



Catena-X
Automotive Network

IDTA 02035-7: Digital Battery Passport – Part 7 Circularity

February 2026

SPECIFICATION

Submodel Template of the
Asset Administration Shell



Submodel Template

IDTA approved

- 100% AAS compliant
- Consistent & interoperable
- Released by the AAS experts

IDTA 02035-7 V1.0

Imprint

Publisher

Industrial Digital Twin Association
Lyoner Strasse 18
60528 Frankfurt am Main
Germany
<https://www.industrialdigitaltwin.org/>

Version history

Date	Version	Comment
18.02.2026	1.0	Release of the official Submodel Template published by IDTA – a joint result of the Model Expert Group comprising IDTA and Catena-X

Table of Contents

IDTA 02035-7 V1.0	1
Imprint	1
Version history	1
1. General	3
1.1. About this document	3
1.2. Scope of the Submodel	3
1.3. Relevant standards for the Submodel Template	3
1.4. Explanations on used UML diagrams	4
2. Information set for Submodel "Circularity"	5
2.1. General	5
2.2. Overview UML model	5
3. Information structures and attributes	6
3.1. Properties of the Submodel "Circularity"	6
3.2. Properties of the SML "DismantlingAndRemovalInformation"	8
3.3. Properties of the SML "SparePartSources"	9
3.4. Properties of the SML "RecycledContentInformation"	10
3.5. Properties of the SMC "SafetyMeasures"	10
3.6. Properties of the SMC "EndOfLifeInformation"	11
3.7. Properties of the SMC "SparePartSupplier"	13
3.8. Properties of the SMC "RecycledContent"	14
3.9. Properties of the SML "SafetyInstructions"	16
3.10. Properties of the SML "ExtinguishingAgents"	16
3.11. Properties of the SML "WastePrevention"	17
3.12. Properties of the SML "SeparateCollection"	18
3.13. Properties of the SML "InformationOnCollection"	18
3.14. Properties of the SMC "AddressOfSupplier"	19
3.15. Properties of the SMC "EmailAddressOfSupplier"	20
3.16. Properties of the SML "Components"	21
3.17. Properties of the SMC "Component"	22
Annex A. Explanations on used table formats	24
1. General	24
2. Tables on Submodels and SubmodelElements	24
Annex B. Changes to the submodel template	25
General	25
Changes Version 1.0	25
Bibliography	26

Chapter 1. General

1.1. About this document

This document is a part of an overall specification series [4]. Each part specifies the contents of a Submodel Template (SMT). The specifications of the Asset Administration Shell (AAS) are the basis for the Submodel Template specifications, see [3].

The target audience of the specification are developers and editors of technical documentation and manufacturer information, which are describing assets by means of the Asset Administration Shell (AAS) and therefore need to create a Submodel instance with a hierarchy of SubmodelElements. This document especially details on the question, which SubmodelElements with which semantic identification shall be used for this purpose.

This specification was created following the "semantic-driven workflow" as defined in [5] based on Aspect Models [6]. There is no central dictionary or repository for Aspect Models. In this specification the following sources are used for defining semantics:

- Aspect Models published at IDTA [7]: <https://github.com/admin-shell-io/smt-semantic-models>, models with namespace "io.admin-shell"
- Aspect Models published by the [BatteryPass Consortium](https://github.com/batterypass/BatteryPassDataModel) (closed project) [8]: <https://github.com/batterypass/BatteryPassDataModel>, models with namespace "io.BatteryPass"
- Aspect Models published at Tractus-X and used in standards published by [Catena-X](https://github.com/eclipse-tractusx/sldt-semantic-models) [9]: <https://github.com/eclipse-tractusx/sldt-semantic-models>, models with namespace "io.catenax"

1.2. Scope of the Submodel

This Submodel template aims to define the data points related to circularity of a Battery Passport conformant to DIN DKE SPEC 99100 and the corresponding EU regulations.

The battery passport consists of the following 7 parts:

Digital Battery Passport - Part 1: Digital Nameplate (IDTA-02035-1)
Digital Battery Passport - Part 2: Handover Documentation (IDTA-02035-2)
Digital Battery Passport - Part 3: Product Carbon Footprint (IDTA-02035-3)
Digital Battery Passport - Part 4: Technical Data (IDTA-02035-4)
Digital Battery Passport - Part 5: Product Condition (IDTA-02035-5)
Digital Battery Passport - Part 6: Material Composition (IDTA-02035-6)
Digital Battery Passport - Part 7: Circularity (IDTA-02035-7)

This specification is Part 7: Circularity (IDTA_02035-7).

1.3. Relevant standards for the Submodel Template

This submodel template fulfills the requirements for data points related to circularity as defined in DIN DKE SPEC 99100 [1]. DIN DKE SPEC 99100 "is based on the European Union and key Member States current regulatory requirements for battery passport information. Mandatory information for the battery passport as stated in the EU Battery Regulation (EU)2023/1542, Article77 and AnnexXIII, as well as the Ecodesign for Sustainable Products Regulation (ESPR), is supplemented by recommendations to increase sustainability and circularity. [1]"

This document is valid for all battery categories. Please be aware that for battery categories that have stronger requirements like industrial batteries with battery management systems etc. some of the data points are specified as optional although mandatory per regulation.

