requirements” given in IEC 62474:2012, 4.3 and provides information on materials, substance groups and substances. All information is provided as mass percent of the next level in the product hierarchy. The declaration of nickel in this specific case is not mandatory, even if nickel is intentionally added, because a capacitor typically being an internal component would not be considered to meet the reportable application “All, where prolonged skin contact is expected” that is specified in the IEC 62474 database. The material class information is specified using percentage of the product mass percent adding up to 100 percent in this example. Figure 7 provides the XML file for this material declaration based on “additional requirements”.

This example demonstrates the functionality of the following subclauses of IEC 62474:2012:

- Subclause 4.2.1 related to product, product family and product identification and mass;
- Subclause 4.2.3 b) related to declarable substance group naming as per the IEC 62474 database;
- Subclause 4.2.3 a) and 4.2.3 c) related to declarable substance being assigned to a product and reporting declarable substance mass or mass percent of a product;
- Subclause 4.2.4 related to reporting business information and use of SI units;
- Subclause 4.3.3 related to reporting materials that are assigned to a product, using mass percent of a product;
- Subclause 4.3.4 related to mandatory reporting if a declarable substance or declarable substance group is present at or over the reporting threshold for an applicable reporting application;
- Subclause 4.3.4 f) for reporting of exemptions.

5.3.2 Reporting material declaration according to“base data requirements”

In the example given in Table 14 and Figure 6, the identical business information as under Example 1 is provided.

Table 14 – Base data requirements – Product information

ProductID			Product information is provided as specified in IEC 62474:2012
ProductFamilyName			CAP2345-xx
unitType			Each
ProductID.identifier	ProductID name	ProductID.effectiveDate	ProductID.Mass
CAP2345-10 0201	10 pf capacitor	2012-07-01	0,14 (g)
CAP2345-10 0402	10 pf capacitor	2012-07-01	0,40 (g)
CAP2345-10 0603	10 pf capacitor	2012-07-01	0,75 (g)

```
<?xml version="1.0" encoding="utf-8"?>
<Main xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://std.iec.ch/iec62474" schemaDatabaseVersion="X5.00"
substanceDatabaseVersion="D7.00" xsi:schemaLocation="http://std.iec.ch/iec62474 IEC62474_Schema_X5.00_20140924.xsd">
  <BusinessInfo fieldLock="false" mode="Distribute">
    <Response date="2014-11-08">
      <Authorizer email="john.doe@supco.com" name="John Doe" phone="301-555-2345" title="Quality Assurance Manager"/>
      <Contact email="fred.smith@supco.com" name="Fred Smith" phone="301-555-2345" title="Quality Assurance Assistant"/>
      <SupplyCompany name="Supco">
        <UniqueID identity="987654321" authority="DUNS"/>
      </SupplyCompany>
    </Response>
  </BusinessInfo>
  <Product unitType="each" productFamilyName="CAP2345-xx">
    <ProductID effectiveDate="2012-07-01" identifier="CAP2345-10 0201" name="10 pf capacitor">
      <Mass mass="0.14" unitOfMeasure="g"/>
    </ProductID>
    <ProductID effectiveDate="2012-07-01" identifier="CAP2345-10 0402" name="10 pf capacitor">
      <Mass mass="0.40" unitOfMeasure="g"/>
    </ProductID>
    <ProductID effectiveDate="2012-07-01" identifier="CAP2345-10 0603" name="10 pf capacitor">
      <Mass mass="0.75" unitOfMeasure="g"/>
    </ProductID>
  </Product>
</Main>
```

Figure 6 – Base data requirements – XML

5.3.3 Material declaration reporting additional information for 100 percent of the product composition

In the example given in Table 15, Table 16 and Figure 7, the identical business information and product information as under the base requirements is provided.

Table 15 – Additional information – Material class information for 100 percent of the product composition

Material class	Material class ID	Mass percent
Nickel and its alloys	M-006	3
Precious metals	M-008	6
Other non-ferrous metals and alloys	M-009	5
Ceramics / glass	M-010	86

Table 16 – Additional information – Declaration of 100 percent of product composition

Material				Substance[a]				
Name	Class ID	Mass (g)	Mass (percent)	Name	CAS	Mass[b] (g)	Mass[b] (percent)	Material mass[b] (percent)
Ceramic	M-010		86	Barium titanate	12047-27-7		87	
				Bismuth titanium oxide	11115-71-2		13	
Electrodes	M-008		4	Silver	7440-22-4		75	
				Palladium	7440-05-3		25	
Termination	M-008		2	Gold	7440-57-5		100	
Nickel plating	M-006		3	Nickel	7440-02-0		100	
Tin plating	M-009		5	Tin	7440-31-5		100	

NOTE See IEC 62474:2012, 4.3.4 c) and 4.3.5 c) for details on reporting requirements

[a] Substances are not required to add up to 100 % of the material or product

[b] Substance groups or substances with mandatory reporting requirements shall be reported; reporting of all other substance groups or substances is optional.

If additional information is reported, the additional requirements specified in IEC 62474:2012 4.3 must be met. Materials and substances are declared in this example.

```
<?xml version="1.0" encoding="utf-8"?>
<Main        xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"          xmlns="http://std.iec.ch/iec62474"          schemaDatabaseVersion="X5.00"
substanceDatabaseVersion="D7.00" xsi:schemaLocation="http://std.iec.ch/iec62474 IEC62474_Schema_X5.00_20140924.xsd">
  <BusinessInfo fieldLock="false" mode="Distribute">
    <Response date="2014-11-08">
      <Authorizer email="john.doe@supco.com" name="John Doe" phone="301-555-2345" title="Quality Assurance Manager"/>
      <Contact email="fred.smith@supco.com" name="Fred Smith" phone="301-555-2345" title="Quality Assurance Assistant"/>
      <SupplyCompany name="Supco">
        <UniqueID identity="987654321" authority="DUNS"/>
      </SupplyCompany>
    </Response>
  </BusinessInfo>
  <Product unitType="each" productFamilyName="CAP2345-xx">
    <ProductID effectiveDate="2012-07-01" identifier="CAP2345-10 0201" name="10 pf capacitor">
      <Mass mass="0.14" unitOfMeasure="g"/>
    </ProductID>
    <ProductID effectiveDate="2012-07-01" identifier="CAP2345-10 0402" name="10 pf capacitor">
      <Mass mass="0.40" unitOfMeasure="g"/>
    </ProductID>
    <ProductID effectiveDate="2012-07-01" identifier="CAP2345-10 0603" name="10 pf capacitor">
      <Mass mass="0.75" unitOfMeasure="g"/>
    </ProductID>
    <MaterialClass id="M-006" name="Nickel and its alloys">
      <MassPercent massPercent="3"/>
    </MaterialClass>
    <MaterialClass id="M-008" name="Precious metals">
      <MassPercent massPercent="6"/>
    </MaterialClass>
    <MaterialClass id="M-009" name="Other non-ferrous metals and alloys">
      <MassPercent massPercent="5"/>
    </MaterialClass>
    <MaterialClass id="M-010" name="Ceramics / glass">
      <MassPercent massPercent="86"/>
    </MaterialClass>
    <Material materialClassID="M-010" name="Ceramic">
      <Substance name="Barium titanate">
        <MassPercent massPercent="87"/>
        <UniqueID identity="12047-27-7" authority="CAS"/>
      </Substance>
      <Substance name="Bismuth titanium oxide">
        <MassPercent massPercent="13"/>
        <UniqueID identity="12048-51-0" authority="CAS"/>
      </Substance>
```

```
        <MassPercent massPercent="86"/>
      </Material>
      <Material materialClassID="M-008" name="Electrodes">
        <Substance name="Silver">
          <MassPercent massPercent="75"/>
          <UniqueID identity="7440-22-4" authority="CAS"/>
        </Substance>
        <Substance name="Palladium">
          <MassPercent massPercent="25"/>
          <UniqueID identity="7440-05-3" authority="CAS"/>
        </Substance>
        <MassPercent massPercent="4"/>
      </Material>
      <Material materialClassID="M-008" name="Termination">
        <Substance name="Gold">
          <MassPercent massPercent="100"/>
          <UniqueID identity="7440-57-5" authority="CAS"/>
        </Substance>
        <MassPercent massPercent="2"/>
      </Material>
      <Material materialClassID="M-006" name="Nickel plating">
        <Substance name="Nickel">
          <MassPercent massPercent="100"/>
          <UniqueID identity="7440-02-0" authority="CAS"/>
        </Substance>
        <MassPercent massPercent="3"/>
      </Material>
      <Material materialClassID="M-009" name="Tin plating">
        <Substance name="Tin">
          <MassPercent massPercent="100"/>
          <UniqueID identity="7440-31-5" authority="CAS"/>
        </Substance>
        <MassPercent massPercent="5"/>
      </Material>
    </Product>
</Main>
```

