AEM CDX DATA GUIDE

CDX Rules and Guidelines for AEM Industries

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RSJ TECHNICAL CONSULTING

Guidelines for CDX Material Datasheets

Table of Contents

1 Purpose

This document describes the basic requirements for the creation of CDX Material Datasheets (MDSs) describing components, semi-finished components (aka semi-components) and materials. Following these requirements will support the entry of high quality and consistent substance content data which is needed to fulfill applicable legal obligations. These requirements are agreed to by all equipment manufacturers participating in the CDX System and define harmonized rules valid throughout the supply chain. Following the rules and guidelines will support an efficient transfer of material data.

There may be additional customer-specific requirements that cannot be harmonized, example: requirements concerning the recipient-specific information. Customer-specific CDX requirements are published in the respective customer specifications.

Questions regarding a CDX rejection should be directed to the rejecting customer, NOT to the CDX Helpdesks.

Each section of this document gives a general description of specific elements of an MDS along with the ***Rules*** and ***Guidelines*** that are valid for that element.

Rules are mandatory requirements (either by the CDX System or by CDX-using equipment companies), while **Guidelines** are generally accepted as best practice throughout the supply chain. A violation of a **Rule** given in this document may result in a CDX Error or Warning. The CDX system performs a check procedure before the MDS can be sent/proposed to a customer, internally released, published and when a customer is reviewing for acceptance. There are two types of messages presented – Warnings and Errors.

The creator of the MDS must be aware that:

a) An MDS containing Errors cannot be sent/proposed/internally released in CDX. An Error means that there is something not acceptable in your MDS. You cannot proceed without resolving the particular issue. Due to evolving CDX requirements, an MDS that was acceptable in prior versions of CDX may no longer be acceptable and might require updating.
b) An MDS containing Warnings can be sent/proposed/published/internally released, but may be rejected by the recipient of the MDS. Warnings are intended to draw attention to possible deviations from Rules or Guidelines. A Warning means that there is something that may not acceptable by all customers in your MDS. While you may ignore the warnings and proceed, that does not mean that the MDS will be accepted by your downstream customer. Due to evolving CDX requirements, an MDS that previously had no warnings may now have several on the check procedure. After investigation, should it be determined that the Warning was invalid and the Rule or Guideline was followed, the MDS must be accepted by the recipient.
c) The CDX check procedures do not encompass all possible data issues. An MDS violating any Rules given in this document may be rejected by the recipient of the MDS even if there has been no Warning or Error in CDX.

2 References

The following are additional references that are mentioned in this document

- *GADSL (Global Automotive Declarable Substance List; http://www.gadsl.org)*
- *GDSL (Global Declarable Substance list under development)*
- *All CDX Recommendations*
- JAMP-AIS Material Classification
- *ISO 1043 (Plastics – Symbols and abbreviated terms)*
- *ISO 1629 (Rubbers and lattices – Nomenclature)*
- *ISO 9000 (Quality management systems – Fundamentals and vocabulary)*
- *ISO 18064 (Thermoplastic elastomers – Nomenclature and abbreviated terms)*
- *CDX Frequently Asked Questions (FAQ) (http://www.cdxsystem.com* ; *Public Pages* ; *FAQ)*

3 General CDX Reporting and Change Management

The following sections describe the General CDX Reporting and Change Management Requirements.

3.1 General Reporting

The flow of data through CDX-using-companies must reflect the flow of materials and components through the actual supply chain. The flow is initiated when materials become introduced for the first time into the supply chain. Material data is passed along the supply chain (tier n, tier n-1, … to the OEM). It is the data creator's responsibility to ensure that requirements are met as it is passed along the supply chain to ensure that compliance and data reporting of the material formulation is accurate. In general, all components and the end (dried/cured/reacted) state of all materials being used throughout the supply chain must be disclosed. Upon special request by the customer, the supplier utilizing CDX must provide evidence that he has collected all material data from the actual manufacturer of a material.

Rule/Guideline	Description
Rule 3.1.1	Material data must be passed along the supply chain ($tier_n$ ➔ $tier_{n-1}$ ➔ … ➔ OEM). All material data must be from material manufacturers actually used within a specific supply chain or be published standard materials. If published data from a CDX participant for a non-standard material is included, the participant must be the manufacturer of the specific material used within the supply chain.

Note: If data is intended to be exported to the automotive IMDS system, data will need to be converted to the IMDS structure upon export. Any additional data, such as automotive exemptions may need to be entered.

3.2 Change Management

This section describes the conditions under which an MDS shall be revised, updated and/or re-submitted. All applicable quality assurance guidelines (example: ISO 9001 / PPAP / VDA 2) are not made invalid by the following rules.

3.2.1 Basic Rules concerning MDS Revisions

A new MDS must be created when the component, semi-component or material described therein is introduced into a supply chain for the first time.

A revision of an existing MDS is caused if any of the circumstances described by the Rules and Guidelines in the table below occur. Depending on the circumstance leading to the revision, either a new MDS with a new ID or a new version of an existing MDS may be necessary.
The following rules are valid for MDSs sent to specific customers as well as for published MDSs (see **Figure 1 for graphical representation**).