1.4. Explanations on used UML diagrams

For clarity and an improved legibility readers suggested to go through this section at first before reading the following chapters.

UML diagrams feature box-like elements, called "classes". These classes, typically Submodels, SubmodelElementCollections or SubmodelElementLists, typically feature a set of Properties or further SubmodelElements. These elements can have specific cardinalities.

The single classes are hierarchally organized by aggregation relations, these can be seen as "contains" relation.

For a further overview on UML diagrams please refer to [2] and [3].

Further details about used table formats please refer to Annex A Explanations.

Chapter 2. Information set for Submodel “Circularity”

2.1. General

The "Circularity" Submodel Template is part of the specification series for the Battery Passport.

Property specification

See clause 3 "Information structures and attributes".

2.2. Overview UML model

The SubmodelElements described in section 3 are structured in the following way (see Figure 1):

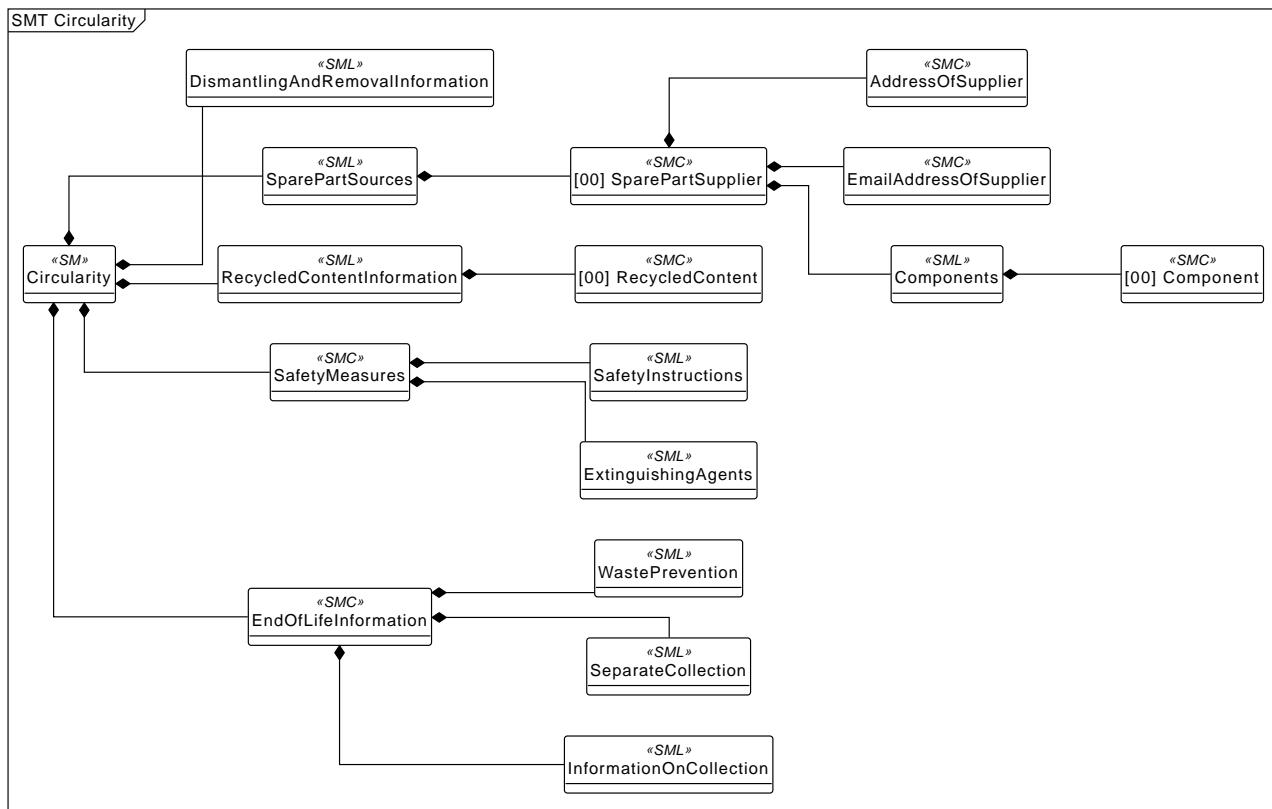


Figure 1. UML overview

Chapter 3. Information structures and attributes

3.1. Properties of the Submodel “Circularity”

Figure 2 shows the UML-diagram defining the relevant properties which need to be set.

