IEC TS 62474-1

Edition 1.0 2022-11

TECHNICAL SPECIFICATION

colour inside

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

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INTERNATIONAL
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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MATERIAL DECLARATION FOR PRODUCTS OF AND FOR THE ELECTROTECHNICAL INDUSTRY –

Part 1: Guidance on the implementation of IEC 62474

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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IEC TS 62474-1 has been prepared by IEC technical committee 111: Environmental standardization for electrical and electronic products and systems. It is a Technical Specification.

This first edition of IEC TS 62474-1 cancels and replaces IEC TR 62474-1:2015.

This edition includes the following significant technical changes with respect to IEC TR 62474-1:2015:

a) IEC TR 62474-1:2015 was revised and converted to a Technical Specification in accordance with the requirements of the ISO/IEC Directives;
b) the introduction and scope have been updated to better align with the requirements of IEC 62474:2018;
c) by defining an authority, list identity and list version, the standard data exchange format can be used for lists other than the IEC 62474 database;
d) two types of material declarations, declaration for compliance and composition declaration, and their requirements are defined;

e) the material classes and exemption list capabilities have been improved;

f) guidance is provided on how to use data fields in the declaration of compliance and composition declaration to collect the information required for the European Chemical Agency (ECHA) Substances of Concern In articles, as such or in complex objects (Products) (SCIP) database;

g) six examples of material declaration are given to show how IEC 62474 meets various industry needs.

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

Draft	Report on voting
111/654/DTS	111/671/RVDTS

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Technical Specification is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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 document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

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

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

There are ever increasing legal regulations around the world along with supply chain requirements that either restrict or require reporting or labeling the use of certain substances in products. To determine a product compliance status, manufacturers need information about the substances in the product that can be passed down the supply chain. This can include data about materials as well as product parts used in products. This information can also be used as one of the inputs in an environmentally conscious design process throughout the product life cycles.

To make material declaration data readily available, the supply chain (including organizations providing products to the electrotechnical industry) needs a standardized method to exchange this type of data. The IEC 62474 standard is flexible for, not only 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 IEC 62474 standard uses a single format for data exchange rather than relying on each customer's own format.

Broad implementation by electrotechnical industry and organizations can result in:

- material declaration data being available as part of the contract sales of products in the electrotechnical 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 reduction of inefficiencies, and
- faster assessments of products and materials compliance status.

Material declarations meeting the IEC 62474 standard provide data needed to make a substance compliance assessment. They can also be used as part of the technical documentation required to place products on the market in different regions. Examples are:

- the EU Restriction of Hazardous Substances (RoHS) Directive;
- the EU Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH);
- the EU Eco-design Directive;
- the Administrative Measures for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products (China RoHS 2).

Government authorities that issue substance restriction regulations need to have economic methods to obtain substance data to conform to these requirements that allow for international trade. IEC standards such as IEC 62474 are recognized by the World Trade Organization (WTO). This means that government authorities can adopt IEC 62474 to provide an economically feasible standard to its resident companies to get needed data from a supply chain in order to achieve the substance restrictions and be assured that such rules facilitate international trade and are in conformance with WTO standards.

Also, restricted substance regulations usually include exemptions for certain products based on available technology or other issues. Exemptions are dynamic and often based on changes to technology and products. This requires government resources to evaluate exemptions from product suppliers and exemptions issued by other government authorities to determine suitability. It is possible governments are not able to update exemptions based on a direct referral to exemptions issued by other governments. This results in significant costs and time lags to do analyses and grant updated exemptions, especially if government authorities lack expertise or adequate funding to perform these tasks. If an exemption approved by a government authority is not adopted in a timely manner, this can put the local economy at a disadvantage because certain products cannot then be placed on the local market. In the case of some product sectors, such as medical devices, this also can prevent access to life-saving technologies.

IEC 62474 now allows government authorities to adopt exemptions from other government authorities by referencing the international IEC 62474 database. Since the IEC 62474 database maintains current exemption lists, governments may rely on this database without additional resources or time.

MATERIAL DECLARATION FOR PRODUCTS OF AND FOR THE ELECTROTECHNICAL INDUSTRY –

Part 1: Guidance on the implementation of IEC 62474

1 Scope

This part of IEC 62474 is a guidance document to help organizations properly implement IEC 62474. These organizations can be the ones creating tools for material data exchange and those who submit and receive material declarations.

This document supports consistent implementation of IEC 62474, including how the procedures, content, and form relating to material declarations for products can be further specified. It also illustrates how to apply IEC 62474 to non-electrotechnical industries.

This document:

- illustrates the flexibility and functionality of the IEC 62474 standard including examples,
- illustrates how to achieve conformity with IEC 62474, including guidance on preparing a declaration for compliance and a composition declaration, including mandatory and optional declaration requirements,
- illustrates how IEC 62474 can be applied to non-electrotechnical industries by preparing material declarations using an alternate declarable substance list (DSL),
- supports organizations that create software to exchange substance and material data to implement IEC 62474 in their tools, and
- supports users that submit and receive material declarations.

Following the IEC 62474 standard scope, process chemicals, emissions during product use and product packaging material are not in the scope of this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62474:2018, *Material declaration for products of and for the electrotechnical industry*
IEC 62474:2018/AMD1:2020

NOTE The requirements of IEC 62474:2018 were not changed substantially by IEC 62474:2018/AMD1:2020. IEC 62474:2018/AMD1:2020 mainly explains certain requirements of IEC 62474:2018 more clearly and corrects some editorial errors.

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62474 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

3.1
declarable article
article into which an instance of the substance of very high concern (SVHC) above 0,1 mass percent was first incorporated

Note 1 to entry: The EU REACH regulation imposes requirements on product suppliers to identify SVHCs that are present in their products above threshold. Following a European Court of Justice ruling, the European Chemical Agency (ECHA) published a guidance document clarifying that the threshold level for reporting the SVHC is 0,1 % of the first article in a product.

Note 2 to entry: The declarable article is sometimes referred to as the first article in the context of the EU REACH regulation.

4 Guidance on functionality of IEC 62474 material declaration

4.1 General information

As shown in Figure 1, the IEC 62474 standard defines two types of material declarations and their requirements:

1) The declaration for compliance provides the declaration at a product level in reference to the list of declarable substances (DSs) and declarable substance groups (DSGs) within the IEC 62474 DSL.
2) The composition declaration provides more detailed reporting of individual substances contained within the IEC 62474 DSL. Reporting can be at material, product part or product level as determined by regulatory requirements and contain very specific mass or mass percent type of information.

IEC 62474 also provides the capability to declare a material class (such as stainless steel, copper, gold, types of plastic), allow a higher level query to a set of questions (such as EU REACH or EU RoHS compliance (true/false)), support exemptions used by a given product, and include attachments for supporting documentation to a declaration or group of declarations.

At minimum either a declaration for compliance or a composition declaration shall be provided. Both can be provided along with a material class declaration, a query list, an exemption list and attachments. It is common for a query list to accompany a declaration for compliance or a composition declaration. If exemptions are needed, they are used in conjunction with the declaration for compliance and composition declaration. Both declarations can be communicated either in the requester/responder mode or the distribution mode.

IEC 62474 specifies the use of a dedicated database (the IEC 62474 database) that lists substances and substance groups requiring declaration. This provides certainty to suppliers regarding what minimum data is required to report, regardless of a manufacturer's product or customer location. The IEC 62474 database also includes a developer's table and XML schema that specify data exchange format (hereinafter referred to as "IEC 62474 DXF") requirements, material classes that may be used as an input to environmentally conscious design and exemption lists that are specific to a single law or regulation. 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/IEC 62474.

Another important feature of IEC 62474 is the flexibility to use other lists than the IEC 62474 DSL. The same declaration format can now use lists from other industries.

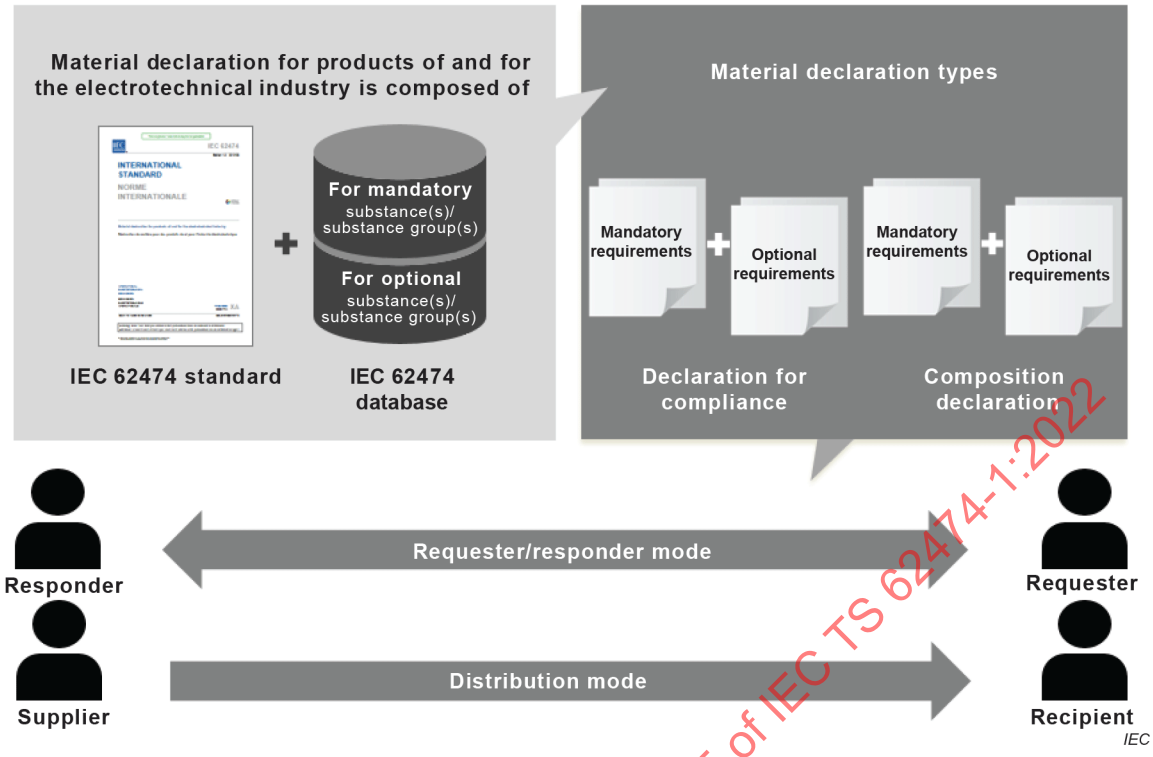

Figure 1 – IEC 62474 principles

4.2 Conformity to the IEC 62474 standard

The IEC 62474 standard consists of several parts, including DXF, DSL, material class list (MCL) and exemption lists (EL). A material declaration may utilize any or all of these parts. IEC 62474 states that a material declaration that is in full conformance with IEC 62474 would utilize, at a minimum, the IEC 62474 DXL and the DSL. It also states that a material declaration may be in conformance only with the IEC 62474 DXF or only with the IEC 62474 DSL, but if so, the declaration can only declare conformance to the specific parts of the standard that is used. Acceptable statements for declaring conformance are provided in IEC 62474.

The opportunity to declare conformance to just the IEC 62474 DXF enables the declaration against other lists. If the material declaration meets the requirements of the IEC 62474 DXF but utilizes an alternate DSL, the material declaration can be claimed to conform to the IEC 62474 DXF.

For a declaration to conform to the IEC 62474 DXF, it shall meet the declaration requirements specified in IEC 62474:2018, Clause 4 and IEC 62474:2018/AMD1:2020, Clause 4, the format requirements in the IEC 62474 XML schema and the additional requirements in the developer's table.

IEC 62474 specifies that only substances that remain in the product are declared in the material declaration. IEC 62474 also requires that process chemicals that react, form other chemicals, or otherwise do not remain in the product shall not 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 DS or as a voluntary declaration. The individual resin and hardener chemical can be declared only if a residual amount of these chemicals remain in the product.

4.3 Material declaration using alternate DSL(s)

4.3.1 General information

Today only a few sectors, such as automotive, aerospace and defence, electronics, have developed a material declaration standard similar to IEC 62474. Owing to, on the one hand, the increasing number of sectors being affected by specific or multi-sectoral policies and legislations such as REACH and critical raw materials (CRMs), and on the other hand, suppliers delivering the same goods to multiple sectors, the need for a generic DXF able to handle any type of substance lists has never been greater.

IEC 62474:2018 has anticipated such need and included this requirement clearly in IEC 62474:2018/AMD1:2020. IEC 62474:2018 allows for the handling of different substance lists compared with the IEC 62474 DSL, provided that such lists have been prepared in accordance with the IEC 62474 DSL format.

4.3.2 Creating an alternate DSL

When preparing an alternate DSL, an identifier (list authority, list identity, and list version) for the DSL shall be available. Several fields in the list are mandatory, as follows:

- substance group;
- specific substance;
- CAS number;
- reportable application(s);
- reporting threshold level in product (unless otherwise specified);
- reporting level;
- reporting requirement.

Additionally, several fields in the list below should be populated, if applicable:

- common synonyms;
- substance clarification;
- typical applications or uses;
- basis for including;
- description of basis (specific regulatory citation or specific market demand);
- mass information requirements;
- first added;
- last revised;
- comments or footnotes.

Here below is a "hypothetical" example of an alternate DSL including authority, identity and version information:

- authority: "CEN-CLC JTC10";
- identity: "CRM_DeclarableSubstances";
- version: "vD1.01;01-mar-2020".

4.4 Business information

Business information describes information of the enterprises that request and provide the material declaration.

IEC 62474 allows the material declaration in local language as an option. In non-English-speaking countries, when enterprises provide business information, the local language notation can more accurately identify the names of the company and the person in charge. Therefore, in addition to English, it is convenient to exchange business information in the local language.

4.5 Product information

Product information discloses specific details of the product(s) subject to the declaration, including the product identification (e.g. model number, stock-keeping unit (SKU), part number) and product mass.

To make a declaration for a product, one shall specify the unitType (for example, each, g, kg, cm, m, cm^2, m^2, cm^3, l, m^3) 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'.

To make a declaration for a product family, one shall specify the identification and mass of each product within the product family. If all products within the declaration have the same mass, one mass entry for all products is sufficient.

Each product disclosed in the declaration shall be identified as an article (with the use of the isArticle flag) if the product contains a DS or DSG substance(s) exceeding a reporting threshold based on 'article'.

4.6 Conversion between ppm and 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

Mass 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

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

Mass percent = (mass of substance/mass of product, product part or material) × 100.

4.7 Guidance on the declaration for compliance

4.7.1 General information

The declaration for compliance provides a true/false statement to determine the product compliance status. As a result of conformity assessment against each entry in a DSL, a true/false statement indicates whether a DS or DSG is present at or above the reporting threshold in the product. The DSL contains DSs and DSGs that require mandatory and optional information provision. It is necessary to provide the information according to the DSL descriptions and instructions. The declaration for compliance does not include information on product build hierarchy, but contains sufficient information for the downstream manufacturer to assess compliance against the regulations covered by the DSL.

Declaration for compliance is made at the product level. The material declarations collected from the upstream of the supply chain are aggregated to determine the compliance for the product. Information of compliance judgment is provided based on the mass percentage in principle. However, some laws and regulations may also require total mass information of the DS and DSG in the product.

4.7.2 Mass and mass percent fields in the declaration for compliance

In the declaration for compliance, if a DS or DSG with mandatory reporting requirements is present in the product at or above the reporting threshold level for an applicable reportable application, it is mandatory to declare mass percent information. The calculation of mass percent is as follows:

1) Mass percent shall be calculated using the value specified as the threshold in the DSL as the denominator. (In the IEC 62474 DSL, it is specified by MassInfoRequirements, for example, mass percent of materials, mass percent of article, mass percent of product parts.)
2) The mass percent information can be passed along the supply chain. There is no need to recalculate it unless the MassInfoRequirements applies to a different denominator.
3) If there are multiple occurrences of a DS or DSG present at or above the reporting threshold within the product or product family, the occurrence with the highest mass percent shall be declared. It can be necessary to indicate that there are multiple occurrences that are equivalent and provide the location information.
4) If a DSG is a metal or metal compound, one can calculate the mass of the metal element based on the metal compound molecular information (metal compound mass × metal conversion factor) and declare the mass percent of metal. If a DSG is not a metal or metal compound, one can declare the mass percent of the DSG substance as it is.

If the total mass information is required by MassInfoRequirements specified by the DSL, in addition to the mass percent information, the total mass of the DS or DSG within the product shall be declared. The total mass is required by some laws and regulations. Examples are:

- EU REACH;
- California Electronic Waste Recycling Act of 2003 (SB 20, Chapter 526, Statutes of 2003, as amended by SB 50, Chapter 863, Statutes of 2004).

4.7.3 Reporting using mass ranges

An emerging trend in the reporting of certain DSs and DSGs is the need to report which of a few specific mass ranges that a substance is present in instead of reporting the actual mass. This is driven by regulations that focus on recycling of these substances and materials. For example, the EU regulation for servers and data storage products (EU 2019/424) specifies that the amount of cobalt/cobalt compounds in each battery is reported in one of three mass ranges (less than 5 g; between 5 g and 25 g; and greater than 25 g).

Manufacturers in the supply chain (instead of reporting the actual mass) may alternately report in a declaration for compliance the mass range that is applicable – the method to do this is specified in the "Mass Info Requirements" field of the DSL. The approach initially deployed is to use the mass tolerance data fields to indicate the mass range. For example, for the cobalt/cobalt compounds DSG entry, the "Mass Info Requirements" field specifies that:

- If mass of cobalt in a battery is less than 5 g, then report mass = 0 with positive mass tolerance = 4,99 g.
- If mass of cobalt in a battery is between 5 g and 25 g, then report mass = 5 g with positive mass tolerance = 20,00 g.
- If mass of cobalt in a battery is greater than 25 g, then report mass = 25,01 g (Note: 25,01 indicates that the actual mass may be any number greater than 25).

NOTE The IEC 62474 Validation Team (VT) is considering various options on how to best address mass ranges in the future. As changes are made to the declaration requirements, they will be reflected in the DSL and in the IEC 62474 database "Introduction" page.

4.7.4 Use attribute for location information

The location information (e.g. name of material or product part, number of units) where the DS or DSG is used may be provided, especially when there are multiple DSs or DSGs within the product. For example, a printed circuit board within a computer can be disclosed at the optional data field of descriptionOfUse.

4.7.5 Declaration of a DS that belongs to multiple different DSGs

In the declaration for compliance, a DS with a mandatory reporting requirement shall be assigned to its respective DSG with a mandatory reporting requirement, if the DSG is declared.

In most cases this is straightforward. However, since the establishment of IEC 62474, several corner cases have emerged with a DS fitting into multiple DSGs. For example, the REACH SVHC, lead sulfochromate yellow (C.I. pigment yellow 34) creates such a situation. Lead sulfochromate yellow belongs to two DSGs, lead/lead compounds and chromium (VI) compounds. If lead sulfochromate yellow is present at or above article level and also triggers the declaration of both DSGs at homogeneous material level, besides the mass percent of lead sulfochromate yellow at the article level by itself, the material mass percent of lead/lead compounds and chromium (VI) compounds shall also be declared, respectively. Since lead sulfochromate yellow has a mass reporting requirement specified in the mass information requirements field of the DSL, the total mass of lead sulfochromate yellow shall also be declared.

Reporting the mass percent for both a DS and its applicable DSGs would not necessarily cause double counting. If the mass reporting requirement applies to both a DS and its applicable DSGs, the responder may preferably report the total mass of DS to avoid the possibility of double counting. The requester can always relate the total mass of the DSGs to the mass reported under the DS.

4.8 Guidance on the composition declaration

4.8.1 General information

The composition declaration provides a hierarchical structure where the substances are used in the materials or product parts within the product. IEC 62474 requires that at least DSs or DSG substances with the mandatory reporting requirements that are present in the product be reported in a composition declaration.

Some optional features in the composition declaration include:

- the capability to provide information about materials and product parts in the build hierarchy;
- information about the materials within the product including material class, material properties, use descriptions, etc.;

- the ability to identify substances based on a variety of different identifiers, including DSL entry, CAS registry number, EC number, REACH Candidate List entry, etc. If a substance is part of a DSG, it is also possible to tag the substance with the DSG ID. This assists the downstream manufacturers for compliance assessment;
- applicable exemptions to substance restrictions that are needed by downstream manufacturers in assessing compliance.

4.8.2 Mass and mass percent fields in the composition declaration

The composition declaration requires 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 cannot know which number is the correct one to use.

A general rule of thumb is to use mass percent when reporting product families (e.g. ICs, resistors, capacitors) which contain multiple products in one declaration, but to use mass when reporting assemblies or finished goods when a single product is declared. Reporting 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.

4.8.3 Product parts

The recursive nature of product parts (i.e. product parts can be further partitioned into other product parts) allows the users to have the 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) containing a mother board (product part 1) with a coin cell battery (product part of product part 1). This flexibility enables all users along the supply chain to be able to effectively utilize the IEC 62474 DXF.

