Using QUDV model library

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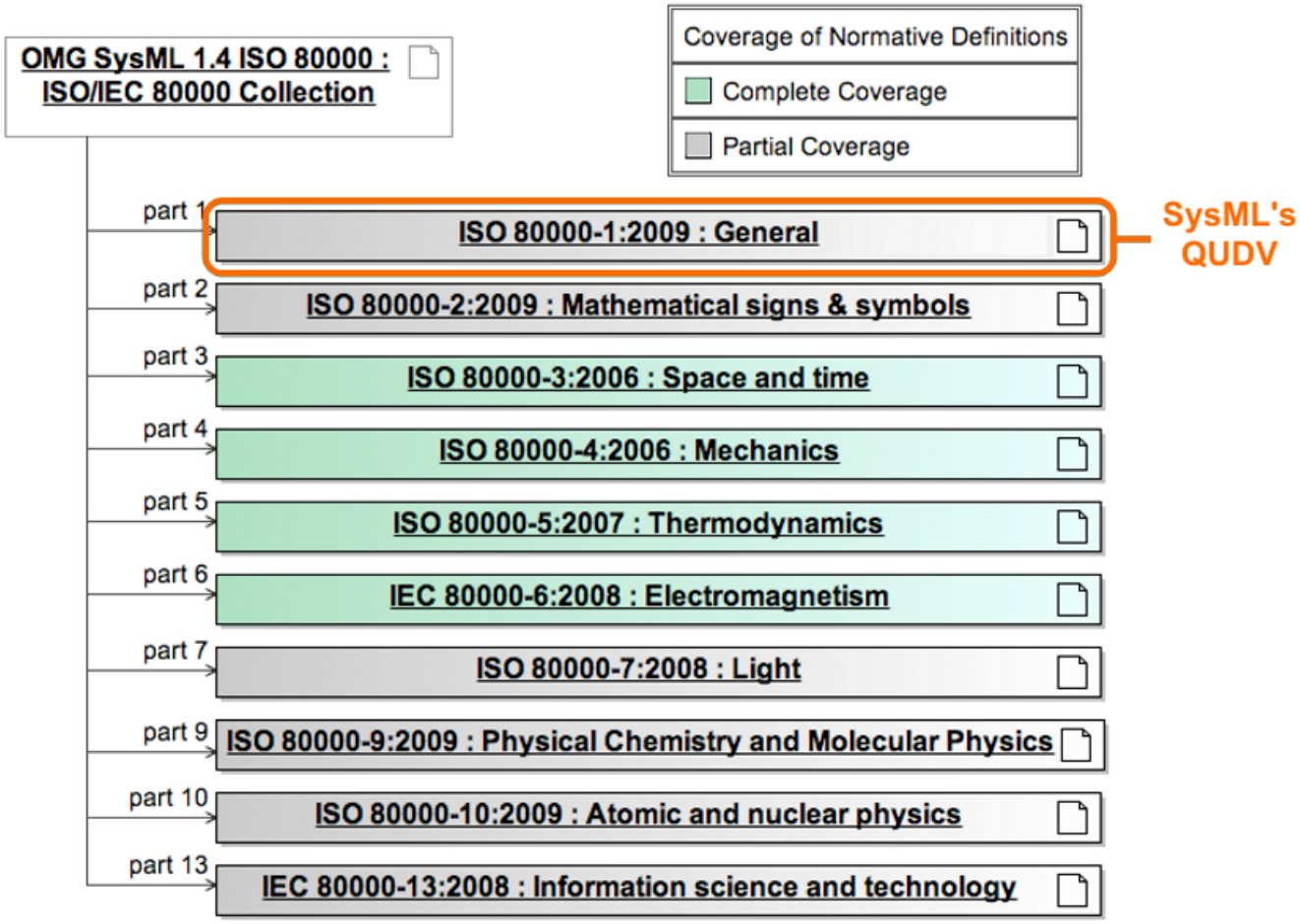
Description of the QUDV model library

This model library is designed in such a way that extensions to ISQ and SI can be represented, as well as any alternative systems of quantities and units.

The SysML 1.5 QUDV library:

- Complies with International Vocabulary of Metrology (VIM 3rd edition).
- Includes ISO/IEC 80000 definitions of base quantities and units to provide semantics for computer-based dimensional analysis.

The QUDV (Quantity Unit Dimension Value) library is introduced in OMG SysML Specification 1.5: **Annex E: Non-normative Extensions** > **E.5 Model Library for Quantities, Units, Dimensions, and Values (QUDV)**.



