Business To Manufacturing Markup Language

Material

Version 6.0 - March 2013

B2MML-Material

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CHANGE HISTORY

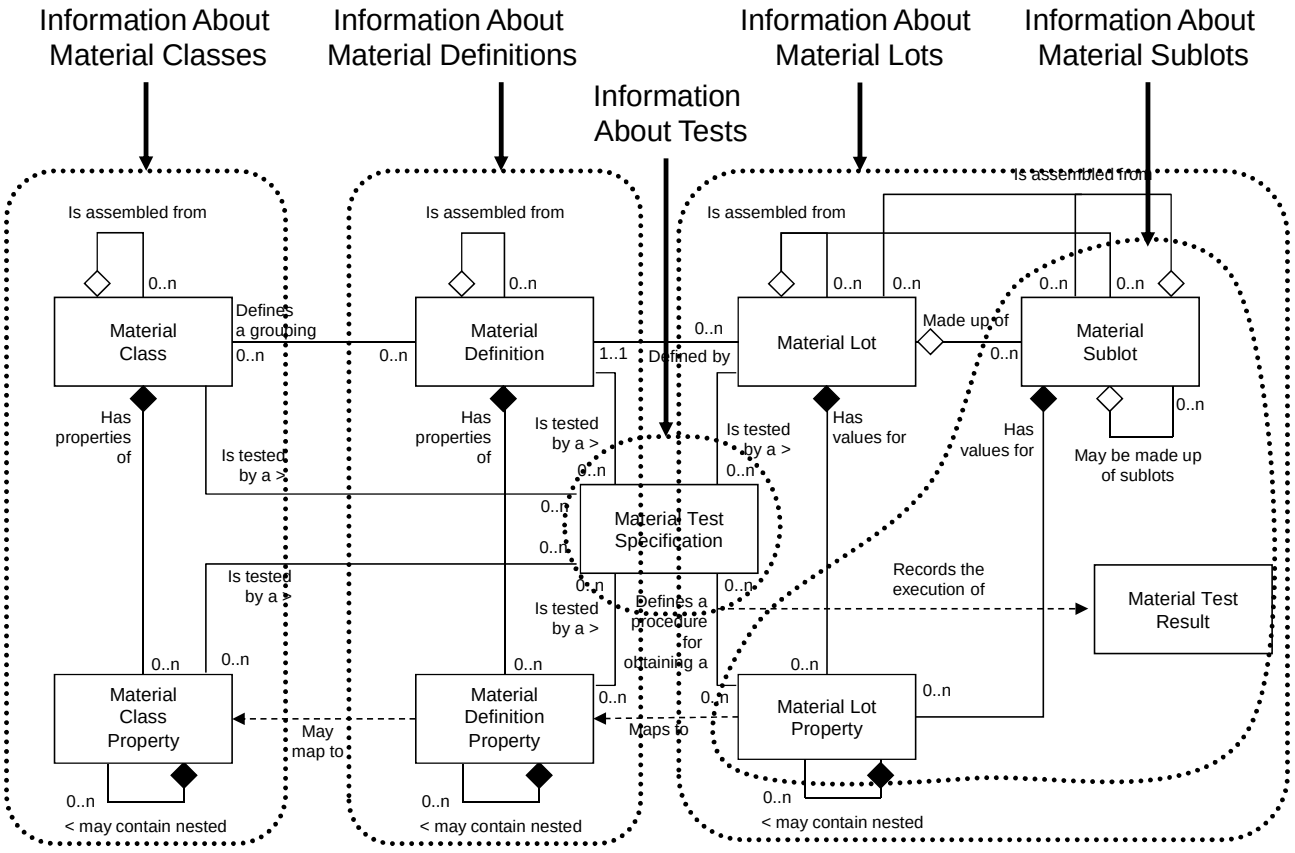
Change	Date	Person	Description
V01	7 April 2002	Dennis Brandl Dave Emerson	Initial release
V02	23 Sept 2003	Dennis Brandl Dave Emerson	• Added Location information to lot type • Changed ##any to "Any" element of type "AnyType" • Move StorageLocation and Quantity to MaterialLotType
V03	26 Aug 2005	Dennis Brandl Dave Emerson	• Added substitution groups. One group added just before each Any element. • Added MaterialLotID to MaterialSubLot so a stand alone MaterialSubLot element can be identified with a Lot ID.
V0301	29 Dec 2005	Dennis Brandl	• Added properties to sublots
V04	04 June 2007	Dennis Brandl	• Added transaction elements
V0401	Oct 2008	Dennis Brandl	• Changed version number
V0500	Mar 2011	Dennis Brandl	• Updated for ISA 95.02-2010 • Added assembly definitions • Changed QATest to MaterialTest
V0600	Aug 2012	D. Brandl	Updated MESA Copyright

SCHEMA SCOPE

This document defines the information about material definitions, material classes, material lots, material sublots, and QA (Quality Assurance) tests that may be exchanged between business systems and manufacturing operations systems. This information is based on the data models and attributes defined in the ANSI/ISA 95.00.02 Enterprise/Control System Integration standard. Contact ISA (The Instrumentation, System, and Automation Society) for copies of the standard. Additional information on the standard is available at www.isa.org.