4.8.4 Materials

Declaring the materials that are in the product is currently optional (in most circumstances) but is recommended, especially for the materials that contain declarable substances. A growing number of regulations (e.g. Waste Framework Directive (WFD)) require reporting of information about the materials in the product which is, in turn, accelerating the need for this information by downstream manufacturers. Full material declarations also typically include all of the materials in the product. Therefore, when a responder creates a composition declaration, the materials that contain substances included in the declaration should be declared whenever possible.

When a material is declared in the composition declaration, the name for the materials is mandatory and can describe the characteristics, the use or location of the materials in the product or product part. The UniqueID field should be used to identify a declared material based on specifications defined in a standard (e.g. ISO 1043-1, ISO 1043-2, ISO 1043-3, ISO 1043-4 for plastics) when available.

When declaring a material in the declaration, it is optional to specify the material class that the material is part of using the "MaterialClassID" element. The material class can help downstream partners with environmentally conscious design efforts and to meet certain regulatory obligations such as the EU Substances of Concern In articles, as such or in complex objects (Products) (SCIP) requirement.

4.8.5 Full material declaration (FMD)

IEC 62474 allows to provide up to an FMD of all substances contained in a product. An FMD is a material declaration of (1) all DS and DSG substances according to the DSL and (2) other substances that are contained in the product according to "reporting threshold level" and "confidential business information (CBI) allowance" that are separately specified either between a requester and responder, or by a responder directly. The isFMD flag enables the responder to indicate whether or not (true/false) the composition declaration is a full material declaration (FMD) of the product.

NOTE IEC 62474:2018 states that a practical reporting threshold for the declaration of other substances (i.e. substances not on the DSL) can be at or above 0,1 mass percent of the mass of the material, product part or product, whichever is the lowest product unit (e.g. material, product part, or product) that the declaration requires.

4.8.6 Explanation of DSG substances

There are special precautions when providing DSG information. DSG usually consists of more than one substance or compound of similar chemical structure. An example would be for EU RoHS, the restricted DSG, polybrominated biphenyls (PBB) contains 10 specific compounds (DSG substances) listed as the IEC 62474 reference substances within its substance group.

The composition declaration does not provide information about the DSG itself, but rather conveys information to DSG substances that belongs to the DSG. Refer to the requirements clauses of the composition declaration (IEC 62474:2018, 4.5 and IEC 62474:2018/AMD1:2020, 4.5) for details.

4.8.7 Compounds, mixtures or materials with a CAS number consisting of substances with individual CAS numbers

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

- steel with CAS number 12597-69-2;
- brass with CAS number 12597-71-6.

It is possible that each of these mixtures or materials can include a substance (e.g. lead) that is a DS or DSG substance. Declaring only "steel" does not give information as to whether lead is a part of the alloy or not. DSs and DSG substances clearly shall be disclosed if present.

Many DSs are compounds which shall be reported as listed in the IEC 62474 DSL. 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, respectively. In this example, the declaration of these elemental CAS-numbers (i.e. boron and oxygen) can hide the existence of the DS and does not meet the reporting requirement of IEC 62474 because it does not properly represent the substances actually contained in the product.

4.8.8 Declaration of UVCB substance which constitutes ceramic or glass

Ceramic or 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 UVCB where constituent substances are dissolved and homogenized during the manufacturing process. For example, diboron trioxide (B_2O_3) 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 specify 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. The International Material Data System (IMDS) method describes substances in a generic way instead of selecting a specific substance to represent the actual substance present or to describe constituents used in the manufacturing process that no longer exist in the product.

4.8.9 Confidential business information (CBI)

Suppliers can have special alloys or compounds in a material that are central for its function where they cannot disclose the exact composition. For these special alloys or compounds in materials that are considered as CBI, IEC 62474 specifies that any DSs or DSGs contained in such a material shall 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.

1) Example no. 1 of bromine use: For EU RoHS compliance, the supplier can verify if it is one of the compounds within the restricted DSGs, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE). If it is, the specific compound shall be reported. If not, it does not require reporting in accordance with CBI requirements.
2) Example no. 2 of metal use: If a DSG substance that refers to a specific metal (e.g. cadmium compounds) but the compound name is unknown or a supplier CBI, the mass or mass percent of only the metal shall be declared.
    - If the cadmium compound is 5 % cadmium and 95 % other, only the 5 % cadmium would be reported. The rest would remain under the definition of CBI.
    - The DSG name and identity listed in the IEC 62474 DSL may be used or a declaration for compliance can be provided to ensure accurate reporting of the DSG.

In the case where the requester requests more than the mandatory requirements of a material declaration as specified in IEC 62474, the contracting parties should agree to details, such as safeguards protecting the supplier CBI at the request of the supplier.

4.8.10 Identification of declarable articles with isArticle flag

4.8.10.1 isArticle flag

When a material, product part or product contains SVHCs above threshold, the IEC 62474 DXF allows an isArticle flag to be assigned to the material, product part or product so that the supplier can identify which objects in the declaration are articles.

4.8.10.2 Identification of declarable article

When a substance is reported in a declaration, it includes mass information which may be either the mass of the substance or a mass percent. However, it is possible that the recipient of the declaration does not know enough about the manufacturing of the product (or product part) to identify the declarable article into which an instance of the SVHC was first incorporated above threshold (this article is referred to as the declarable article). To provide downstream recipients with sufficient information to meet certain regulations, the supplier identifies the declarable article and passes sufficient information down the manufacturing chain for downstream manufacturers to assess compliance requirements. For the recipient to be able to determine the mass percent of the SVHC in the declarable article, the supplier can include the declarable article as an object in the declaration (this can be a material, product part or the product).

Figure 2 illustrates a simple declaration hierarchy of an SVHC (S1) that is included in a material (M1) which is included in a product part (SP1) (declarable article). Material M1 is identified as not an article (isArticle=False) and product part SP1 is identified as the declarable article (isArticle=True). Therefore, the recipient is able to calculate that the mass percent of S1 in the declarable article (SP1) is 0,2 g (S1:SVHC)/10 g (SP1) = 2 % (> 0,1 % threshold that triggers the REACH communication requirements). The top-level product is a higher-level article and therefore, also has isArticle=True.

There are instances where a material (M1) can have a specific shape and meets the definition of an article (see Figure 3) and therefore can be treated as the product part (SP2). In this case, the isArticle flag for material M1 is set to True, therefore, the material as the 'declarable article' is declared as a ProductPart in the composition declaration. Thus, the SVHC mass percent in an article will be 0,2 g (S1:SVHC)/1,0 g (SP2) = 20 % (see an example described in 7.3.8).

In this way, when the isArticle of material is true, the principle is that the material is regarded as a 'Declarable article' and treated as a 'Product part'. This principle will apply to all items considered as 'Article as such' in the ECHA SCIP database.

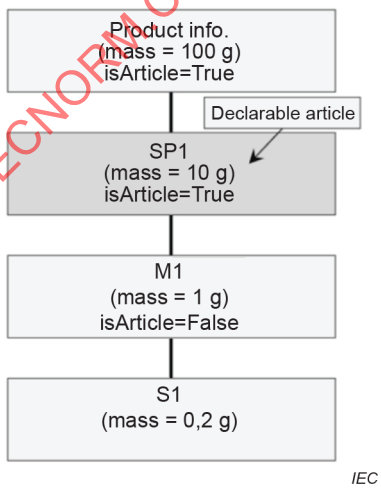

Figure 2 – Example of a product part that is an article

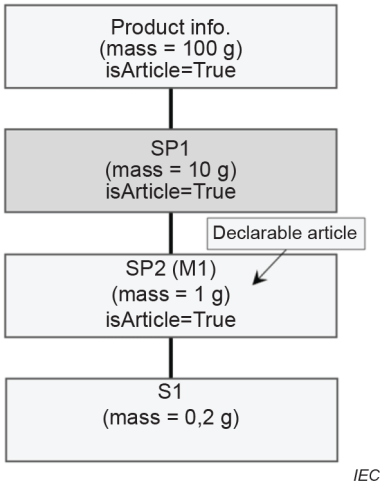

Figure 3 – Example of a material that is an article

In both examples, the SVHC content is above 0,1 %, triggering REACH communication obligations, but there are cases where only a small amount of the SVHC is present, and the selection of the declarable article will have an impact on whether or not the SVHC is present above this threshold. It is up to the supplier that first incorporates an SVHC into an article to provide this information to downstream manufacturers.

4.8.10.3 Multiple SVHCs added at different stages of manufacturing

There can also be products that contain more than one SVHC. In some cases, the SVHCs may be applied at different stages during manufacturing, resulting in a complicated declaration hierarchy. One such example is illustrated in Figure 4.

- The substance S1 (an SVHC) is included in a plating material (M1) which is applied to a lead frame (SP1), which then becomes a plated lead frame (SP2).
  - SP2 is the declarable article that includes S1, therefore the mass % of S1 in an article is the (mass of S1)/(mass of SP2).
  - If this mass % is above 0,1 %, then S1 has REACH obligations.
- The substance S2 (another SVHC) is a constituent of die attach material (M2) that is applied to the die (SP3) and the plated lead frame (SP2) to become the die assembly (SP4).
  - In this case, SP4 is the declarable article for substance S2 and is used as the basis of the mass % calculation to compare to 0,1 %.
- Overall, in this declaration hierarchy of the IC, subproducts SP4 and SP2 are both declarable articles for different SVHCs, which creates a complex declaration.

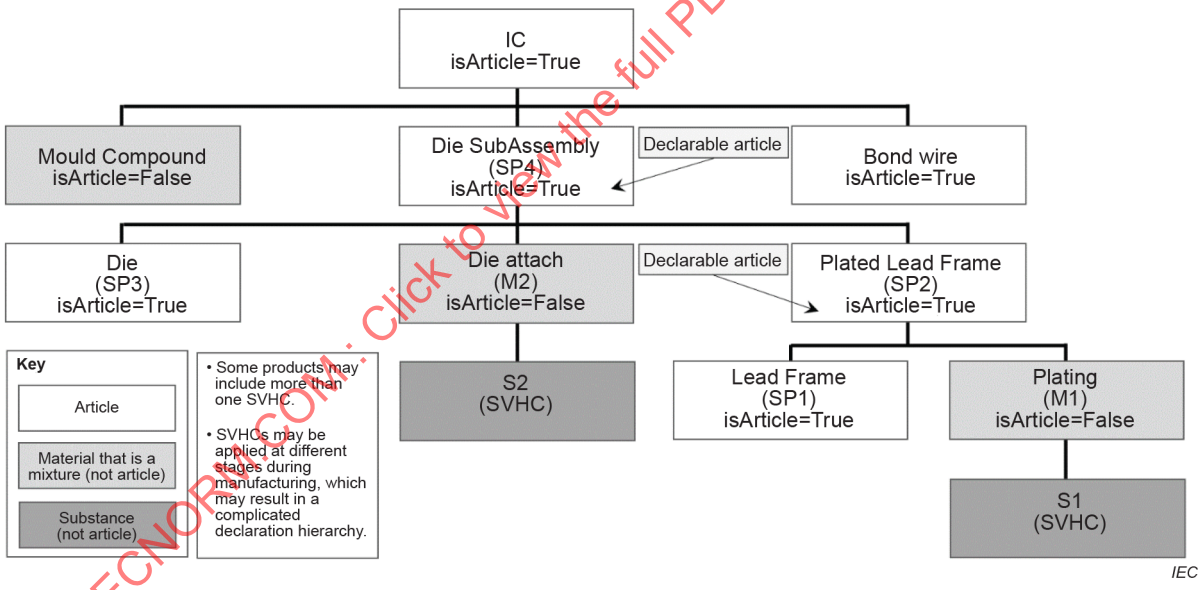

Figure 4 – Example of a product containing more than one SVHC

For the recipient of a declaration to accurately assess REACH obligations, it is necessary for the supplier to declare the product part (or product) that is the declarable article identified by using the isArticle flag.

NOTE In some cases (for simple products), the product can be the declarable article (e.g. the product provided by a supplier can be a single piece of moulded plastic) or the product can be a mixture (e.g. wet paint) and there is no article.

4.9 Material class declaration

4.9.1 General information

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 are significant to a specific product.

Material classes represent categories of materials, so that an electrotechnical equipment manufacturer can 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. Material classes are neither positive nor negative, and are not related to current or future restricted substances or materials.

4.9.2 Material class list (MCL)

4.9.2.1 Revised MCL

The revised MCL is the first update to the MCL since it was initially published in 2012. The original MCL was kept to relatively broad material classifications to make it easier for manufacturers and suppliers to classify the materials in their products. But the downside was that it did not provide enough information for conducting environmental assessments such as life cycle assessment (LCA), recyclability analysis. In the revised MCL, the number of material classes has been expanded to better identify material classifications for LCA and material recycling streams.

4.9.2.2 Material class

The revised MCL includes three levels of material class identification. The first level (Cat1) distinguishes between inorganic materials, organic materials and materials for product operation. The second level (Cat2) identifies a general category of material (such as steels and ferrous materials) and the third level provides enough specificity for LCA or to identify the applicable recycling stream (such as polyethylene (PE) which has material class ID = M-201).

Given that fillers can have a significant impact on the recycling opportunity for thermoplastics, thermoplastics are subdivided at level 2 between unfilled thermoplastics resin (M-20) and filled thermoplastics resin (M-25).

Every level 2 material class in the MCL is assigned a two-digit MC code (e.g. M-10 for steels and ferrous materials). This level 2 code may be used in the material declaration in the situation when a supplier does not know the level 3 code (which are represented by a 3-digit code). This provides a migration path from broader classifications to more detailed classifications when known. However, given that the level 2 material class does not provide enough information for LCA, the intent is to encourage the supply chain to provide third level material class data when it is available, and only to report level 2 material class when the level 3 material class data is not available.

4.9.2.3 Use of material class

The material class in the MCL can be used in two different ways in material declarations:

1) overall summary declaration of the material classes associated with the materials in a product (e.g. 40 % aluminium and its alloys, 30 % acrylonitrile-butadiene-styrene plastic (ABS), 20 % polycarbonate (PC), 1 % gold, and 1 % other precious metals);
2) assignment of a material class to each individual material that is declared in a composition declaration. This allows the recipient of the material declaration to identify where in the product specific types of materials are located and to roll-up the overall material composition of the product.

Material class declarations (item 1) above) are supported by the IEC 62474 DXF. This is a separate declaration module in the declaration file (XML) that focuses exclusively on an overall summary of the material classes that make up the product. It does not provide information on where the materials are in the product, but it provides an excellent summary to conduct environmental impact analysis using LCA.

4.10 Other information

4.10.1 Query lists

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 critical 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 IEC 61249-2-21.

Query lists can be created by the requester, or the requester has the option of referencing a pre-defined query list, for example, an industry-specific safe use query list.

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

Table 2 – Use of query list

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

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

4.10.2 Attachments

Users have the ability to provide supplementary files related to the product and declaration. Files can be embedded into the declaration XML, provided as an external file or folder, or provided as an external link (URL). UTF-8 encoding is required for embedding of files within the declaration XML. While there is no limit on file size or number of attachments, it is recommended

final file size be as small as possible, as the file size or total number of attachments can be limited by supporting software tools.

Attachments can be provided in reference to business information, product, product part, or material. Users can provide a description of each attachment and can optionally designate the language of each attached file. Examples of potential attachments are shown below.

- test report: attached to a specific material or subpart within a declaration;
- certificate of compliance: attached to the product under declaration, or product part within the declaration;
- picture or drawing of the product: attached to the product under declaration;
- disassembly instructions: attached to the product under declaration;
- other, for example, corporate environmental policy statement attached to the business information within a declaration.

NOTE The attachments can be used to provide information for certain optional data fields (e.g. picture) in the EU SCIP database.

4.10.3 Requester/responder and distribution modes

4.10.3.1 General information

In the requester/responder mode, the requester will communicate to the responder that a declaration is required, with the type of declaration(s) needed and the requester's business information included. The responder will use the IEC 62474 format(s) to respond to the requester and include the requester's business information.

Declarations may be readily available from a supplier in the distribution mode. The data may be sent as part of the standard purchasing or qualification process to the recipient or the recipient may be able to go on-line to the supplier's website to download the data directly. In either of these cases the business information from the recipient is not included.

4.10.3.2 Requester/responder mode in the developer's table

In the requester/responder mode, utilizing the request class, the requester may specify if the responder is required to provide a declaration for compliance or a composition declaration or both.

The requester may also specify that the responder provides the following:

1) material class declaration,
2) query list response,
3) supporting document(s) as attachment(s).

When requesting the attachment(s), the requester may specify the type of supporting document(s) in the comment field of the Request Class.

Utilizing the Response Class, the responder can provide a requested declaration(s) in correspondence to the Request Class.

4.10.3.3 Distribution mode in the developer's table

In the distribution mode, the recipient is not identified therefore the request element of the BusinessInfo Class is not required to be declared.

Utilizing the Response Class, the supplier shall provide either a declaration for compliance or a composition declaration or both.

The supplier may also provide the following:

1) material class declaration,
2) query list response,
3) attachment(s).

4.10.3.4 Writer field

The write-code Q or P of the writer field in the developer's table indicates the status of a writer entry in the requester/responder mode and distribution mode for assisting the programmers.

NOTE The requester can only fill attributes (fields) with a Writer entry of 'Q', and attributes with a Writer entry of 'P' can only be filled by the responder. Attributes designated with a Writer code of 'Q or P' can be filled or modified by either the requester or the responder.

4.10.4 Safe use information

The IEC 62474 DXF has the capability to declare safe use instructions (if applicable) for substances in the product. IEC 62474 allows the safe use information to be declared as either a free-text field or as an entry from a reference list published by an authority (see Figure 5).

In the composition declaration, safe use information may be reported with the substance or the material.

In the declaration for compliance, the safe use information may be assigned to either the DS or DSG or to ProductPartInformation if the product part information is provided. However, if the DS or DSG is a REACH SVHC and the declaration is intended for the SCIP notification dossier submission, then the SafeUse element in ProductPartInformation should be used since the safe use instructions can vary based on the article (for example, whether the SVHC is accessible to the user or not).

NOTE ECHA has suggested a possible default statement for safe use instructions if no special instructions are applicable. If this phrase is updated by ECHA, refer to ECHA for the actual sentence.

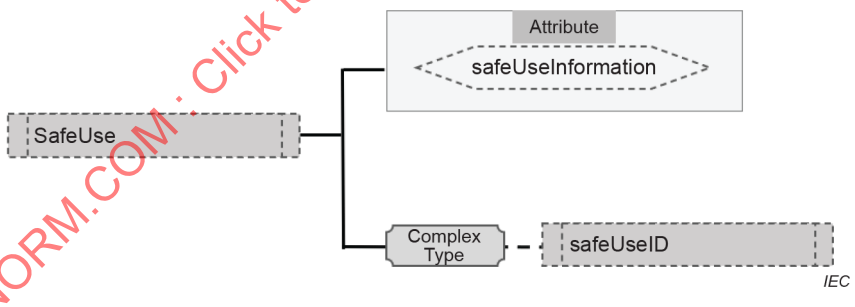

Figure 5 – SafeUse element

5 Guidance on the IEC 62474 database

5.1 Requirement of data fields in the developer's table

The IEC 62474 developer's table includes an obligation column that indicates whether a specific data field (element or attribute) is mandatory, conditional or optional. The details of mandatory or optional conditions in the material declaration are summarized in the subclause as "mandatory reporting requirements" and "optional reporting requirements", respectively, in "Requirements for material declarations" of IEC 62474:2018, Clause 4 and IEC 62474:2018/AMD1:2020, Clause 4. Other mandatory conditions are clearly indicated as "shall" in sentences.

Some data fields are listed as conditional which are mandatory under certain 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 should 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 shall 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 and MassPercent have particularly complex conditional provisions that should be carefully reviewed to ensure correct implementation.

5.2 Threshold element

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 DSL. The Threshold element includes three individual attributes: the reporting threshold (reportingThreshold), the reportable application (reportableApplication), and true/false information about whether the substance or substance group is present at or above the reporting threshold (aboveThresholdLevel). For DSs and DSGs the reporting threshold and reportable application fields should be copied directly from the IEC 62474 DSL which 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 or substance group. The reporting threshold should be provided and it can also be helpful 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 be included in the declaration. The multiplicity of 0:* for this element, means that multiple reporting thresholds may be provided by the supplier. This can be useful in circumstances where multiple reporting threshold and 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 DSs and DSGs in the IEC 62474 DSL, the reporting threshold is based on the mass percent. 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 many other DSs and DSGs that have a reporting threshold on a different calculation basis. The EU RoHS DSGs are examples that use the mass of the homogeneous material as the basis for calculation.

5.3 Exemption lists in the IEC 62474 database

5.3.1 General information

Restricted substances are sometimes allowed (exempted) when they are used for specific applications or in certain types of products. If the substance exceeds the threshold but is allowed based on an applicable exemption, it is necessary to report that mass percent and which exemption is being applied.

When filing an exemption, it is necessary to clarify which regulation exemption is applied. The IEC 62474 database provides the exemption lists, so the applicable laws and regulations, etc. can be clearly classified.

If an exemption is different even for the same DS and DSG, it is necessary to declare them separately for each exemption.

5.3.2 Benefits of exemptions lists

Adding exemption lists to the IEC 62474 database has two main purposes:

1) to provide a globally standardized way of referencing exemptions in material declarations through the supply chain; and
2) to provide the ability for regulators to reference exemption lists when the regulators wish to develop substance regulations but would prefer not to copy and regularly update their own exemption lists.

