Business To Manufacturing Markup Language

Equipment

Version 6.0 - March 2013

B2MML-V06RC02-Equipment

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CHANGE HISTORY

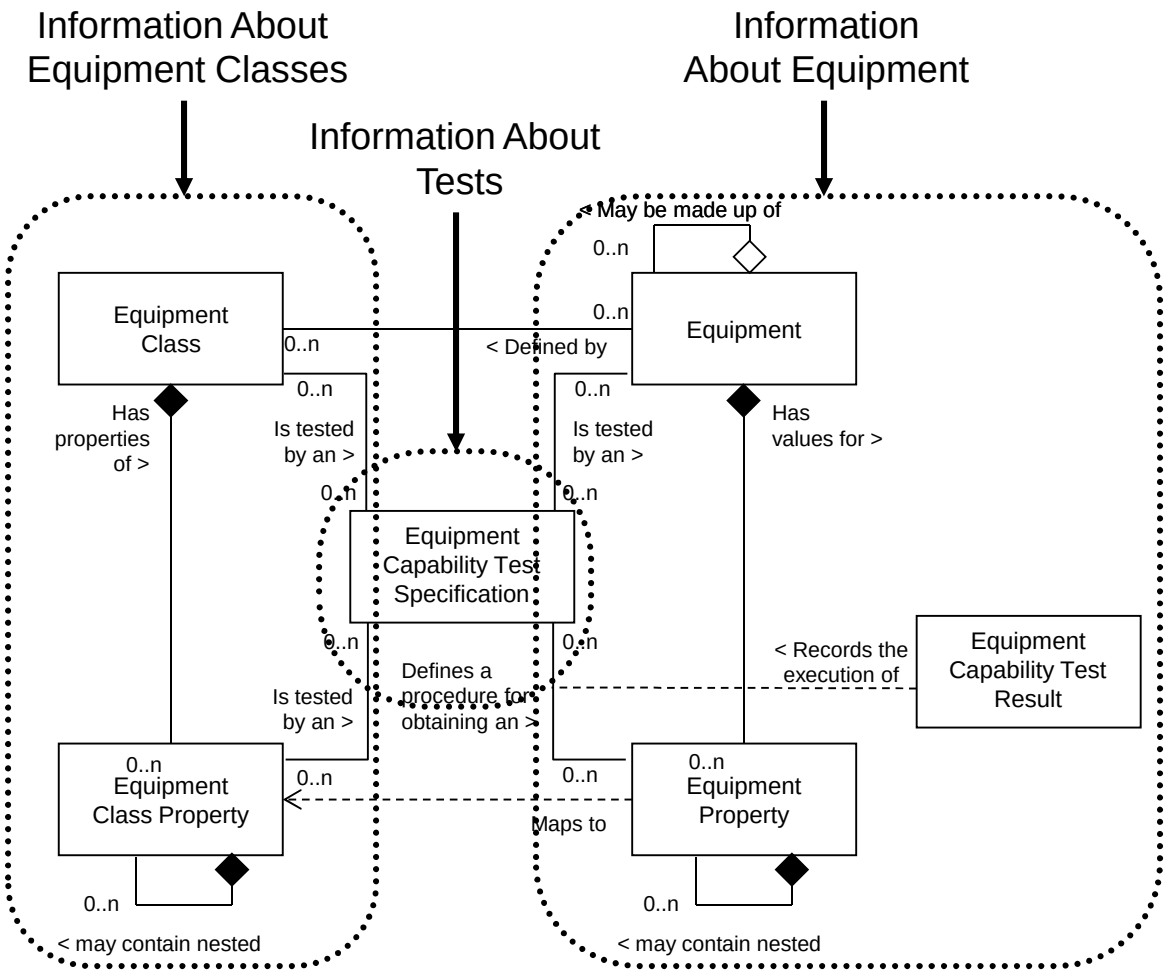
Change	Date	Person	Description
V01	7 April 2002	Dennis Brandl Dave Emerson	Initial release
V02	23 Sept 2003	Dennis Brandl Dave Emerson	• Added *Location* to *EquipmentType* • Changed ##any to "Any" element of type "AnyType"
V03	26 Aug 2005	Dennis Brandl Dave Emerson	• Added substitution groups. One group added just before each Any element.
V0301	29 Dec 2005	Dennis Brandl	• Only changed version to V0301
V04	04 June 2007	Dennis Brandl	• Added transaction elements
V0401	Oct 2008	Dennis Brandl	• Changed version
V0500	Mar 2011	Dennis Brandl	• Updated to match ANSI/ISA 95.02-2010 • Added Equipment Asset Mapping
V0600	Aug 2012	D. Brandl	Updated MESA Copyright