Figure 7 – Additional information – XML for 100 percent of the product composition

5.4 Example 3 – An assembly consisting of a circuit board and a battery

5.4.1 General

Example 3 illustrates how an assembly, which weighs 6,3 g and consists of a circuit board weighing 4 g and a battery weighing 2,3 g, could be defined. The circuit board contains a brominated flame retardant at or above the reporting threshold level for the optional reporting requirement for this substance group in the IEC 62474 database. The battery contains 0,296 mass percent of mercury and 0,004 8 mass percent of lead. Both of these substances are contained in the battery (reportable application “Batteries”) at or above the reporting threshold levels for the mandatory reporting requirements in the IEC 62474 database for “Mercury/Mercury Compounds” and “Lead/Lead Compounds”. The battery also contains 0,000 4 mass percent cadmium, which is below the reporting threshold level for the mandatory reporting requirements for this substance group in the IEC 62474 database.

Base data requirements example:

Subclause 5.4.2 and Tables 17, 18 and 19 illustrate the material declaration based on the “base data requirements” given in IEC 62474:2012, 4.2. IEC 62474:2012, 4.2.2 states that product parts shall be declared if a substance group or substance in the IEC 62474 database refers to this part in the reporting threshold and its reporting threshold is met or exceeded. Therefore, the battery is reported as a product part. Figure 8 provides the XML file for this material declaration based on “base data requirements”.

Additional requirements example:

Subclause 5.4.3, and Tables 20, 21 and 22 illustrate the material declaration reporting optional information that goes beyond the base requirements. This declaration is based on the “additional requirements” given in IEC 62474:2012, 4.3 and provides information on materials, substance groups and substances in the battery product part and also the circuit board product part. All information is provided as mass percent of the next level in the product hierarchy shown in Figure 2. The declaration of Cadmium/Cadmium compounds in this specific case is not mandatory, because cadmium below the reporting threshold level for the mandatory reporting requirements for this substance group in the IEC 62474 database.

The material class information is specified using percent of the product mass percent adding up to 100 percent in this example. Figure 9 provides the XML file for this material declaration based on “additional requirements”.

This example demonstrates the functionality of the following subclauses of IEC 62474:2012:

- Subclause 4.2.1 related to product, and product identification and mass;
- Subclause 4.2.2 related to product part identification, product parts assigned to the product and reporting product part mass;
- Subclause 4.2.3 related to assigning declarable substances and declarable susbstance groups to a product part and declarable substance and declarable substance group naming per the IEC 62474 database;
- Subclause 4.2.4 related to reporting business information and use of SI units;
- Subclause 4.3.1 related to optional reporting of product parts, assigning product parts to a product, assigning a product part identification and reporting product part mass;
- Subclause 4.3.4 related to mandatory reporting if a declarable substance or declarable substance group is present at or above the reporting threshold for an applicable reporting application;
- Subclause 4.3.4 f) for reporting of exemptions.

5.4.2 Material declaration reporting “base data requirements”

In this example, the identical business information as under Example 1 is provided.

Table 17 – Base data requirements – Product information

ProductID	Product information is provided as specified in IEC 62474:2012
ProductID.identifier	ASS-XYZ
ProductID name	Assembly
ProductID.effectiveDate	2013-01-10
ProductID.Mass	6,3 (g)
unitType	Each

Table 18 – Base data requirements – Product part information

ProductID	Product part information is provided as specified in IEC 62474:2012
ProductID.identifier	BATT-S325
ProductID name	Battery
ProductID.effectiveDate	2013-01-10
ProductID.Mass	2,3 (g)
Number of Units	1

Table 19 – Base data requirements – Product part and substance group information

Product part			Substance group[a]			
Name	Mass[b] (g)	Mass[b] (percent)	Name	Mass[c] (g)	Mass[c] (percent)	Material mass[c] (percent)
Battery[d]	2,3		Mercury/Mercury Compounds[c]		0,296	
			Lead/Lead Compounds[c]		0,004 8	

[a] Substance groups or substances with mandatory reporting requirements shall be reported.

[b] See IEC 62474:2012, 4.2.2 c) for details on reporting requirements.

[c] See IEC 62474:2012, 4.2.3 c) for details on reporting requirements.

[d] IEC 62474:2012, 4.2.2 states that product parts shall be declared if a substance group or substance in the IEC 62474 database refers to this part in the reporting threshold and its reporting threshold is exceeded. Therefore, the battery is reported as a product part.

```
<?xml version="1.0" encoding="utf-8"?>
<Main xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://std.iec.ch/iec62474" schemaDatabaseVersion="X5.00" substanceDatabaseVersion="D7.00"
xsi:schemaLocation="http://std.iec.ch/iec62474 IEC62474_Schema_X5.00_20140924.xsd">
  <BusinessInfo fieldLock="false" mode="Distribute">
    <Response date="2014-11-08">
      <Authorizer email="john.doe@supco.com" name="John Doe" phone="301-555-2345" title="Quality Assurance Manager"/>
      <Contact email="fred.smith@supco.com" name="Fred Smith" phone="301-555-2345" title="Quality Assurance Assistant"/>
      <SupplyCompany name="Supco">
        <UniqueID identity="987654321" authority="DUNS"/>
      </SupplyCompany>
    </Response>
  </BusinessInfo>
  <Product unitType="each">
    <ProductID effectiveDate="2013-01-10" identifier="ASS-XYZ" name="Assembly">
      <Mass mass="6.3" unitOfMeasure="g"/>
    </ProductID>
    <ProductPart numberOfUnits="1">
      <SubstanceGroup name="Mercury/Mercury Compounds">
        <MassPercent massPercent="0.296"/>
        <Threshold aboveThresholdLevel="true" reportableApplication="Batteries" reportingThreshold="0.00001 mass% of battery"/>
      </SubstanceGroup>
      <SubstanceGroup name="Lead/Lead Compounds">
        <MassPercent massPercent="0.0048"/>
        <Threshold aboveThresholdLevel="true" reportableApplication="Batteries" reportingThreshold="0.0004 mass% of battery"/>
      </SubstanceGroup>
      <ProductID name="Battery" identifier="BATT-S325" effectiveDate="2013-01-10">
        <Mass mass="2.3" unitOfMeasure="g"/>
      </ProductID>
    </ProductPart>
  </Product>
</Main>
```

Figure 8 – Base data requirements – XML

5.4.3 Material declaration reporting "Additional requirements" for 100 percent of the product composition

In this example, the identical business information and product information as under the base requirements is provided.