Key Information Assumptions

The data represented in these schemas is derived from the UML model below. This model is defined in the ANSI/ISA 95.00.02 standard. The information model in the model below is not hierarchical, so the key assumption is that the information may be accessed from any of four starting points: material class, material definition, material lot, material sublot or material test specifications, as identified by the dotted collections in the figure.



Model of Exchanged Material Information

This schema uses a common schema for definition of elements that are used in multiple schemas, such as ID, Description, and Value. See the document defining the Common schema for definition of the common elements.

MaterialInformation

The main structuring element of the schema definition is MaterialInformation.

MaterialLot

A material lot object uniquely identifies a specific amount of material, countable or weighable. This describes the actual total quantity or amount of material available, its current state, and its specific property values.

MaterialLot elements may be used to contain information about specific material and subsets of the material stored as sublots. It may also include the definition of QA test results. It may include the list of material definitions the material belongs to and the list of QA test specifications associated with properties.

MaterialSubLot

A material lot may be stored as separately identifiable quantities. Each separate identifiable quantity of the material is identified in a material sublot. All material sublots must contain the same material lot, so they use the material lot element's property values. A material sublot may be just a single item. Material sublots may have sublot specific properties, such as RFID tag IDs or other identification properties, maintained in a MaterialSublotProperty element.

Each material sublot also contains the location of the sublot, the quantity or amount of material available in the sublot, and a reference to the material lot. Material sublots may contain other sublots. For example, a sublot may be a pallet, each box on the pallet may also be a sublot, and each material blister pack in the box may also be a sublot.

MaterialDefinition

A material definition is a means to describe goods with similar characteristics for purposes of scheduling and planning. Examples of these may be "City Water", "HCl", and "Grade B Aluminum". The materials may be identified as raw, intermediate, or final and may have other state information, such as availability of safety information.

MaterialDefinition information may be used to contain information about material definitions. It may contain the list of material lots belonging to the definition and the list of QA test specifications associated with material definition properties.

MaterialClass

A material class is means of defining groupings material definitions for use in production scheduling or processing. An example of a material class is "Sweetener", with members of "Fructose", "Corn Syrup", and "Sugar Cane Syrup". Another example of a material class is "Water", with members of "City Water", "Recycled Water", and "Spring Water". A material definition may belong to zero or more material classes.