Rule/Guideline	Description
Rule 3.2.1.1	When a new part or material is introduced to a customer for the first time, a new MDS (new CDX ID) must be created if the part or material is also new on the supplier side. If the part or material already exists on the supplier side, the supplier may add the customer as a new recipient to the most current MDS version.
Rule 3.2.1.2	The addition of any new material(s) or the elimination of any already reported

	material(s) contained in a part requires a new version and resubmission of the corresponding MDS.
Rule 3.2.1.3	A change in mass of a part exceeding the allowed deviation listed on the production part drawing or in customer requirements requires the revision and resubmission of the corresponding MDS. Small changes made over a period of time may accumulate to be significant, and, in that case, a new version and resubmission of the MDS is required. The customer may determine the significance of the change according to Quality Management Guidelines.
Rule 3.2.1.4	When there is a change to the **GDSL,** all MDSs that have a joker/wildcard in their tree structure must be reviewed to determine whether the substance that the joker/wildcard replaces is now declarable or prohibited. All substances marked as confidential must undergo the same review to identify if any confidential substance is now declarable or prohibited. Should that be the case, a new version must be submitted with a full non-confidential disclosure of the declarable or prohibited substance is required by the date in the legislation. If no date is given or the date is longer than 6 months, the resubmission must occur no later than 6 months from the publication date of the updated GADSL or customer specified list. (OEMs may determine a longer timeframe).
Rule 3.2.1.5	If a new revision is required, the most recent CDX Rules & Recommendations must be adhered to for that portion of the ingredients section being edited. Sections of the tree structure that were previously proposed to the customer and accepted by the customer do not necessarily have to be updated if CDX System does not generate an error on those nodes. Upon receipt of the updated submission a customer may review the entire submission and may require updates to the unedited portion(s) of the ingredients section at their option.

3.2.2 New MDS ID vs. New Version

The following rules define when a new MDS must be created and submitted, and when a new version of an existing MDS (same CDX ID, higher version) is required. Again, the following rules are valid for MDSs sent to specific customers.

Rule/Guideline	Description
Rule 3.2.2.1	A new customer part number requires a new MDS (new CDX ID) unless you are informed otherwise by your customer.
Rule 3.2.2.2	The same customer part number with updated content requires a new MDS version (same CDX ID, higher version number).

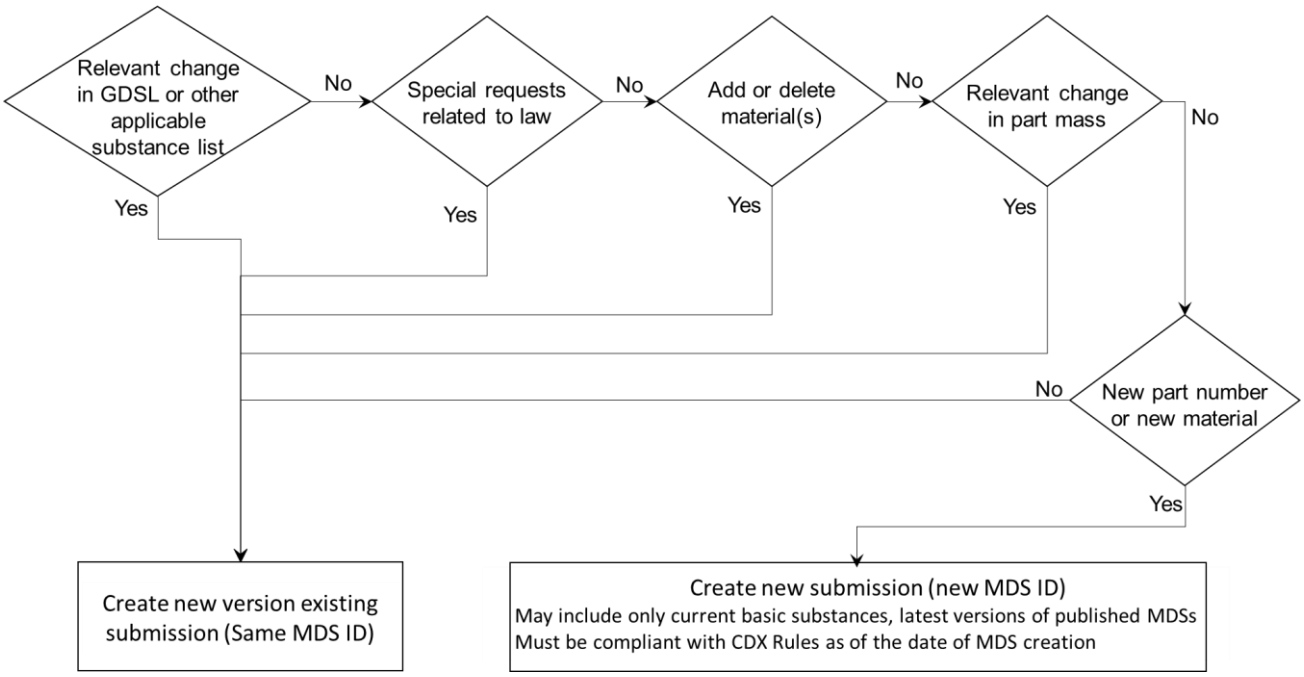

Figure 1 – Change Management Flow

4 Datasheets (MDSs)

The following section describes the general tree structure and the rules and guidelines surrounding components, semi-components, materials and basic substances.

4.1 Structure

An MDS is built up as a tree structure with a hierarchical parent/child relationship (Figure 2). In general, the MDS tree structure matches the indented Bill of Materials (BOM).

Each branching point in the structure is called a node. The higher node is called the “parent” and a node directly attached to the parent is called a “child”. The rules and guidelines for the different node types are described in subsequent sections of this document.

(For additional information on how to create an MDS, please refer to the CDX User Manual.)

Rule/Guideline	Description
Rule 4.1.1	If the child nodes are physically separate and are mechanically combined, then all child nodes of a parent node shall be of the same type (ex. a component parent node may consist of all component child nodes). If the child nodes represent a manufacturing process where material is applied to a component, then the child nodes of a parent node may be of mixed types (ex. Plating, coating, adhesive, etc. applied to a component). A Semi-component will be treated as a component in the tree structure when a specific weight is specified.
Guideline 4.1.1a	When component and material nodes are mixed, they should be represented in the order they are applied (ex. closest material to the article is first applied, next closest second applied, etc.)

The following figure depicts the top parent node with 2 child nodes. (Child nodes can also be parent nodes.)