Table 20 – Additional information – Product part information

ProductID	Product part information is provided as specified in IEC 62474:2012
ProductID.identifier	CIRC-FR4
ProductID name	Circuit board
ProductID.effectiveDate	2013-01-10
ProductID.Mass	4 (g)
Number of Units	1
ProductID.identifier	BATT-S325
ProductID name	Battery
ProductID.effectiveDate	2013-01-10
ProductID.Mass	2,3 (g)
Number of Units	1

Table 21 – Additional information – Material class information for 100 percent of assembly composition

Material Class	Material class ID	Mass (g)	Mass percent
Stainless steel	M-001		23,62
Zinc and its alloys	M-007		3,83
Other inorganic materials	M-011		9,06
Other plastics and rubber	M-014		63,49

Table 22 – Additional information – Product part/material/substance group/ substance information for 100 percent of assembly composition.

Product part			Material				Substance group [a]				Substance [a]			
Name	Mass[b] (g)	Mass[b] (per-cent)	Name	Class ID	Mass[c] (g)	Mass[c] (per cent)	Name	Mass[d] (g)	Mass[d] (per-cent)	Material mass[d] (percent)	Name	Mass[d] (g)	Mass[d] (percent)	Material mass[d] (percent)
Circuit board	4		laminate	M-014		100	Brominated Flame Retardants (BFR) – other			21,8[e]	Tetrabromobisphenol A diglycidyl ether – tetrabromo-bisphenol A copolymer)		40,86	
											Silicon Oxide (SiO2)		54,5	
											Copper		4,34	
											Tin		0,3	
Battery	2,3		Positive electrode	M-011		21,3					Silver oxide (Ag2O)		17,84	
											Manganese oxide (MnO2)		82,16	
			Negative electrode	M-007		10,5					Zinc		97,131 8	
							Mercury/ Mercury Compounds		2,818 7		Mercury		2,818 7	
							Cadmium/ Cadmium Compounds		0,003 79		Cadmium		0,003 79	
							Lead/Lead Compounds		0,045 71		Lead		0,045 71	
			Electrolyte	M-011		3,5					Potassium hydroxide KOH[f]		10	
			Casing Steel	M-001		64,7					Iron		99,12	
											Carbon		0,15	
											Manganese		0,60	

Product part			Material				Substance group [a]				Substance [a]			
Name	Mass[b] (g)	Mass[b] (per-cent)	Name	Class ID	Mass[c] (g)	Mass[c] (per cent)	Name	Mass[d] (g)	Mass[d] (per-cent)	Material mass[d] (percent)	Name	Mass[d] (g)	Mass[d] (percent)	Material mass[d] (percent)
											Phosphorus		0,10	
											Sulfur		0,03	

[a] Substance groups or substances with mandatory reporting requirements shall be reported; reporting of all other substance groups or substances is optional

[b] See IEC 62474:2012, 4.3.1 c) for details on reporting requirements.

[c] See IEC 62474:2012, 4.3.3 c) for details on reporting requirements.

[d] See IEC 62474:2012, 4.3.4 c) and 4.3.5c) for details on reporting requirements.

[e] Reporting threshold is for Bromine content only and not full BFR compound.

Assuming that the material is made of 100 % of the substance Tetrabromobisphenol A diglycidyl ether – tetrabromobisphenol A copolymer (CAS 70682-74-5), we need to calculate the Bromine content of this substance in order to determine the material mass %

http://www.guidechem.com/cas-706/70682-74-5.html

so we have 79,9×8/1200 = 53,3

Since BFR is 40.86% in laminate – Br Content = 53,3 x 40,86% = 21,8%

[f] Balance of electrolyte is water (90 mass percent)