An example of benefit 2) is when a country developing an RoHS-like regulation wishes to harmonize with another country's exemption list (e.g. EU RoHS). A few non-EU countries have tried to copy the EU exemption list, but the fragmented nature of the list and the frequent update by the EU makes it almost impossible to maintain – which has been a frustration for manufacturers. Governments typically will not directly reference another country's regulation, but it is common for regulations to reference an IEC standard – either directly or as a national adoption of the IEC standard. The regulator can reference specific IEC exemption lists that they would like to duplicate and leverage the work done by the IEC 62474 Validation Team (VT) to continuously track the exemptions and update the lists as needed. In the long-term, this can lead to harmonized exemptions globally.

5.3.3 Initial set of exemption lists in the IEC 62474 database

The exemption lists for EU RoHS Annex III, Annex IV and China RoHS were posted to the IEC 62474 database as the initial set of exemption lists (Table 3). Exemption lists for other regulations may be posted in the future. The IEC 62474:2018 standard specifies the criteria that should be met for an exemption list to be included in the database.

Table 3 – Initial set of exemption lists in the IEC 62474 database

List authority	List identity	Version	Regulatory basis
IEC 62474	EU-RoHS-AnnexIII	E1.0	EU RoHS 2 Annex III (2011/65/EU)
IEC 62474	EU-RoHS-AnnexIV	E1.0	EU RoHS 2 Annex IV (2011/65/EU)
IEC 62474	China-RoHS	E1.0	China RoHS 2
NOTE The exemption lists are periodically updated resulting in a new version. The E1.0 versions shown in this table are examples only. The latest version of each exemption list is indicated in the IEC 62474 database.			

5.3.4 Exemption lists in a material declaration

5.3.4.1 Format of exemption lists

When a substance is used in a specific application, the supplier is usually in the best position to know if the conditions for an exemption have been met. It is therefore important for the supply chain to pass on this information to downstream manufacturers.

In a material declaration, the exemption information is reported along with the DS or DSG. For example, if a product contains lead in a high melting temperature solder (as specified in EU RoHS Annex III exemption 7(a)), the supplier can report the lead substance and then 'tags' that substance entry with one or more exemptions. They can identify the exemption list (authority = "IEC 62474", identity = "EU-RoHS-AnnexIII", version = "E1.0") and the specific exemption (identity = "00042-B-00" and description = "Lead in high melting temperature type solders (i.e. lead-based alloys containing 85 % by weight or more lead)"), and (optionally) the regulation index if available (7(a) in this case). If the product is sold into China, the supplier can also specify the China RoHS exemption (authority = "IEC 62474", identity = "China-RoHS", version = "E1.0", exemption identity = "02037-A-00" and exemption description = "Lead in high melting temperature type solders (i.e. lead-based alloys containing 85 % by weight or more lead)").

Each exemption in the IEC 62474 exemption lists has a unique IEC-ID (e.g. 00042-B-00) so that IT tools can identify exactly which exemption is being reported. The regulatory IDs (such as 7(a)) cannot always be used for this purpose because regulators may modify or reuse IDs. The IEC-ID for each entry is of the format "nnnnn-vv-ss", where nnnnn = base ID number, vv = version (alphabetic), and ss = sub-exemption ID (sub-identity). Additional information on sub-exemptions is provided below.

5.3.4.2 Sub-exemptions

A unique aspect of the IEC 62474 exemption lists is that exemptions with technical requirements that change over time or have different effective or expiry dates, based on product category, will be split up into sub-exemptions that each has a unique technical requirement, effective date and expiry date. Each sub-exemption will share the base ID and version ID of its parent exemption but will have a unique sub-exemption identity (referred to as the sub-identity).

This enables suppliers to identify specifics about the exemption that they are declaring, including the product categories and validity periods that they are assuming. It can also be used to indicate that a part is intended only as a spare part for repair and not to be used in new products. This, in turn, makes it easier for the downstream manufacturer to review whether an exemption is applicable to their product.

The sub-exemption concept has the disadvantage of making the exemption lists more complex. Each original exemption (as published in the regulation) is always specified in the exemption list with sub-identity='00'. To make the exemption lists that use sub-exemptions more readable, users can filter the sub-identity (column G) to show only the original exemptions and not the sub-exemptions which have a sub-identity that is not equal to '00'.

Suppliers do not need to use sub-exemptions when creating declarations; for example, if a supplier's part or material can be used in different product categories, the supplier can report the original exemption (sub-identity='00').

The IEC 62474 exemption lists may also include additional information about each exemption such as the regulatory basis for the exemption and the DSL entry that the exemption applies to. "First Added" and "Last Revised" dates are provided to record when a specific entry was added or changed in the exemption list.

6 Material declaration for EU SCIP database requirements

6.1 Introduction to EU SCIP database

The ECHA was mandated by the WFD to establish an SCIP database by January 5, 2020. Any supplier of an article in the EU that contains an SVHC above threshold is required to provide the information pursuant to Article 33(1) of the REACH Regulation to the SCIP database as from January 5, 2021. Given the global nature of electrotechnical product manufacturing and supply chains, this imposes requirements on manufacturers and suppliers worldwide to provide information to meet these SCIP reporting obligations. At the end of the fall of 2019, ECHA released the detailed information requirements and the XML Schema that will be used by manufacturers, importers and distributers to make SCIP notification dossier submissions into the database. The specifications include several new data requirements that supply chains do not typically report and will be a challenge for many industries, especially those that still require the use of SVHCs because there are no technical alternates for many applications.

6.2 IEC 62474 support for SCIP

The IEC 62474:2018 standard was developed to meet a variety of global regulations including emerging requirements under the EU REACH regulation and the WFD. Most data requirements were supported at the time of publication with DXF version X8.00. The IEC 62474 DXF includes features such as the isArticle flag, support for safe use instructions, an identifier field, material classification (e.g. categories). ECHA specified a few additional mandatory data requirements

that were not originally anticipated. These were addressed by the IEC 62474 Validation Team and added to the DXF version X8.10 and published in March 2020.

Supply chain communication for SCIP is supported in both declaration for compliance and composition declaration. Both declarations provide a flag with True/False response that enables the responder (the supplier) to indicate that the declaration includes the mandatory information needed for a downstream manufacturer to submit into the SCIP database. The flag is named "isSCIPComplete".

6.3 Product information for EU SCIP database

An SCIP notification dossier requires that certain minimum information about the product being manufactured or imported into the EU is provided. This includes the article name, primary article identifier, article category (i.e. CN customs code), safe use instructions, and production in the EU. The "production in the EU" indicator has the possibility of a default response of "No data". For the other data fields, the material declaration reports the corresponding information.

The above data is provided in the ProductID element of the XML Schema, as shown in Table 4.

Table 4 – Product level SCIP information

SCIP requirement	Data field	Notes
Article name	ProductID name	Free text string
Other names	ProductID OtherNames	Of type OtherNames which includes a type and a text string for 'name'.
Primary article identifier	ProductID Identifier	Of type UniqueEntry which includes a ListID and an EntryID. The ListID should correspond to one of the article identifier types that is allowed by ECHA, although ECHA does allow other identifier types. If the ProductID includes multiple Identifiers, then the first one is considered to be the Primary article identifier.
Other article identifier	ProductID Identifier	All instances of Identifier after the first instance and meeting the SCIP information requirements may be considered to be other article identifiers.
Article category (i.e. CN customs code)	ProductID ProductCategory	Of type UniqueEntry which includes a ListID and an EntryID. The ListID should correspond to ECHA picklist PG6_60768 (or later version).
Safe use instructions	SafeUse	This information will be reported with the substance or article.
Production in the EU	Generic value of "No data" may be used; alternately, CountryOfManufacture may be used if provided by the supplier.	
Number of units	Default value of one is used for the product being imported or manufactured in the EU.	

A graphical representation of the ProductID element is shown in Figure 6. The new data fields indicated by the hand pointers have been implemented in X8.10 for SCIP support.

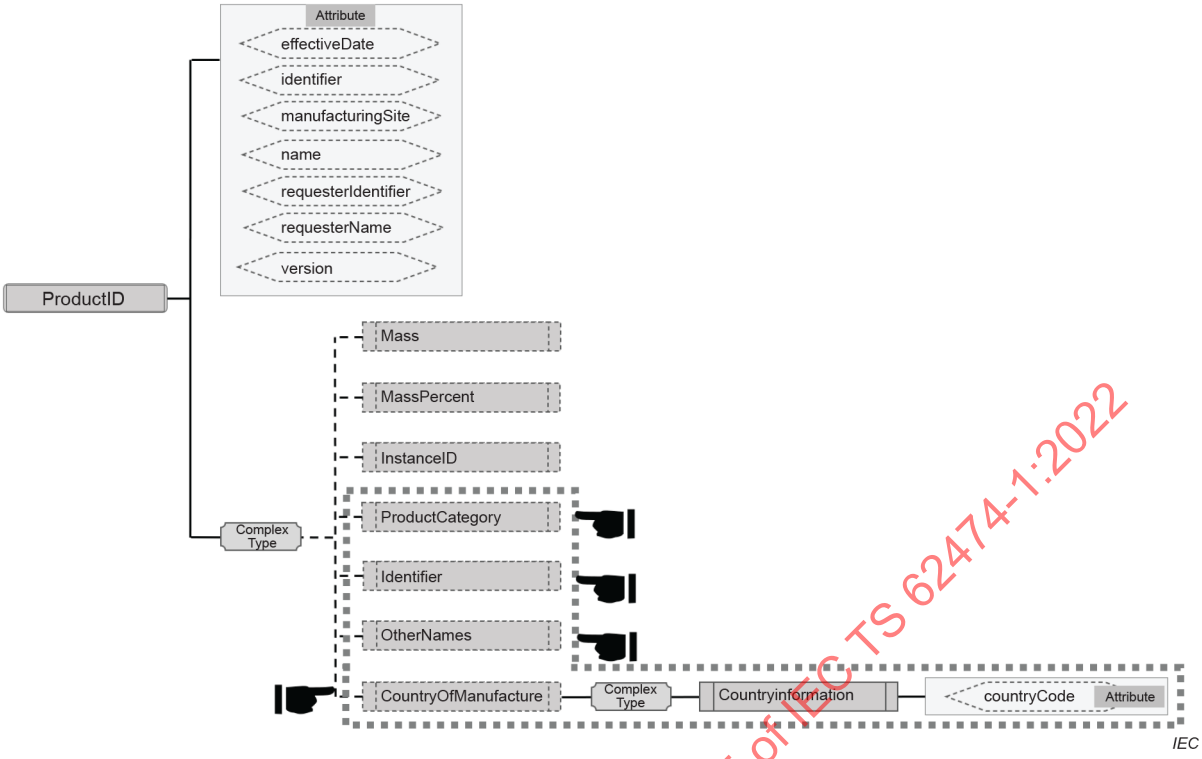

Figure 6 – SCIP data fields in ProductID

6.4 Declaration for compliance for EU SCIP database

6.4.1 Compliance element

In a typical declaration for compliance, if an SVHC is present in the product above 0,1 mass% of declarable article, the responder (supplier) is required to declare that the SVHC is above threshold and to report the highest mass percent within any of the declarable articles containing the SVHC and the total mass of the SVHC in the product. However, for the SCIP notification dossier, information (such as article name, primary article identifier) is needed for each different type of declarable article containing the SVHC. For example, a product that contains the SVHC lead (Pb) in ten different declarable articles, has ten sets of article information to be provided with the SVHC. Given that this is a unique requirement among regulations, a new ProductPartInformation element has been created to support suppliers when declaring SCIP information in a declaration for compliance.

In the declaration for compliance, the Product element (described above) already includes information about the top-level product. The Compliance element (see Figure 7) already includes the DSL (which may be used to identify the Candidate list version), the DSL entry (DsDsgID which identifies a specific SVHC entry), whether or not the SVHC is present above threshold, and if so, mass information.

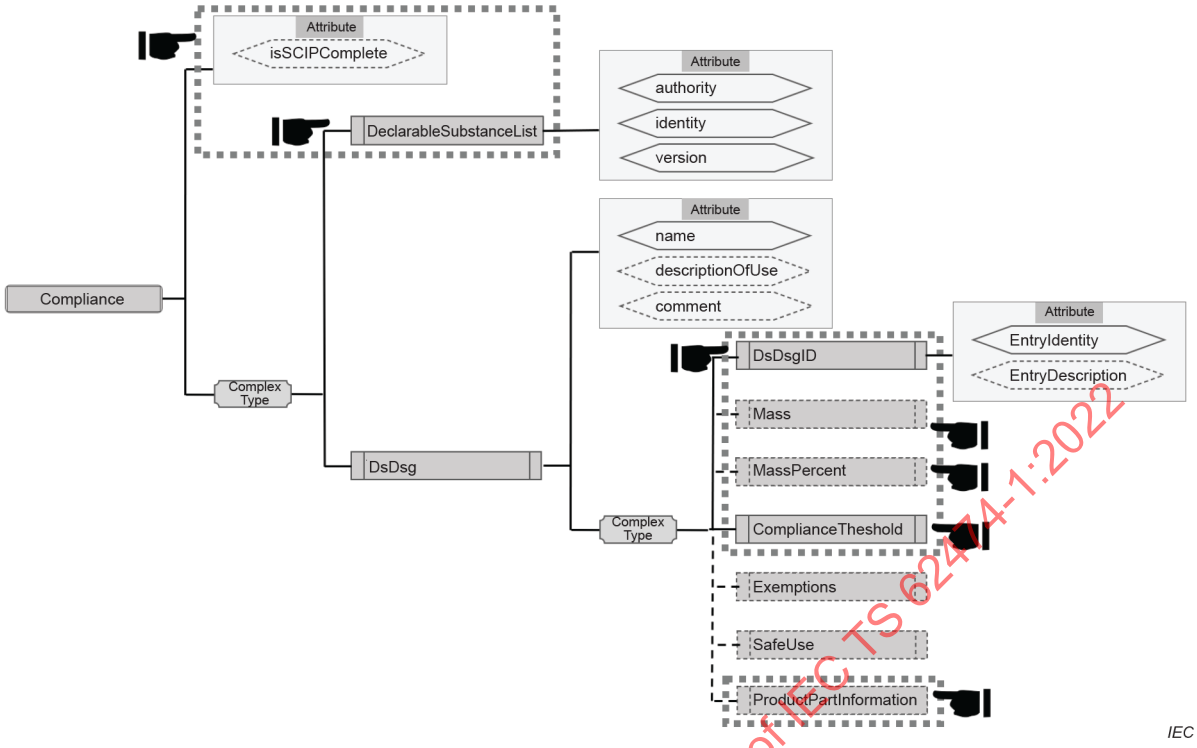

Figure 7 – Compliance element

6.4.2 ProductPartInformation for declarable articles

The ProductPartInformation element provides the necessary information for each article containing the SVHC. The data structure for the ProductPartInformation element is illustrated in Figure 8. The data fields indicated by the hand pointers have been implemented in X8.10 for SCIP support. A sub-element IntermediateComplexObject may be used if the supplier wishes to provide additional information about an intermediate complex object. For example, in the car example in the ECHA SCIP information requirements documents, this field may be used to identify information about the engine, which in turn contains the O-rings containing the SVHC. This field is optional.

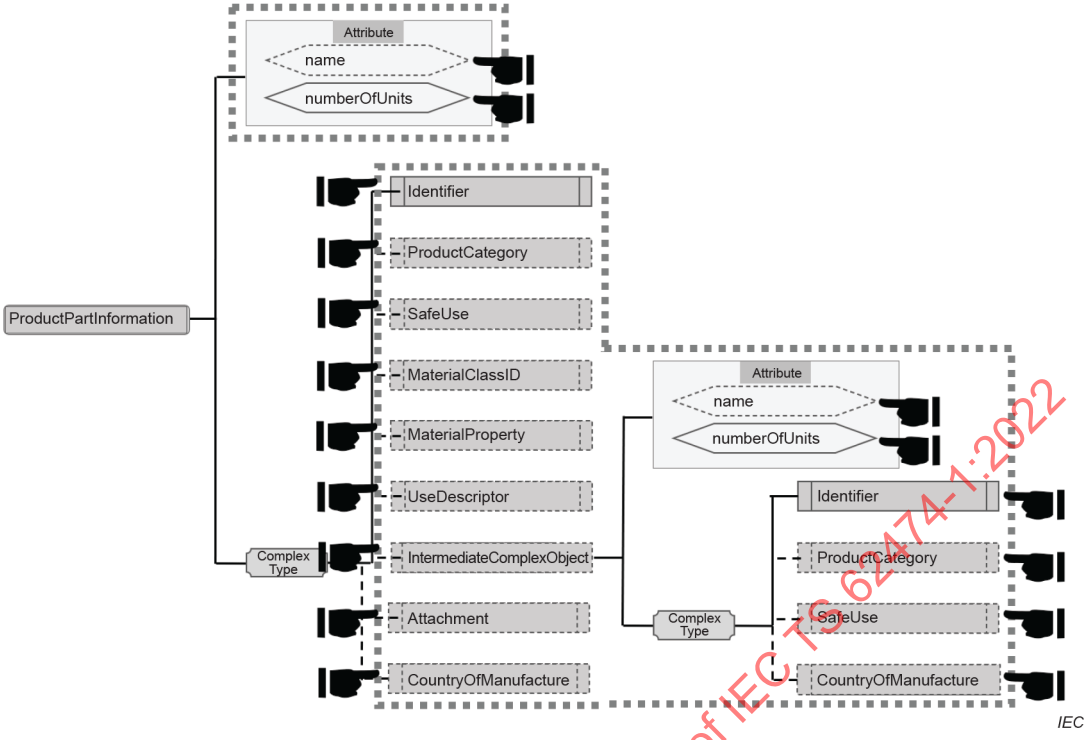

Figure 8 – ProductPartInformation element for the declarable articles

6.4.3 Data requirements considered as SCIP complete

The declaration for compliance includes an isSCIPComplete flag that allows the responder to indicate if all of the mandatory information has been provided for the SCIP. The definition and detailed requirements are provided in the developer's table. The isSCIPComplete flag may only be used if the DSL includes REACH SVHCs (as applicable to the industry).

isSCIPComplete may be set to TRUE by the responder if the following information is included in the declaration:

- For the Product element:
  - ProductID name provides the "Article name";
  - ProductID ProductCategory provides the ProductCategory (i.e. article category) information;
  - ProductID Identifier provides at least one Article Identifier (the first Identifier Code provided in the declaration file for the product will be considered as the Primary Article Identifier).
- For the declaration for compliance, each DsDsg corresponding to a REACH SVHC present in the product above the reporting threshold should include ProductPartInformation for each declarable article. If the same article occurs multiple times in the product, the numberOfInstances data field should be used instead of repeating ProductPartInformation multiple times.
- ProductPartInformation should include a link to the article if already submitted in the SCIP database or the following information: articleCategory, at least one instance of Identifier (i.e. article identifier), numberOfInstances, at least one instance of SafeUse, at least one of MaterialClassID (i.e. material category) or UseDescriptor (i.e. mixture category).

The information requirements of data fields are specified in the ECHA SCIP database.

6.5 Composition declaration for EU SCIP database

6.5.1 Declarable article reported as a product or product part

The declaration of materials and product parts is usually optional, but this becomes mandatory if the material or product part contains a declarable substance based on that material or product part. For example, if the declarable substance has a threshold based on battery, then the battery can be declared as a product part. This also applies to an article that contains an SVHC. The declarable article containing the SVHC can be declared as a product part so that downstream manufacturers can calculate the mass percent of the SVHC in the article.

For EU SCIP notification dossier submissions, the manufacturer or importer can submit (1) information about the product being manufactured or imported and (2) information about the declarable article in the build hierarchy where the SVHC is incorporated (if above 0,1 mass %). This declarable article may be an "article as such" (e.g. a simple fastener such as a screw) or it may be a "complex object" (e.g. a power supply). For one product, there can be multiple declarable articles, according to how many instances of SVHCs are included. The concentration of each SVHC in the product or product part is calculated as a function of the article into which the SVHC was first incorporated.

If the product is the declarable article into which an instance of the SVHC was first incorporated, then the SVHC is reported directly under the product. However, if the declarable article into which an instance of the SVHC was first incorporated is a product part, the article can be assigned to the product part in the composition declaration. ProductPart includes ProductID (as described above) and is used to identify the required information for the declarable article, including the article name, primary article identifier, article category (e.g. CN customs code). The CountryOfManufacture element may be used (if reported) to determine production in the EU information.

The ProductPart element itself also includes the isArticle flag and a data field for numberOfUnits which is used to report how many of these articles are present in the product as required for the SCIP notification dossier submission.

ProductPart also allows attachments. This was primarily intended for test reports or other conformance document, but may be used to attach pictures or disassembly instructions which are optional pieces of information suggested by ECHA for SCIP notification dossier submissions.

6.5.2 Material element

Some of the information required for the SCIP notification dossier is reported in the Material element of the IEC 62474 composition declaration. Figure 9 illustrates the data fields that provide information needed for the SCIP notification dossier submission. The new and existing data fields indicated by the hand pointers have been implemented in X8.10 for SCIP support.