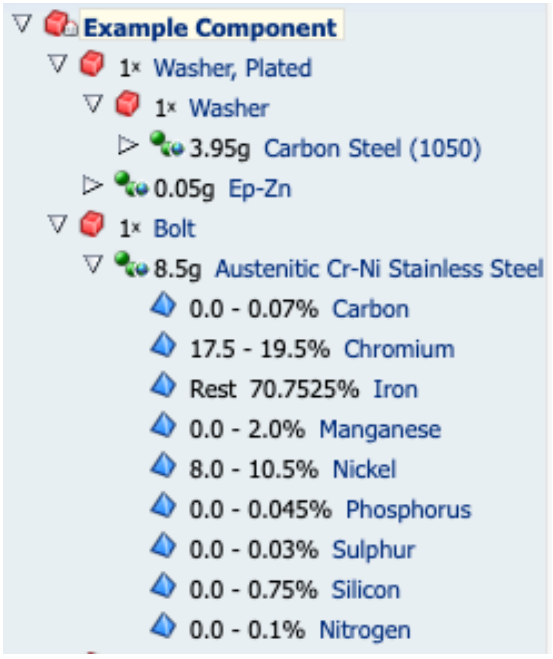

Figure 2 – Sample MDS

4.2 Components

The following section describes the requirements of a component parent node.

4.2.1 General Information

A **component** may be a single part or an assembly of multiple parts. A component on a lower level is commonly called a sub-component. A sub-component is represented by the same symbol as a component. Sub-component is a term of convenience only, not a separately defined type of node.
(NOTE: A sub-component is not the same as a semi-component.)

Rule/Guideline	Description
Rule 4.2.1.1	A **component** node must have at least one child node. The child node may be a component, a semi-component or a material node. It will have a company unique part number.
Rule 4.2.1.2	The **component** name must not be the default name generated by the CDX System (example: Component_12345678). The name must be in English.
Rule 4.2.1.3	The top node component name must be descriptive and be in line with applicable customer specifications. If the component is a top node and will be sent to a customer, the recipient information controls the name the customer will see.
Rule 4.2.1.4	The **component** name (in the field “Description”) shall be reported in English.
Rule 4.2.1.5	Part numbers or trade names shall not be used as component names.
Guideline 4.2.1.a	The **component** name should be consistent with the name on the component print, so that any material-related Application Code is related to the component name (example: component name: *Bushing*, application code: *Alloying element in bearing shells and bushes*).
Guideline 4.2.1.b	If applicable, the top node component name should be similar to the Bill of Material (BOM) description.

4.2.2 Weight and Tolerance

The value entered in the field ***Measured Weight per Item*** is the actual weight of the component. Stated weight of the component on the print can be used if accurate.

The value entered in the field ***Tolerance*** is the allowable deviation from the stated weight. This is typically <=5% unless specified otherwise by the recipient.

The ***Calculated Weight per Item*** is provided by the CDX system and is the sum of the Measured Weight per Item(s) of the direct child nodes.

The ***Deviation*** is provided by the CDX system and is the difference between the measured and calculated weights.

Rule/Guideline	Description
Rule 4.2.2.1	For any component, its real weight (measured weight; if not available, the weight given on the drawing) must be entered in metric units.
Rule 4.2.2.2	In the tree structure it is not allowed to lower the weight of a sub-component node and then control the weight of the component assembly by increasing the quantity of the sub-component. Ex: If a single sub-component weighs 10 grams, it may not be represented as 5 of the sub-component each weighing 2 grams.
Rule 4.2.2.3	The value in the field “tolerance” of the measured weight of a (sub-) component must not exceed the allowed deviation listed on the appropriate production part drawing (if applicable), in applicable Quality Management Guidelines or in the respective OEM standard. Note: Weights are used for compliance calculations, and accuracy is important as the maximum allowed is needed for worst case analysis.
Rule 4.2.2.4	The ***Deviation*** between measured and calculated weight per item must not exceed the entered tolerance.

4.3 Semi-components/Bulk Products

The following section describes the requirements of a semi-component parent node.

4.3.1 General Information

A **semi-component** is a semi-finished product (example: steel coil, pipe, leather hide, plated steel) that will go through further process steps (example: cutting, stamping) to make a finished component with a fixed weight. A semi-component does not have a fixed weight as, before further processing, the weight cannot be defined. Therefore, a semi-component MDS may be created without a weight attached. A usage weight type (example: kg/m², kg/m) for a semi-component may be entered in order to make weight calculations easier once the semi-component MDS is attached to or changed into a component node. A semi-component parent may can contain several material or semi-component child nodes or both. (see Figure 3).

Rule/Guideline	Description
Rule 4.3.1.1	A **semi-component** parent node must have at least one material or at least one semi-component child node and a material.
Rule 4.3.1.2	For all semi-components, the usage weight type (kg/m, kg/m² or kg/m³) of the semi-component must be entered.
Rule 4.3.1.3	The semi-component must be reported in the state which it will have in the finished component. Ties, wraps, liners etc. that are removed in production, and not on the final OEM product, must not be reported as part of the semi-component.
Rule 4.3.1.4	The semi-component name (article name) must not be the default name generated by the CDX system (example: Semi-Component_12345678).
Rule 4.3.1.5	The top node semi-component name (article name) must be descriptive of the semi-component and be in line with applicable customer specifications. A part number or other non-descriptive name is not allowed.
Rule 4.3.1.6	The semi-component name shall be reported in English.

The following figure depicts an acceptable structure(s) for semi-components.