In addition to the base data requirements product parts, materials, substance groups and substances are declared in this example (see Figure 9).

```
<?xml version="1.0" encoding="utf-8"?>
<Main xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://std.iec.ch/iec62474" schemaDatabaseVersion="X5.00" substanceDatabaseVersion="D7.00" xsi:schemaLocation="http://std.iec.ch/iec62474 IEC62474_Schema_X5.00_20140924.xsd">
  <BusinessInfo fieldLock="false" mode="Distribute">
    <Response date="2014-11-08">
      <Authorizer email="john.doe@supco.com" name="John Doe" phone="301-555-2345" title="Quality Assurance Manager"/>
      <Contact email="fred.smith@supco.com" name="Fred Smith" phone="301-555-2345" title="Quality Assurance Assistant"/>
      <SupplyCompany name="Supco">
        <UniqueID identity="987654321" authority="DUNS"/>
      </SupplyCompany>
    </Response>
  </BusinessInfo>
  <Product unitType="each">
    <ProductID effectiveDate="2013-01-10" identifier="ASS-XYZ" name="Assembly">
      <Mass mass="6.3" unitOfMeasure="g"/>
```

```
</ProductID>
<MaterialClass id="M-001" name="Stainless steel">
   <MassPercent massPercent="23.62"/>
</MaterialClass>
</MaterialClass>
<MaterialClass id="M-007" name="Zinc and its alloys">
   <MassPercent massPercent="3.83"/>
</MaterialClass>
</MaterialClass>
<MaterialClass id="M-011" name="Other inorganic materials">
   <MassPercent massPercent="9.06"/>
</MaterialClass>
<MaterialClass id="M-014" name="Other Plastics and Rubber">
   <MassPercent massPercent="63.49"/>
</MaterialClass>
<ProductPart numberOfUnits="1">
   <ProductID name="Circuit board" identifier="CIRC-FR4" effectiveDate="2013-01-10">
      <Mass mass="4" unitOfMeasure="g"/>
   </ProductID>
   <Material name="laminate" materialClassID="M-014">
      <SubstanceGroup name="Brominated Flame Retardants (BFR) – other">
         <MassPercent massPercent="21.8"/>
         <Substance name="Tetrabromobisphenal A diglycidyl ether – tetrabromobisphenol A copolymer">
            <MassPercent massPercent="40.86"/>
            <UniqueID authority="CAS" identity="68928-70-1"/>
         </Substance>
         <Threshold aboveThresholdLevel="true" reportableApplication="Printed wiring board laminate" reportingThreshold="0.09 mass% total bormine
content in laminate"/>
      </SubstanceGroup>
      <Substance name="Silicon Oxide (SiO2)">
         <MassPercent massPercent="54.5"/>
         <UniqueID authority="CAS" identity="7631-86-9"/>
      </Substance>
      <Substance name="Copper">
         <MassPercent massPercent="4.34"/>
         <UniqueID authority="CAS" identity="7440-50-8"/>
      </Substance>
      <Substance name="Tin">
         <MassPercent massPercent="0.3"/>
         <UniqueID authority="CAS" identity="7440-31-5"/>
      </Substance>
      <MassPercent massPercent="100"/>
   </Material>
```

```
</ProductPart>
<ProductPart numberOfUnits="1">
  <ProductID name="Battery" identifier="BATT-S325" effectiveDate="2013-01-10">
    <Mass mass="2.3" unitOfMeasure="g"/>
  </ProductID>
  <Material name="Positive electrode" materialClassID="M-011">
    <Substance name="Silver oxide Ag2O">
      <MassPercent massPercent="17.84"/>
      <UniqueID authority="CAS" identity="20667-12-3"/>
    </Substance>
    <Substance name="Manganese Oxide (MnO2)">
      <MassPercent massPercent="82.16"/>
      <UniqueID authority="CAS" identity="1313-13-9"/>
    </Substance>
    <MassPercent massPercent="21.3"/>
  </Material>
  <Material name="Negative electrode" materialClassID="M-007">
    <SubstanceGroup name="Mercury/Mercury Compounds">
      <MassPercent massPercent="2.8187"/>
      <Substance name="Mercury">
        <MassPercent massPercent="2.8187"/>
        <UniqueID authority="CAS" identity="7439-97-6"/>
      </Substance>
      <Threshold aboveThresholdLevel="true" reportingThreshold="0.0001 mass% of battery" reportableApplication="Batteries"/>
    </SubstanceGroup>
    <SubstanceGroup name="Cadmium/Cadmium Compounds">
      <MassPercent massPercent="0.00379"/>
      <Substance name="Cadmium">
        <MassPercent massPercent="0.00379"/>
        <UniqueID authority="CAS" identity="7440-43-9"/>
      </Substance>
      <Threshold aboveThresholdLevel="true" reportingThreshold="0.0005 mass% by weight of battery" reportableApplication="Batteries"/>
    </SubstanceGroup>
    <SubstanceGroup name="Lead/Lead Compounds">
      <MassPercent massPercent="0.04571"/>
      <Substance name="Lead">
        <MassPercent massPercent="0.04571"/>
        <UniqueID authority="CAS" identity="7439-92-1"/>
      </Substance>
      <Threshold aboveThresholdLevel="true" reportingThreshold="0.004 mass% of battery" reportableApplication="Batteries"/>
    </SubstanceGroup>
    <Substance name="Zinc">
      <MassPercent massPercent="97.1318"/>
```

```
    <UniqueID authority="CAS" identity="20667-12-3"/>
  </Substance>
  <MassPercent massPercent="10.5"/>
</Material>
<Material name="Electrolyte" materialClassID="M-011">
  <Substance name="Potassium Hydroxide KOH">
    <MassPercent massPercent="100"/>
    <UniqueID authority="CAS" identity="1310-58-3"/>
  </Substance>
  <MassPercent massPercent="3.5"/>
</Material>
<Material name="Casing Steel" materialClassID="M-001">
  <Substance name="Iron">
    <MassPercent massPercent="99.12"/>
  </Substance>
  <Substance name="Carbon">
    <MassPercent massPercent="0.15"/>
  </Substance>
  <Substance name="Manganese">
    <MassPercent massPercent="0.60"/>
  </Substance>
  <Substance name="Phosphorus">
    <MassPercent massPercent="0.10"/>
  </Substance>
  <Substance name="Sulfur">
    <MassPercent massPercent="0.03"/>
  </Substance>
  <MassPercent massPercent="64.7"/>
</Material>
</ProductPart>
</Product>
</Main>
```

Figure 9 – Additional information – XML for 100 percent of the assembly composition

5.5 Example 4 – A product containing a substance which falls under both REACH Annex XVII and REACH candidate list of substances of very high concern (SVHC)

5.5.1 General

Example 4 illustrates how a product which contains Bis (2-ethylhexyl) phthalate (DEHP) (CAS# 117-81-7) which falls under REACH Annex 17 (restricted substances) and REACH SVHC could be reported. This example also includes some optional data fields for declarable substance group and declarable substance shown in IEC 62474:2012, Table B.1.

Subclause 5.5.2, Figure 10 and Tables 23 and 24 illustrate the reporting of REACH SVHCs.

The mass of the product provided by the supplier is 200 g. Five mass percent (2,5 g) of Bis (2-ethylhexyl) phthalate (DEHP) is contained in the plasticized material (50 g) of this product. In addition to the plasticized materials, this product also includes 150 g of an electronic component which does not contain any declarable substances based on the IEC 62474 database. The concentration of DEHP in the product is 1,25 mass percent.

DEHP is on the REACH candidate list of SVHCs and is listed in the IEC 62474 database. Its concentration in the product exceeds the threshold level (0,1 mass percent) specified in the IEC 62474 database. So, reporting of DEHP at the substance level is mandatory under base requirements (see IEC 62474:2012, 4.2.3).

DEHP is also one of the substances which is included in the substance group entry in the IEC 62474 database named “Phthalates, Selected Group 1 (BBP, DBP, DEHP)”. This is based on a restriction in REACH Annex XVII, with the reporting threshold based on the mass percent in plasticized material and a reportable application of “toy or child care article”. If the reporting threshold level is met or exceeded and the reportable application is met, then the presence of “Phthalates, Selected Group 1 (BBP, DBP, DEHP)” shall be declared. In this case, the declarable substance group “Phthalates, Selected Group 1 (BBP, DBP, DEHP)” is mandatory according to IEC 62474:2012, 4.2.3. If just one of the conditions is met, the declaration of “Phthalates, Selected Group 1 (BBP, DBP, DEHP)” is optional. In this situation, another substance group that is not listed in the IEC 62474 Database, such as “Phthalates”, could also be declared.

In general, for this supplied product, it is difficult for the supplier to judge whether this requester’s product corresponds to a “toy or child care article,” which is the “reportable application” for “Phthalates, Selected Group 1 (BBP, DBP, DEHP)”. IEC 62474:2012, 4.2.4 d) states that if the supplier is uncertain of the applicability of the reportable application to their product, then the presence of the substance shall be declared if it exceeds the reporting threshold of the supplied product. In this example , the “Above Threshold Level” is “Yes” because the content of DEHP in the plasticized material meets or exceeds the threshold level of 0,1 mass percent for “Phthalates, Selected Group 1 (BBP, DBP, DEHP)” and the material mass percent is provided. However, the supplier does not know whether the requester’s product corresponds to a “toy or child care article” and so the supplier provides a voluntary comment field to clarify that the part being declared is not suitable for use in a child care article.

If the supplier is sure that their product can never be assembled or used in a toy or child care article by the downstream manufacturer, then even if the supplied product contains “Phthalates, Selected Group 1 (BBP, DBP, DEHP)” that exceed the threshold level of 0,1mass percent, declaration is not required. However the supplier may voluntarily declare content information in this case as described inIEC 62474:2012, 4.3.4, first paragraph. In this example, the DEHP content meets or exceeds the threshold levels both for the substance group “Phthalates, Selected Group 1 (BBP, DBP, DEHP)” and for the REACH candidate list of SVHCs. The content data is calculated as follows.