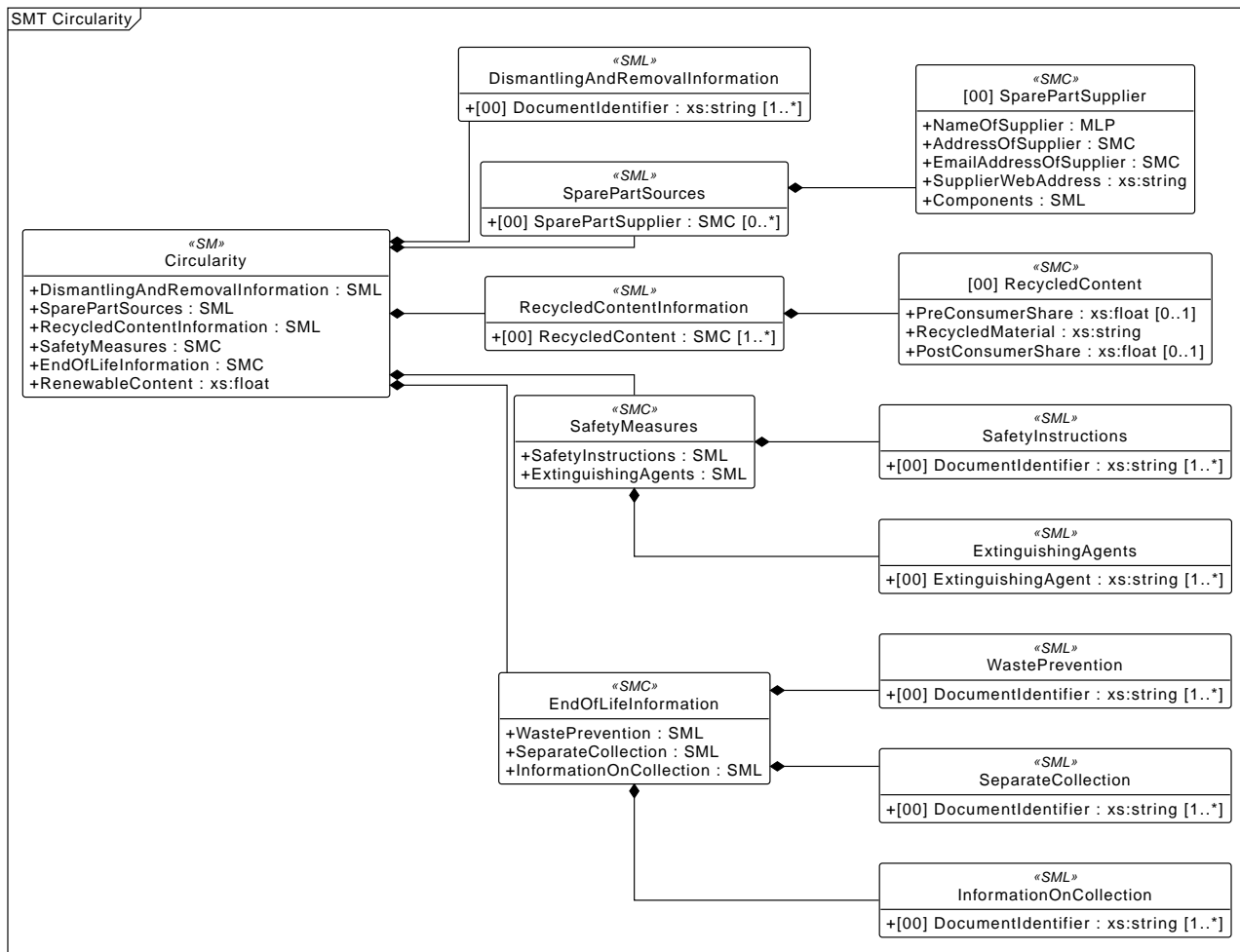


Figure 2. UML-Diagram for Submodel "Circularity"

idShort:	Circularity
Class:	Submodel
semanticId:	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#Circularity
Parent:	-
Explanation:	<p>Dismantling information (including at least: exploded diagrams of the battery system/pack showing the location of battery cells; disassembly sequences; type and number of fastening techniques to be unlocked; tools required for disassembly; warnings if risk of damaging parts exists; amount of cells used and layout); part numbers for components and contact details of sources for replacement spares; safety measures</p> <p>(Annex XIII (2b-d)); usable extinguishing agent (Annex VI, Part A(9)).</p>

Element details:			
[SME type]	semanticId	[valueType]	card.
idShort	Description@en	example	
[SML] DismantlingAndRemovalInformation	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#dismantlingAndRemovalInformation Dismantling and Removal information, including at least: * Exploded diagrams of the battery system/pack showing the location of battery cells * Disassembly sequences * Type and number of fastening techniques to be unlocked * Tools required for disassembly * Warnings if risk of damaging parts exists * Amount of cells used and layout. BR Annex XIII (2c) DIN DKE Spec 99100 chapter reference: 6.6.1.2 > NOTE: For more information on the document identified by its document ID please refer to the Handover Documentation of the battery.	[] 1 elements	1
[SML] SparePartSources	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#sparePartSources Contact details of sources for replacement spares. Postal address, including name and brand names, postal code and place, street and number, country, telephone, if any. BR Annex XIII (2b) DIN DKE Spec 99100 chapter reference: 6.6.1.3	[] 1 elements	1
[SML] RecycledContentInformation	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#recycledContent Share of material recovered from waste present in active materials for each battery model per year and per manufacturing plant. DIN DKE Spec 99100 chapter reference: 6.6.2.3 - 6.6.2.10	[] 1 elements	1
[SMC] SafetyMeasure	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#safetyMeasures Safety measures and instructions should also take past negative and extreme events as well as the separate data attributes 'battery status' and 'battery composition/chemistry' into account. DIN DKE Spec 99100 chapter reference: 6.6.1.5	[] 2 elements	1