SCHEMA SCOPE

This document defines the information about equipment classes, equipment, and capability 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 three starting points: equipment class, equipment, or capability test, as identified by the dotted collections in the figure.

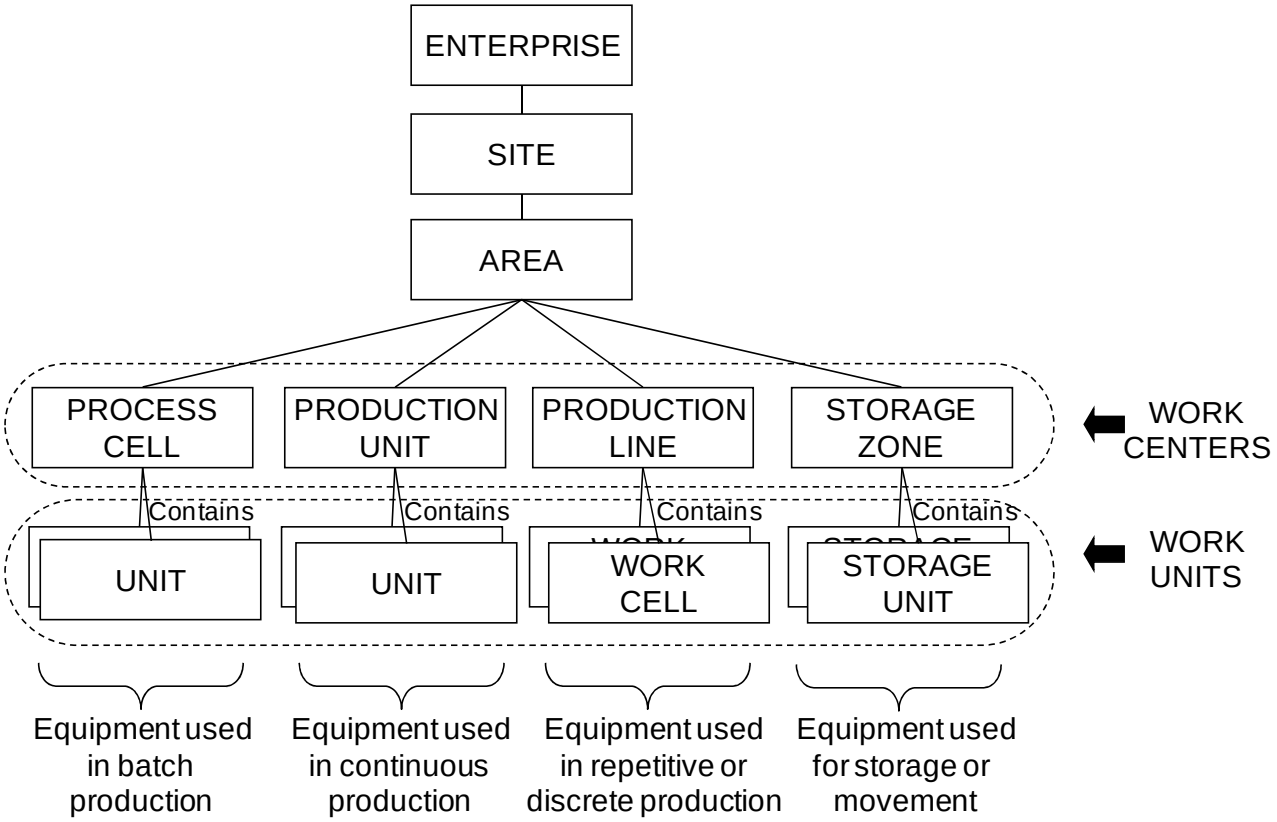


Model of Exchanged Equipment Information

This schema uses a common schema for definition of elements that are used in multiple schemas, such as ID, Description, and Value. See the documentation of the B2MML common schema for definition of the common elements.