- Material mass percent of DEHP in plasticized material = (2,5 g ÷ 50 g) × 100 = 5,00 percent

- Mass percent of DEHP as an SVHC in the product part = (2,5 g ÷ 200 g) × 100 = 1,25 percent

Optional data fields included in this example are:

- Above Threshold Level
- Reportable Application
- Description of Use
- Comment field

This example demonstrates the functionality of the following subclauses of IEC 62474:2012:

- Subclause 4.2.1 related to product, and product identification and mass;
- Subclause 4.2.3 related to declarable substance and declarable substance group naming per the IEC 62474 database and reporting mass;
- Subclause 4.2.4 related to reporting business information, use of SI units and how to report if uncertain if thresholds are exceeded;
- Subclause 4.3.4 related to assigning declarable substances to a declarable substance group if the declarable substance group is declared;
- Subclause 4.3.4 related to RoHS and REACh reporting.

5.5.2 Material declaration reporting based on “base data requirements” with optional additional data fields

In this example, the identical business information as for Example 1 is provided.

Table 23 – Base data requirements – Product information

ProductID	Product information is provided as specified in IEC 61474:2012
ProductID.identifier	XYZ-001
ProductID name	Product A
ProductID.effectiveDate	2013-02-01
ProductID.Mass	200,0 (g)
unitType	Each

Table 24 – Base data requirements with optional additional data fields – Substance group/substance information

Substance group [a]							Substance [a]					
Name	Mass[b] (g)	Mass[b] (per-cent)	Material mass[b] (per-cent)	Above Threshold Level	Reportable Application	Comment	Name	Mass[b] (g)	Mass[b] (per-cent)	Material mass[b] (per-cent)	Above Threshold Level	Description of use
Phthalates, Selected Group 1 (BBP, DBP, DEHP)			5,0	Yes	Children's toy or child care article	This part is not suitable for use as a children’s toy or child care article	Di(2-ethylhexyl) phthalate (DEHP)		1,25		Yes	Plasticizer

[a] Substance groups or substances with mandatory reporting requirements shall be reported.

[b] See IEC 62474:2012, 4.2.3 c) for details on reporting requirements.

```
<?xml version="1.0" encoding="utf-8"?>
<Main xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://std.iec.ch/iec62474" schemaDatabaseVersion="X5.00" substanceDatabaseVersion="D7.00" xsi:schemaLocation="http://std.iec.ch/iec62474 IEC62474_Schema_X5.00_20140924.xsd">
  <BusinessInfo fieldLock="false" mode="Distribute">
    <Response date="2014-10-18">
      <Authorizer email="john.doe@supco.com" name="John Doe" phone="301-555-2345" title="Quality Assurance Manager"/>
      <Contact email="john.doe@supco.com" name="Fred Smith " phone="301-555-2345" title="Quality Assurance Assistant"/>
      <SupplyCompany name="Supco">
        <UniqueID identity="987654321" authority="DUNS"/>
      </SupplyCompany>
    </Response>
  </BusinessInfo>
  <Product unitType="each">
    <ProductID effectiveDate="2013-02-01" identifier="XYZ-001 " name="Product A">
      <Mass mass="200.0" unitOfMeasure="g"/>
    </ProductID>
    <SubstanceGroup name="Phthalates, Selected Group 1 (BBP, DBP, DEHP)" descriptionOfUse="Plasticizer" comment="This part is not suitable for use as a children's toy or child care article">
      <MatMassPercent massPercent="5.0" />
      <Threshold aboveThresholdLevel="true" reportingThreshold="0.1 mass percent as the sum of the phthalate concentrations in plasticized material" reportableApplication="Children's toy or child care article" />
      <Substance name="Di(2-ethylhexyl)phthalate (DEHP)" descriptionOfUse="Plasticizer">
        <MassPercent massPercent="1.25" />
        <Threshold aboveThresholdLevel="true" reportingThreshold="All" />
      </Substance>
    </SubstanceGroup>
  </Product>
</Main>
```

Figure 10 – Base data requirements with optional additional data fields – XML

5.6 Example 5 – Material declaration reporting additional information declaring based on query lists and for product parts

5.6.1 General

Three additional capabilities of the IEC 62474 standard are to declare information based on query lists; declare information related to product parts; and to allow use of comment fields. A query list may be used to provide supplemental information (see Tables 25, 26, 27, 28 and 29 and Figure 11).

Example 5 shows this functionality using an AC power adapter.

Subclause 5.4.2, Figure 11 and Table 17, Table 18 and Table 19 illustrate the material declaration based on the “base data requirements” given in IEC 62474:2012, 4.2.

This example demonstrates the functionality of the following subclauses of IEC 62474:2012:

- Subclause 4.3.1 related to optional reporting of product parts, assigning product parts to a product, assigning a product part identification and reporting product part mass;
- Subclause 4.3.6 related to other requirements, such as query lists.

Table 25 – Base data requirements – Business information

BusinessInfo	Business information is provided as specified in IEC 62474:2012
Authoriser name	John Doe
Authoriser title	Quality Assurance Manager
Authoriser phone	301-555-2345
Authoriser email	John.doe@supco.com
Contact name	Fred Smith
Contact title	Quality Assurance Assistant
Contact phone	301-555-2345
Contact email	Fred.smith@supco.com
SupplyCompany name	Supco
SupplyCompany UniqueID authority	DUNS
SupplyCompany UniqueID identity	987654321

Table 26 – Base data requirements – Product information

ProductID	Product information is provided as specified in IEC 62474:2012
ProductID.identifier	ABC4523
ProductID name	AC Power Adapter
ProductID effectiveDate	2013-06-06
ProductID.Mass	34,0 (g)
unitType	Each

Table 27 – Base data requirements – Substance group/substance information with optional additional data fields

Product part			Material				Substance group [a]					Substance [a]			
Name	Mass [b] (g)	Mass [b] (per-cent)	Name	Class ID	Mass [c] (g)	Mass [c] (per cent)	Name	Mass [d] (g)	Mass [d] (per-cent)	Material mass [d] (per-cent)	Exemption	Name	Mass [d] (g)	Mass [d] (per-cent)	Comment
IC		0,325	Lead solder	M-009		1,0	Lead/Lead Compounds			97	See footnote [f] below for exemption text for cited exemption 7(a)				
Resistor		0,01706	Termina-tion Glass	M-010		0,02	Lead/Lead Compounds			9,3	See footnote [g] below for exemption text for cited exemption 7(c)-I				
Circuit board		29,82	Lamina-te	M-014		100	Brominated flame retardants (BFR) – other			21,8[e]		Tetrabromo-bisphenol A diglycidyl ether – tetrabromobis-phenol A copolymer)		40,86	This does not meet the IEC 61249-2-21 low halogen definition for PCB

[a] Substance groups or substances with mandatory reporting requirements shall be reported; reporting of all other substance groups or substances is optional

[b] See IEC 62474:2012, 4.3.1 c) for details on reporting requirements

[c] See IEC 62474:2012, 4.3.3 c) for details on reporting requirements.

[d] See IEC 62474:2012, 4.3.4 c) and 4.3.5 c) for details on reporting requirements.

[e] Reporting threshold is for Bromine content only not full BFR compound.