[SMC] EndOfLifeInfor mation	urn:samm:io.admin- shell.idta.batterypass.circularity:1.0.0#endOfLifeInformatio n Producer or producer responsibility organisations shall make information available to distributors and end-users on: the role of end-users in contributing to waste prevention, including by information on good practices and recommendations concerning the use of batteries aiming at extending their use phase and the possibilities of re- use, preparing for re-use, preparing for repurpose, repurposing and remanufacturing. DIN DKE Spec 99100 chapter reference: 6.6.3.2 - 6.6.3.4	[] 3 elements	1
[Prop] RenewableCo ntent	urn:samm:io.admin- shell.idta.batterypass.circularity:1.0.0#renewableContent supplementalSemanticId: urn:irdi:0173-1#02-ABL867#001 Share of renewable material content. A renewable material is a material made of natural resources that can be replenished. DIN DKE Spec 99100 chapter reference: 6.6.2.11	[Float]	1

3.2. Properties of the SML

"DismantlingAndRemovalInformation"

Figure 3 shows the UML-diagram for **SML DismantlingAndRemovalInformation**.

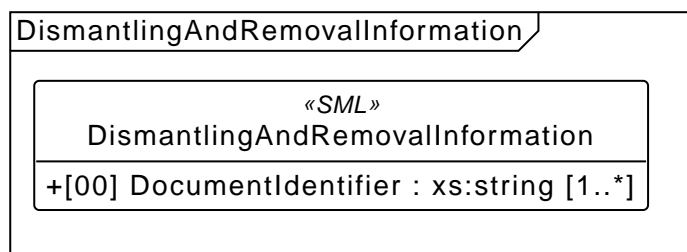


Figure 3. UML-Diagram for SML "DismantlingAndRemovalInformation"

List of data points related to dismantling and removal information.

idShort:	DismantlingAndRemovalInformation
Class:	SubmodelElementList
semanticId:	urn:samm:io.admin- shell.idta.batterypass.circularity:1.0.0#dismantlingAndRemovalInformation
Parent:	Circularity
Explanation:	
Element details:	orderRelevant=No, typeValueListElement=Property

[SME type]	semanticId	[valueType]	card.
idShort	Description@en	example	
[Prop]	urn:samm:io.admin-shell.idta.handover_documentation:2.0.0#DocumentIdentifier	[String]	1..*
DocumentIdentifier	Alphanumeric character sequence uniquely identifying a document.		

3.3. Properties of the SML "SparePartSources"

Figure 4 shows the UML-diagram for [SML sparePartSources](#).

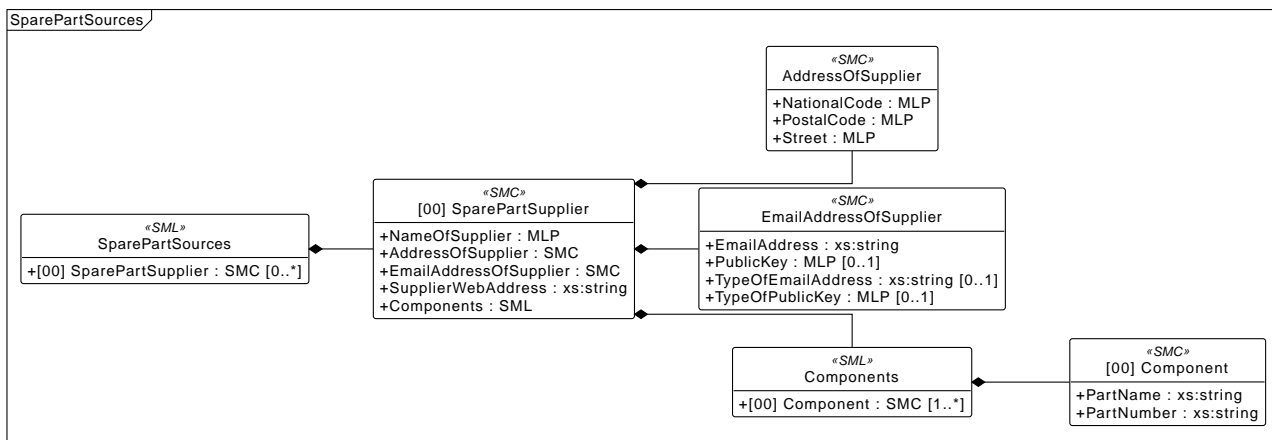


Figure 4. UML-Diagram for SML "sparePartSources"

List of data points related to spare part sources.

idShort:	SparePartSources		
Class:	SubmodelElementList		
semanticId:	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#sparePartSources		
Parent:	Circularity		
Explanation:			
Element details:	orderRelevant=No, typeValueListElement=SubmodelElementCollection		
[SME type]	semanticId	[valueType]	card.
idShort	Description@en	example	
[SMC]	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#SparePartSupplier	[] 5 elements	0..*
SparePartSupplier	The part numbers for components should be provided together with the postal address, e-mail address and web address of the sources for spare parts. \n\nDIN DKE Spec 99100 chapter reference: 6.6.1.3		

3.4. Properties of the SML "RecycledContentInformation"

Figure 5 shows the UML-diagram for **SML RecycledContentInformation**.