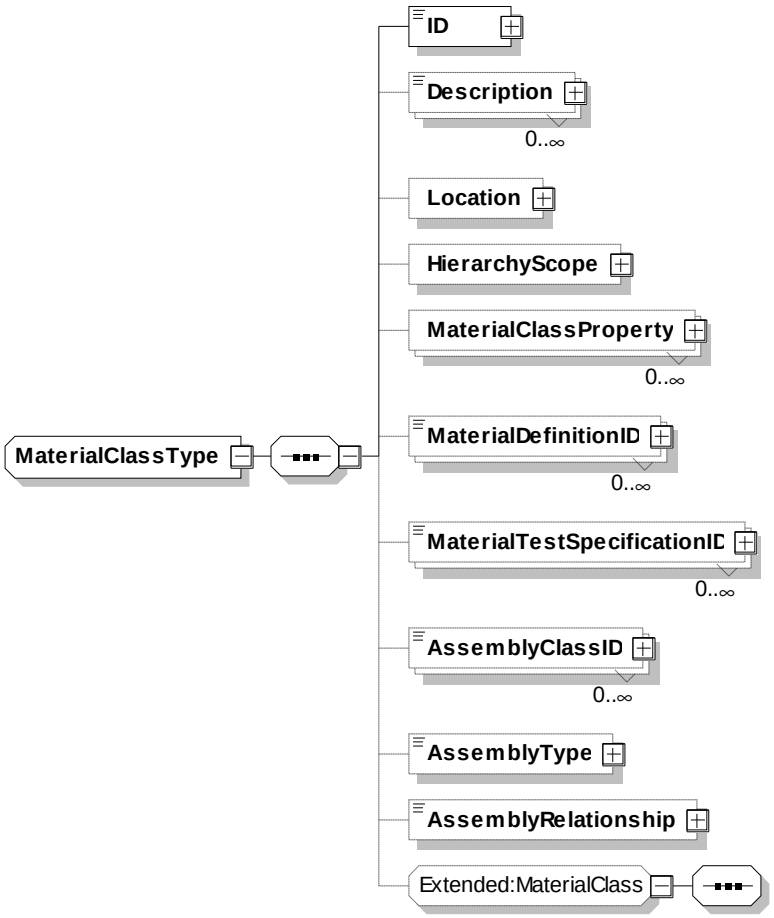
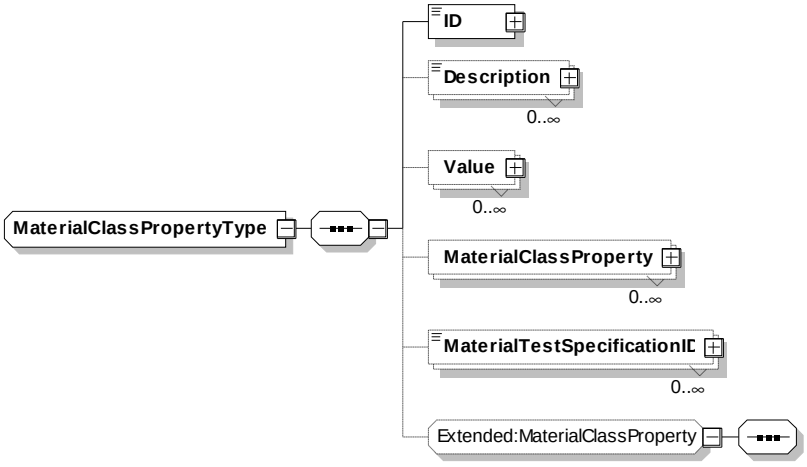
MaterialClass information may be used to contain information about material classes. It may contain the list of material definitions belonging to the class and the list of QA test specifications associated with material class properties.

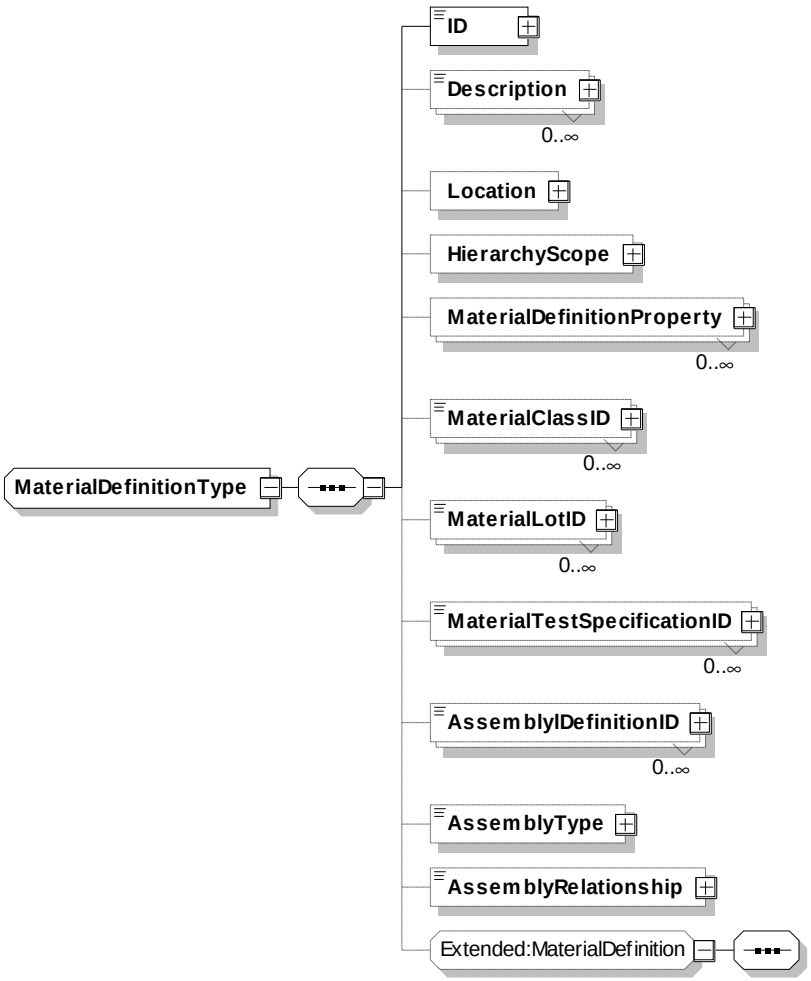
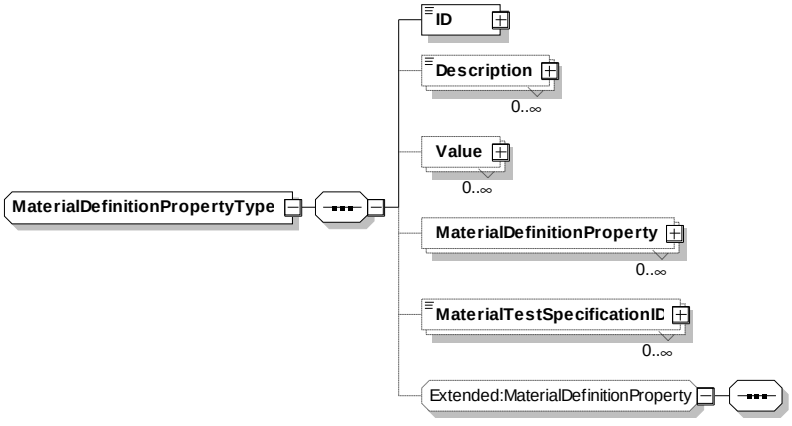
MaterialTestSpecification