SCIP requires that either a material category or a mixture category associated with the SVHC be reported. MaterialClassID may be used to indicate the Material Category (the ListID will indicate the ECHA material category list). A new UseDescriptor element may be used to indicate the mixture category.

In the reporting of Substance under the Material element, the safe use Instructions are reported in the SafeUse element – this may be either a text string or an entry in a defined list. If the REACH SVHC is a substance group, then the DSG in the DSL should be reported using the DsgID data field.

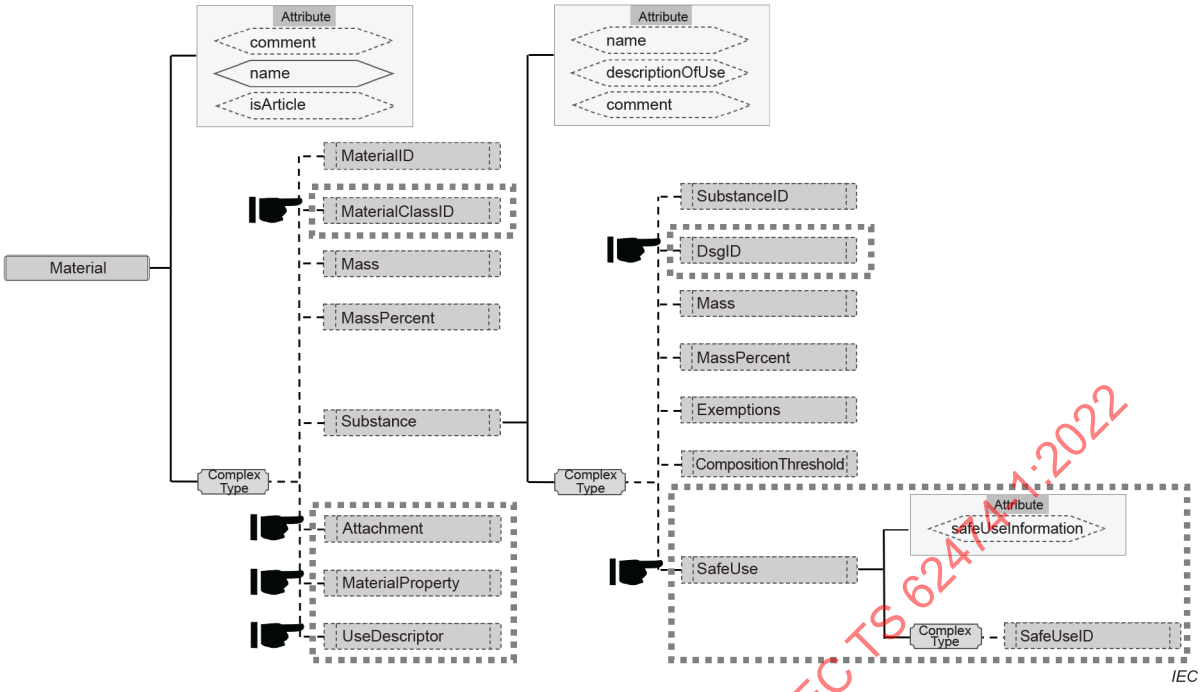

Figure 9 – Material element supporting SCIP information

6.5.3 Material classification mapping to EU SCIP material categories

The IEC 62474 database contains a mapping table between the IEC 62474 MCL and the EU SCIP material category list. The table is located under "Supplementary Lists and Information" and with ID = "MCL-SCIP-MAP".

For manufacturers who need to submit SCIP product declarations into the EU SCIP database (or to provide information to downstream producers), the MCL-SCIP mapping table helps identify the SCIP material categories that are commonly used in products.

The ECHA SCIP material categories are sometimes not well aligned with material naming conventions used in supply chains and some of the categories overlap, making it difficult to select the appropriate category.

Figure 10 below illustrates the first few rows of the mapping table. The IEC 62474 material classes appear on the left side of the table (level 2 and level 3 IDs and names).

NOTE The level 1 categories (i.e. organic, inorganic, and materials for product operation) are not shown. The corresponding SCIP material categories (identifier and phrase text) are shown on the right side of the table.

For most material classes, a single SCIP material category is suggested. But for a few of the material classes, there may be multiple SCIP material categories that are good matches based on materials that are commonly used. When multiple matches have been identified, a default material category and one or more alternate material categories are provided. If a manufacturer has information about the material or application suggesting that one of the alternate material categories is most appropriate, they may select it or otherwise they can select the default material category. The middle column titled "Default Mapping" indicates whether the mapping is to the default material category ("Default") or to an alternate material category ("Alternate"). For example, the material class M121 Copper and its alloys appears in three rows in the table (see Figure 10). The default mapping is to "metal > copper (and alloys of, except bronze and brass)" with alternate mappings for "metal > bronze" and "metal > brass".

IEC62474 Material Class List (MCL) version M3.00				SCIP Material Category 202110	
Level 2 Class ID and Name	ID	Level 3 Class Name	Default Mapping	Identifier	Phrase Text
M-10 Steels and ferrous materials	M-100	Stainless steel	Default	66376	metal > steel > stainless steel
M-10 Steels and ferrous materials	M-101	Cast and sintered irons	Default	66369	metal > iron (and alloys of, except steel)
M-10 Steels and ferrous materials	M-101	Cast and sintered irons	Alternate	66374	metal > steel
M-10 Steels and ferrous materials	M-119	Other ferrous alloys, non-stainless steels	Default	66377	metal > steel > alloy steel (except stainless steel)
M-12 Non-ferrous metals and alloys	M-120	Aluminium and its alloys	Default	66380	metal > aluminium (and alloys of)
M-12 Non-ferrous metals and alloys	M-121	Copper and its alloys	Default	66392	metal > copper (and alloys of, except bronze and brass)
M-12 Non-ferrous metals and alloys	M-121	Copper and its alloys	Alternate	66388	metal > bronze
M-12 Non-ferrous metals and alloys	M-121	Copper and its alloys	Alternate	66386	metal > brass
M-12 Non-ferrous metals and alloys	M-122	Magnesium and its alloys	Default	66399	metal > magnesium (and alloys of)
M-12 Non-ferrous metals and alloys	M-123	Nickel and its alloys	Default	66402	metal > nickel (and alloys of)
M-12 Non-ferrous metals and alloys	M-124	Zinc and its alloys	Default	66411	metal > zinc (and alloys of, except brass)
M-12 Non-ferrous metals and alloys	M-125	Lead and its alloys (including Pb solders)	Default	66396	metal > lead (and alloys of)
M-12 Non-ferrous metals and alloys	M-126	Tin and its alloys (including Pb-free solders)	Default	66406	metal > tin (and alloys of), except bronze

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Figure 10 – Excerpt from IEC 62474 material class to SCIP mapping table (Version 1.0)

6.5.4 Data requirements considered as SCIP complete

The composition declaration includes an isSCIPComplete flag that allows the responder to indicate if all of the mandatory information has been provided for SCIP. The definition and detailed requirements are provided in the developer's table. The isSCIPComplete flag may only be used if the product includes REACH SVHCs above threshold.

isSCIPComplete may be set to TRUE if the following information is included in the declaration:

For the Product element:

- ProductID name provides the "Article name";
- ProductID ProductCategory provides the ProductCategory (i.e. article category) information;
- ProductID Identifier provides at least one Article Identifier (the first Identifier Code provided in the declaration file for the product will be considered as the Primary Article Identifier).

For the composition declaration, when a DS or DSG Substance that is on the REACH SVHC Candidate List is present above the reporting threshold:

- the declarable article (article as such or complex object) containing the substance shall be declared as a ProductPart meeting the following requirements:
  - the isArticle flag is declared and set to TRUE;
  - ProductID name provides the "Article name";
  - ProductID ProductCategory provides the ProductCategory (i.e. article category) information;
  - ProductID Identifier provides at least one Article Identifier (as specified in the SCIP requirements specification). The first Identifier provided for the ProductPart will be considered the Primary Article Identifier.
- The Material element in the declaration provides the material or mixture related information that is needed for the SCIP submission. For the material category, MaterialClassID is used or if the mixture category is appropriate then UseDescriptor is used.
- The Substance element may include safe use instruction (either free text or from a SafeUse list) using the SafeUse element.

Data fields should meet the information requirements as specified in the ECHA SCIP database.

7 Material declaration examples

7.1 Overview

Clause 7 describes the specifics of how material declaration data is required to be formatted and exchanged, to support information transfer through the supply chain. Although hardcopy exchange may be used, this document specifies criteria for the electronic exchange of material declarations by eXtensible Markup Language (XML). Clause 7 provides instructions to users, but it is mainly focused to provide requirements to software developers. It is not intended to promote any specific software application.

7.2 General

The IEC 62474:2018 standard introduces several new and revised capabilities. Figure 11 illustrates the capabilities of the material declaration based on the IEC 62474 developer's table X8.10. For example, i) business information (<BusinessInfo>: mandatory and optional information), ii) declaration for compliance (<Compliance>: mandatory and optional information) and iii) composition declaration (<Composition>: mandatory and optional information). The new material declaration capabilities are based on emerging regulatory requirements, user feedback, and the needs of a broad range of industries. It provides significant flexibility for suppliers to provide material declaration information and ensure that critical information for downstream manufacturers to assess product compliance is always available. The IEC 62474 developer's table and IEC 62474 DXF now include additional support for EU REACH compliance and the EU SCIP database. The changes were also intended to make the standard useful for a broad range of industries and different stages in the supply chain given the intertwined nature of global supply chains.

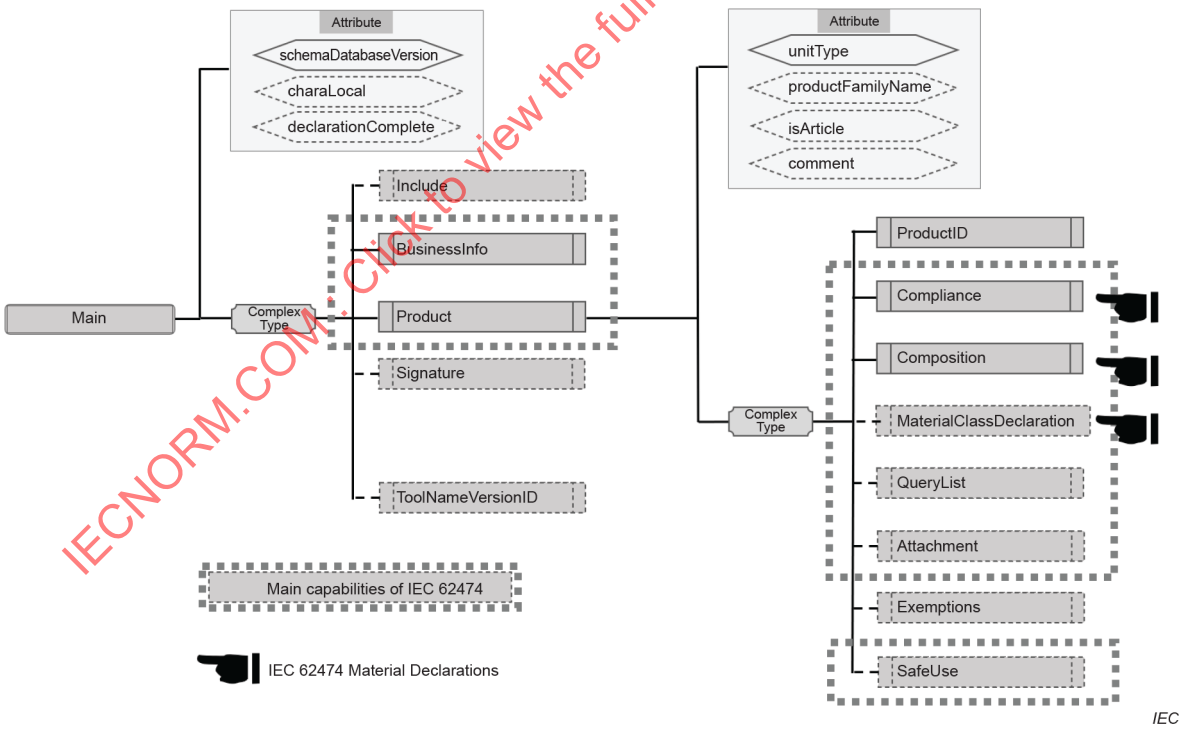


Figure 11 – Material declaration capabilities

Material declaration examples in this document are focused on those newly introduced features. The material and substance information in the material declaration is organized into the following types of declarations:

- declaration for compliance;
- composition declaration;

- material class declaration.

Other main capabilities include:

- query list (see 4.10.1);
- attachments (see 4.10.2).

The structure of the IEC 62474 XML schema, requirements, and options of these types of declarations are clearly specified in the IEC 62474 developer's table. XML editor programs are commercially available that can show XML files in a more readable format.

For a complete list of information required for material declaration, see IEC 62474:2018, Clause 4 and IEC 62474:2018/AMD1:2020, Clause 4 and the developer's table and XML schema in the IEC 62474 database.

7.3 Examples

7.3.1 General

7.3.1.1 Introduction to material declaration examples

There are six material declaration examples in 7.3:

1) declaration for compliance;
2) composition declaration;
3) composition declaration including isFMD flag;
4) material class declaration;
5) declaration for compliance including the ECHA SCIP information;
6) composition declaration including the ECHA SCIP information.

The listed information on chemical substances and preparations in products and parts, etc. described in the examples is fictitious. Do not use this exampled information for any purpose other than as a reference for creating an XML instance conforming to IEC 62474 XML schema X8.10.

In the examples, it is assumed that information about material declarations is transmitted by the following software Tool developed by a system vendor.

- Tool
  identity = Material-Declaration-Tool
  authority = IEC company
  version = 1.0

7.3.1.2 Clauses of IEC 62474:2018 referred by examples

The six examples demonstrate the functionality of the following subclauses of IEC 62474:2018 and IEC 62474:2018/AMD1:2020:

- Subclauses 4.1.3 and 4.2 related to reporting business information and use of SI units;
- Subclause 4.3 a), b), and c) related to product, and product identification and mass;
- Subclause 4.4.2 related to DS and DSG separately for each occurrence that exceeds a reporting threshold;
- Subclauses 4.4.2 f), g) and 4.5.4 e) for reporting of exemptions;
- Subclause 4.5.3 related to reporting of materials as either the mass or mass percent of a product part or product;

- Subclause 4.5.4 related to naming DSs and DSG substances in accordance with the IEC 62474 database, assigning DSs and DSG substances to a product part, and reporting as mass percent of the product part or product;
- Subclause 4.6 related to optional reporting material classes as named by the IEC 62474 database and assigned to the product, accounting for at least 90 % by weight of the product.

7.3.1.3 Unique identifier of the IEC 62474 lists

The examples provided in this guidance document refer to the IEC 62474 database's identifications and versions. These designations are required when suppliers are completing a material declaration that includes the IEC 62474 database information.

The latest IEC 62474 database unique designations at the time of this document's publication are:

- IEC 62474 XML schema and developer's table for materials declaration
  - XML Schema Database Version="X8.10";
- declarable substance list (DSL)
  - List Authority="IEC 62474"; List Identity="IEC 62474-DSL"; List Version="D20.00";
- material class list (MCL)
  - List Authority="IEC 62474"; List Identity="IEC 62474-MCL"; List Version="M2.00";
- exemption lists
  - List Authority="IEC 62474"; List Identity="EU-RoHS-AnnexIV"; List Version="E1.0";
  - List Authority="IEC 62474"; List Identity="EU-RoHS-AnnexIII"; List Version="E1.0";
  - List Authority="IEC 62474"; List Identity="China-RoHS"; List Version="E1.0".

7.3.1.4 Obligation (normative) specified in IEC 62474 developer's table

The IEC 62474 developer's table specifies the following three types of normative obligation codes.

- M: Mandatory;
- O: Optional;
- C: Conditional.

M, O, and C codes in the obligation (normative) field of the IEC 62474 developer's table correspond to the mandatory, optional, and conditional requirements determined in IEC 62474:2018, Clause 4 and IEC 62474:2018/AMD1:2020, Clause 4, respectively. Since the IEC 62474 XML schema can only validate M and O codes by their function, C code is considered as an option in the XML schema.

To follow conditional requirements of XML elements or attributes specified by C-code is usually necessary for the logical computing to determine if they are mandatory or optional in order to create an IEC 62474 conforming XML data.

7.3.2 Example of business and product information

7.3.2.1 Example of business information

Business and product information is provided with other IEC 62474 material declarations as a combination. Table 5 and Table 7 show an instance of business and product information contained in the material declaration as defined by the IEC 62474 developer's table (see Figure 11). The elements and attributes listed in the Preferred Name field highlighted by bold font are mandatory requirements, and others are optional or conditional. The IEC 62474 developer's table formats the element with the start of an upper-case letter and the attributes with the start of a lower-case letter.

The business information (see 4.4) shown in Table 5 has newly defined optional capabilities distinguished by the italic font to allow for local languages corresponding to the attributes added with the word "Local". The example of the second language code (ISO 639-2/B) is "JPN".

Table 5 – Example of business information

IEC 62474 Capabilities	IEC 62474 developer's table X8.10[a]		Example of business information
	Response class	**Preferred name (Normative)**	**Product information is provided corresponding to mandatory or optional fields in IEC 62474 XML schema X8.100**
Business information	**Authorizer** (Contact class)	**name**	John Doe
		nameLocal	ジョン ドウ
		title	Quality Assurance Manager
		titleLocal	品質保証マネージャー
		division	
		divisionLocal	
		email	John.doe@supco.com
		phone	301-555-2345
		internalAddress	
		street	
		streetLocal	
		city	
		cityLocal	
		stateProvince	
		stateProvinceLocal	
		country	
		postalCode	
		comment	
		commentLocal	
	Contact (Contact class)	**name**	Fred Smith
		nameLocal	フレッド スミス
		title	Quality Assurance Assistant
		titleLocal	品質保証アシスタント
		division	
		divisionLocal	
		email	Fred.smith@supco.com
		phone	301-555-2346
		internalAddress	
		street	
		streetLocal	
		city	
		cityLocal	
		stateProvince	
		stateProvinceLocal	
		country	
		postalCode	
		comment	
		commentLocal	
	SupplyCompany (Company class)	UniqueID	Authority: DUNS, identity: 987654321
		name	Supco
		nameLocal	

[a] Mandatory requirements are in bold type and newly defined elements and attributes are in italic type.

7.3.2.2 Example of product and product information

Figure 12 and Table 6 illustrate the configuration of a connector as an example of product and the corresponding substance, material and product part information for the material declaration. The connector is assembled by five different product parts, and the shell of the connector contains lead that is exempted by the RoHS directive.

SOURCE: Reproduced from chemSHERPA with the permission of JAMP

Figure 12 – Product – Connector

Table 6 – Configuration and main ingredient of a connector

Product part	Number of units	Material class	Material	Mass	Composition	
					Main ingredient	CAS: Maximum content
Terminal	9	Copper and its alloys M-121	Phosphor bronze	0,03 g	Copper, Tin, Phosphorus	Copper (Cu: 70 %) 7440-50-8
		Tin and its alloys M-126	Tin plating	0,6 mg	Tin	
Insulating element	1	PolyButylene Terephthalate (PBT) M-261	PBT resin	0,5 g	PBT, Antimony trioxide, Brominated flame retardant	Tetrabromobisphenol A (25 %) 79-94-7
						Antimony trioxide (7 %) 1309-64-4
Shell	1	Cast and sintered irons M-101	Free-cutting steel	4 g	Iron, Lead	Lead (0,2 %) 7439-92-1
		Nickel and its alloys M-123	Nickel plating	0,3 mg	Nickel	Nickel (100 %) 7440-02-0
Junction shell	1	Acrylonitrile-Butadiene-Styrene (ABS) M-256	ABS resin	5 g	ABS, Antimony trioxide, Brominated flame retardant	Tetrabromobisphenol A (20 %) 79-94-7
						Antimony trioxide (5 %) 1309-64-4
Screw	2	Cast and sintered irons M-101	Carbon steel	0,2 g	Iron, Carbon	
		Other non-ferrous metals and alloys M-149	Chrome plating	0,2 mg	Chromium	

The product information shown in the product class (see Table 7) lists newly defined conditional elements and their attributes such as Compliance, Composition, and isArticle for the material declaration distinguished by the italic font. The ProductID class has newly specified four optional elements for supporting the ECHA SCIP notification dossier.

Table 7 – Example of product information

IEC 62474 Capabilities	IEC 62474 developer's table X8.10[a]		Example of product information
	Response class	**Preferred name (Normative)**	**Product information is provided corresponding to mandatory or optional fields in IEC 62474 XML schema X8.10**
Product information	**Product** (Product Class)	**ProductID**	see Table 7 ProductID (ProductID class) below
		Compliance	see Table 9 Compliance
		Composition	see Table 11 Composition
		MaterialClassDeclaration	see Table 12
		QueryList	
		Attachment	
		Exemptions	
		SafeUse	
		unitType	Each
		productFamilyName	
		isArticle	
		comment	
	ProductID (ProductID Class)	**Mass**	10,176 1 (g)
		MassPercent	
		InstanceID	
		ProductCategory	see Table 13, Table 14 and Table 15
		Identifier	see Table 13, Table 14 and Table 15
		OtherNames	see Table 13, Table 14 and Table 15
		CountryOfManufacture	see Table 13, Table 14 and Table 15
		name	Connector
		identifier	ABC4523
		manufacturingSite	
		effectiveDate	2020-01-13
		version	
		requesterName	
		requesterIdentifier	

[a] Mandatory requirements are in bold type and newly defined elements and attributes are in italic type.