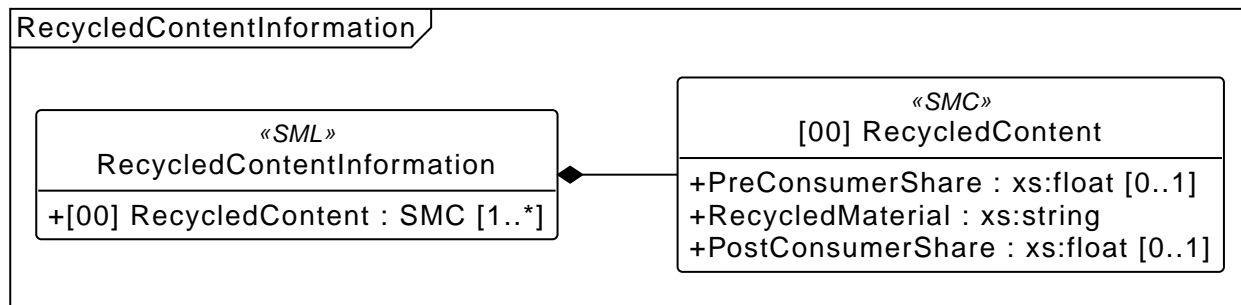


Figure 5. UML-Diagram for SML "RecycledContentInformation"

List of data points related to recycled content.

idShort:	RecycledContentInformation		
Class:	SubmodelElementList		
semanticId:	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#recycledContent		
Parent:	Circularity		
Explanation:			
Element details:	orderRelevant=No, typeValueListElement=SubmodelElementCollection		
[SME type]	semanticId	[valueType]	card.
idShort	Description@en	example	
[SMC]	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#RecycledContent	[]	1..*
RecycledContent	<p>A battery passport must include recycled content information.</p> <p>The content information must include the percentage share of nickel that is present in active materials and that has been recovered from battery manufacturing waste, for each battery model per year and per manufacturing plant.</p>	3 elements	

3.5. Properties of the SMC "SafetyMeasures"

Figure 6 shows the UML-diagram for **SML SafetyMeasures**.

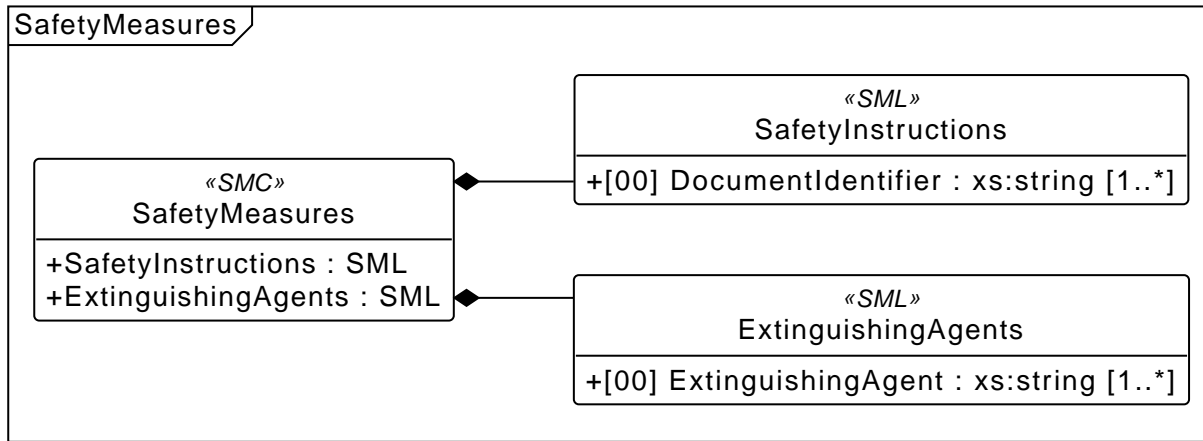


Figure 6. UML-Diagram for SMC "SafetyMeasures"

Data points related to safety measures.

idShort:	SafetyMeasures		
Class:	SubmodelElementCollection		
semanticId:	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#safetyMeasures		
Parent:	Circularity		
Explanation:			
Element details:	-		
[SME type]	semanticId	[valueType]	card.
idShort	Description@en	example	
[SML] SafetyInstructions	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#safetyInstructions Necessary safety instructions to handle waste batteries, including in relation to the risks associated with, and the handling of, batteries containing lithium.	[] 1 elements	1
[SML] ExtinguishingAgents	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#extinguishingAgents Usable extinguishing agents referring to classes of extinguishers (A, B, C, D, K). EUBR: Annex XIII (1a), Annex VI Part A (9)	[] 1 elements	1

3.6. Properties of the SMC "EndOfLifeInformation"

Figure 7 shows the UML-diagram for **SMC endOfLifeInformation**.