Description of sub-libraries

Sub-libraries are located in the *modelLibraries* folder in the installation directory of your modeling tool. The SysML plugin consists of those sub-libraries:

- **ISO-80000.mdzip**. ISO-80000 model library consists of specific quantities and units that are defined by ISO 80000. Full details of ISO-80000 Library Model definitions are available in OMG SysML Specification 1.5: **Annex E: Non-normative Extensions** > **E.6 Model Library of SysML Quantity Kinds and Units for ISO 80000**.

  - The ISO-80000 library is loaded by default in the MagicGrid Blank and MagicGrid QuickStart projects.
  - If you work with projects older than version 18.0, which use the QUDV library and SysML 1.3 library, the ISO-80000 library will not be compatible.

- **ISO-80000-Extension.mdzip**. The ISO-80000-Extension library extends the ISO-80000 library with the collection of imperial, nautical, and common units.

> The ISO-80000-Extension library is loaded by default in the MagicGrid Blank and MagicGrid QuickStart projects.

- **QUDV.mdzip**. QUDV model library consists of main definitions of new units and quantity kinds system as specified in OMG SysML Specifications, for example, SimpleUnit, SimpleQuantityKind, DerivedUnit, DerivedQuantityKind, AffineConversionUnit, UnitFactor, QuantityKindFactor, and many more. Full details of ISO-80000 Library Model definitions are available in OMG SysML Specification 1.5: **Annex E: Non-normative Extensions** > **E.5 Model Library for Quantities, Units, Dimensions, and Values (QUDV)**.
- **SI Value Type Library.mdzip**. SysML Plugin provides a model library that contains predefined value types. You can use them for typing the Value Properties in your SysML model. These value types use the units and quantity kinds defined in the QUDV model library.

Name	Unit	Quantity Kind
A	ampere : SimpleUnit	electricCurrent : SimpleQuantityKind
A/m	amperePerMeter : DerivedUnit	magneticFieldStrength : DerivedQuantityKind
A/m²	amperePerSquareMeter : DerivedUnit	currentDensity : DerivedQuantityKind
Bq	becquerel : DerivedUnit	radionuclideActivity : DerivedQuantityKind
C	coulomb : DerivedUnit	electricCharge : DerivedQuantityKind
cd	candela : SimpleUnit	luminousIntensity : SimpleQuantityKind
cd/m²	candelaPerSquareMeter : DerivedUnit	luminance : DerivedQuantityKind
F	farad : DerivedUnit	capacitance : DerivedQuantityKind
Gy	gray : DerivedUnit	absorbedDose : DerivedQuantityKind
H	henry : DerivedUnit	inductance : DerivedQuantityKind
Hz	hertz : DerivedUnit	frequency : DerivedQuantityKind
J	joule : DerivedUnit	energy : DerivedQuantityKind
K	kelvin : SimpleUnit	thermodynamicTemperature : SimpleQuantityKind
kat	katal : DerivedUnit	catalyticActivity : DerivedQuantityKind
kg	kilogram : SimpleUnit	mass : SimpleQuantityKind
kg/m³	kilogramPerCubicMeter : DerivedUnit	massDensity : DerivedQuantityKind
lm	lumen : DerivedUnit	luminousFlux : DerivedQuantityKind
lx	lux : DerivedUnit	illuminance : DerivedQuantityKind
m	meter : SimpleUnit	length : SimpleQuantityKind
m/s	meterPerSecond : DerivedUnit	velocity : DerivedQuantityKind
m/s²	meterPerSecondSquared : DerivedUnit	acceleration : DerivedQuantityKind
mol	mole : SimpleUnit	amountOfSubstance : SimpleQuantityKind
mol/m³	molePerCubicMeter : DerivedUnit	amountOfSubstanceConcentration : DerivedQuantityKind
m²	squareMeter : DerivedUnit	area : DerivedQuantityKind
m³	cubicMeter : DerivedUnit	volume : DerivedQuantityKind
m³/kg	cubicMeterPerKilogram : DerivedUnit	specificVolume : DerivedQuantityKind
m¹	reciprocalMeter : DerivedUnit	waveNumber : DerivedQuantityKind
N	newton : DerivedUnit	force : DerivedQuantityKind
Pa	pascal : DerivedUnit	pressure : DerivedQuantityKind

rad	radian : DerivedUnit	planeAngle : DerivedQuantityKind
s	second : SimpleUnit	time : SimpleUnit
S	siemens : DerivedUnit	electricConductance : DerivedQuantityKind
sr	steradian : DerivedUnit	solidAngle : DerivedQuantityKind
Sv	sievert : DerivedUnit	doseEquivalent : DerivedQuantityKind
T	tesla : DerivedUnit	magneticFluxDensity : DerivedQuantityKind
V	volt : DerivedUnit	electricPotentialDifference : DerivedQuantityKind
W	watt : DerivedUnit	power : DerivedQuantityKind
Wb	weber : DerivedUnit	magneticFlux : DerivedQuantityKind
°C	celciusTemperature : AffineConversionUnit	celciusTemperature : DerivedQuantityKind
	ohm : DerivedUnit	electricResistance : DerivedQuantityKind