7.3.3 Example of declaration for compliance

7.3.3.1 Conformity assessment

Table 8 shows how to assess the conformity of a product to regulations listed on the BasisDescription column of the IEC 62474 DSL based on the main ingredient of the connector (see Table 6). To enable conformity assessment based on a declaration for compliance, the declaration on the presence of DSs and DSGs at or above the reporting threshold level for an applicable reportable application provided in the IEC 62474 DSL shall have a positive ("true") response for all such DSs or DSGs. And the declaration on the absence of DSs and DSGs shall have a negative ("false") response for DSs or DSGs in the IEC 62474 DSL.

Table 8 – Conformity assessment of the main ingredient of a connector

IEC 62474 DSL						IEC 62474 XML schema				IEC 62474 Exemption List
Entry ID	Substance/ Substance group	CAS	ReportableApplications	ReportingThreshold	MassInfoRequirements	above Compliance Threshold	MassPercent (ppm)	Mass	descriptionOfUse	
00003	Asbestos		All	Intentionally added [ReportingLevel:Product]	Mass percent of product	FALSE				
00008	Brominated flame retardants (other than PBBs, PBDEs, or HBCDD)		Printed wiring board laminate	0.09 mass% total bromine content in laminate [ReportingLevel:Material]	Mass percent of total bromine content in laminate	FALSE				
00009	Brominated flame retardants (other than PBBs, PBDEs, or HBCDD)		Plastic materials except printed wiring board laminates	0.1 mass% of bromine in plastic materials [ReportingLevel:Material]	Mass percent of bromine in plastic materials	TRUE	147500	73.75 mg	Location: PBT resin in Insulating element	
							118000	590 mg	Location: ABS resin in Junction shell	
00010	Cadmium/Cadmium compounds		All, except batteries	0.01 mass% of total Cd in homogenous material [ReportingLevel:Material]	Mass percent of total cadmium in homogenous material	FALSE				
00020	Hexabromocyclododecane (HBCDD)		All	Intentionally added or 0.01 mass% of article [ReportingLevel:Article]	Mass percent of article and total mass of all occurrences in product	FALSE				
00021	Lead/Lead Compounds		All, except for: 1. batteries, 2. surface coating material of cables/cords with thermoset or thermoplastic coatings, and 3. paint and similar surface coatings of toys and other articles intended for use by children	0.1 mass% of total Pb in homogenous material [ReportingLevel:Material]	Mass percent of total lead in homogeneous material	TRUE	2000	8 mg	Location: Free-cutting steel in Shell	RoHS Annex III IEC ID:00034-A-00 regIndex: 6(a)-I
00042	1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich	71888-89-6	All	0.1 mass% of article [ReportingLevel:Article]	Mass percent of article and total mass of all occurrences in product	FALSE				
00154	Lead	7439-92-1	All	0.1 mass% of article [ReportingLevel:Article]	Mass percent of article and total mass of all occurrences in product	TRUE	2000	8 mg	Location: Free-cutting steel in Shell	

NOTE 1 The remainder of the DSs and DSGs listed on the IEC 62474 DSL but not present in the connector are not indicated in Table 8 for simplification.

NOTE 2 Those DSs and DSGs listed on the IEC 62474 DSL indicated as "FALSE" in Table 8 are either present below the reporting threshold level for an applicable reportable application, or present but the reportable application is not applicable.

The declaration of brominated flame retardants listed as identifier 00008/00009 with criteria 3 optional reporting requirements in the IEC 62474 DSL is taken as an example in Table 6. Here, the insulating element as the product part weighs at 0,5 g which contains 7 % of antimony trioxide and 25 % of brominated flame retardant. The MassInfoRequirements of the IEC 62474 DSL specifies the conformity as "Mass percent of bromine in plastic materials" and the ReportingThreshold is "0,1 mass % of bromine in plastic materials" (see 4.7.2 item 1)). The mass of bromine in brominated flame retardants (other than PBBs, PBDEs, or HBCDD) can be calculated utilizing the following conversion factor.

- constituent substance of brominated flame retardant in the connector
  - substance name: 3,5,3',5'-Tetrabromo-bisphenol A (TBBPA);
  - CAS No: 79-94-7;
  - molecular formula: $C_{15}H_{12}Br_4O_2$;
  - molecular weight: 543,88;
- conversion factor (0,59) = atomic weight of desired element (Br: 79,904) × 4/molecular weight of constituent substances ($C_{15}H_{12}Br_4O_2$);

- bromine contained in the insulating element
  - mass = 0,5 g × 25 % × 0,59 = 0,073 75 g = 73,75 mg;
  - mass percent = 0,073 75 g/0,5 g × 100 = 14,75 % = 147,500 ppm;
- bromine contained in the junction shell
  - mass = 5 g × 20 % × 0,59 = 0,59 g = 590 mg;
  - mass percent = 0,59 g/5 g × 100 = 11,8 % = 118,000 ppm.

In accordance with 4.7.2 item 3), since there are multiple occurrences of a DSG present at or above the reporting threshold within the product, the MassPercent of 147,500 ppm as the highest mass percent shall be declared, and optionally the location information can be provided such as the insulating element and junction shell. If the requester needs a total mass of DSG, the total mass of 663,75 mg can be declared.

Thus, as a result of conformity assessment of "0,1 mass % of bromine in plastic materials" shall be declared as "true" at the attribute of aboveComplianceThreshold attribute.

In this example, the entry ID 21, the DSG "Lead/Lead Compounds" corresponding to the EU RoHS can be declared as it is present above threshold in the homogeneous material (free-cutting steel of the shell). The declaration for compliance does not require to provide product hierarchy. The material location where the DSG is used in the product (free-cutting steel of the shell) can be declared in the "descriptionOfUse".

In addition to the entry ID 21, "Lead" contained in the shell can also be declared in correspondence to the EU REACH. Therefore, "Lead" in the electrical connector has to complete the conformity assessment for both EU RoHS and REACH regulations.

7.3.3.2 Capability and XML structure of the declaration for compliance

Figure 13 and Table 9 illustrates the capability and XML structure of the declaration for compliance that declares conformity under the "Compliance" element mainly structured by DSs and DSGs corresponding to the product.

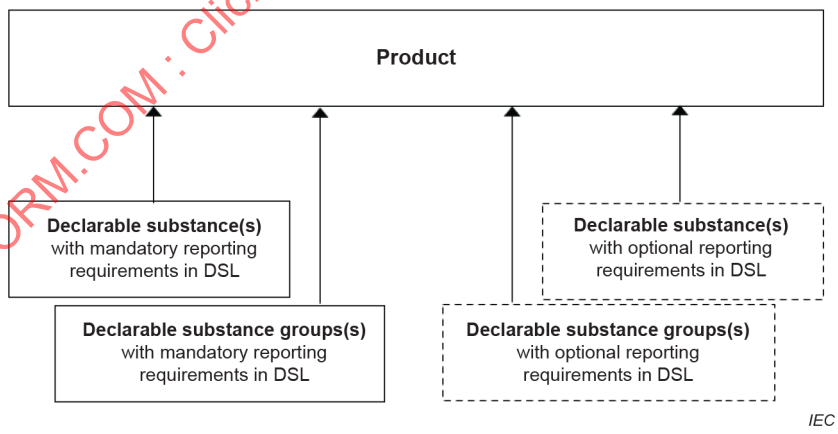


Figure 13 – Data model for a declaration for compliance

The connector data provided as an example in Table 6 is assessed against regulations listed in the BasisDescription column specified by the ReportableApplications, ReportingThreshold, ReportingLevel, ReportingRequirement, and MassInfoRequirements of the IEC 62474 DSL (see Table 8). In Table 9, those results summarized in Table 8 are mapped to elements and attributes of the "Compliance for Declaration" specified by the IEC 62474 developer's table and the IEC 62474 XML schema.

Lead (ID 00154) is required to be declared with both 'MassPercent' and 'Mass' that are specified by the following 'reporting threshold level' and 'mass information requirements' listed on the IEC 62474 DSL.

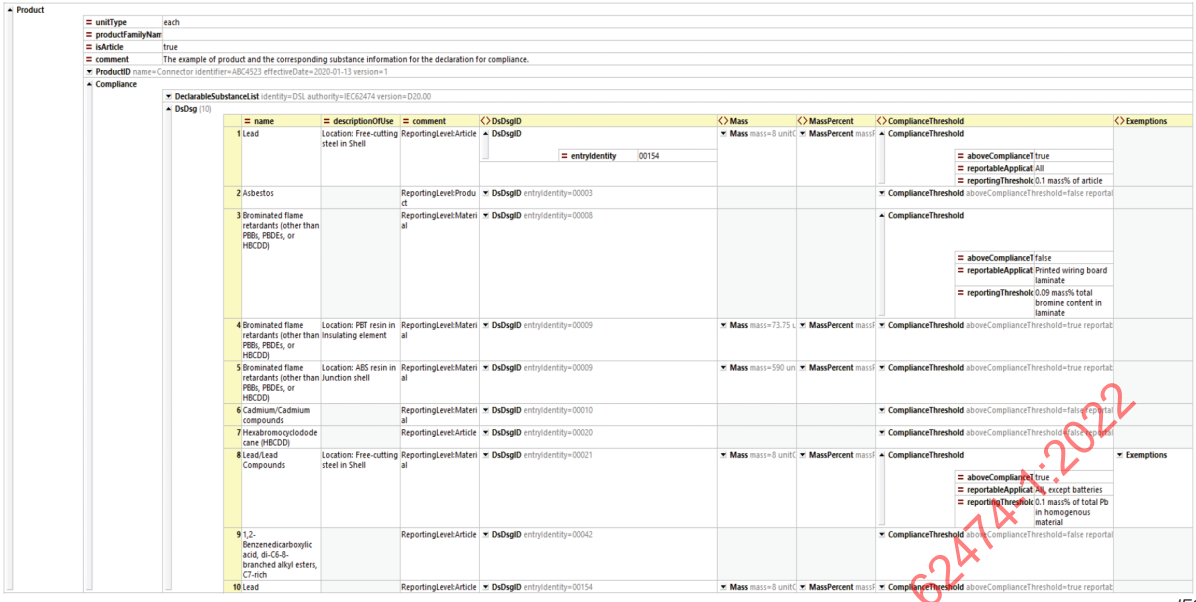
- ReportableApplications: all;
- ReportingThreshold: 0,1 mass% of article;
- ReportingLevel: article;
- MassInfoRequirements: mass percent of article and total mass of all occurences in product.

Table 9 – Mapping between declaration for compliance requirements and DSs and DSGs information

IEC 62474 Capabilities	IEC 62474 developer's table X8.10[a]		Example of compliance information
	Response class	**Preferred name (Normative)**	**Compliance information is provided corresponding to mandatory or optional fields in IEC 62474 XML schema X8.10**
Compliance information	**Compliance** (Compliance Class)	***DeclarableSubstanceList*** *See Response Class*	see Table 9, DeclarableSubstanceList(UniqueID Class) below
		DsDsg	see Table 9, DsDsg(DsDsg Class) below
		isSCIPComplete	
	DsDsg (DsDsg Class)	***DsDsgID*** *See Response Class*	see Table 9, DsDsgID(EntryID Class) below
		Mass	8 mg
		MassPercent	0,2
		ComplianceThreshold *See Response Class*	see Table 9, ComplianceThreshold(ComplianceThreshold Class) below
		Exemptions	
		SafeUse	N/A
		ProductPartInformation	see Table 14, ProductPartInformation(ProductPartInformation Class)
		name	Lead
		descriptionOfUse	Location: Free-cutting steel in Shell
		comment	
	DeclarableSubstanceList (UniqueID Class)	**authority**	See 7.3.1.3 List Authority="IEC 62474"; List Identity="IEC 62474-DSL"; List Version="D20.00"
		identity	
		version	
	DsDsgID (EntryID Class)	**entryIdentity**	00154
		entryDescription	
	ComplianceThreshold (ComplianceThreshold Class)	**aboveComplianceThreshold**	true
		reportableApplication	All
		reportingThreshold	0,1 mass % of article

[a] Mandatory requirements are in bold type and newly defined elements and attributes are in italic type.

Only the typical mapping patterns are illustrated in Table 9 and the detailed declaration of this example can be shown in Figure 14.



IEC

```
<?xml version="1.0" encoding="UTF-8"?>
<Main xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" schemaDatabaseVersion="X8.10"
xmlns="http://std.iec.ch/IEC 62474" charaLocal="JPN" declarationComplete="true"
xsi:schemaLocation="http://std.iec.ch/IEC 62474 file:///C:/Users/IEC/Desktop/IEC 62474_Schema_X8.10-20200229.xsd">
    <Include>
        <Sectional nameOfSectional="Compliance"/>
    </Include>
    <BusinessInfo mode="Distribution">
        <Response date="2020-01-13" docID="9876xyz" comment="If you have any further questions about the material
declaration, please contact us by e-mail.">
            <Authorizer division=" Environment and Quality Control Centre " name=" John Doe" title="Quality Assurance
Manager" email="John.doe@supco.com" phone="301-555-2345" divisionLocal="環境品質管理センター" nameLocal="ジョン ドウ" titleLocal="品質保証マネージャー"/>
            <Contact division=" Environment and Quality Control Centre" name=" Fred Smith" title="Quality Assurance
Assistant" email="Fred.smith@supco.com" phone=" 301-555-2346" comment="" divisionLocal="品質管理部" nameLocal="フレッド スミス" titleLocal="品質保証アシスタント" commentLocal="お問い合わせはe-mailでお願いします"/>
            <SupplyCompany name="Supco Inc." nameLocal=" Supco株式会社">
                <UniqueID authority="DUNS" identity="987654321" version="0"/>
            </SupplyCompany>
        </Response>
    </BusinessInfo>
    <Product unitType="each" productFamilyName="" isArticle="true" comment="The example of product and the
corresponding substance information for the declaration for compliance.">
        <ProductID name="Connector" identifier="ABC4523" effectiveDate="2020-01-13" version="1">
            <Mass mass="10.1761" unitOfMeasure="g"/>
        </ProductID>
        <Compliance>
            <DeclarableSubstanceList identity="DSL" authority="IEC 62474" version="D20.00"/>
            <DsDsg name="Lead" descriptionOfUse="Location: Free-cutting steel in Shell"
comment="ReportingLevel:Article">
                <DsDsgID entryIdentity="00154"/>
                <Mass mass="8" unitOfMeasure="mg"/>
                <MassPercent massPercent="0.2"/>
                <ComplianceThreshold aboveComplianceThreshold="true" reportableApplication="All"
reportingThreshold="0.1 mass% of article"/>
            </DsDsg>
            <DsDsg name="Asbestos" comment="ReportingLevel:Product">
                <DsDsgID entryIdentity="00003"/>
                <ComplianceThreshold aboveComplianceThreshold="false" reportableApplication="All"
reportingThreshold="Intentionally added"/>
            </DsDsg>
            <DsDsg name="Brominated flame retardants (other than PBBs, PBDEs, or HBCDD)"
comment="ReportingLevel:Material">
                <DsDsgID entryIdentity="00008"/>
                <ComplianceThreshold aboveComplianceThreshold="false" reportableApplication="Printed wiring board
laminate" reportingThreshold="0.09 mass% total bromine content in laminate"/>
            </DsDsg>
            <DsDsg name="Brominated flame retardants (other than PBBs, PBDEs, or HBCDD)"
descriptionOfUse="Location: PBT resin in Insulating element" comment="ReportingLevel:Material">
                <DsDsgID entryIdentity="00009"/>
```

```
                <Mass mass="73.75" unitOfMeasure="mg"/>
                <MassPercent massPercent="14.75"/>
                <ComplianceThreshold aboveComplianceThreshold="true" reportableApplication="Plastic materials except
printed wiring board laminates" reportingThreshold="0.1 mass% of bromine in plastic materials"/>
            </DsDsg>
            <DsDsg name="Brominated flame retardants (other than PBBs, PBDEs, or HBCDD)"
descriptionOfUse="Location: ABS resin in Junction shell" comment="ReportingLevel:Material">
                <DsDsgID entryIdentity="00009"/>
                <Mass mass="590" unitOfMeasure="mg"/>
                <MassPercent massPercent="11.8"/>
                <ComplianceThreshold aboveComplianceThreshold="true" reportableApplication="Plastic materials except
printed wiring board laminates" reportingThreshold="0.1 mass% of bromine in plastic materials"/>
            </DsDsg>
            <DsDsg name="Cadmium/Cadmium compounds" comment="ReportingLevel:Material">
                <DsDsgID entryIdentity="00010"/>
                <ComplianceThreshold aboveComplianceThreshold="false" reportableApplication="All, except batteries"
reportingThreshold="0.01 mass% of total Cd in homogenous material"/>
            </DsDsg>
            <DsDsg name="Hexabromocyclododecane (HBCDD)" comment="ReportingLevel:Article">
                <DsDsgID entryIdentity="00020"/>
                <ComplianceThreshold aboveComplianceThreshold="false" reportableApplication="All"
reportingThreshold="Intentionally added or 0.01 mass% of article"/>
            </DsDsg>
            <DsDsg name="Lead/Lead Compounds" descriptionOfUse="Location: Free-cutting steel in Shell"
comment="ReportingLevel:Material">
                <DsDsgID entryIdentity="00021"/>
                <Mass mass="8" unitOfMeasure="mg"/>
                <MassPercent massPercent="0.2"/>
                <ComplianceThreshold aboveComplianceThreshold="true" reportableApplication="All, except batteries"
reportingThreshold="0.1 mass% of total Pb in homogenous material"/>
                <Exemptions>
                    <UniqueID identity="EU-RoHS-AnnexIII" authority="IEC 62474" version="E1.0"/>
                    <Exemption identity="00034-A-00" regIndex="6(a)-I" description="Lead as an alloying element in steel
for machining purposes containing up to 0.35% lead by weight and in batch hot dip galvanised steel components containing up
to 0.2% lead by weight"/>
                </Exemptions>
            </DsDsg>
            <DsDsg name="1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich"
comment="ReportingLevel:Article">
                <DsDsgID entryIdentity="00042"/>
                <ComplianceThreshold aboveComplianceThreshold="false" reportableApplication="All"
reportingThreshold="0.1 mass% of article"/>
            </DsDsg>
            <DsDsg name="Lead" comment="ReportingLevel:Article">
                <DsDsgID entryIdentity="00154"/>
                <Mass mass="8" unitOfMeasure="mg"/>
                <MassPercent massPercent="0.2"/>
                <ComplianceThreshold aboveComplianceThreshold="true" reportableApplication="All"
reportingThreshold="0.1 mass% of article"/>
            </DsDsg>
        </Compliance>
    </Product>
    <ToolNameVersionID identity=" Material-Declaration-Tool" authority="IEC company" version="1.0"/>
</Main>
```

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Figure 14 – XML instance – Declaration for compliance requirements

NOTE 1 The remainder of the DSs and DSGs listed in the IEC 62474 DSL but not present in the connector are not shown in Figure 14 for simplification.

NOTE 2 The IEC 62474 database (http://std.iec.ch/IEC 62474/IEC 62474.nsf/) does not support a web service providing a URI for the XML schema as the single reference namespace. The latest version of the XSD file (e.g. IEC 62474_Schema_X8.10-20200229.xsd) in the IEC 62474 database can be downloaded to a mainframe, a server, or a personal computer, etc., for validating an XML instance.

7.3.4 Example of composition declaration

7.3.4.1 Assessment of hierarchical structure and composition of a product

Table 10 shows how to assess the hierarchical structure and composition of a product to regulations listed on the BasisDescription column of the IEC 62474 DSL and other industrial DSLs based on the main ingredient of the connector (see Table 6).