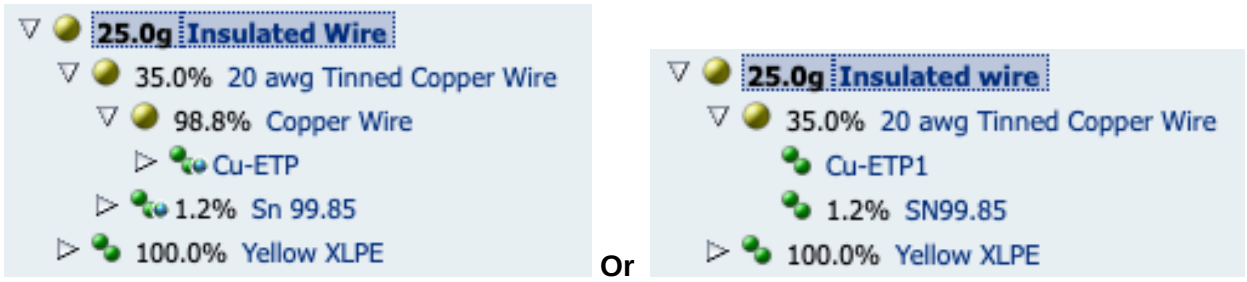

Figure 3 – Example Structures of Semi-Components

4.3.2 Portion (Percentage) Ranges for Semi-Components

CDX allows the user to define the portion (percentage) of a semi-component or a material child node attached to the semi-component parent node. This portion may be a fixed percent value, a range "from X to Y %", or "Rest" (CDX calculates the percentage from the portions of the other child nodes of the same parent node).

<table>
<tr><th>Rule/Guideline</th><th>Description</th></tr>
<tr><td>Rule 4.3.2.1</td><td>The portion type "range" must be used solely to reflect real variations of a material or semi-component amount in a semi-component description. Ranges must not be used as a means to avoid declaring the full composition.</td></tr>
<tr><td>Rule 4.3.2.2</td><td>If the portion type "range" is selected, for semi-component or material child nodes that are attached to a semi-component parent node, the maximum allowable difference between the X and Y percentage values is 20.

<table>
<tr><th>Portion: from X % to Y %</th><th>Maximum M = Y % – X %</th></tr>
<tr><td>0 < X ≤ 100</td><td>M ≤ 20</td></tr>
</table>
Example: the Range 30% to 70% is not allowed because the difference would be 40 (70-30=40).
For semi-components and materials in MDSs published by the CDX Steering Committee (Supplier: CDX Standard Materials, ID 104;, this rule does not apply, and MDSs containing such standard materials must not be rejected based on application of this rule to such materials, i.e. materials published by CDX Standard Materials are acceptable even if the material does not meet all the rules in this Guidance.</td></tr>
</table>

4.4 Materials 

The following section describes the requirements of a material parent node.

4.4.1 General Information

A **material** normally consists only of basic substances. For details on basic substances see section 4.5 Basic Substances. In some cases, a material can consist of other materials, commonly referred to as sub-materials. If sub-materials are used, the top-level material must be homogenous. (Example: filled thermoplastics consisting of the materials: basic polymer, master batch color and master batch flame retardant that are processed into a new colored, flame-retarding, filled thermoplastic compound that is homogenous). Sub-materials must follow the same rules as materials regarding substance declarations, although ranges may be larger since they are calculated as part of the top-level material. The CDX symbol () for materials and sub-materials is the same. Sub-material is a term of convenience only, not a separately defined type of node.

Basic substances must be added to a material before being applied to a tree structure.

Rule/Guideline	Description
Rule 4.4.1.1	A **material** parent node must have at least one basic substance or two material child nodes attached to it. (If it is not a pure substance there will always be at least two basic substances shown.)
Rule 4.4.1.2	A material must be described in its end state. Only basic substances contained in the final material are to be reported (example: cured adhesives or paint coatings are entered without the evaporating solvents, e.g. water, toluene).
Rule 4.4.1.3	Process chemicals used in the production of a material that are not contained in the end material must not be reported.
Rule 4.4.1.4	Every homogeneous material has to be described as a separate material. “Homogeneous” means that there is a consistent material composition which cannot be separated mechanically into two or more different materials. “Mechanical separation” here means that it is generally possible to separate materials by means of cutting, trimming and abrasion. Example of homogeneous materials include plastics, metals, alloys and coatings. If a material parent node has material child nodes, the material represented by the *parent* node must be homogeneous. Two or more materials forming layers cannot be regarded as homogeneous. Example: Zinc coating on steel or paint layers cannot be reported as a material with sub-materials, as the top material is not homogeneous.
Rule 4.4.1.5	Material data must only be created by material-producing companies. Companies not producing materials must obtain material data from their material suppliers *or* (if they use materials described in a public standard supported by CDX) use the applicable material MDS published by the CDX Committee.
Guideline 4.4.1.a	A polymer material should have at least two substances attached to it. A comment should be entered in the remarks field if it contains only one basic substance and is therefore a “pure” material.
Guideline 4.4.1.b	A material supplier SDS (safety data sheet) usually does not provide sufficient data for the creation of an MDS. MDSs must be include all substances found in the end state material (i.e. final product), including additives and excluding process chemicals that do not remain in the finished material.

4.4.1.1 Material MDSs Published by the CDX Steering Committee

The CDX Steering Committee has published many MDSs, primarily for metallic materials (Classifications 1-4) that are defined in public standards supported by CDX. The CDX Steering Committee may also publish other materials that may be used when applicable (example: passivations, metal coatings etc. where the material is identical to what is being used.)

Material MDSs issued by the CDX Steering Committee are exempt from CDX check procedures.

If a material that is defined with its chemical composition in a public standard like ISO, EN, JIS, ASTM etc., is not published by the CDX Steering Committee, it is recommended to ask one of the CDX Helpdesks to have the material added. Public material composition standards only exist for metal classifications. Not all material standards are publishable by the CDX Committee. (Example: certain SAE norms that only describe material properties and not composition, as with many Korean and Chinese standards.)