A material test specification may be associated with a material class property. This is typically used where a test is required to ensure that the material has the required property value. A material test specification may identify a test for one or more material class properties. Not all properties need to have a defined material test specification.

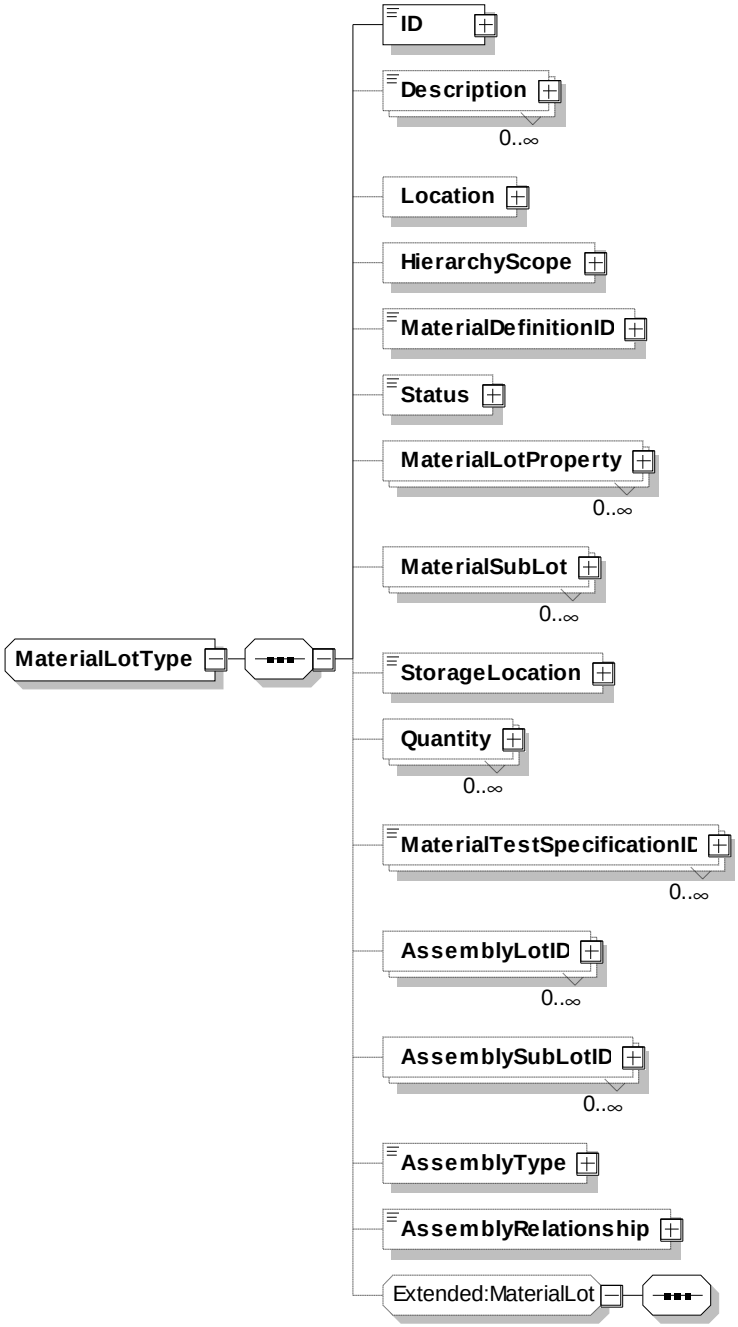
MaterialTestSpecification information may be used to contain information about material tests. It may contain identifications of the tested material properties and the tested material class properties.