Assuming that the material is made of the 100 % of substance Tetrabromobisphenol A diglycidyl ether – tetrabromobisphenol A copolymer (CAS 70682-74-5) we need to calculate the Bromine content of this substance in order to determine the material mass %

http://www.guidechem.com/cas-706/70682-74-5.html

so we have 79,9 × 8/1200 = 53,3

Since BFR is 40,86 % in laminate – Br Content = 53,3 × 40,86 % = 21,8 %

[f] Exemption information

UniqueID authority=IPC

UniqueID Identity=EL2011/534/EU

Exemption identity=7(a)

Exemption description= Lead in high melting temperature type solders ...(see XML for full description)

[g] Exemption information

UniqueID authority=IPC

UniqueID Identity=EL2011/534/EU

Exemption identity=7(c)-I

Exemption description= Electrical and electronic components containing lead in a glass (see XML for full description)

Table 28 – Additional information – Query list

Query List	Statement	Response
ABC CompanyList-001	This product contains a battery	FALSE
	This product meets JEDEC JS-709A low halogen definition	TRUE
	This product meets IEC 61249-2-21 low halogen definition for PCB	FALSE
	This product is EU RoHS compliant	TRUE
	This product contains one or more EU RoHS exemptions	TRUE

Table 29 – Additional information – Product parts

Product part(s)						
ID	Description	Effective date	Number of units	Percent of product mass[a]	Product mass	Comment (optional)
AC-01	IC	4/18/2012	2	0,325		
AC-02	Resistor	8/25/2011	17	0,017 06		
AC-03	Circuit Board	9/28/2012	1	29,82		
AC-04	AC adapter – Misc Other	5/22/2013	1	69,24		
[a] The percent of product mass is per unit. The mass percent will sum to 100 percent when multiplied by the number of units.						

```
<?xml version="1.0" encoding="utf-8"?>
<Main xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://std.iec.ch/iec62474" schemaDatabaseVersion="X5.00" substanceDatabaseVersion="D7.00" xsi:schemaLocation="http://std.iec.ch/iec62474 IEC62474_Schema_X5.00_20140924.xsd">
  <BusinessInfo mode="Distribute" fieldLock="false">
    <Response date="2014-11-13">
      <Authorizer email="John.doe@supco.com" name="John Doe" phone="301-555-2345" title="Quality Assurance Manager"/>
      <Contact email="John.doe@supco.com" name="John Doe" phone="301-555-2345" title="Quality Assurance Assistant"/>
      <SupplyCompany name="Supco">
        <UniqueID authority="DUNS" identity="987654321"/>
      </SupplyCompany>
    </Response>
  </BusinessInfo>
  <Product unitType="each">
    <ProductID name="AC Power Adapter" effectiveDate="2013-06-06" identifier="ABC4523">
      <Mass mass="34" unitOfMeasure="g"/>
    </ProductID>
    <MaterialClass name="Nickel and its alloys" id="M-006">
      <MassPercent massPercent="3"/>
    </MaterialClass>
    <MaterialClass name="Copper and its alloys" id="M-004">
      <MassPercent massPercent="14"/>
    </MaterialClass>
    <MaterialClass name="Precious metals" id="M-008">
      <MassPercent massPercent="6"/>
    </MaterialClass>
    <MaterialClass name="Other non-ferrous metals and alloys" id="M-009">
      <MassPercent massPercent="5"/>
    </MaterialClass>
    <MaterialClass name="Ceramics / glass" id="M-010">
```

```
        <MassPercent massPercent="26"/>
      </MaterialClass>
      <MaterialClass name="Other Thermoplastics" id="M-013">
        <MassPercent massPercent="34"/>
      </MaterialClass>
      <MaterialClass name="Other plastics and Rubber" id="M-014">
        <MassPercent massPercent="12"/>
      </MaterialClass>
      <ProductPart numberOfUnits="2">
        <ProductID name="IC" effectiveDate="2012-04-18" identifier="AC-01">
          <MassPercent massPercent="0.325"/>
        </ProductID>
        <Material name="Lead solder" materialClassID="M-009">
          <SubstanceGroup name="Lead/Lead Compounds">
            <Exemptions>
              <Exemption description="Lead in high melting temperature type solders (i.e. lead-based alloys containing 85 % by weight or more lead)"
identity="7(a)"/>
              <UniqueID authority="IPC" identity="EL2011/534/EU"/>
            </Exemptions>
            <MatMassPercent massPercent="97"/>
          </SubstanceGroup>
          <MassPercent massPercent="1"/>
        </Material>
      </ProductPart>
      <ProductPart numberOfUnits="17">
        <ProductID name="Resistor" effectiveDate="2011-08-25" identifier="AC-02">
          <MassPercent massPercent="0.01706"/>
        </ProductID>
        <Material name="Termination Glass" materialClassID="M-010">
          <SubstanceGroup name="Lead/Lead Compounds">
            <Exemptions>
              <Exemption description="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" identity="7(c)-I"/>
              <UniqueID authority="IPC" identity="EL2011/534/EU"/>
            </Exemptions>
            <MatMassPercent massPercent="9.3"/>
          </SubstanceGroup>
          <MassPercent massPercent="0.02"/>
        </Material>
      </ProductPart>
      <ProductPart numberOfUnits="1">
        <ProductID name="Circuit board" effectiveDate="2012-09-28" identifier="AC-03">
          <MassPercent massPercent="29.82"/>
```

```
        </ProductID>
        <Material name="laminate" materialClassID="M-010">
          <SubstanceGroup name="Brominated flame retardants (other than PBBs, PBDEs, or HBCDD)">
            <MatMassPercent massPercent="21.8 "/>
            <Substance comment="This does not meet the IEC 61249-2-21 low halogen definition for PCB" name="Tetrabromobisphenol A diglycidyl ether –
tetrabromobisphenol A copolymer)">
              <MassPercent massPercent="40.86"/>
            </Substance>
          </SubstanceGroup>
          <MassPercent massPercent="100"/>
        </Material>
      </ProductPart>
      <ProductPart numberOfUnits="1">
        <ProductID name="AC adapter – Misc Other" effectiveDate="2013-05-22" identifier="AC-04">
          <MassPercent massPercent="69.24"/>
        </ProductID>
      </ProductPart>
      <QueryList identity="ABC CompanyList-001">
        <Query response="false" statement="This product contains a battery"/>
        <Query response="true" statement="This product meets JEDEC JS-709A low halogen definition"/>
        <Query response="false" statement="This product meets meet IEC 61249-2-21 low halogen definition for PCB"/>
        <Query response="true" statement="This product is EU RoHS compliant"/>
        <Query response="true" statement="This product contains one or more EU RoHS exemptions"/>
      </QueryList>
    </Product>

</Main>
```

Figure 11 – Base data requirements with optional additional data fields – XML

5.7 Example 6 – Thresholds referring to metals

5.7.1 General

Example 6 illustrates how a product which contains lead oxide in glass can be reported. The product has a weight of 0,02 g and 19 mass percent of the product is made of glass. It does not contain other declarable substances.

The glass of the encapsulation consists of 57 mass percent lead monoxide. Lead monoxide (CAS# 1317-36-8) is a reference substance for the substance group named “Lead/Lead Compounds”. For lead/lead compounds, the reporting threshold level is defined in the IEC 62474 database as ”0,1 mass percent of total lead in homogenous material”. The denominator in this calculation is per definition the homogenous material. Furthermore, only the content of lead within a lead compound needs to be considered when identifying if the threshold is exceeded or not.

This is why the material mass percent has been introduced and provided (see IEC 62474:2012, 4.2.3 c) or 4.3.4 c)).

To identify the content of a chemical element contained within a compound the following generic formula can be applied:

Content of chemical element X within Compound X_nY (with Y being another chemical element or a combination of other chemical elements) is $n*M(X)/M(X_nY)$ (with M being the relevant molar masses).