Rule/Guideline	Description
Rule 4.4.1.1.1	If an applicable CDX Steering Committee material MDS exists, it must be used instead of creating your own. “Applicable” means that the specifications of the material you are using matches exactly the specifications of the CDX Steering Committee material MDS. Materials such as recycled metal alloys that are made to an internal smelter specification that does match exactly the standards body specification should be created as an MDS by the material manufacturer. Heat (or ladle) certificates are not an acceptable source of material specifications as such certificates only serve to verify that a particular melt is within the specification tolerances, unless they specify the allowable substance ranges as well.
Rule 4.4.1.1.2	If material MDSs published by the CDX Steering Committee are used, they must be referenced or attached to a tree structure. Making a copy of these material MDSs is allowed only if the applicable norms and standards need to be modified, or the material is made to a different range specification than allowed by the standard. (Common for recycled materials.)
Rule 4.4.1.1.3	If the materials used do not match the material descriptions given in the respective CDX Steering Committee material MDSs, the CDX Steering Committee material MDSs must not be used.
Guideline 4.4.1.1.a	For materials manufactured according to a public standard supported by CDX, material MDSs published by the CDX Steering Committee should preferably be used, or copied to show applicable norm and standards information

4.4.2 Information Given in Material MDSs

There are several fields to be filled in when creating a material MDS. Each provides a certain kind of information. Information may be mandatory or optional depending on the material classification. This section describes each field and the respective rules.

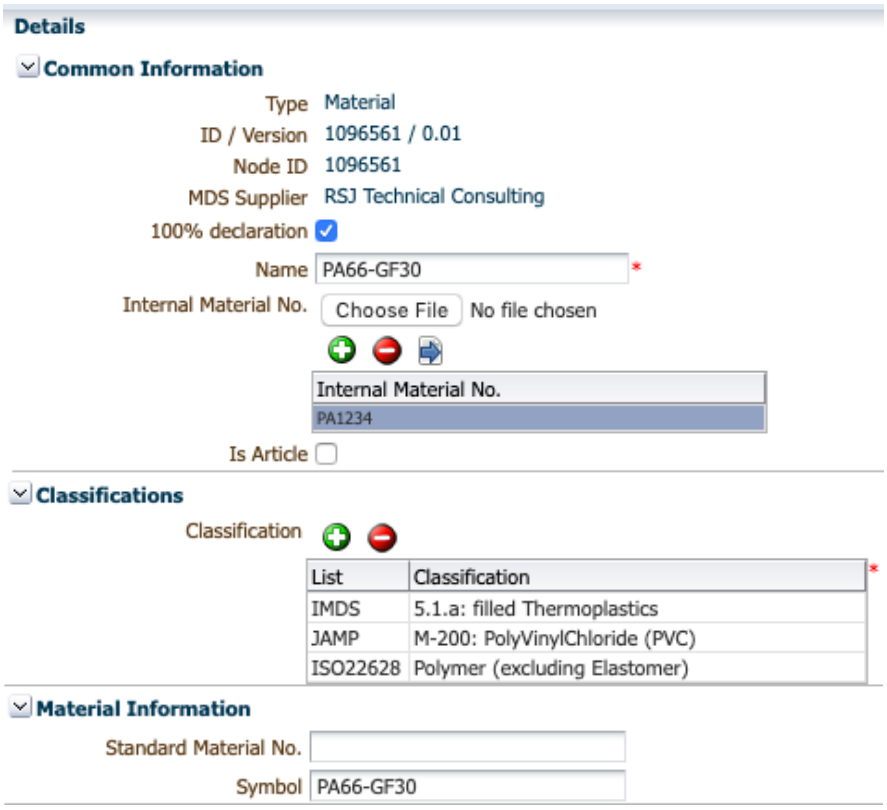

Figure 4 – Structure of a Material MDS ID/Version

Common Information:

Type, ID / Version, Node ID are system generated.

100% declaration: (Required) Check this box if 100% of all substances in the MDS are being declared or represented. If child nodes are not 100% declarations an error message will be generated when data check is run. Do not check box if MDS is not a 100% declaration.

Rule/Guideline	Description	
Rule 4.4.2.1	This box must be checked for 100% full material disclosures (all confidential materials accounted for and meet the rules for confidential substances)	

Name: (Required)(Check routine will generate an error if the default name is not changed)

Rule/Guideline	Description
Rule 4.4.2.2	The material name must be entered in English.
Rule 4.4.2.3	The material name must not be a trade or manufacturer or OEM name.
Rule 4.4.2.4	If the material is described in a public standard, then the material name according to this public standard must be entered, example: • For steels – ASTM, SAE, EN 10027, JIS norms, example: STM-C 540 • For aluminum alloys – SAE, EN 573, JIS norms, example: Al-Si12 • For copper alloys – ISO norms, example: CuAl5 • Additional identifying information may be entered in parentheses after the public standard name.
Rule 4.4.2.5	If the nomenclature for materials of a certain type is described in a public standard (example: ISO 1043-1 and 2 for plastics, ISO 1629 for elastomers or ISO 18064

	for thermoplastic elastomers), then the material name according to this public standard must be entered, example: • For plastics – ISO 1043-1 and ISO 1043-2, example: PE-LD • For elastomers – ISO 1629, example: ACM • For thermoplastic elastomers – ISO 18064, example: TPA-ES. Additional identifying information may be entered in parentheses after the name defined by the applicable nomenclature.
Rule 4.4.2.6	If no name is available which is described in a public standard or is specified in a public nomenclature standard, then the name must be descriptive of the material's usage or classification. Examples are: • Aluminum alloy • Adhesive layer • Basecoat, clear coat • Glass • Propellant, airbag • Lubricant

Internal Material No.: (Optional) Suppliers often use internal material numbers to identify their products. This internal material number can be entered in this field. This entry should not be confused with the standard material number (see the section **Std. Mat. No.**). This number is only visible to the material manufacturer.

Rule/Guideline	Description
Guideline 4.4.2.b	This entry is optional, but recommended.

Trade Name: (Field under discussion to be added, not currently available) (Optional)This is the trade name of the material. It is not a valid material name.

Is Article: Optional field (Recommended). Check this box if MDS is an article per REACH 05A perspective. (This is used for export in the IPC1754 data exchange format)

Dates: (System generated)

Product Business Information: (only relevant for components, not accessible for materials)

Classifications: (Required)

Rule/Guideline	Description
Rule 4.4.2.7	This entry is mandatory. For all materials a *correct* classification must be assigned based on the appropriate classification list for the industry for which the MDS is being created and independent of the material weight in the part. The IMDS classification is required.
Guideline 4.4.2.c	Additional classifications may be added if required by customers or market requirements. It is recommended to check the box mapping classification to other classification lists.