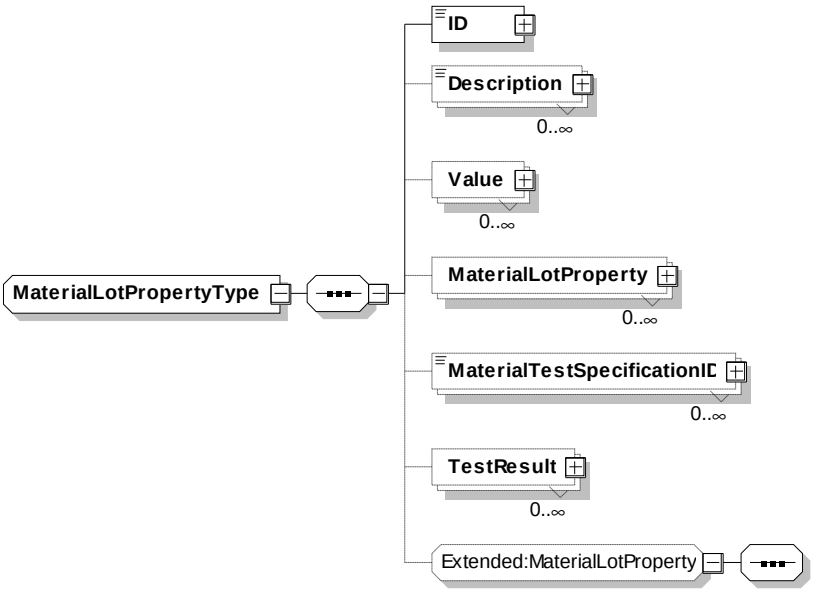
ELEMENT DEFINITIONS

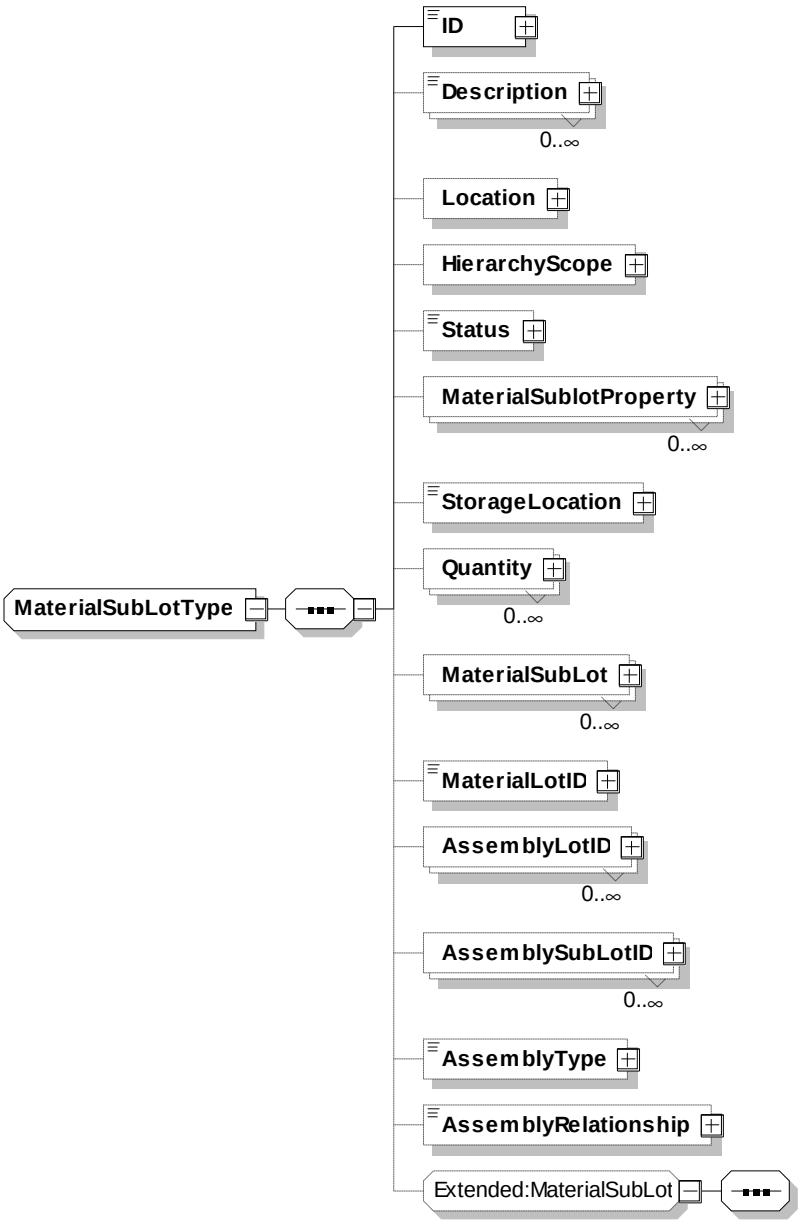
Element/Type	Description
MaterialClass ***MaterialClassType***	Contains a definition of a material class, the properties associated with the class, and the list of material definitions associated with the class. 
MaterialClassProperty ***MaterialClassPropertyType***	Contains a definition of a property for a material class, the nominal value of the property, any nested properties, and the ID of a QA test specification for the property. 