Key Use Assumptions

The equipment follows the ANSI/ISA-95.00.01 model for the equipment hierarchy, as shown in the figure below. The terminology used in naming the equipment levels follows the ISA standard.



EquipmentInformation

The main structuring element of the schema definition is EquipmentInformation. Alternately, schemas may be made up an equipment, equipment class, or equipment capability test specification document.

EquipmentInformation elements define equipment, equipment classes, and/or equipment capability test specifications.

Equipment

Equipment represents the elements of the equipment hierarchy model defined in ANSI/ISA-95.00.01. Equipment may be definitions of sites, areas, production units, production lines, work cells, process cells, or units.

Examples of equipment are “Reactor Unit #1”, “Bottling Line #1”, and “Horizontal Drill Press #4”

Equipment may be made up of other equipment, as defined in equipment hierarchy model. For example, a production line may be made up of work cells. Each may be defined as a separate equipment element with separate properties and capabilities.

Equipment elements may be used to contain information about specific equipment. Equipment elements may also include the definition of capability test results.

EquipmentClass

An equipment class is a means to describe a grouping of equipment with similar characteristics for purposes of scheduling and planning. Any piece of equipment may be a member of zero or more equipment classes. Examples of equipment classes are “Reactor Unit”, “Bottling Line”, and “Horizontal Drill Press”.

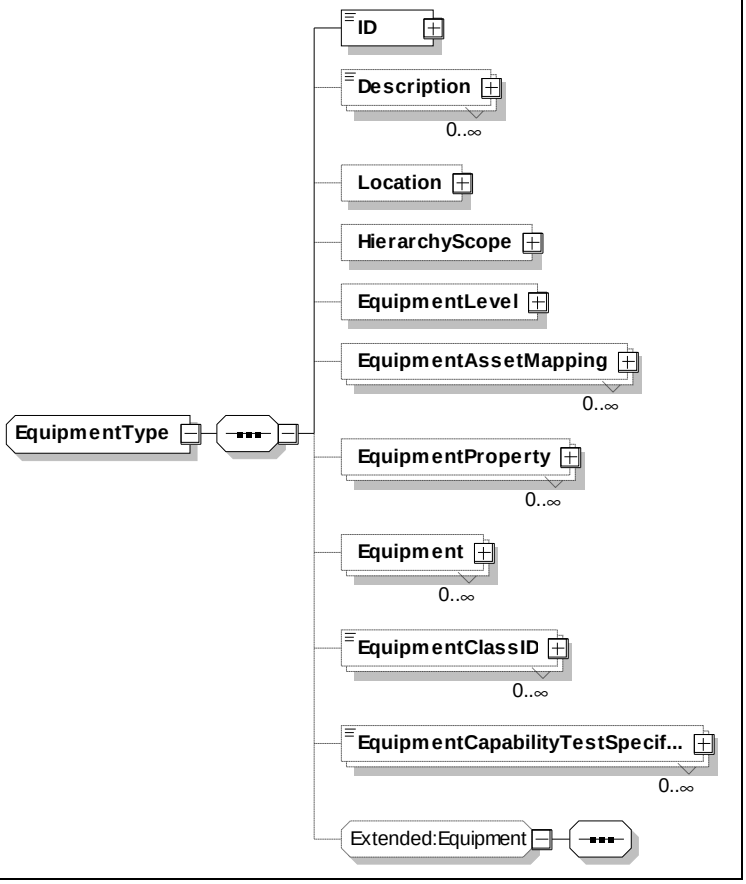
EquipmentClass information may be used to contain information about classes of Equipments. It may contain the list of equipment belonging to the class and the list of capability test specifications associated with equipment class properties.