Material Information

Standard material No. This is the standard material number described for materials in specified public standards. The standard material number must not be confused with the internal material number (see above).

Rule/Guideline	Description
Rule 4.4.2.8	This entry is mandatory for any material if a number for that material is defined in a public standard.

Symbol: This is the standard symbol for thermoplastics, thermoplastic elastomers and elastomers as defined in the respective ISO standards.

Rule/Guideline	Description
Rule 4.4.2.9	This entry is mandatory for any material show symbol is defined in a public nomenclature standard, e.g. • For plastics – ISO 1043-1 and ISO 1043-2, example: PE-LD • For elastomers – ISO 1629, example: ACM • For thermoplastic elastomers – ISO 18064, example: TPA-ES. In the case of such materials, the material name and the material symbol should be the same.

Norms/Standards

There are three data elements to specifying a norm or standard:

- **Company:** Currently only public norms are supported. (In future norms specific to a particular OEM may be included.)
- **Norm:** Standards association publishing the norm (example: EN, DIN, JIS, ASTM, ISO etc.). Any norm not published by such a standards body is a private norm. Do not confuse public with published. A private norm may be published on the internet or via some other media available to the public in general; but that does not make it a public norm. A public norm is one issued by a standards association.

- **Norm Code:** Type in the correct norm designation from the selected standards association.

Example of these data elements:
- Company: public norms
- Norm: ASTM – American Society for Testing and Materials
- Norm code: A401

Rule/Guideline	Description
Rule 4.4.2.10	For materials with compositions described in public norms supported by CDX, this entry is mandatory. Some classifications may not have public norms. Norms which define material attributes other than composition should not be cited.

Note: Select and use appropriate norms and standards that reflect actual material and processing. If Norms / Standards shown in committee materials may not applicable, since many are added to help locate the material in the system.

Remarks:

Any remarks about the actual material or its properties, such as explaining if the standard rules cannot be followed and why, may be entered in this field. These will be reviewed if a material doesn't meet system rules and recommendations or system checks to understand if an exception to a recommendation is required. This is not a searchable field at this time.

Rule/Guideline	Description
Rule 4.4.2.11	The Remarks field is optional, used only if needed
Guideline 4.4.2.d	The Remarks field should not be used to make general/generic statements about compliance to standards or restricted substance lists.
Guideline 4.4.2.e	IF a safety data sheet is required, the box should be checked and the sheet added in the attachments section,

Attachment: (Optional) Files can be attached to the material. These can be SDSs, lab reports for RoHS compliance or other regulatory or customer required documents.

Where used: This is a system generated listing of where the MDS has been used on internally created materials, semi-components and components.

4.4.2.3 Portion (Percentage) Ranges of Sub-materials

When a material parent node has material child nodes, CDX requires the user to define the portion (or percentage) of the parent node that each sub-material contributes. This portion may be a fixed percent value, a range "from X to Y %", or "Rest" (calculated from the portions of the other sub-nodes on the same tree level).

Rule/Guideline	Description
Rule 4.4.3.1	The portion type "Range" must be used solely to reflect real variations of a material within another material. It must not be used as a means to avoid declaring the full composition.
Rule 4.4.3.2	If the portion type "range" is selected, the maximum allowable difference between the X and Y percentage values is 20. Example: the Range 30% to 70% is not allowed because the difference would be 40 (70 – 30 = 40). For materials published by the CDX Steering Committee (Supplier: CDX Standard Materials, ID 104, this rule does not apply.

4.4.3 Application Codes:

For some basic substances, typically those with a regulatory concern, an **Application Code** must be selected when the material containing one of these substances is first attached to a component type parent node. The substances requiring an application code are generally substances whose use in products is limited to certain applications.

When an Application code is required, an additional tab "**Application**" appears. If there is more than one substance in the material that requires an application code, all substances appear on the same tab. The applicable application code for each substance can then be selected from this tab. ***While the CDX system may make a suggestion as to an application, it is the responsibility of the user to verify that this is the correct application for each substance.***

Application codes are not a free-text field. Acceptable options for the application code are presented by CDX. CDX uses the substance, material classification, usage and percentage of the substance in the material to determine which application codes can be used. Selection of the appropriate application code is made through checking the appropriate radio button. Only one application code per substance can be selected per material. The identified market the material will be used in will determine which list of application codes are available.

Application Codes are updated according to legal requirements. In accordance with section X.X Change Management, new MDSs may not contain outdated application codes.

Rule/Guideline	Description
Rule 4.4.3.1	If a substance in a material MDS is application-relevant, the correct application code must be assigned when the material MDS is referenced in a component MDS.
Rule 4.4.3.2	The application code must reflect the real use of the material within the component.
Guideline 4.4.5.a	If a substance becomes application-relevant for the first time, the respective MDSs should be modified and resubmitted.

4.5 Basic Substances 

4.5.1 General Information

A **basic substance** is part of a material. It can be either a chemical element (example: iron, copper) or a compound (example: acrylic resin, zinc oxide). Basic substances fit into three distinct categories:

- **Chemical Abstract Service (*CAS)-numbered basic substance*** – *This is a basic substance with a CAS# assigned to it, meaning it is a clearly defined substance, example: Iron (CAS# 7439-89-6) or Tetrazinc trioxide phosphite CAS# 64539-51-1).*
- ***Pseudo-Substance*** –A pseudo-substance does not have a CAS# assigned to it. Such substances serve as generic representations of a substance or substance group. For example the pseudo-substance Acrylic resin can be used to represent any acrylic resin or group of acrylic resins present in a material in lieu of naming the specific Acrylic resin(s). They are pure substances and contain no additives. Any additives must be listed separately under the material.
- ***Jokers or Wildcards*** – These substances do not define a specific substance. *When used it is the responsibility of the material creator to monitor and track substances they represent.*