- **SIDefinitions.mdzip**. The SI Definitions library consists of predefined units and quantity kinds in QUDV system that you can use in your model. You can customize the units and value types.
- **SISpecializations.mdzip**. The SI Specializations library consists of a diagram (and Blocks). It demonstrates how to extend the current QUDV system.
- **SysML_SI_Definitions_Library.mdzip**.
- **QUDV_SysML1.4.mdzip**.

Loading the ISO 80000 library

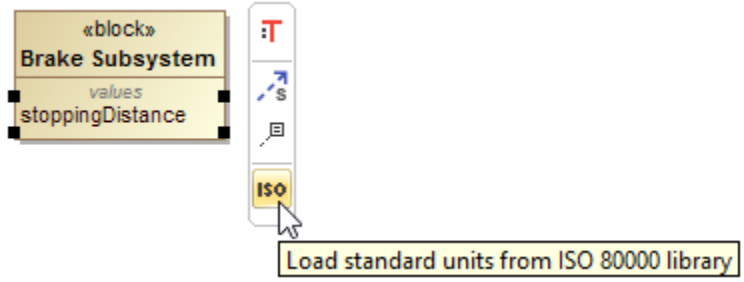
If you want to use the full ISO 80000 library in your project, you can:

- Load it manually for a separate main projects.
- Set the ISO 80000 library usage options each time when opening the main project.

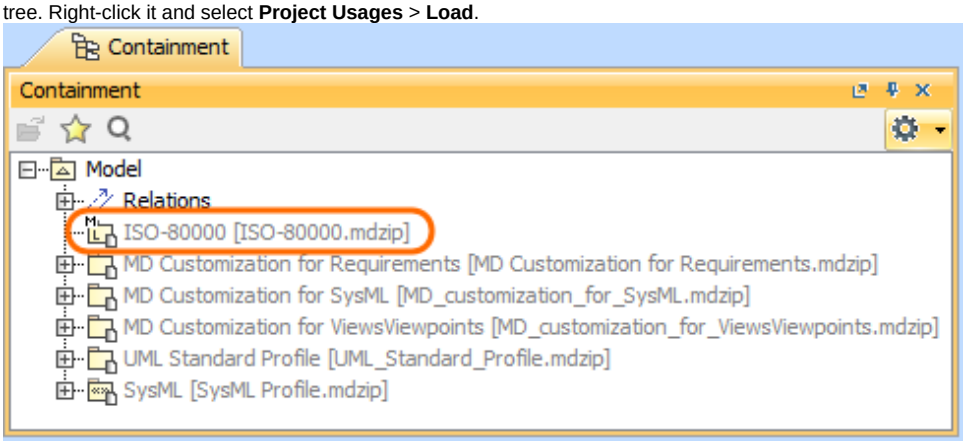
To load the full ISO 80000 library for a separate project, do either

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- Select the value in Compartment area and click the **ISO** button on smart manipulator toolbar.



- Click  in the Containment tree and select the **Show Auxiliary Resources** option. The **ISO-80000** package appears in the Containment tree. Right-click it and select **Project Usages** > **Load**.



All standard units and value types are loaded.

To specify the ISO80000 library usage each time when opening the main project

1. On the main menu, select **Options** > **Project Usages**.
2. On the right side of the **Used Projects** dialog, select the **ISO-80000.mdzip** package.
3. On the left side of this dialog, in the **Load Mode** area, select desired mode:
   - **Always load** - the library is always loaded when the main project is opened.
   - **Autoload** - the library is not loaded when the main project is loaded. Modeling tool monitors user activities in the project and loads the particular used project on the demand by the project.
   - **Autoload with prompt** - this mode is similar to an **Autoload** mode. The difference is that modeling tool asks the user a confirmation before loading it.
   - **Manual load** - the library is not loaded when the main project is loaded. The model integrity is not broken, as all required elements of the used project exists, just simplified versions (that is, loaded as proxies) of the elements are used in the project. This load mode is recommended for all used projects that are stable or rarely modified.
4. Click **OK**.
5. Reload the main project.
   The **ISO-80000.mdzip** package is used in the main project according to the selected mode.

Related pages

- Managing project usages