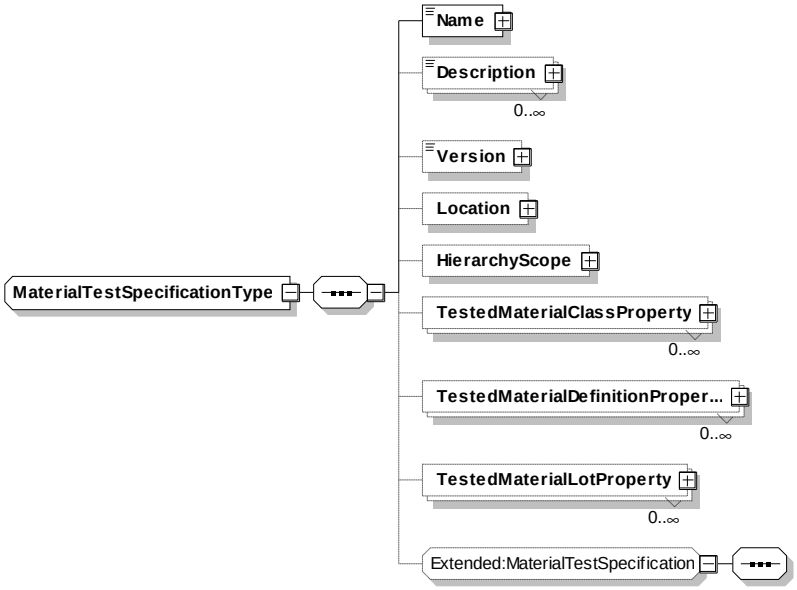
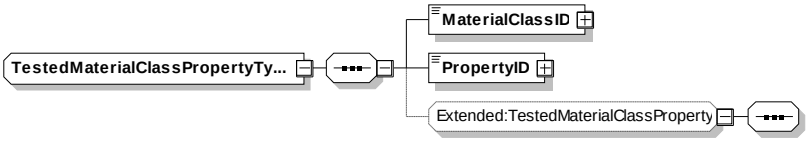
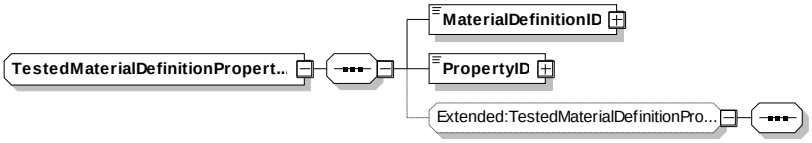
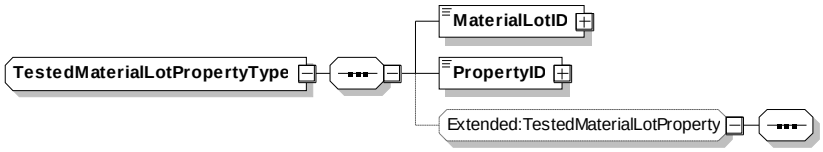
Element/Type	Description
MaterialDefinition ***MaterialDefinitionType***	Contains a definition of a material definition, the properties associated with the definition, the list of material class the definition belongs to, and the list of material lots belonging to the definition. 
MaterialDefinitionProperty ***MaterialDefinitionPropertyType***	Contains a definition of a property for a material definition, the nominal value of the property, any nested properties, and the ID of a QA test specification for the property. 

Element/Type	Description
MaterialInformation ***MaterialInformationType***	Contains material information, may include a list of material classes, material definitions, material lots, material sublots, and QA test specifications. 

Element/Type	Description
MaterialLot ***MaterialLotType***	Contains a definition of a material lot, the properties associated with the lot, the material definition of the lot, a status of the lot, the list of material sub lots associated with the lot, an optional storage location and quantity. 

Element/Type	Description
MaterialLotProperty ***MaterialLotPropertyType***	Contains a definition of a property for a material lot, the value of the property, any nested properties, and the ID of a QA test specification for the property. It may contain a storage location and quantity, and test results from QA material tests. 

Element/Type	Description
MaterialSubLot ***MaterialSubLotType***	Contains a definition of a material sublot, a status of the sublot, the storage location of the sublot, the quantity of the sublot, any sublots that make up the sublot, and the ID of the associated material lot. NOTE: The **MaterialSublotProperty** is of type **MasterialLotPropertyType**. 