Table 10 – Assessment of hierarchical structure and composition of connector

Mass of Connector(g): 10.1761

Note: Other substances not listed on the IEC 62474 DSL/RSL

IEC 62474 XML schema – product part: Name	Identity	number OFUnits	Mass	isArticle	IEC MCL: Material Class	Material – JUMP Material List: Name	ID	Mass	isArticle	DSs and DSG substances listed in IEC 62474 DSL/RSL – IEC 62474 DSL: Entry ID	DSG / DS	DSG Substances / Substances	CAS	ReportableApplications	ReportingThreshold	IEC 62474 XML schema: above Threshold	Mass Percent (%)	Mass	IEC 62474 Exemption List
Junction shell	P01-a723	1	5 g	N/A	M206	A(B)S Poly(acrylonitrile (-butadiene)-styrene)	P517	5g	N/A	00009	Brominated flame retardants (other than PBBs, PBDEs, or HBCDD)	3,5,3',5'-Tetrabromo-bisphenol A (TBBPA)	79-94-7	Plastic materials except printed wiring board laminates	0.1 mass% of bromine in plastic materials [ReportingLevel:Material]	TRUE	20	200 mg	
												Antimonytrioxide (Diantimonytrioxide)	1309-64-4	N/A	0.1 mass percent of the mass of the material, product part or product,	TRUE	5	50 mg	
Shell	P01-a356	1	4.0003 g	TRUE	M-119	Steels/cast steel/sintered steel	R101	4.0g	TRUE	00021	Lead/Lead Compounds	Lead	7439-92-1	All, except for: 1. batteries, 2. surface coating material of cables/cords with thermoset or thermoplastic coatings, and 3. paint and similar surface coatings of toys and other articles intended for use by children	0.1 mass% of total Pb in homogenous material [ReportingLevel:Material]	TRUE	0.2	8 mg	RoHS Annex III IEC ID:00034-A-00 regIndex: 6(a)-I
										00154	Lead			All	0.1 mass% of article	TRUE			
					M-123	Nickel plating	S002	0.3mg	N/A	00031	Nickel/Nickel Compounds	Nickel	7440-02-0	All, where prolonged skin contact is expected	Intentionally Added	FALSE	100	0.3 mg	
Insulating element	P01-e007	1	0.5 g	N/A	M-249	Other thermoplastics	P529	0.5g	N/A	00009	Brominated flame retardants (other than PBBs, PBDEs, or HBCDD)	3,5,3',5'-Tetrabromo-bisphenol A (TBBPA)	79-94-7	Plastic materials except printed wiring board laminates	0.1 mass% of bromine in plastic materials [ReportingLevel:Material]	TRUE	25	125 mg	
												Antimonytrioxide (Diantimonytrioxide)	1309-64-4	N/A	0.1 mass percent of the mass of the material, product part or product,	TRUE	7	70 mg	
Terminal	P01-a111	9	0.0306 g	N/A	M-121	Copper alloys	R312	0.03g	N/A			Copper (Cu)	7440-50-8	N/A	0.1 mass percent of the mass of the material, product part or product (see subclause 4.5.6 of IEC 62474:2018)	TRUE	70	21 mg	
					M-126	Tin plating	S005	0.6mg	N/A					N/A					
Screw thread	P01-x001	2	0.2002 g	N/A	M-119	Steels/cast steel/sintered steel	R101	0.2g	N/A					N/A					
					M-149	Chromium plating	S006	0.2mg	N/A					N/A					

The presence of DSs and DSG substances with mandatory reporting requirements at or above the reporting threshold level for an applicable reportable application provided in the IEC 62474 DSL shall have a positive ("true") response to the "above threshold" field. Otherwise, the DSs and DSG substances below the reporting threshold may be declared with a negative ("false") response.

The presence of substances provided by other industrial DSLs or not listed on the IEC 62474 DSL may be assessed according to the IEC 62474 requirements, or the requester/responder own reporting requirements (see substances shaded in grey in Table 10).

The DSG substance "nickel" with mandatory reporting requirements provided in the IEC 62474 DSL is present above the reporting threshold level but not meeting an applicable reportable application (All, where prolonged skin contact is expected), so it is assessed as a negative ("false") response. The declaration of such substance shall be agreed on either between a requester and responder or by a responder (see 7.3.5).

The 3,5,3',5'-Tetrabromo-bisphenol A (TBBPA) present at or above the threshold within different materials should be declared separately for each material in corresponding product parts. The substance, lead, is regarded as both DSG substance and DS, for the Entry ID 00021 and 00154 with mandatory reporting requirements, respectively.

Material names should be defined according to a standard (e.g. ISO 1043-1, ISO 1043-2, ISO 1043-3, ISO 1043-4 for plastics). In this example materials are referred to an internationally recognized industrial standard and correspond to IEC 62474 material classes for environmentally conscious design (ECD) purposes.

The material contains lead (ID 00154) that has the following 'reporting threshold level' specified by the IEC 62474 DSL.

- ReportableApplications: All;
- ReportingThreshold: 0,1 mass% of article;
- ReportingLevel: Article.

The material is a sintered steel formed as the shell of the connector where it meets the definition of "article" given in IEC 62474:2018, 3.1:

> "object which during production is given a special shape, surface or design which determines its function to a greater degree than does its chemical composition".

Since the MassPercent of Lead contained in the material as the article has computed as 0,2 % and ReportableApplications is 'All', isArticle flag is determined as "true".

7.3.4.2 Capability and XML structure of the composition declaration

Figure 15 and Table 11 illustrate the capability of the "composition declaration" with the hierarchy structure of ProductPart, Material, and Substance corresponding to its belonging product under the "composition" element. The IEC 62474 material classes corresponding to materials can be optionally declared in the composition declaration as shown in Figure 15.

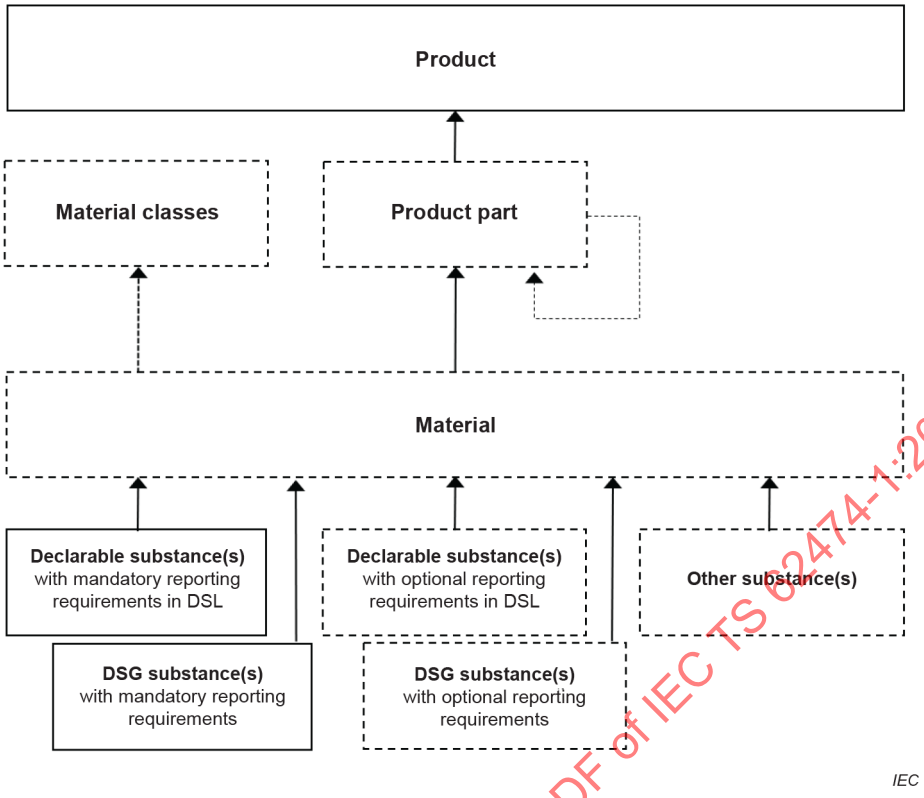


Figure 15 – Data model for a composition declaration

The assessment result of the hierarchical structure and composition of the connector shown in Table 10 was mapped to elements and attributes of the "composition declaration" specified by the IEC 62474 developer's table and the IEC 62474 XML schema in referring to Figure 15.

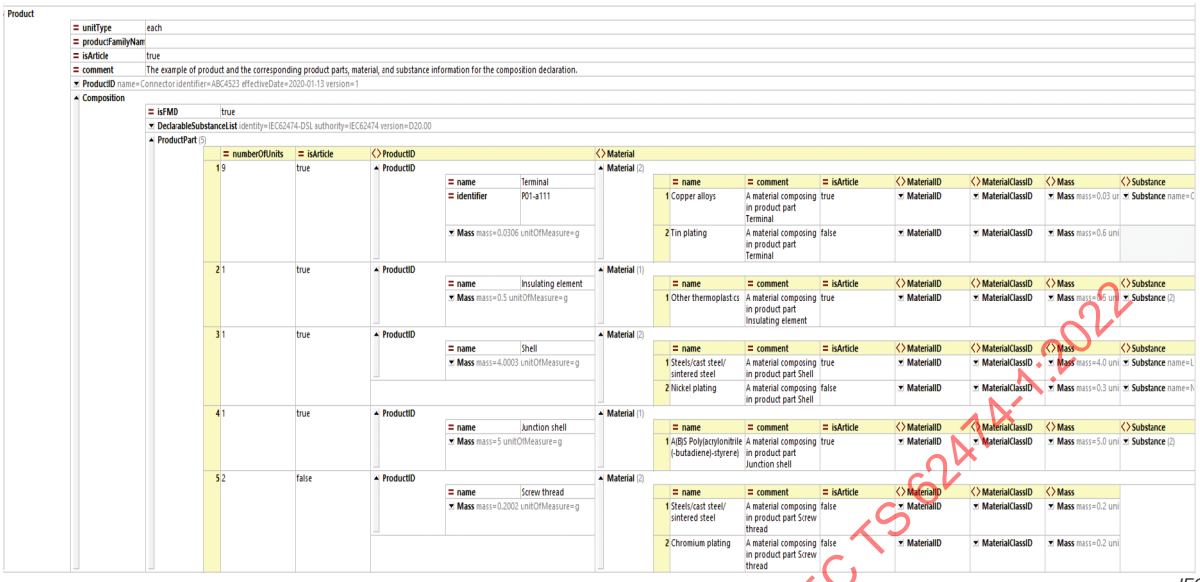
Table 11 – Mapping between composition declaration requirements and DSs and DSGs information

IEC 62474 Capabilities	IEC 62474 developer's table X8.10[a]		Example of composition information
	Response class	**Preferred name (Normative)**	**Composition information is provided corresponding to mandatory or optional fields in IEC 62474 XML schema X8.10**
Composition information	**Composition** (Composition Class)	**DeclarableSubstanceList** *See Response Class*	see Table 11, DeclarableSubstanceList (UniqueID Class)
		ProductPart *See Response Class*	see Table 11, ProductPart (ProductPart Class)
		Material *See Response Class*	
		Substance *See Response Class*	
		isFMD	
		isSCIPComplete	
	ProductPart (ProductPart Class)	**ProductID** *See Response Class*	see Table 11, ProductID (ProductID Class)
		ProductPart	
		Material	see Table 11, Material (Material Class)
		Substance	
		Attachment	
		SafeUse	
		numberOfUnits	1
		isArticle	True
		comment	
	ProductID (ProductID Class)	**Mass**	4,000 3 g
		MassPercent	
		InstanceID	
		ProductCategory	
		Identifier	
		OtherNames	
		CountryOfManufacture	
		name	Shell
		identifier	
		manufacturingSite	
		effectiveDate	
		version	
		requesterName	
		requesterIdentifier	
	Material (Material Class)	MaterialID	e.g. identity="chemSHERPA_MaterialList" authority="chemSHERPA" version="2.00.00" entryIdentity="R101"

IEC 62474 Capabilities	IEC 62474 developer's table X8.10[a]		Example of composition information
	Response class	**Preferred name (Normative)**	**Composition information is provided corresponding to mandatory or optional fields in IEC 62474 XML schema X8.10**
		MaterialClassID	identity="MCL" authority="IEC 62474" version="M2.00" entryIdentity="M-119"
		MaterialProperties	
		Mass	4,0 g
		MassPercent	
		Substance	see Table 11, Substance (Substance Class)
		Attachment	
		UseDescriptor	
		name	Steels/cast steel/sintered steel
		isArticle	True
		comment	e.g.: 1@@@
	Substance (Substance Class)	*SubstanceID* *See Response Class*	
		DsgID	
		Mass	
		MassPercent	0,2
		Exemptions	identity="EU-RoHS-AnnexIII" authority="IEC 62474" version="E1.0" Exemption identity="00034-A-00" regIndex="6(a)-I" description="Lead as an alloying element in steel for machining purposes containing up to 0,35 % lead by weight and in batch hot dip galvanised steel components containing up to 0,2 % lead by weight"
		CompositionThreshold *See Response Class*	see Table 11, DeclarableSubstanceList (UniqueID Class)
		SafeUse	
		name	Lead
		comment	@0
		descriptionOfUse	
	DeclarableSubstanceList (UniqueID Class)	**authority** **identity** **version**	See 7.3.1.3 List Authority="IEC 62474"; List Identity=" IEC 62474-DSL "; List Version="D20.00"
	SubstanceID (UniqueEntry Class)	*ListID*	
		EntryID	entryIdentity="7439-92-1"
	CompositionThreshold (Threshold Class)	**aboveThreshold**	true
		reportableApplication	All
		reportingThreshold	0,1 mass% of article

[a] Mandatory requirements are in bold type and newly defined elements and attributes are in italic type.

Figure 16 is an XML instance of composition declaration with exemption and material class information.




```
<?xml version="1.0" encoding="utf-8"?>
<Main xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" schemaDatabaseVersion="X8.10"
xmlns="http://std.iec.ch/IEC 62474" charaLocal="JPN" declarationComplete="true"
xsi:schemaLocation="http://std.iec.ch/IEC 62474 file:///C:/Users/IEC/Desktop/IEC 62474_Schema_X8.10-20200229.xsd">
    <Include>
        <Sectional nameOfSectional="Composition"/>
    </Include>
    <BusinessInfo mode="Distribution">
        <Response date="2020-01-13" docID="9876xyz" comment="If you have any further questions about the material
declaration, please contact us by e-mail.">
            <Authorizer division=" Environment and Quality Control Centre " name=" John Doe" title="Quality Assurance
Manager" email="John.doe@supco.com" phone="301-555-2345" divisionLocal="環境品質管理センター" nameLocal="ジョン ドウ" titleLocal="品質保証マネージャー"/>
            <Contact division=" Environment and Quality Control Centre" name=" Fred Smith" title="Quality Assurance
Assistant" email="Fred.smith@supco.com" phone=" 301-555-2346" comment="" divisionLocal="品質管理部" nameLocal="フレッド スミス" titleLocal="品質保証アシスタント" commentLocal="お問い合わせはe-mailでお願いします"/>
            <SupplyCompany name="Supco Inc." nameLocal=" Supco株式会社">
                <UniqueID authority="DUNS" identity="987654321" version="0"/>
            </SupplyCompany>
        </Response>
    </BusinessInfo>
    <Product unitType="each" productFamilyName="" isArticle="true" comment="The example of product and the
corresponding product parts, material, and substance information for the composition declaration.">
        <ProductID name="Connector" identifier="ABC4523" effectiveDate="2020-01-13" version="1">
            <Mass mass="10.1761" unitOfMeasure="g"/>
        </ProductID>
        <Composition isFMD="true">
            <DeclarableSubstanceList identity="IEC 62474-DSL" authority="IEC 62474" version="D20.00"/>
            <ProductPart numberOfUnits="9" isArticle="true">
                <ProductID name="Terminal" identifier="P01-a111">
                    <Mass mass="0.0306" unitOfMeasure="g"/>
                </ProductID>
                <Material name="Copper alloys" comment="A material composing in product part Terminal" isArticle="true">
                    <MaterialID>
                        <ListID identity="chemSHERPA_MaterialList" authority="chemSHERPA" version="2.00.00"/>
                        <EntryID entryIdentity="R312"/>
                    </MaterialID>
                    <MaterialClassID>
                        <ListID identity="MCL" authority="IEC 62474" version="M2.00"/>
                        <EntryID entryIdentity="M-121"/>
                    </MaterialClassID>
                    <Mass mass="0.03" unitOfMeasure="g"/>
                    <Substance name="Copper (Cu)" comment="chemSHERPA_SubstanceList">
                        <SubstanceID>
                            <ListID identity="chemSHERPA_SubstanceList" authority="chemSHERPA"
version="2.00.00"/>
                            <EntryID entryIdentity="7440-50-8"/>
```

```
                        </SubstanceID>
                        <MassPercent massPercent="70"/>
                    </Substance>
                </Material>
                <Material name="Tin plating" comment="A material composing in product part Terminal" isArticle="false">
                    <MaterialID>
                        <ListID identity="chemSHERPA_MaterialList" authority="chemSHERPA" version="2.00.00"/>
                        <EntryID entryIdentity="S005"/>
                    </MaterialID>
                    <MaterialClassID>
                        <ListID identity="MCL" authority="IEC 62474" version="M2.00"/>
                        <EntryID entryIdentity="M-126"/>
                    </MaterialClassID>
                    <Mass mass="0.6" unitOfMeasure="mg"/>
                </Material>
            </ProductPart>
            <ProductPart numberOfUnits="1" isArticle="true">
                <ProductID name="Insulating element">
                    <Mass mass="0.5" unitOfMeasure="g"/>
                </ProductID>
                <Material name="Other thermoplastics" comment="A material composing in product part Insulating element"
isArticle="true">
                    <MaterialID>
                        <ListID identity="chemSHERPA_MaterialList" authority="chemSHERPA" version="2.00.00"/>
                        <EntryID entryIdentity="P529"/>
                    </MaterialID>
                    <MaterialClassID>
                        <ListID identity="MCL" authority="IEC 62474" version="M2.00"/>
                        <EntryID entryIdentity="M-249"/>
                    </MaterialClassID>
                    <Mass mass="0.5" unitOfMeasure="g"/>
                    <Substance name="Tetrabromobisphenol A (TBBPA)" comment="IEC 62474-DSL">
                        <SubstanceID>
                            <EntryID entryIdentity="79-94-7"/>
                        </SubstanceID>
                        <MassPercent massPercent="25"/>
                    </Substance>
                    <Substance name="Antimonytrioxide (Diantimonytrioxide)" comment="chemSHERPA_SubstanceList">
                        <SubstanceID>
                            <ListID identity="chemSHERPA_SubstanceList" authority="chemSHERPA"
version="2.00.00"/>
                            <EntryID entryIdentity="1309-64-4"/>
                        </SubstanceID>
                        <MassPercent massPercent="7"/>
                    </Substance>
                </Material>
            </ProductPart>
            <ProductPart numberOfUnits="1" isArticle="true">
                <ProductID name="Shell">
                    <Mass mass="4.0003" unitOfMeasure="g"/>
                </ProductID>
                <Material name="Steels/cast steel/sintered steel" comment="A material composing in product part Shell"
isArticle="true">
                    <MaterialID>
                        <ListID identity="chemSHERPA_MaterialList" authority="chemSHERPA" version="2.00.00"/>
                        <EntryID entryIdentity="R101"/>
                    </MaterialID>
                    <MaterialClassID>
                        <ListID identity="MCL" authority="IEC 62474" version="M2.00"/>
                        <EntryID entryIdentity="M-119"/>
                    </MaterialClassID>
                    <Mass mass="4.0" unitOfMeasure="g"/>
                    <Substance name="Lead" comment="IEC 62474-DSL">
                        <SubstanceID>
                            <EntryID entryIdentity="7439-92-1"/>
                        </SubstanceID>
                        <MassPercent massPercent="0.2"/>
                        <Exemptions>
                            <UniqueID identity="ELV_Ver.2.00.00" authority="chemSHERPA" version="2.00.00"/>
                            <Exemption identity="ELV_0041" regIndex="1(a)" description="Steel for machining purposes
and batch hot dip galvanised steel components containing up to 0,35 % lead by weight"/>
                        </Exemptions>
                        <Exemptions>
                            <UniqueID identity="EU-RoHS-AnnexIII" authority="IEC 62474" version="E1.0"/>
                            <Exemption identity="00034-A-00" regIndex="6(a)-I" description="Lead as an alloying element
in steel for machining purposes containing up to 0.35% lead by weight and in batch hot dip galvanised steel components
containing up to 0.2% lead by weight"/>
```

```
                    </Exemptions>
                </Substance>
            </Material>
            <Material name="Nickel plating" comment="A material composing in product part Shell" isArticle="false">
                <MaterialID>
                    <ListID identity="chemSHERPA_MaterialList" authority="chemSHERPA" version="2.00.00"/>
                    <EntryID entryIdentity="S002"/>
                </MaterialID>
                <MaterialClassID>
                    <ListID identity="MCL" authority="IEC 62474" version="M2.00"/>
                    <EntryID entryIdentity="M-123"/>
                </MaterialClassID>
                <Mass mass="0.3" unitOfMeasure="mg"/>
                <Substance name="Nickel" comment="IEC 62474-DSL">
                    <SubstanceID>
                        <EntryID entryIdentity="7440-02-0"/>
                    </SubstanceID>
                    <MassPercent massPercent="100"/>
                </Substance>
            </Material>
        </ProductPart>
        <ProductPart numberOfUnits="1" isArticle="true">
            <ProductID name="Junction shell">
                <Mass mass="5" unitOfMeasure="g"/>
            </ProductID>
            <Material name="A(B)S Poly(acrylonitrile (-butadiene)-styrene)" comment="A material composing in product
part Junction shell" isArticle="true">
                <MaterialID>
                    <ListID identity="chemSHERPA_MaterialList" authority="chemSHERPA" version="2.00.00"/>
                    <EntryID entryIdentity="P517"/>
                </MaterialID>
                <MaterialClassID>
                    <ListID identity="MCL" authority="IEC 62474" version="M2.00"/>
                    <EntryID entryIdentity="M-206"/>
                </MaterialClassID>
                <Mass mass="5.0" unitOfMeasure="g"/>
                <Substance name="Tetrabromobisphenol A (TBBPA)" comment="IEC 62474-DSL">
                    <SubstanceID>
                        <EntryID entryIdentity="79-94-7"/>
                    </SubstanceID>
                    <MassPercent massPercent="20"/>
                </Substance>
                <Substance name="Antimonytrioxide (Diantimonytrioxide)" comment="chemSHERPA_SubstanceList">
                    <SubstanceID>
                        <ListID identity="chemSHERPA_SubstanceList" authority="chemSHERPA"
version="2.00.00"/>
                        <EntryID entryIdentity="1309-64-4"/>
                    </SubstanceID>
                    <MassPercent massPercent="5"/>
                </Substance>
            </Material>
        </ProductPart>
        <ProductPart numberOfUnits="2" isArticle="false">
            <ProductID name="Screw thread">
                <Mass mass="0.2002" unitOfMeasure="g"/>
            </ProductID>
            <Material name="Steels/cast steel/sintered steel" comment="A material composing in product part Screw
thread" isArticle="false">
                <MaterialID>
                    <ListID identity="chemSHERPA_MaterialList" authority="chemSHERPA" version="2.00.00"/>
                    <EntryID entryIdentity="R101"/>
                </MaterialID>
                <MaterialClassID>
                    <ListID identity="MCL" authority="IEC 62474" version="M2.00"/>
                    <EntryID entryIdentity="M-119"/>
                </MaterialClassID>
                <Mass mass="0.2" unitOfMeasure="g"/>
            </Material>
            <Material name="Chromium plating" comment="A material composing in product part Screw thread"
isArticle="false">
                <MaterialID>
                    <ListID identity="chemSHERPA_MaterialList" authority="chemSHERPA" version="2.00.00"/>
                    <EntryID entryIdentity="S006"/>
                </MaterialID>
                <MaterialClassID>
                    <ListID identity="MCL" authority="IEC 62474" version="M2.00"/>
                    <EntryID entryIdentity="M-149"/>
```

```
                    </MaterialClassID>
                    <Mass mass="0.2" unitOfMeasure="mg"/>
                </Material>
            </ProductPart>
        </Composition>
    </Product>
    <ToolNameVersionID identity=" Material-Declaration-Tool" authority="IEC company" version="1.0"/>
</Main>
```

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Figure 16 – XML instance of the composition declaration

NOTE The IEC 62474 database (http://std.iec.ch/IEC 62474/IEC 62474.nsf/) does not support a web service providing a URI for the XML schema as the single reference namespace. The latest version of the XSD file (e.g. IEC 62474_Schema_X8.10-20200229.xsd) in the IEC 62474 database can be downloaded to a mainframe, a server, or a personal computer, etc., for validating an XML instance.