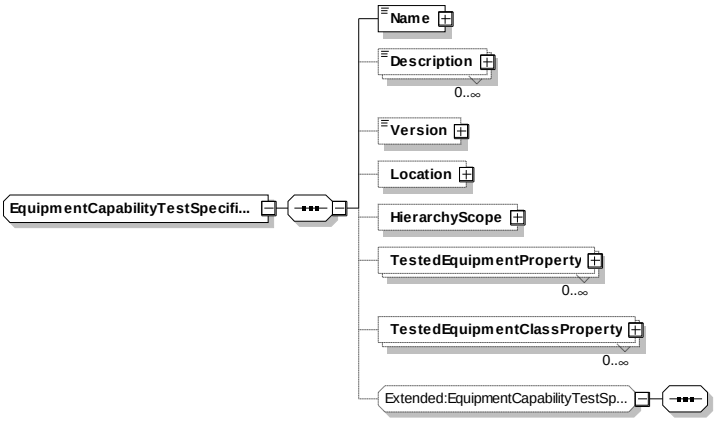
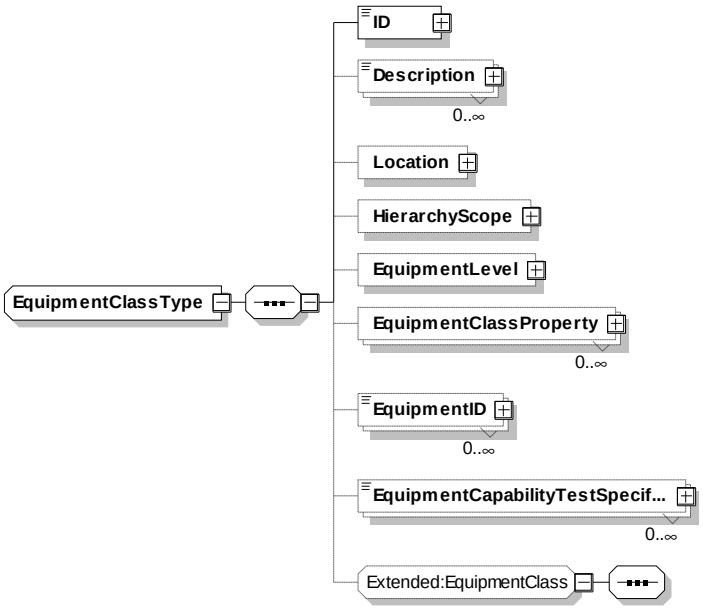
EquipmentCapabilityTestSpecification

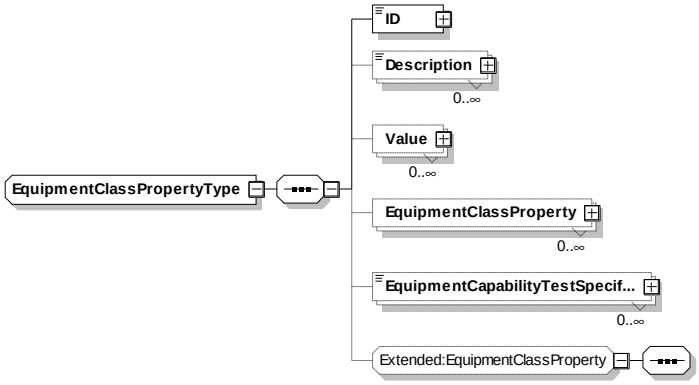
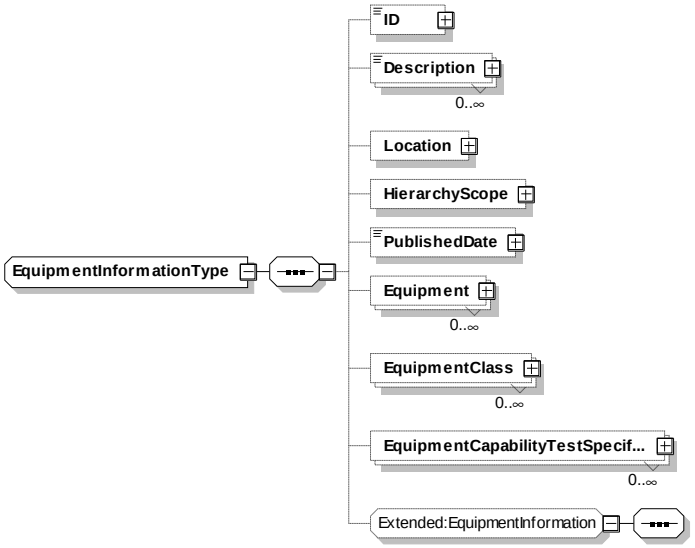
An equipment capability test specification may be associated with an equipment property. This is typically used where a test is required to ensure that the equipment has the rated capability. An equipment capability test specification may test for one or more equipment properties.