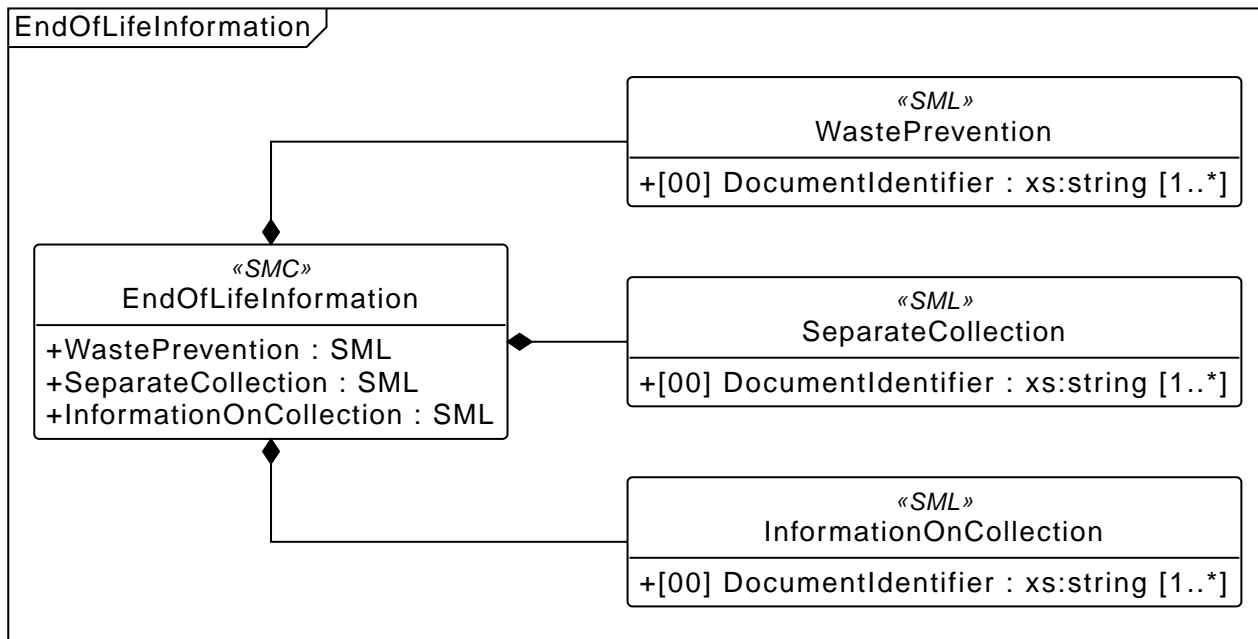


Figure 7. UML-Diagram for SMC "EndOfLifeInformation"

Data points related to end of life information.

idShort:	EndOfLifeInformation		
Class:	SubmodelElementCollection		
semanticId:	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#endOfLifeInformation		
Parent:	Circularity		
Explanation:			
Element details:	-		
[SME type]	semanticId	[valueType]	card.
idShort	Description@en	example	
[SML]	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#wastePrevention supplementalSemanticId: urn:irdi:0173-1#02-ABL855#001 Prevention and management of waste batteries: Point (a) of Article 60(1): Information on the role of end-users in contributing to waste prevention, including by information on good practices and recommendations concerning the use of batteries aiming at extending their use phase and the possibilities of re-use, preparing for re-use, preparing for repurpose, repurposing and remanufacturing	[] 1 elements	1

[SML] SeparateCollection	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#separateCollection supplementalSemanticId: urn:idi:0173-1#02-ABL854#001 Prevention and management of waste batteries: Point (b) of Article 60(1): Information on the role of end-users in contributing to the separate collection of waste batteries in accordance with their obligations under Article 51 so as to allow their treatment	[] 1 elements	1
[SML] InformationOnCollection	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#informationOnCollection supplementalSemanticId: urn:irdi:0173-1#02-ABL856#001 Prevention and management of waste batteries: Point (c) of Article 60(1): information on the separate collection, the take back, the collection points and preparing for re-use, preparing for repurposing, and recycling operations available for waste batteries	[] 1 elements	1

3.7. Properties of the SMC "SparePartSupplier"

Figure 8 shows the UML-diagram for **SMC SparePartSupplier**.