7.3.5 Example of composition declaration including isFMD flag

IEC 62474:2018, 7.3.1 allows to provide up to a full material declaration of all substances contained in a product and where they are located within the product. The detailed conditions of the full material declaration are specified in the 'isFMD' attribute of the composition class of the IEC 62474 developer's table X8.10, and is also described in 4.8.5 of this document. The Data Type of the 'isFMD' attribute is boolean (denoted true/false) so that it is generally called isFMD flag.

If the composition declaration fulfils at least the following conditions, the isFMD flag enables the responder to indicate whether or not the composition declaration is a full material declaration of the product as an option.

i) Reporting all DSs and DSG substances that are present at or above the reporting threshold according to the IEC 62474 DSL/RSL or other DSLs.

ii) Reporting other substances not listed on the DSL/RSL that are contained in the product according to a "reporting threshold level" (see 4.8.5).

Table 10 shows an example of a connector with all DSs and DSG substances that are present at or above the reporting threshold of the IEC 62474 DSL that meets the condition i) listed above of the full material declaration requirements.

To fulfil the condition ii), the scope of the 'other substances', 'Declaring the substances below Reporting Threshold' and 'confidential business information (CBI) allowance' shall be specified either between a requester and responder or by a responder.

If all substances shaded in grey in Table 10 meet condition ii), the 'isFMS' flag can be declared "true" as shown below referring to Figure 16.

```
                .
                .
<Product unitType="each" productFamilyName="" isArticle="true" comment="1@2019-10-14 20:24@1@2019-10-14
20:30@1@@ Supco Inc..@">
    <ProductID name="Connector" identifier="ABC4523" effectiveDate="2020-01-13" version="1">
        <Mass mass="10.1761" unitOfMeasure="g" />
     </ProductID>
    <Composition isFMD="true">
        <DeclarableSubstanceList identity="DSL" authority="IEC 62474" version="D20.00" />
                .
                .
```

7.3.6 Example of material class declaration

IEC 62474:2018, 4.6 e) recommends that material classes declared represent at least 90 % of the product. In the example shown in Table 12, the information is more precise, and 100 % of the product composition is declared. Material class information can be reported as mass or mass percent but cannot use both. This example shows IEC 62474 material class information by mass.

NOTE MassPercent information in Table 12 is for reference only indicating all material classes represent 100 % of the product mass.

Based on the data in Table 10, the connector is composed of seven different IEC MCLs shown in Table 12. Figure 17 shows the structure of the material class declaration and Figure 18 provides the XML file.

Table 12 – Composition declaration – Material class information for 100 % of the product composition

Classification	Class name	Material class ID	Mass	MassPercent Note: reference only
2 Organic materials M-20 Unfilled thermoplastics resin	Acrylonitrile-Butadiene-Styrene (ABS)	M206	5g	49.1347%
1 Inorganic materials M-10 Steels and ferrous materials	Other ferrous alloys, non-stainless steels	M-119	4g+0.2gx2=4.4g	43.2386%
1 Inorganic materials M-12 Non-ferrous metals and alloys	Nickel and its alloys	M-123	0.3mg	0.0029%
2 Organic materials M-20 Unfilled thermoplastics resin	Other unfilled thermoplastics	M-249	0.5g	4.9135%
1 Inorganic materials M-12 Non-ferrous metals and alloys	Copper and its alloys	M-121	0.03gx9=0.27g	2.6533%
1 Inorganic materials M-12 Non-ferrous metals and alloys	Tin and its alloys (including Pb-free solders)	M-126	0.6mgx9=5.4mg	0.0531%
1 Inorganic materials M-12 Non-ferrous metals and alloys	Other non-ferrous metals and alloys	M-149	0.2mgx2=0.4mg	0.0039%
				100%

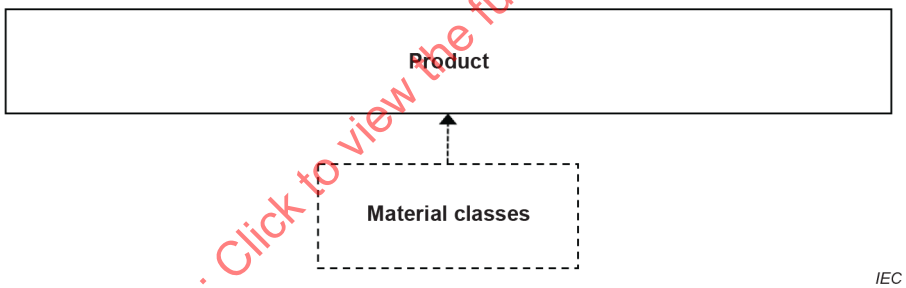
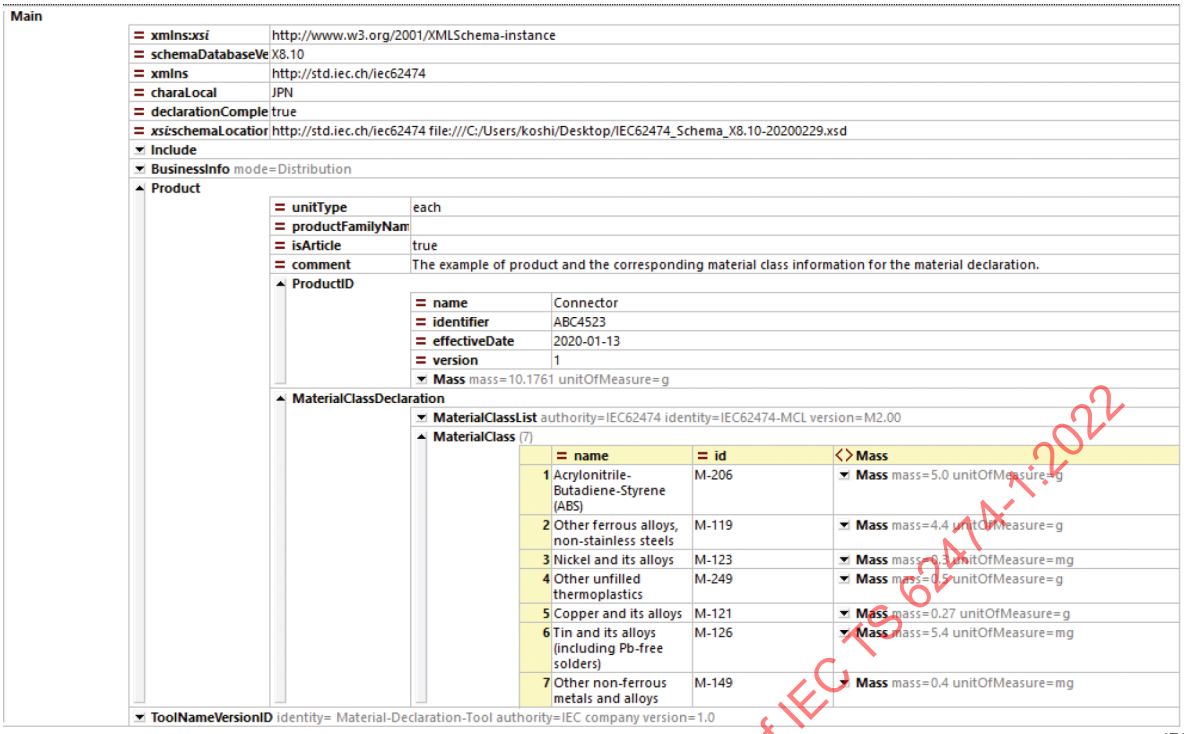


Figure 17 – Structure of the material class declaration



Main

xmlns:xsi	http://www.w3.org/2001/XMLSchema-instance
schemaDatabaseVe	X8.10
xmlns	http://std.iec.ch/iec62474
charaLocal	JPN
declarationComple	true
xsi:schemaLocatior	http://std.iec.ch/iec62474 file:///C:/Users/koshi/Desktop/IEC62474_Schema_X8.10-20200229.xsd

Include

BusinessInfo mode=Distribution

Product

unitType	each
productFamilyNam	
isArticle	true
comment	The example of product and the corresponding material class information for the material declaration.

ProductID

name	Connector
identifier	ABC4523
effectiveDate	2020-01-13
version	1

Mass mass=10.1761 unitOfMeasure=g

MaterialClassDeclaration

MaterialClassList authority=IEC62474 identity=IEC62474-MCL version=M2.00

MaterialClass (7)

	name	id	Mass
1	Acrylonitrile-Butadiene-Styrene (ABS)	M-206	Mass mass=5.0 unitOfMeasure=g
2	Other ferrous alloys, non-stainless steels	M-119	Mass mass=4.4 unitOfMeasure=g
3	Nickel and its alloys	M-123	Mass mass=0.3 unitOfMeasure=mg
4	Other unfilled thermoplastics	M-249	Mass mass=0.5 unitOfMeasure=g
5	Copper and its alloys	M-121	Mass mass=0.27 unitOfMeasure=g
6	Tin and its alloys (including Pb-free solders)	M-126	Mass mass=5.4 unitOfMeasure=mg
7	Other non-ferrous metals and alloys	M-149	Mass mass=0.4 unitOfMeasure=mg

ToolNameVersionID identity= Material-Declaration-Tool authority=IEC company version=1.0

IEC


```
<?xml version="1.0" encoding="utf-8"?>
<Main xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" schemaDatabaseVersion="X8.10"
xmlns="http://std.iec.ch/IEC 62474" charaLocal="JPN" declarationComplete="true"
xsi:schemaLocation="http://std.iec.ch/IEC 62474 file:///C:/Users/IEC/Desktop/IEC 62474_Schema_X8.10-20200229.xsd">
    <Include>
     <Sectional nameOfSectional="MaterialClassDeclaration" />
   </Include>
    <BusinessInfo mode="Distribution">
        <Response date="2020-01-13" docID="9876xyz" comment="If you have any further questions about the material
declaration, please contact us by e-mail.">
            <Authorizer division=" Environment and Quality Control Centre " name=" John Doe" title="Quality Assurance
Manager" email="John.doe@supco.com" phone="301-555-2345" divisionLocal="環境品質管理センター" nameLocal="ジョン ドウ" titleLocal="品質保証マネージャー"/>
            <Contact division=" Environment and Quality Control Centre" name=" Fred Smith" title="Quality Assurance
Assistant" email="Fred.smith@supco.com" phone=" 301-555-2346" comment="" divisionLocal="品質管理部" nameLocal="フレッド スミス" titleLocal="品質保証アシスタント" commentLocal="お問い合わせはe-mailでお願いします"/>
            <SupplyCompany name="Supco Inc." nameLocal=" Supco株式会社">
                <UniqueID authority="DUNS" identity="987654321" version="0"/>
            </SupplyCompany>
        </Response>
    </BusinessInfo>
    <Product unitType="each" productFamilyName="" isArticle="true" comment="The example of product and the
corresponding material class information for the material declaration.">
        <ProductID name="Connector" identifier="ABC4523" effectiveDate="2020-01-13" version="1">
            <Mass mass="10.1761" unitOfMeasure="g"/>
        </ProductID>
            <MaterialClassDeclaration>
                <MaterialClassList authority="IEC 62474" identity="IEC 62474-MCL" version="M2.00" />
                <MaterialClass name="Acrylonitrile-Butadiene-Styrene (ABS)" id="M-206">
                    <Mass mass="5.0" unitOfMeasure="g" />
                </MaterialClass>
                <MaterialClass name="Other ferrous alloys, non-stainless steels" id="M-119">
                    <Mass mass="4.4" unitOfMeasure="g" />
                </MaterialClass>
                <MaterialClass name="Nickel and its alloys" id="M-123">
                  <Mass mass="0.3" unitOfMeasure="mg" />
                </MaterialClass>
                <MaterialClass name="Other unfilled thermoplastics" id="M-249">
                    <Mass mass="0.5" unitOfMeasure="g" />
                </MaterialClass>
                <MaterialClass name="Copper and its alloys" id="M-121">
                    <Mass mass="0.27" unitOfMeasure="g" />
                </MaterialClass>
```

```
                <MaterialClass name="Tin and its alloys (including Pb-free solders)" id="M-126">
                    <Mass mass="5.4" unitOfMeasure="mg" />
                </MaterialClass>
                <MaterialClass name="Other non-ferrous metals and alloys" id="M-149">
                    <Mass mass="0.4" unitOfMeasure="mg" />
                </MaterialClass>
            </MaterialClassDeclaration>
    </Product>
    <ToolNameVersionID identity=" Material-Declaration-Tool" authority="IEC company" version="1.0" />
</Main>
```

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Figure 18 – Material classes declaration – XML instance for 100 % of the product composition

NOTE The IEC 62474 database (http://std.iec.ch/IEC 62474/IEC 62474.nsf/) does not support a web service providing a URI for the XML schema as the single reference namespace. The latest version of the XSD file (e.g. IEC 62474_Schema_X8.10-20200229.xsd) in the IEC 62474 database can be downloaded to a mainframe, a server, or a personal computer, etc., for validating an XML instance.

7.3.7 Example of declaration for compliance including the ECHA SCIP information

There are unique information requirements of the ECHA SCIP database, and its corresponding elements with structures are determined in the IEC 62474 XML schema X8.10 as described in Clause 6. To clarify the ECHA SCIP information requirements, Table 13, Table 14 and Table 15 cite product information specified in the ECHA [Detailed information requirements for the SCIP database,

https://echa.europa.eu/documents/10162/28213971/scip_information_requirements_en.pdf].

In Table 13, those information requirements of the ECHA SCIP database related to the product information are mapped to the elements and attributes as specified by the IEC 62474 developer's table and the IEC 62474 XML schema X8.10.

Table 13 – Mapping between product information and the ECHA SCIP database

IEC 62474 Capabilities	IEC 62474 developer's table X8.10[a]		Corresponding information requirements in the ECHA SCIP database[b]
	Response class	**Preferred name (Normative)**	**Cited reference: ECHA [Detailed information requirements for the SCIP database], September 2019**
Product information	**Product** (Product Class)	**ProductID**	see Table 13 ProductID (ProductID Class) below
		Compliance	see Table 14 Compliance
		Composition	see Table 15 Composition
		MaterialClassDeclaration	
		QueryList	
		Attachment	**Picture** **Safe use instruction(s)** Disassembling instructions Disassembling_instructions_AAA-ZXCV.pdf
		Exemptions	
		SafeUse Information about the safe use of the substance in the product	**Safe use instruction(s)** e.g. Safe use instruction(s) [Specific instructions]
		unitType	
		productFamilyName	

IEC 62474 Capabilities	IEC 62474 developer's table X8.10[a]		Corresponding information requirements in the ECHA SCIP database[b] Cited reference: ECHA [Detailed information requirements for the SCIP database], September 2019
	Response class	**Preferred name (Normative)**	
		isArticle	True
		comment	**Characteristics** e.g. Height 1,8 m Width 1,95 m Length 4,0 m Colour Red Number of doors 3 Engine type Combustion Cubic capacity 1 100 cm^3
	ProductID (ProductID Class)	**Mass**	1 100 (kg)
		MassPercent	
		InstanceID	
		ProductCategory *Category of a Product or ProductPart*	**Article category (name and code) [TARIC/CN code and description]** see Table 13 ProductCategory (UniqueEntry Class) below
		Identifier *Identifier associated with the Product or ProductPart*	**Primary Article Identifier** **Other article identifier** see Table 13 Identifier (UniqueEntry Class) below
		OtherNames *Other names applicable to the product or product part*	**Other names** see Table 13 OtherNames (OtherNames Class) below
		CountryOfManufacture *A list of country of manufacture information*	**Production in European Union** see Table 13 CountryOfManufacture (CountryOfManufacture Class) below
		name	**Article name** e.g. Motor vehicle (passengers)
		identifier product identifying code as defined by the declaring company	e.g. Model AAA
		manufacturingSite	
		effectiveDate	
		version	
		requesterName	
		requesterIdentifier	
	ProductCategory *(UniqueEntry Class)*	*ListID*	**Article category (name and code) [TARIC/CN code and description]** e.g. 8703 22 10: Motor cars and other motor vehicles principally designed for the transport of persons
		EntryID	

IEC 62474 Capabilities	IEC 62474 developer's table X8.10[a]		Corresponding information requirements in the ECHA SCIP database[b] Cited reference: ECHA [Detailed information requirements for the SCIP database], September 2019
	Response class	**Preferred name (Normative)**	
	Identifier (UniqueEntry Class)	*ListID*	**Primary Article Identifier** e.g. EAN code 558101011110
	Identifier (UniqueEntry Class)	*ListID*	**Other article identifier** e.g. Universal product Code (GPC): 770300000 Reference number: AAA111X000
		EntryID	
	OtherNames (OtherNames Class)	*type* *four type options: brand, model, type, other*	**Other names** e.g. Brand: Trade mark Y Model: Model AAA Type: Type ZXCV
		otherType *if type="other" is selected; otherwise this attribute is not applicable*	
		name *The name of the product part of article that corresponds to 'type'.*	
	CountryOfManufacture (CountryOfManufacture Class)	*CountryInformation* *A "Country of Manufacture"*	**Production in European Union** e.g. No: Country Code

[a] Mandatory requirements are in bold type and newly defined elements and attributes are in italic type.

[b] The information shaded in grey is a mandatory requirement.

In the declaration for compliance, if a responder had declared the status as 'true' based on the reporting threshold of the ECHA SVHC specified as "0,1 mass% of article", and provided mass percent information, a requester is able to determine the concentration range (e.g. ≥ 20,0 % w/w and < 100 % w/w) of the SCIP 'Concern Element'.

Table 14 shows the mapping of the data fields in the ECHA SCIP database with the declaration for compliance of the IEC 62474 XML schema X8.10.