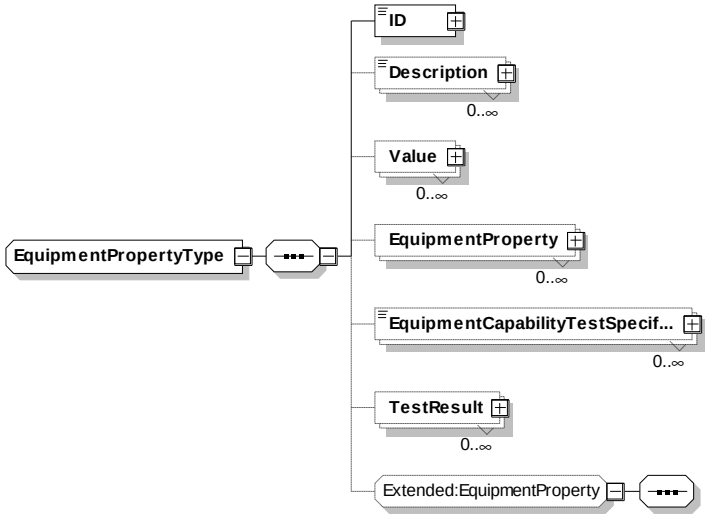
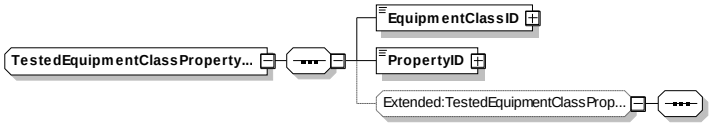
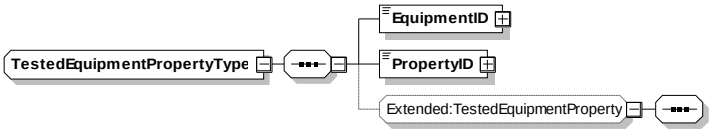
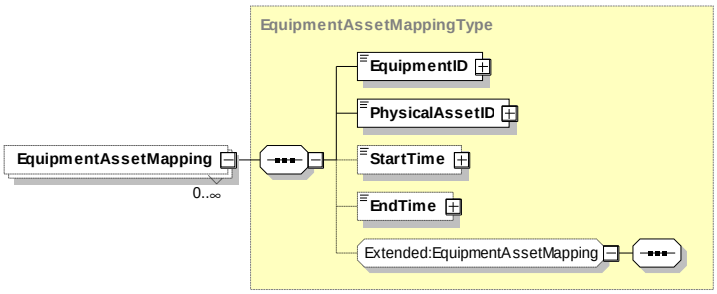
EquipmentCapabilityTestSpecification information may be used to contain information about equipment capability tests. It may contain identifications of the tested equipment properties and the tested equipment class properties.

ELEMENT DEFINITIONS

Element/Type	Description
Equipment ***EquipmentType***	A top-level object that may contain a definition of equipment, containing equipment, equipment properties, the ID's of equipment classes the equipment belongs to, and the equipment to physical asset mapping. May also contain application specific elements. 