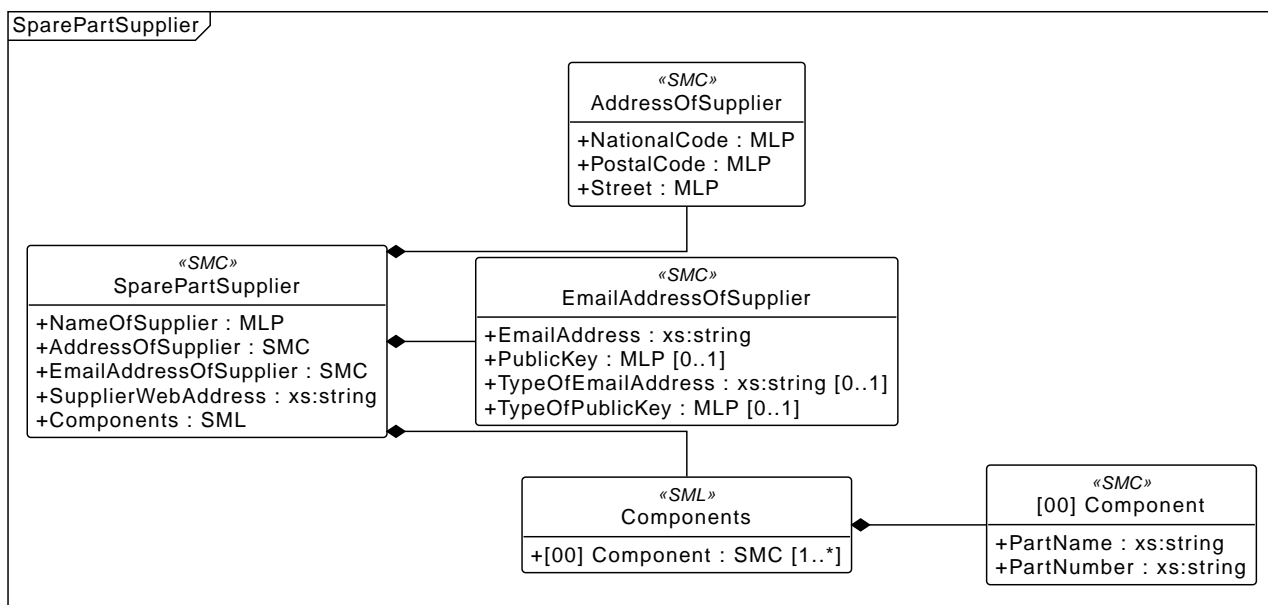


Figure 8. UML-Diagram for SML "SparePartSupplier"

Data points related to a spare part supplier.

idShort:	SparePartSupplier
Class:	SubmodelElementCollection
semanticId:	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#SparePartSupplier
Parent:	SparePartSources

Explanation:			
Element details:	-		
[SME type]	semanticId	[valueType]	card.
idShort	Description@en	example	
[MLP] NameOfSupplier	urn:samm:io.admin-shell.idta.contact_information:1.0.0#company supplementalSemanticId: urn:irdi:0173-1#02-AAW001#001 Name of the company.	[]	1
[SMC] AddressOfSupplier	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#addressOfSupplier supplementalSemanticId: https://schema.org/PostalAddress Postal address of supplier for spare parts.	[] 3 elements	1
[SMC] EmailAddressOfSupplier	urn:samm:io.admin-shell.idta.contact_information:1.0.0#email supplementalSemanticId: urn:irdi:0173-1#02-AAQ836#005 E-mail address and encryption method.	[] 4 elements	1
[Prop] SupplierWebAddress	urn:samm:io.admin-shell.idta.contact_information:1.0.0#addressOfAdditionalLink supplementalSemanticId: urn:irdi:0173-1#02-AAQ326#002 Web site address where information about the product or contact is given.	[String]	1
[SML] Components	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#components Components available at supplier.	[] 1 elements	1

3.8. Properties of the SMC "RecycledContent"

Figure 9 shows the UML-diagram for **SMC RecycledContent**.

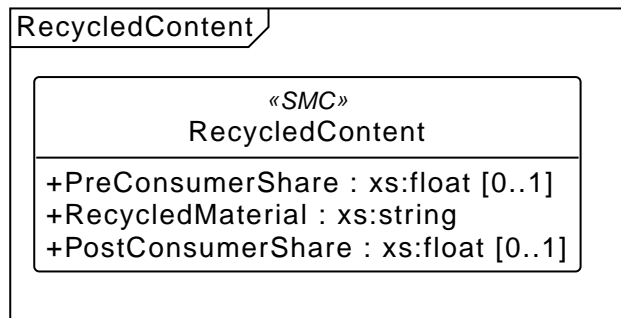


Figure 9. UML-Diagram for SML "recycledContents"

Data points related to recycled content.

idShort:	RecycledContent		
Class:	SubmodelElementCollection		
semanticId:	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#RecycledContent		
Parent:	RecycledContentInformation		
Explanation:			
Element details:	-		
[SME type]	semanticId	[valueType]	card.
idShort	Description@en	example	
[Prop]	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#preConsumerShare	[Float]	0..1
PreConsumer Share	Recycled material share from pre-consumer waste (manufacturing waste, excluding run-around scrap) of the active material.		
[Prop]	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#recycledMaterial	[String]	1
RecycledMaterial	Name of recycled material		
[Prop]	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#postConsumerShare	[Float]	0..1
PostConsumer Share	Recycled material share from post-consumer waste (end-of-life scrap) of the active material.		

The following values are allowed for 'recycledMaterial':

- "Cobalt"
- "Nickel" "Lithium"
- "Lead" "Cobalt"
- "Nickel"

- "Lithium"
- "Lead"

3.9. Properties of the SML "SafetyInstructions"

Figure 10 shows the UML-diagram for **SML SafetyInstructions**.