Element/Type	Description
MaterialTestSpecification ***MaterialTestSpecificationType***	Contains a definition of a material test specification, including the ID and version of the test, the list of tested material class properties, the list of tested material definition properties, the list of tested material lot properties, and application defined elements. 
TestedMaterialClassProperty ***TestedMaterialClassPropertyType***	Contains an identification of a tested material class and a property ID. 
TestedMaterialDefinitionProperty ***TestedMaterialDefinitionPropertyType***	Contains an identification of a tested material definition and a property ID. 
TestedMaterialLotProperty ***TestedMaterialLotPropertyType***	Contains an identification of a tested material lot and a property ID. 

TRANSACTION ELEMENTS

The following elements are defined to support the ISA 95 Part 5 transactions, using the transaction data types defined in the B2MML-Common.xsd schema.

Material Information Elements	Description
GetMaterialInformation	Get *MaterialClass*, *MaterialDefinition*, *MaterialLot*, *MaterialSubLot*, and *MaterialTestSpecification* definitions.
ShowMaterialInformation	Returned information from the *GetMaterialInformation* message.
ProcessMaterialInformation	Process *MaterialClass*, *MaterialDefinition*, *MaterialLot*, *MaterialSubLot*, and *MaterialTestSpecification* definitions.
AcknowledgeMaterialInformation	Returned status from the *ProcessMaterialInformation* message.
ChangeMaterialInformation	Change *MaterialClass*, *MaterialDefinition*, *MaterialLot*, *MaterialSubLot*, and *MaterialTestSpecification* definitions.
RespondMaterialInformation	Returned status from the *ChangeMaterialInformation* message.
CancelMaterialInformation	Cancel *MaterialClass*, *MaterialDefinition*, *MaterialLot*, *MaterialSubLot*, and *MaterialTestSpecification* definitions.
SyncMaterialInformation	Published *MaterialClass*, *MaterialDefinition*, *MaterialLot*, *MaterialSubLot*, and *MaterialTestSpecification* definitions.

Material Class Elements	Description
GetMaterialClass	Get *MaterialClass* definitions.
ShowMaterialClass	Returned information from the *GetMaterialClass* message.
ProcessMaterialClass	Process *MaterialClass* definitions.
AcknowledgeMaterialClass	Returned status from the *ProcessMaterialClass* message.
ChangeMaterialClass	Change *MaterialClass* definitions.
RespondMaterialClass	Returned status from the *ChangeMaterialClass* message.
CancelMaterialClass	Cancel *MaterialClass* definitions.
SyncMaterialClass	Published *MaterialClass* definitions.

Material Definition Elements	Description
GetMaterialDefinition	Get *MaterialDefinition* definitions.
ShowMaterialDefinition	Returned information from the *GetMaterialDefinition* message.

Material Definition Elements	Description
ProcessMaterialDefinition	Process *MaterialDefinition* definitions.
AcknowledgeMaterialDefinition	Returned status from the *ProcessMaterialDefinition* message.
ChangeMaterialDefinition	Change *MaterialDefinition* definitions.
RespondMaterialDefinition	Returned status from the *ChangeMaterialDefinition* message.
CancelMaterialClass	Cancel *MaterialDefinition* definitions.
SyncMaterialDefinition	Published *MaterialClass* definitions.

Material Lot Elements	Description
GetMaterialLot	Get *MaterialLot* definitions.
ShowMaterialLot	Returned information from the *GetMaterialLot* message.
ProcessMaterialLot	Process *MaterialLot* definitions.
AcknowledgeMaterialLot	Returned status from the *ProcessMaterialLot* message.
ChangeMaterialLot	Change *MaterialLot* definitions.
RespondMaterialLot	Returned status from the *ChangeMaterialLot* message.
CancelMaterialLot	Cancel *MaterialLot* definitions.
SyncMaterialLot	Published *MaterialLot* definitions.