The list of basic substances in CDX (Basic Substance List; BSL) is centrally administered. Users may not add basic substances to CDX. If a needed basic substance is not currently available in CDX, the user must submit a Basic Substance Request via the CDX Function menu option. (

Some substance must be declared and cannot be hidden by marking them confidential (see section 4.5.2 below) or represented by jokers/wild cards. Such substances are shown in special text in CDX. Substances that must be declared appear in blue letters (This includes the GASL list and other regulated substances that may be specific to our industry). Such substances have no quantity limitations. Substances that are prohibited appear in red letters. Such substances may not be present in a material above the applicable percentage threshold unless a regulatory exemption is applicable to the specific substance and/or use of the substance. The names of basic substances that are **SVHCs** (Substances of Very High Concern) according to the European chemical regulation REACH are highlighted when the appropriate filter is selected. Substances on the REACH Annex XVII restrictions list are also highlighted in red when the appropriate filter is selected. (There are filters for various global regulations).

Rule/Guideline	Description
Rule 4.5.1.1	Basic substances must be entered in the form in which they exist in the material. This means that an elemental breakdown (example: polymers represented by their formulation C, H, N, O) is not allowed.
Rule 4.5.1.2	All basic substances in a material must be disclosed, either explicitly or with a Joker/Wildcard (see Sections *4.5.2 Confidential Substances* and 4.5.3 Jokers/Wildcards (Highly Confidential Substances).
Rule 4.5.1.3	The total of all basic substances in a material must be 100 %. If ranges are used, the system-calculated weighted averages plus other fixed percentages must equal 100 %.
Rule 4.5.1.4	Declarable and prohibited substances and their concentration/application must be declared in a manner such that compliance to legal requirements can be evaluated.
Guideline 4.5.1.a	If applicable, a basic substance should always be associated with its CAS number.

4.5.2 Confidential Substances

Substances that are not declarable or prohibited according to GADSL, are not a REACH SVHC, do not appear on the REACH restrictions list, or do not require an application code, or appear on other regulatory reporting lists (such as Conflict Minerals and others shown in the pull down filter menu) may be marked *confidential* by checking the Confidential box in the detail section for the basic substance on the Ingredients page. When the material MDS is submitted to a recipient the recipient will see the words "Confidential Substances" in place of the actual substance as will all further recipients along the supply chain. The substance will remain visible to users for the company that created the MDS. A confidential substance may revealed to a user in another company by designating such a user as a Trust User. A User in another company is given "trusted user" status by the client manager of the MDS-creating company. The MDS-creating company remains the data owner. Along the supply chain this information is only visible to these "trusted users". It is ***not*** possible to transfer confidential substances via data download into in-house systems – not even by OEMs. (They are converted to wildcards.) It is ***not*** possible for users in other CDX companies to make a copy of the tree and retrieve the actual data. This is the recommended way to track confidential substances, as it is easy to determine if one becomes declarable and data needs to be updated along the supply chain.

Rule/Guideline	Description
Rule 4.5.2.1	Substances may only be marked as confidential if they are not declarable or prohibited, are not an SVHC, or appear on regulatory reporting lists and do not require an application code. (They must meet the requirements defined in 4.5.2)
Rule 4.5.2.2	If the regulatory status of a substance marked as confidential in a material MDS changes, the respective material MDS must be updated to reveal the presence of that substance. MDSs containing this material MDS also must be updated along the supply chain (see section 3.2).
Rule 4.5.2.3	The sum of confidential substances, including wildcards for highly confidential substances (see section 4.5.3) must not exceed 10 % of a material. Exceptions are allowed for masterbatches in sub-materials; see 5.1 (Highly) Confidential Substances in Plastics Masterbatches. If substance ranges are used, the maximum value of the range for each substance are used to calculate this sum.
Guideline 4.5.2.a	As CDX is providing certain tools to simplify and automate necessary updates of MDS containing confidential substances, it is highly recommended to use confidential substances instead of wildcards (cf. 4.5.3) to cover your trade secret/proprietary substance information.
Guideline 4.5.2.b	In order to facilitate screening for conflict minerals substances, it is recommended that tin, tantalum, tungsten and gold as well as any chemical compounds containing these substance, eg. Tin monoxide, not be marked confidential.

4.5.3 Jokers/Wildcards (Highly Confidential Substances):

Substances that are not declarable or prohibited according to GADSL, and are not a REACH SVHC or a REACH Annex XVII or biocidal substance, and do not require an application code, or appear on other regulatory reporting lists (such as Conflict Minerals and others shown in the pull down filter menu) may sometimes be *highly confidential* to a supplier. These substances may be replaced by a joker/wildcard in the tree structure. This means that the actual substance is not entered. This is different from confidential substances which are entered and therefore visible to a company's users but hidden from users external to the company other than designated Trust Users. The joker/wildcard is a stand in for a substance(s) and their concentration that are present, but not listed in the MDS.
In CDX, jokers/wildcards for highly confidential substances are assigned the pseudo CAS# "system". Currently, there are ten (10) different wildcards available in order to characterize the type(s) of highly confidential substance(s).

The jokers/wildcards are as follows:

- Flame Retardant, not to declare
- Further Additives, not to declare
- Impact modifier, not to declare
- Inorganic Ingredient, not to declare

- Misc., not to declare
- Miscellaneous
- not yet specified, not to declare
- Organic Ingredient, not to declare
- Pigment portion, not to declare
- Plasticizer, not to declare

Use of a wildcard in a material does not make the material valid as a declaration for any other material or for a group of materials. Each material MDS is considered unique to the specific material it was created to represent. For example, using the wildcard *Pigment portion, not to declare* for a material that is blue means that the wildcard is standing in for the pigments used to create the specific shade of blue. If a similar material is a different shade of blue or is another color such as red or yellow, a separate material MDS must be created for each different color of the material even if each MDS uses the same wildcard, *Pigment portion, not to declare* in place of the specific pigments in each material. It is strongly suggested that an in-house database or cross-reference list be used to identify the substance(s) represented by each use of a wildcard, so that a valid change management process is in place to deal with changes in the regulatory status of any substance represented by a wildcard.