Element/Type	Description
EquipmentCapabilityTestSpecification ***EquipmentCapabilityTestSpecificationType***	A top level object that contains the description of an equipment capability test specification. Containing the name of the test, version of the test, description of the test, the list of class properties tested by the test, the list of specific equipment properties tested by the test, and additional application specific information. May also contain application specific elements. 
EquipmentClass ***EquipmentClassType***	A top-level object that may contain a definition of an equipment class, containing equipment properties, and the ID's of equipment the belonging to the class. May also contain application specific elements. 

Element/Type	Description
EquipmentClassPropertyType	Contains a definition of an equipment class property, consisting of an ID, a description, a nominal value, and any nested properties. May include the capability test specification. 
EquipmentInformation ***EquipmentInformationType***	A top-level object that may contain a list of equipment, equipment class, and/or equipment capability test specifications. May also contain application specific elements. 

Element/Type	Description
EquipmentProperty ***EquipmentPropertyType***	Contains a definition of an equipment property, consisting of an ID, a description, a value for the property and any nested properties. May include the capability test specification and test result. 
TestedEquipmentClassProperty ***TestedEquipmentClassPropertyType***	Contains a definition of a class property type tested by a qualification test specification. The ID defines the property. 
TestedEquipmentProperty ***TestedEquipmentPropertyType***	Contains a definition of a property type tested by a qualification test specification. The ID defines the property. 
EquipmentAssetMapping ***EquipmentAssetMappingType***	Defines the mapping of equipment to a physical asset. 

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.

Equipment Information Elements	Description
GetEquipmentInformation	Get *EquipmentClass*, *Equipment*, and *EquipmentCapabilityTestSpecification* definitions.
ShowEquipmentInformation	Returned information from the *GetEquipmentInformation* message.
ProcessEquipmentInformation	Process *EquipmentClass*, *Equipment*, and *EquipmentCapabilityTestSpecification* definitions.
AcknowledgeEquipmentInformation	Returned status from the *ProcessEquipmentInformation* message.
ChangeEquipmentInformation	Change *EquipmentClass*, *Equipment*, and *EquipmentCapabilityTestSpecification* definitions.
RespondEquipmentInformation	Returned status from the *ChangeEquipmentInformation* message.
CancelEquipmentInformation	Cancel *EquipmentClass*, *Equipment*, and *EquipmentCapabilityTestSpecification* definitions.
SyncEquipmentInformation	Published *EquipmentClass*, *Equipment*, and *EquipmentCapabilityTestSpecification* definitions.