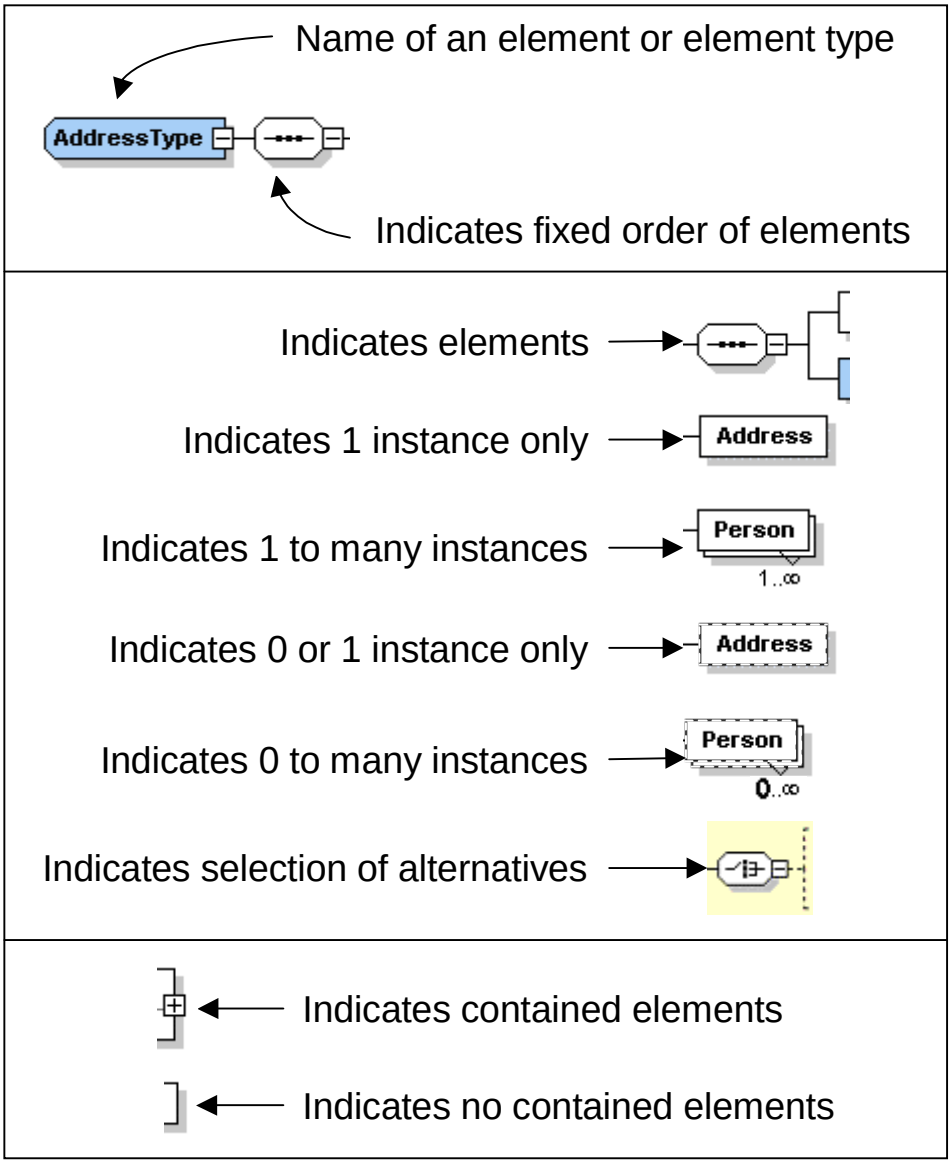
Material Sublot Elements	Description
GetMaterialSubLot	Get *MaterialSubLot* definitions.
ShowMaterialSubLot	Returned information from the *GetMaterialSubLot* message.
ProcessMaterialSubLot	Process *MaterialSubLot* definitions.
AcknowledgeMaterialSubLot	Returned status from the *ProcessMaterialSubLot* message.
ChangeMaterialSubLot	Change *MaterialSubLot* definitions.
RespondMaterialSubLot	Returned status from the *ChangeMaterialSubLot* message.
CancelMaterialSubLot	Cancel *MaterialSubLot* definitions.
SyncMaterialSubLot	Published *MaterialSubLot* definitions.

QA Material Test Specification Elements	Description

QA Material Test Specification Elements	Description
GetMaterialTestSpec	Get *MaterialTestSpecification* definitions.
ShowMaterialTestSpec	Returned information from the *GetMaterialTestSpec* message.
ProcessMaterialTestSpec	Process *MaterialTestSpecification* definitions.
AcknowledgeMaterialTestSpec	Returned status from the *ProcessMaterialTestSpec* message.
ChangeMaterialTestSpec	Change *MaterialTestSpecification* definitions.
RespondMaterialTestSpec	Returned status from the *ChangeMaterialTestSpec* message.
CancelMaterialTestSpec	Cancel *MaterialTestSpecification* definitions.
SyncMaterialTestSpec	Published *MaterialTestSpecification* definitions.

DIAGRAM CONVENTION

The schema diagrams using the following convention to illustrate the structure of the schema elements, the type of the elements and attributes, and the rules for optional elements and repetition.



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About the XML Committee: The XML Committe was formed within MESA to provide a forum for the development of the B2MML and BatchML specifications.