The Japanese mirror committee of VT 62474 provides in their guidance documents metal conversion factors at http://www.vt62474.jp/data/toolv431/130910_V4.3-SR_manual_1.1_eg.pdf. These metal conversion factors are calculated based on the above generic formula and equals the metal content within the metal compound (so they range from 0 to 1). They are provided for several metal elements and more than 150 reference substances. They may serve as a reference to quickly calculate the metal content within a material by multiplying the substance mass percent with the respective metal conversion factor.

The metal conversion factor of lead in lead (II) monoxide is 0,928 [207,2/(207,2+15,994)] resulting in a lead content of 93 mass percent. As a result, the material mass percent of lead/lead compounds in the glass homogenous material glass in this example is 52,9 mass percent (57 mass percent × 0,928).

Other declarable substance groups where the same logic is applied include Cadmium/cadmium compounds, Cr(VI) compounds are Mercury/mercury compounds.

Subclause 5.6.2, Figure 12 and Tables 25, 26 and 27 illustrate the reporting of heavy metals when declaring to base data requirements.

Subclause 5.6.3, Figure 16 and Table 28 illustrate the reporting of heavy metals when declaring to additional data requirements.

This example demonstrates the functionality of the following subclauses of IEC 62474:2012:

- Subclause 4.2.1 related to product, and product identification and mass;
- Subclause 4.2.3 related to declarable substance and declarable substance group naming per the IEC 62474 database;
- Subclause 4.2.4 related to reporting business information and use of SI units;
- Subclause 4.3.4 related to RoHS and REACh reporting.

5.7.2 Material declaration reporting “base data requirements”

Table 30 – Base data requirements – Business information

BusinessInfo	Business information is provided as specified in IEC 62474:2012
Authoriser name	John Doe
Authoriser title	Quality Assurance Manager
Authoriser phone	301-555-2345
Authoriser email	John.doe@supco.com
Contact name	Fred Smith
Contact title	Quality Assurance Assistant
Contact phone	301-555-2345
Contact email	John.doe@supco.com
SupplyCompany name	Supco
SupplyCompany UniqueID authority	DUNS
SupplyCompany UniqueID identity	987654321

Table 31 – Base data requirements – Product information

ProductID	Product information is provided as specified in IEC 62474:2012
ProductID.identifier	ABC4523
ProductID name	Electronic component
ProductID effectiveDate	2013-06-06
ProductID.Mass	0,02 (g)
unitType	Each

Table 32 – Base data requirements – Substance group/substance information

Substance group[a]				Substance[a]			
Name	Mass[b] (g)	Mass[b] (percent)	Material mass[b] (percent)	Name	Mass (g)	Mass[b] (percent)	Material mass[b] (percent)
Lead/Lead Compounds			52,9				

[a] Substance groups or substances with mandatory reporting requirements shall be reported.

[b] See IEC 62474:2012, 4.2.3 c) for details on reporting requirements.

```
<?xml version="1.0" encoding="utf-8"?>
<Main xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://std.iec.ch/iec62474" schemaDatabaseVersion="X5.00"
substanceDatabaseVersion="D7.00" xsi:schemaLocation="http://std.iec.ch/iec62474 IEC62474_Schema_X5.00_20140924.xsd">
  <BusinessInfo mode="Distribute" fieldLock="false">
    <Response date="2014-11-18">
      <Authorizer email="John.doe@supco.com" name="John Doe" phone="301-555-2345" title="Quality Assurance Manager"/>
      <Contact email="Fred.smith@supco.com" name="Fred Smith" phone="301-555-2345" title="Quality Assurance Assistant"/>
      <SupplyCompany name="Supco">
        <UniqueID authority="DUNS" identity="987654321"/>
      </SupplyCompany>
    </Response>
  </BusinessInfo>
  <Product unitType="each">
    <ProductID name="Electronic component" effectiveDate="2013-06-06" identifier="ABC4523">
      <Mass mass="0.02" unitOfMeasure="g"/>
    </ProductID>
    <SubstanceGroup name="Lead/Lead Compounds">
      <MatMassPercent massPercent="52.9"/>
    </SubstanceGroup>
  </Product>
</Main>
```

Figure 12 – Base data requirements – XML

5.7.3 Material declaration reporting additional information declaring reference substances for a declarable substance group

In this example, the identical business information and product information as under the base requirements is provided. The example shows that lead monoxide is the source for the entry under “Lead/Lead Compounds in the base requirements. Material glass is specified (see Table 33 and Figure 13).

Table 33 – Additional information – Product material/substance group/substance information.

Material				Substance group [a]				Substance [a]			
Name	**Class ID**	**Mass[b] (g)**	**Mass[b] (percent)**	**Name**	**Mass[c] (g)**	**Mass[c] (percent)**	**Material mass[c] (percent)**	**Name**	**Mass[c] (g)**	**Mass[c] (percent)**	**Material mass[c] (percent)**
Glass	M-010		19	Lead/Lead Compounds			52,9	Lead monoxide[d]		57	

[a] Substance groups or substances with mandatory reporting requirements shall be reported; reporting of all other substance groups or substances is optional

[b] See IEC 62474:2012, 4.3.3 c) for details on reporting requirements.

[c] See IEC 62474:2012, 4.3.4 c) and 4.3.5 c) for details on reporting requirements.

[d] This material is a glass handled as UVCB, and multiple declaration methods may be used to describe the substances contained. See 4.2.3 and Annex A. However, in this example, the RoHS substance group of lead/lead compounds shall be declared as specified in the IEC 62474 database.

```
<?xml version="1.0" encoding="utf-8"?>
<Main xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://std.iec.ch/iec62474" schemaDatabaseVersion="X5.00"
substanceDatabaseVersion="D7.00" xsi:schemaLocation="http://std.iec.ch/iec62474 IEC62474_Schema_X5.00_20140924.xsd">
  <BusinessInfo mode="Distribute" fieldLock="false">
    <Response date="2014-11-18">
      <Authorizer email="John.doe@supco.com" name="John Doe" phone="301-555-2345" title="Quality Assurance Manager"/>
      <Contact email="John.doe@supco.com" name="John Doe" phone="301-555-2345" title="Quality Assurance Assistant"/>
      <SupplyCompany name="Supco">
        <UniqueID authority="DUNS" identity="987654321"/>
      </SupplyCompany>
    </Response>
  </BusinessInfo>
  <Product unitType="each">
    <ProductID name="Electronic component" effectiveDate="2013-06-06" identifier="ABC4523">
      <Mass mass="0.02" unitOfMeasure="g"/>
    </ProductID>
    <Material materialClassID="M-010" name="Glass">
      <SubstanceGroup name="Lead/Lead Compounds">
        <MatMassPercent massPercent="52.9"/>
        <Substance name="Lead mon oxide">
          <MassPercent massPercent="57"/>
        </Substance>
      </SubstanceGroup>
      <MassPercent massPercent="19"/>
    </Material>
  </Product>
</Main>
```

Figure 13 – Base data requirements with optional additional data fields – XML

Annex A
(informative)

Guidance to declare substances of unknown or variable composition, complex reaction products and biological materials (UVCBs)

Two methods are provided below for the materials reporting of UVCB's such as glass and ceramic. They are examples as to how substance reporting may be accomplished for the situations where reportable substance(s) may be either present or absent in the UVCB. These methods are presented since they were developed predominantly for use by the electronics industry (JEITA method) and the automotive industry (IMDS method). Depending on the specific reporting requirements of the user, either of the two approaches or another approach may be applicable.