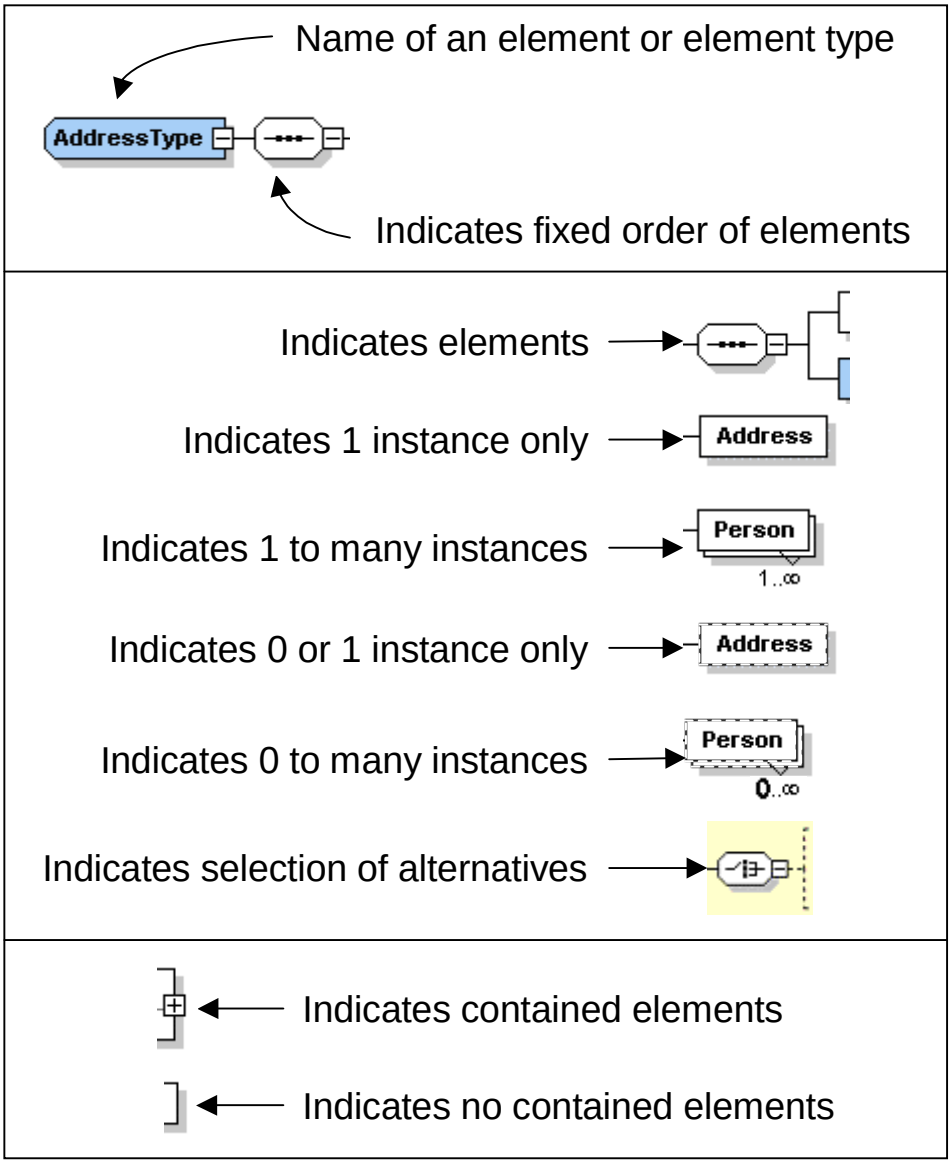
Equipment Class Elements	Description
GetEquipmentClass	Get *EquipmentClass* definitions.
ShowEquipmentClass	Returned information from the *GetEquipmentClass* message.
ProcessEquipmentClass	Process *EquipmentClass* definitions.
AcknowledgeEquipmentClass	Returned status from the *ProcessEquipmentClass* message.
ChangeEquipmentClass	Change *EquipmentClass* definitions.
RespondEquipmentClass	Returned status from the *ChangeEquipmentClass* message.
CancelEquipmentClass	Cancel *EquipmentClass* definitions.
SyncEquipmentClass	Published *EquipmentClass* definitions.

Equipment Elements	Description
GetEquipment	Get *Equipment* definitions.
ShowEquipment	Returned information from the *GetEquipment* message.
ProcessEquipment	Process *Equipment* definitions.
AcknowledgeEquipment	Returned status from the *ProcessEquipment* message.
ChangeEquipment	Change *Equipment* definitions.
RespondEquipment	Returned status from the *ChangeEquipment* message.
CancelEquipment	Cancel *Equipment* definitions.
SyncEquipment	Published *Equipment* definitions.

EquipmentCapabilityTestSpec Elements	Description
GetEquipmentCapabilityTestSpec	Get *EquipmentCapabilityTestSpecification* definitions.
ShowEquipmentCapabilityTestSpec	Returned information from the *GetEquipmentCapabilityTestSpec* message.
ProcessEquipmentCapabilityTestSpec	Process *EquipmentCapabilityTestSpecification* definitions.
AcknowledgeEquipmentCapabilityTestSpec	Returned status from the *ProcessEquipmentCapabilityTestSpec* message.
ChangeEquipmentCapabilityTestSpec	Change *EquipmentCapabilityTestSpecification* definitions.
RespondEquipmentCapabilityTestSpec	Returned status from the *ChangeEquipmentCapabilityTestSpec* message.
CancelEquipmentICapabilityTestSpec	Cancel *EquipmentCapabilityTestSpecification* definitions.
SyncEquipmentCapabilityTestSpec	Published *EquipmentCapabilityTestSpecification* 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.