Table 14 – Mapping between declaration for compliance requirements and the ECHA SCIP database

IEC 62474 Capabilities	IEC 62474 developer's table X8.10[a]		Corresponding information requirements in the ECHA SCIP database[b] Cited reference: ECHA [Detailed information requirements for the SCIP database], September 2019
	Response class	**Preferred name (Normative)**	
Compliance information	**Compliance** (Compliance Class)	***DeclarableSubstanceList***	**Concern Element** Candidate List version see Table 14 DeclarableSubstanceList (UniqueID Class)
		DsDsg	**Concern Element** Candidate List entry / Substance see Table 14 DsDsg (DsDsg Class)
		isSCIPComplete *True/False response stating whether the declaration for Compliance contains, at least, the mandatory information required for submission into the EU SCIP database*	True
	DsDsg (DsDsg Class)	***DsDsgID***	**Concern Element** Candidate List entry / Substance see Table 14 DsDsgID (EntryID Class)
		Mass	e.g. total mass=123 mg
		MassPercent	**Concern Element** Concentration range e.g 0,11 % NOTE Assuming the SVHC 'substance S' mass percent in this article is 0,11 %.
		ComplianceThreshold	**Concern Element** Concentration range see Table 14 ComplianceThreshold (ComplianceThreshold Class)
		Exemptions	
		SafeUse Information about the safe use of the substance in the product	**N/A**
		ProductPartInformation *Additional Information on Article* *See ProductPartInformation Class*	see ProductPartInformation Class in Table 14 for material and product part information

IEC 62474 Capabilities	IEC 62474 developer's table X8.10[a]		Corresponding information requirements in the ECHA SCIP database[b] Cited reference: ECHA [Detailed information requirements for the SCIP database], September 2019
	Response class	Preferred name (Normative)	
		name	**Concern Element** Candidate List entry / Substance e.g. Candidate List substance S
		descriptionOfUse	e.g. Characteristics Diameter 0,050 m Weight 0,005 kg
		comment	
	DeclarableSubstanceList (UniqueID Class)	**authority** **identity** **version**	**Concern Element** Candidate List version e.g. IEC 62474-DSL
	DsDsgID (EntryID Class)	**entryIdentity** entryDescription	**Concern Element** Candidate List entry / Substance e.g. EC xxx-xxx-x; CAS yyyy-yy-y
	ComplianceThreshold (ComplianceThreshold Class)	**aboveComplianceThreshold**	**Concern Element** Concentration range e.g. True
		reportableApplication	e.g. Declare a corresponding reportableApplication of IEC 62474 DSL which is 'All'
		reportingThreshold	**Concern Element** Concentration range e.g. Declare a corresponding reportingThreshold of IEC 62474 DSL which is '0,1 mass% of article'
	ProductPartInformation *(ProductPartInformation Class)*	*Identifier* *identification of the article as such or the complex object*	**Complex object component (article)** **Primary Article Identifier** Reference number e.g. RR005R001
		Identifier *identification of the article as such or the complex object*	**Complex object component (article)** **Other Article Identifier**

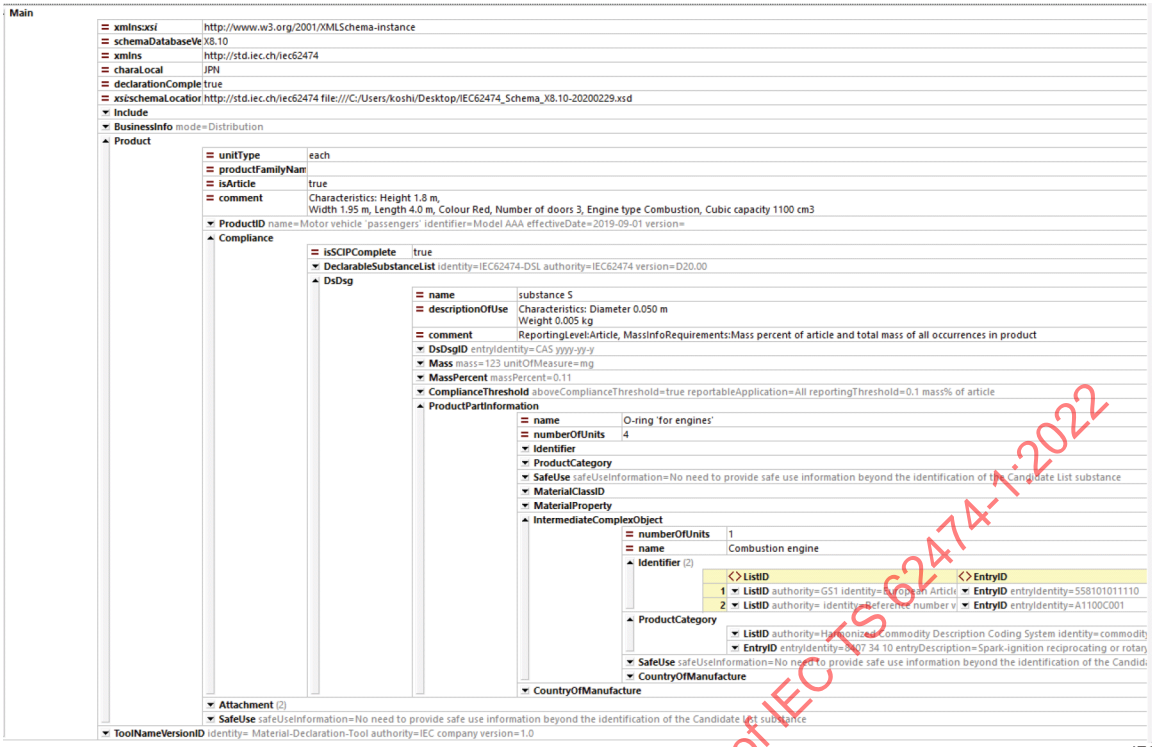
IEC 62474 Capabilities	IEC 62474 developer's table X8.10[a]		Corresponding information requirements in the ECHA SCIP database[b] Cited reference: ECHA [Detailed information requirements for the SCIP database], September 2019
	Response class	**Preferred name** **(Normative)**	
		ProductCategory *Identification of the declarable article from a harmonized list based on the EU Combined Nomenclature (CN) description and code*	**Complex object component (article)** **Article category (name and code)** e.g. 4016 93 00 90: Other articles of vulcanised rubber other than hard rubber
		SafeUse *Information about the safe use of the substance in the product*	**Complex object component (article)** **Safe use instruction(s)** e.g. Safe use instruction(s) [Specific instructions]
		MaterialClassID *The Identity of the material category (or material class) from the ECHA material category list or another material class list (MCL) (e.g IEC 62474 MCL)*	**Concern Element** Material category e.g 66554. Rubbers and elastomers > Ethylene-propylene-non-conjugated diene rubber (EPDM); Vulcanised
		MaterialProperties *The Identity of material attribute(s) or property(ies) associated with the Material Category and are applicable to the material*	e.g. S401 Painted resin chemSHERPA_MaterialList (ver.2.00.00)
		UseDescriptor *The Identity of the mixture category class associated with the European product categorisation system (EuPCS)*	
		CountryOfManufacture	**Complex object component (article)** **Identifiers** Production in European Union e.g. No
		Attachment	
		IntermediateComplexObject *identification of a complex object which is in the build hierarchy of the Product to help identify the location of the declarable article containing the REACH Candidate List SVHC*	Intermediate **Complex object component (article)** **Identifiers** see Table 14 IntermediateComplexObject (IntermediateComplexObject Class)
		name	**Complex object component (article)** **Identifiers** Article name e.g. O-ring (for engines)

IEC 62474 Capabilities	IEC 62474 developer's table X8.10[a]		Corresponding information requirements in the ECHA SCIP database[b] Cited reference: ECHA [Detailed information requirements for the SCIP database], September 2019
	Response class	**Preferred name (Normative)**	
		numberOfUnits *Number of part instances required within a declared product*	**Complex object component (article)** **Number of units** e.g. 4
	IntermediateComplexObject *(IntermediateComplexObject* Class)	*ProductCategory*	Intermediate **Complex object component (article)** **Identifiers** Article category (name and code) [TARIC/CN code and description] e.g. 8407 34 10: Spark-ignition reciprocating or rotary internal combustion piston engines Reciprocating piston engines of a kind used for the propulsion of vehicles of Chapter 87 -- Of a cylinder capacity exceeding 1 000 cm^3 --For the industrial assembly of: pedestrian-controlled tractors of subheading 8701 10; motor vehicles of heading 8703; motor vehicles of heading 8704 with an engine of a cylinder capacity of less than 2 800 cm^3; motor vehicles of heading 8705

[a] Mandatory requirements are in bold type and newly defined elements and attributes are in italic type.

[b] The information shaded in grey is a mandatory requirement.

Only the typical mapping patterns to the ECHA SCIP database are illustrated in Table 14 and the detailed material declaration for the ECHA SCIP database is shown in Figure 19.



IEC


```
<?xml version="1.0" encoding="UTF-8"?>
<Main xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" schemaDatabaseVersion="X8.10"
xmlns="http://std.iec.ch/IEC 62474" charaLocal="JPN" declarationComplete="true"
xsi:schemaLocation="http://std.iec.ch/IEC 62474 file:///C:/Users/IEC/Desktop/IEC 62474_Schema_X8.10-20200229.xsd">
    <Include>
        <Sectional nameOfSectional="Compliance"/>
    </Include>
    <BusinessInfo mode="Distribution">
        <Response date="2020-01-13" docID="9876xyz" comment="If you have any further questions about the material
declaration, please contact us by e-mail.">
            <Authorizer division=" Environment and Quality Control Centre " name=" John Doe" title="Quality Assurance
Manager" email="John.doe@supco.com" phone="301-555-2345" divisionLocal="環境品質管理センター" nameLocal="ジョン ドウ" titleLocal="品質保証マネージャー"/>
            <Contact division=" Environment and Quality Control Centre" name=" Fred Smith" title="Quality Assurance
Assistant" email="Fred.smith@supco.com" phone=" 301-555-2346" comment="" divisionLocal="品質管理部" nameLocal="フレッド スミス" titleLocal="品質保証アシスタント" commentLocal="お問い合わせはe-mailでお願いします"/>
            <SupplyCompany name="Supco Inc." nameLocal=" Supco株式会社">
                <UniqueID authority="DUNS" identity="987654321" version="0"/>
            </SupplyCompany>
        </Response>
    </BusinessInfo>
    <Product unitType="each" productFamilyName="" isArticle="true" comment="Characteristics: Height 1.8 m,
Width 1.95 m, Length 4.0 m, Colour Red, Number of doors 3, Engine type Combustion, Cubic capacity 1100 cm3">
        <ProductID name="Motor vehicle 'passengers'" identifier="Model AAA" effectiveDate="2019-09-01" version="">
            <Mass mass="1100" unitOfMeasure="kg"/>
            <ProductCategory>
                <ListID authority="Harmonized Commodity Description Coding System" identity="commodity codes Chapter
87" version=""/>
                <EntryID entryIdentity="8703 22 10" entryDescription="Motor cars and other motor vehicles principally
designed for the transport of persons (other than those of heading 8702), including station wagons and racing cars; – Other
vehicles, with only spark-ignition internal combustion reciprocating piston engine; -- Of a cylinder capacity exceeding 1 000 cm3
but not exceeding 1 500 cm3; --- New"/>
            </ProductCategory>
            <Identifier>
                <ListID authority="GS1" identity="European Article Number" version=""/>
                <EntryID entryIdentity="558101011110"/>
            </Identifier>
            <Identifier>
                <ListID authority="Uniform Code Council,Inc." identity="Universal product Code 'GPC'" version=""/>
                <EntryID entryIdentity="770300000"/>
            </Identifier>
            <Identifier>
```

```
                <ListID authority="" identity="Reference number" version=""/>
                <EntryID entryIdentity="AAA111X000"/>
            </Identifier>
            <OtherNames type="brand" name="Trade mark Y"/>
            <OtherNames type="model" name="Model AAA"/>
            <OtherNames type="type" name="Type ZXCV"/>
            <CountryOfManufacture>
                <CountryInformation countryCode="ABC"/>
            </CountryOfManufacture>
        </ProductID>
        <Compliance isSCIPComplete="true">
            <DeclarableSubstanceList identity="IEC 62474-DSL" authority="IEC 62474" version="D20.00"/>
            <DsDsg name="substance S" descriptionOfUse="Characteristics: Diameter 0.050 m
Weight 0.005 kg" comment="ReportingLevel:Article, MassInfoRequirements: Mass percent of article and total mass of all
occurrences in product">
                <DsDsgID entryIdentity="CAS yyyy-yy-y"/>
                <Mass mass="123" unitOfMeasure="mg"/>
                <MassPercent massPercent="0.11"/>
                <ComplianceThreshold aboveComplianceThreshold="true" reportableApplication="All"
reportingThreshold="0.1 mass% of article"/>
                <ProductPartInformation name="O-ring 'for engines'" numberOfUnits="4">
                    <Identifier>
                        <ListID authority="" identity="Reference number" version=""/>
                        <EntryID entryIdentity="RR005R001"/>
                    </Identifier>
                    <ProductCategory>
                        <ListID authority="Harmonized Commodity Description Coding System" identity="commodity codes
Chapter 40" version=""/>
                        <EntryID entryIdentity="4016 93 00 90" entryDescription="Other articles of vulcanised rubber other
than hard rubber; – Other; -- Gaskets, washers and other seals."/>
                    </ProductCategory>
                    <SafeUse safeUseInformation="No need to provide safe use information beyond the identification of the
Candidate List substance">
                        <SafeUseID>
                            <ListID authority="ECHA" identity="ECHA-125" version="acc"/>
                            <EntryID entryIdentity="abc127"/>
                        </SafeUseID>
                    </SafeUse>
                    <MaterialClassID>
                        <ListID authority="ECHA" identity="SCIP Material Category" version="20191106"/>
                        <EntryID entryIdentity="66554" entryDescription="rubber and elastomers > ethylene-propylene-
non-conjugated diene rubber 'epdm'"/>
                    </MaterialClassID>
                    <MaterialProperty>
                        <ListID authority="chemSHERPA" identity="chemSHERPA_MaterialList" version="2.00.00"/>
                        <EntryID entryIdentity="S401" entryDescription="Painted resin"/>
                    </MaterialProperty>
                    <IntermediateComplexObject numberOfUnits="1" name="Combustion engine">
                        <Identifier>
                            <ListID authority="GS1" identity="European Article Number" version=""/>
                            <EntryID entryIdentity="558101011110"/>
                        </Identifier>
                        <Identifier>
                            <ListID authority="" identity="Reference number" version=""/>
                            <EntryID entryIdentity="A1100C001"/>
                        </Identifier>
                        <ProductCategory>
                            <ListID authority="Harmonized Commodity Description Coding System" identity="commodity
codes Chapter 84" version=""/>
                            <EntryID entryIdentity="8407 34 10" entryDescription="Spark-ignition reciprocating or rotary
internal combustion piston engines Reciprocating piston engines of a kind used for the propulsion of vehicles of Chapter 87 -- Of
a cylinder capacity exceeding 1000 cm$3 --For the industrial assembly of: pedestrian-controlled tractors of subheading 8701 10;
motor vehicles of heading 8703; motor vehicles of heading 8704 with an engine of a cylinder capacity of less than 2 800 cm$3;
motor vehicles of heading 8705"/>
                        </ProductCategory>
                        <SafeUse safeUseInformation="No need to provide safe use information beyond the identification
of the Candidate List substance">
                            <SafeUseID>
                                <ListID authority="ECHA" identity="ECHA-723" version="tbc"/>
                                <EntryID entryIdentity="abc237"/>
                            </SafeUseID>
                        </SafeUse>
                        <CountryOfManufacture>
                            <CountryInformation countryCode="ABC"/>
                        </CountryOfManufacture>
                    </IntermediateComplexObject>
                    <CountryOfManufacture>
```

```
                        <CountryInformation countryCode="ABC"/>
                    </CountryOfManufacture>
                </ProductPartInformation>
            </DsDsg>
        </Compliance>
        <Attachment fileName="Picture" fileType="URL" fileURL="https://echa.europa.eu/scip-database"/>
        <Attachment fileName="Disassembling_instructions_AAA-ZXCV.pdf" fileType="pdf" fileDescription="Disassembly
Instructions"/>
        <SafeUse safeUseInformation="No need to provide safe use information beyond the identification of the Candidate
List substance">
            <SafeUseID>
                <ListID authority="ECHA" identity="ECHA-123" version="abc"/>
                <EntryID entryIdentity="abc123"/>
            </SafeUseID>
        </SafeUse>
    </Product>
    <ToolNameVersionID identity=" Material-Declaration-Tool" authority="IEC company" version="1.0"/>
</Main>
```

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Figure 19 – XML instance – Declaration for compliance including ECHA SCIP database information

NOTE 1 The remainder of the DSs and DSGs listed in the IEC 62474 DSL in the Motor vehicle (passengers) are not shown in Figure 19 for simplification.

NOTE 2 The IEC 62474 database (http://std.iec.ch/IEC 62474/IEC 62474.nsf/) does not support a web service providing a URI for the XML schema as the single reference namespace. The latest version of the XSD file (e.g. IEC 62474_Schema_X8.10-20200229.xsd) in the IEC 62474 database can be downloaded to a mainframe, a server, or a personal computer, etc., for validating an XML instance.

7.3.8 Example of composition declaration including the ECHA SCIP information

The motor vehicle (passengers) data provided in Table 13, Table 14 and the composition information mapped to the IEC 62474 XML schema X8.10 are structured for the ECHA SCIP database according to the composition declaration of the IEC 62474 XML schema X8.10 as shown in Table 15 below.

Normally a material does not match the definition of the article, but there are cases where the material can be regarded as the article, for example an O-ring. In this example, assuming this hypothetical material of O-ring has a specific shape and meets the definition of the article, 'isArticle' flag is set to True in this material.

In such a declarable article, the product part and material can be regarded as the same, so the product part is declared as the article to which the DS or DSG belongs (see 4.8.10.2). The material category in Concern Element can be declared utilizing the optional Material element of the IEC 62474 XML schema.

In the composition declaration, if a responder had declared the status as 'true' based on the reporting threshold of the ECHA SVHC specified as "0,1 mass% of article", and provided a mass or a mass percent, a requester is able to determine the concentration range (e.g. ≥ 20,0 % w/w and < 100 % w/w) of the SCIP 'Concern Element'.

Table 15 – Mapping between composition declaration requirements including 'declarable article' and the ECHA SCIP database

IEC 62474 Capabilities	IEC 62474 developer's table X8.10[a]		Corresponding information requirements in the ECHA SCIP database[b]
	Response class	**Preferred name (Normative)**	**Cited reference: ECHA [Detailed information requirements for the SCIP database], September 2019**
Composition information	**Composition** (Composition Class)	***DeclarableSubstanceList*** *See UniqueID Class*	**Concern Element** Candidate List version See Table 15 DeclarableSubstanceList (UniqueID Class) below
		ProductPart	Intermediate **Complex object component (article)** **Identifiers** See Table 15 ProductPart for Intermediate below
		Material	
		Substance	
		isFMD	True
		isSCIPComplete *True/False response stating whether the declaration for Compliance contains, at least, the mandatory information required for submission into the EU SCIP database*	True
	ProductPart (ProductPart Class) *for Intermediate*	**ProductID**	see Table 15 ProductID for Intermediate below
		ProductPart	**Complex object component (article)** **Identifiers** see Table 15 ProductPart (ProductPart Class) below
		Material	
		Substance	
		Attachment	
		SafeUse *Information about the safe use of the substance in the product*	**Complex object component (article)** **Safe use instruction(s)** e.g. Other: [Specific instructions]
		numberOfUnits *Number of part instances required within a declared product*	**Complex object component (article)** **Number of units** e.g. 1
		isArticle	True

IEC 62474 Capabilities	IEC 62474 developer's table X8.10[a]		Corresponding information requirements in the ECHA SCIP database[b] Cited reference: ECHA [Detailed information requirements for the SCIP database], September 2019
	Response class	**Preferred name (Normative)**	
		comment	e.g. Characteristics Weight 100 kg Engine type Combustion Cubic capacity 1 100 cm^3
	ProductID (ProductID Class) for Intermediate	**Mass**	100 Kg
		MassPercent	
		InstanceID	
		ProductCategory *Category of a Product or ProductPart*	**Article category** (name and code) [TARIC/CN code and description] see Table 15 ProductCategory (UniqueEntry Class) for Intermediate below
		Identifier *Identifier associated with the Product or ProductPart*	**Primary Article Identifier** **Other article identifier** see Table 15 Identifier (UniqueEntry Class) for Intermediate below
		OtherNames *Other names applicable to the product or product part*	**Other names** see Table 15 OtherNames (OtherNames Class) for Intermediate below
		CountryOfManufacture *A list of country of manufacture information*	**Production in European Union** see Table 15 CountryOfManufacture (CountryOfManufacture Class) for Intermediate below
		name	**Article name** e.g. Combustion engine
		identifier product identifying code as defined by the declaring company	e.g. Model B-1100
		manufacturingSite	
		effectiveDate	
		version	
		requesterName	
		requesterIdentifier	

IEC 62474 Capabilities	IEC 62474 developer's table X8.10[a]		Corresponding information requirements in the ECHA SCIP database[b] Cited reference: ECHA [Detailed information requirements for the SCIP database], September 2019
	Response class	**Preferred name (Normative)**	
Composition information	*ProductCategory (UniqueEntry Class) for Intermediate*	*ListID*	**Article category (name and code) [TARIC/CN code and description]** e.g. 8407 34 10: Spark-ignition reciprocating or rotary internal combustion piston engines; – Reciprocating piston engines of a kind used for the propulsion of vehicles of Chapter 87
		EntryID	
	Identifier (UniqueEntry Class) for Intermediate	*ListID*	**Primary Article Identifier** e.g. EAN/bar code 558101011110
		EntryID	
	Identifier (UniqueEntry Class) for Intermediate	*ListID*	**Other article identifier** e.g. Reference number A1100C001
		EntryID	
	OtherNames (OtherNames Class) for Intermediate	*type* *four type options: brand, model, type, other*	**Other names** e.g. Brand: B Motors Model: Model B-1100 Type: Type Combustion
		otherType *if type="other" is selected; otherwise this attribute is not applicable*	
		name *The name of the product part of article that corresponds to 'type'.*	
	CountryOfManufacture (CountryOfManufacture Class) for Intermediate	*CountryInformation* *A "Country of Manufacture"*	**Production in European Union** e.g. No: Country Code