Rule/Guideline	Description
Rule 4.5.3.1	Substances may only be represented by wildcards/jokers if they are not declarable or prohibited per the declarable substance list being used and do not require an application code. (They must meet the requirements defined in 4.5.3)
Rule 4.5.3.2	If the regulatory status of a substances represented by wildcards/jokers in a material MDS changes, the respective material MDS must be updated to reveal the presence of that substance. MDSs containing this material MDS also must be updated along the supply chain (see section 3.2).
Rule 4.5.3.3	The sum of confidential substances, including wildcards for highly confidential substances must not exceed 10% of a material. (Exceptions are allowed for masterbatches in sub-materials where substance percentage is calculated for the top-level homogenous material). If substance ranges are used, the maximum value of the range for each substance is used to calculate this amount.
Rule 4.5.3.4	In order to facilitate screening for conflict minerals substances, it is strongly recommended that tin, tantalum, tungsten, gold cobalt, mica and other substances added to the list, as well as any chemical compounds containing these substances, e.g. Tin monoxide, not be marked confidential.
Guideline 4.5.3.a	As CDX is providing certain tools to simplify and automate necessary updates of MDS containing confidential substances, it is recommended to use confidential substances instead of wildcards to cover your trade secret/proprietary substance information.
Guideline 4.5.3.b	In order to facilitate screening for conflict minerals substances, it is strongly recommended that tin, tantalum, tungsten, gold cobalt, mica and other substances added to the list, as well as any chemical compounds containing these substances, eg. Tin monoxide, not be marked confidential.

4.5.4 Portion (Percentage) Ranges

CDX requires the user to define the portion of a basic substance used in a material. This portion may be a fix percentage value, a range “from X to Y %”, or rest (calculated by CDX).

<table>
<tr><th>Rule/Guideline</th><th colspan="2">Description</th></tr>
<tr><td>Rule 4.5.4.1</td><td colspan="2">The portion type “range” must be used solely to reflect real variations of a basic substance in a material. Ranges must not be used as a means to avoid declaring the full composition of a material.</td></tr>
<tr><td>Guideline 4.5.4.a</td><td colspan="2">For confidential and wildcard/joker substances, the option “rest” should not be used.</td></tr>
<tr><td rowspan="5">Rule 4.5.4.2</td><td colspan="2">If the portion type “range” is selected, the following maximum portion ranges apply:</td></tr>
<tr><td>Portion: from X % to Y %</td><td>Maximum M = Y % – X %</td></tr>
<tr><td>0 ≤ X ≤ 7.5</td><td>M ≤ 3</td></tr>
<tr><td>7.5 < X ≤ 20</td><td>M ≤ 5</td></tr>
<tr><td>20 < X ≤ 100</td><td>M ≤ 10</td></tr>
<tr><td colspan="2">If ranges are used (example: 2 % – 8 %), the smaller number defines the row and M value in the table to be used. Consequently, the range 2 % – 8 % is not allowed because for the lower limit 2 %, the maximum Y value is 5 (2 + 3 = 5).
Exemptions from this rule:
A basic substance as part of a material that is defined with a larger range in a public norm (although in this case, the respective material MDSs published by the IMDS Steering Committee should preferably be used when available).
A basic substance as part of a material is defined with a larger range in an in-house specification. This in-house specification must be part of the delivery conditions. A remark should be entered identifying the in-house standard for which defines the material composition.
Basic substances in MDSs published by CDX Standard Materials, ID 104.
Materials containing substances with a natural range higher than those given in this table. (Comment in Remarks field should be added for this).</td></tr>
</table>

5 Special Cases

5.1 Data received from IMDS

Data imported from IMDS will be considered acceptable, even though it does not meet the O5A data structure model specified in this document.

5.2 Electronic Components

Due to the manufacturing issues of the semiconductor industry, electronic components under 5 grams, or integrated circuits may be represented by FMD disclosures reported via IPC1752A provided they are FMD and declare all substances that are not allowed to be hidden as confidential in section 4.5. and contain valid material declarations, where data structure conforms to the IPC1752A or IEC62474 standards. It is still preferable to collect all electronic component data in the CDX format.

5.3 Elecronic Subassemblies (PCBs)

It is preferable that all electronic subassemblies be reported using data collected in the CDX format and be reported in the CDX format. It will be allowed for electronic subassemblies (PCBs) may be declared using IPC1752A, IPC1752B or IEC 62474 formats as a special case provided they meet the following requirements and meet the rules for FMDs.

This special case recommendation describes the general requirements for the creation of Material Data Sheets (MDSs) for E/E components, assembled printed circuit boards (PCB/PWB, including flexible circuit boards (FCP)), and hybrid electronics (standard LTCC1) used.
This special case recommendation does not cover parts connected to E/E components, such as housings or mounting plates, which must be reported separately in CDX.
If the modules described in this section are to be used in an MDS, **the supplier must have obtained evidence** from the sub-tier suppliers that all materials meet the predefined material descriptions and ranges of the standard materials. Upon special request by the customer, the supplier utilizing the special case reporting has to prove per evidence that he has collected all material data from its sub-tier levels.
Any use of standard materials does not substitute the suppliers mandate to track and gather all necessary material information along the total sub-tier supply chain. This mandatory process of material tracking and obtaining of information must be proven to be in full compliance with legal requirements.

6 Supplier Data

This entry informs about the material MDS creating company and is also automatically created by CDX, identifying the company and it CDX ID#. If a company has multiple organizational units, the correct one must be chosen. The contact person for the supplier must be changed if the default name is not correct.

7 Recipient Data

The recipients part number and part name should be used. If not provided, the supplier name and part number may be used.

8 Recommendation 001 Release and Revisions

8.1 Release

The recommendation was first approved and released on June 25, 2019.

8.2 Revisions