Japan Electronics and Information Technology Industries Association (JEITA)

Under the REACH regulation glass is considered a UVCB substance. However, since boron trioxide (B2O3, CAS 1303-86-2), lead monoxide (PbO, CAS 1317-36-8), lead (II, IV) oxide (Pb3O4, CAS 1314-41-6), lead zirconate titanate (PZT, CAS 12626-81-2), lead titanate (PT, CAS 12060-00-3) are designated as substances of very high concern, it is mandatory to have a clearly defined method for describing the glass or ceramic to support REACH reporting requirements.

First of all, it is imperative to fully understand the basic chemistry (phenomena) of those substances which take place in glass or ceramic in order to prepare a correct declaration.

For glass/ceramic prepared using Boron trioxide (B2O3, CAS 1303-86-2), lead monoxide (PbO, CAS 1317-36-8), lead (II, IV) oxide (Pb3O4, CAS 1314-41-6):

Even though those substances are used as the starting chemicals, the final products such as glass or ceramic do not contain those substances since they are incorporated into the glass or ceramic matrix and lose their initial chemical identity. Boron trioxide (B2O3, CAS 1303-86-2), lead monoxide (PbO, CAS 1317-36-8), lead (II, IV) oxide (Pb3O4, CAS 1314-41-6) become the constituent material of the UVCB in glass or ceramic. Therefore, it is not necessary to declare Boron trioxide (B2O3, CAS 1303-86-2), lead monoxide (PbO, CAS 1317-36-8), lead (II, IV) oxide, Pb3O4 (CAS 1314-41-6) as a REACH SVHC.

For ceramic prepared using lead-zirconate-titanate (PZT) (CAS 12626-81-2) or lead titanate (PT) (CAS 12060-00-3):

Although ceramic prepared with lead zirconate titanate (PZT) and lead titanate (PT) is considered to be a UVCB, the resultant ceramic may have the same crystal structure as PZT or PT. If this is the case, it would be necessary to declare the presence of PZT or PT as REACH SVHC's.

Examples of declaration by the JEITA method are given in Tables A.1, A.2, A.3, A.4 and A.5.

Simple glass:

- Glass
  - ▲ Glass without declarable substances

Table A.1 – Example for simple glass declaration by the JEITA method

Material	Substance	
	Name	Mass (percent)
Glass	Glass without declarable substances	100

Glass prepared with B2O3:

- Glass prepared with B2O3
  - ▲ Glass without declarable substances
  - ▲ Boron trioxide (B2O3) (With comment such as “This is the identifier of chemical composition. This is not an SVHC as defined by REACH.”)

Table A.2 – Example for glass prepared with B2O3 by the JEITA method

Material	Substance	
	Name	Mass (percent)
Glass	Glass without declarable substances	85
	B2O3 (With comment such as “This is the identifier of chemical composition. This is not an SVHC as defined by REACH.”)	15
NOTE Because comments are interpreted by most automated tools as informational only, it is possible that no actions are taken based on the comment. This could create a false verdict in an automated tool where a regulatory requirement is unintentionally triggered by the declaration. For the above example, the automated tool can incorrectly interpret the listing of B2O3 as a REACH SVHC in the product.		

Glass prepared with PbO:

- Glass prepared with PbO
  - ▲ Glass without declarable substances
  - ▲ Lead monoxide (PbO) (With comment such as “The lead monoxide in this case is only an identifier that represents the lead compound contained in the glass and does not represent the chemical substance lead monoxide. Although lead monoxide is a REACh SVHC, the lead compound contained in the glass is not a REACH SVHC.”)

Table A.3 – Example for glass prepared with PbO by the JEITA method

Material	Substance group		Substance	
	Name	Material mass (percent)	Name	Mass (percent)
Glass			Glass without declarable substances	20
	Lead/Lead Compounds	74,3	PbO (With comment such as “This is the identifier of chemical composition. The lead compound in the glass is not an SVHC as defined by REACH.”)	80

Simple ceramic

- Ceramic
  - ▲ Ceramic without declarable substances

Table A.4 – Example for simple ceramic by the JEITA method

Material	Substance	
	Name	Mass (percent)
Ceramic	Ceramic without declarable substances	100

Ceramic prepared with PZT:

- Ceramic containing PZT
  - ▲ Ceramic without declarable substances
  - ▲ Lead zirconate titanate (PZT)

Table A.5 – Example for ceramic containing PZT by the JEITA method

Material	Substance group		Substance	
	Name	Material mass (percent)	Name	Mass (percent)
Ceramic			Ceramic without declarable substances	5
	Lead/Lead Compounds	70	Lead zirconate titanate (PZT)	95

International Material Data System (IMDS)

Under the REACH regulation glass is a UVCB substance. It is considered a state of a substance and does not contain individual elements or oxides after the formation of the UVCB. This approach is used for IMDS entries. Declarable constituents and additives still have to be reported separately.

IMDS issued an updated approach effective June 2014 that requires that all entries for glass, ceramic and enamel must be described by a single (pseudo) substance. Using this approach, IMDS supports the update of higher numbers of entries.

Examples of declaration by the IMDS method are given in Tables A.6, A.7 and A.8.

Simple glass:

- Glass
  - ▲ Glass without declarable substances

Table A.6 – Example for simple glass by the IMDS method

Material	Substance	
	Name	Mass (percent)
Glass	Glass without declarable substances	100

Specific glass:

- Tinted glass
  - ▲ Glass without declarable substances
  - ▲ Miscellaneous, not to declare
  - ▲ Pigment portion, not to declare

Table A.7 – Example for specific glass by the IMDS method

Material	Substance	
	Name	Mass (percent)
Glass	Glass without declarable substances	70
	Miscellaneous, not to declare	10
	Pigment portion, not to declare	20

Glass containing lead:

- Glass containing lead
  - ▲ Glass without declarable substances
  - ▲ Lead

Should the glass contain any other declarable substance this has to be declared in addition, as per general rules of IMDS Recommendation 001.

Similar rules are to be applied for ceramic and enamel materials, using the following pseudo substances:

- ▲ Ceramic without declarable substances
- ▲ Enamel without declarable substances

The following example is given when the above-mentioned description method is applied to the notation method of IEC62474.

The example in Table A.8 is identical to the PbO declaration according to the JEITA method shown above, and shows the declaration of a glass that has been prepared by adding 80 % of lead oxide, in this case following the declaration approach of IMDS.

Table A.8 – Example for glass containing lead by the IMDS method

Material	Substance group		Substance	
	Name	Material Mass (percent)	Name	Mass (percent)
Glass			Glass without declarable substances	25,7
	Lead/Lead Compounds	74,3	Lead	74,3

Bibliography

IEC 61249-2-21, *Materials for printed boards and other interconnecting structures – Part 2-21: Reinforced base materials, clad and unclad – Non-halogenated epoxide woven E-glass reinforced laminated sheets of defined flammability (vertical burning test), copper-clad*

ISO 14021, *Environmental labels and declarations – Self-declared environmental claims (Type II environmental labelling)*

ISO 1043 (all parts), *Plastics – Symbols and abbreviated terms*

IPC 1752A*, Materials Declaration Management Standard*

IMDS Recommendation 001, *General Structure*

JAMP (Joint Article Management Promotion-consortium) material declaration system (http://www.jamp-info.com)

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