Figure 10. UML-Diagram for SML "SafetyInstructions"

List of data points related to safety instructions.

idShort:	ExtinguishingAgents		
Class:	SubmodelElementList		
semanticId:	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#extinguishingAgents		
Parent:	SafetyMeasures		
Explanation:			
Element details:	orderRelevant=No, typeValueListElement=SubmodelElementCollection		
[SME type]	semanticId	[valueType]	card.
idShort	Description@en	example	
[Prop]	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#ExtinguishingAgent	[String]	1..*
ExtinguishingAgent			

3.10. Properties of the SML "ExtinguishingAgents"

Figure 11 shows the UML-diagram for **SML ExtinguishingAgents**.

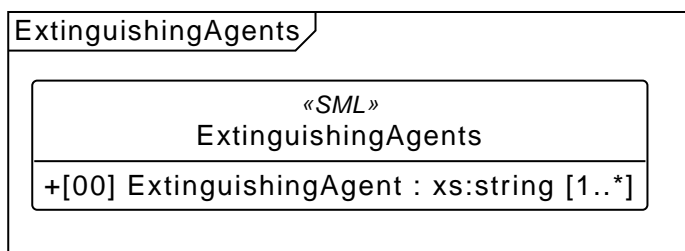


Figure 11. UML-Diagram for SML "ExtinguishingAgents"

List of data points related to extinguishing agents.

idShort:	ExtinguishingAgents		
Class:	SubmodelElementList		
semanticId:	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#extinguishingAgents		
Parent:	SafetyMeasures		
Explanation:			
Element details:	orderRelevant=No, typeValueListElement=SubmodelElementCollection		
[SME type]	semanticId	[valueType]	card.
idShort	Description@en	example	
[Prop] ExtinguishingAgent	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#ExtinguishingAgent	[String]	1..*

3.11. Properties of the SML "WastePrevention"

Figure 12 shows the UML-diagram for [SML_WastePrevention](#).

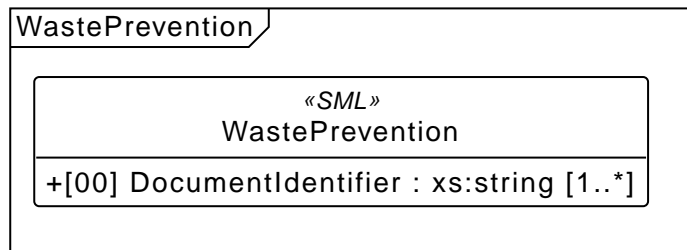


Figure 12. UML-Diagram for SML "WastePrevention"

Set of document identifiers related to waste prevention.

idShort:	WastePrevention		
Class:	SubmodelElementList		
semanticId:	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#wastePrevention		
Parent:	EndOfLifeInformation		
Explanation:			
Element details:	orderRelevant=No, typeValueListElement=SubmodelElementCollection		
[SME type]	semanticId	[valueType]	card.
idShort	Description@en	example	

[Prop]	urn:samm:io.admin-shell.idta.handover_documentation:2.0.0#DocumentIdentifier	[String]	1..*
DocumentIdentifier	Alphanumeric character sequence uniquely identifying a document.		

3.12. Properties of the SML "SeparateCollection"

[UML_for_SML_SeparateCollection] shows the UML-diagram for [SML_SeparateCollection](#).

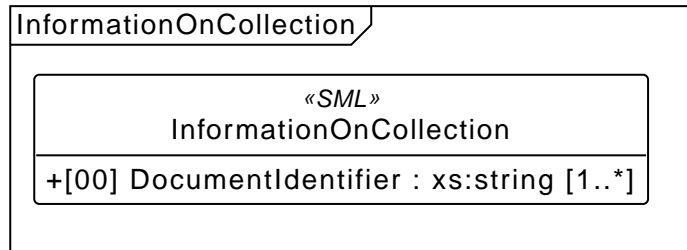


Figure 13. UML-Diagram for SML "SeparateCollection"

Set of document identifiers.

idShort:	SeparateCollection		
Class:	SubmodelElementList		
semanticId:	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#separateCollection		
Parent:	EndOfLifeInformation		
Explanation:			
Element details:	orderRelevant=No, typeValueListElement=SubmodelElementCollection		
[SME type]	semanticId	[valueType]	card.
idShort	Description@en	example	
[Prop]	urn:samm:io.admin-shell.idta.handover_documentation:2.0.0#DocumentIdentifier	[String]	1..*
DocumentIdentifier	Alphanumeric character sequence uniquely identifying a document.		

3.13. Properties of the SML "InformationOnCollection"

[UML_for_SML_InformationOnCollection] shows the UML-diagram for [SML_InformationOnCollection](#).

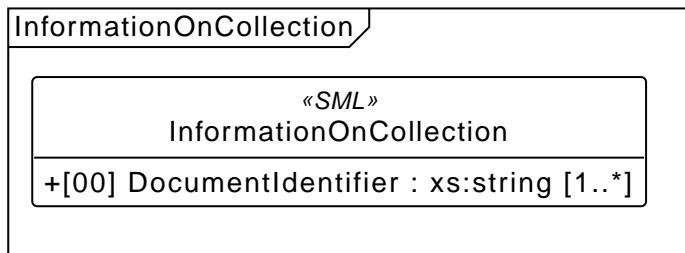


Figure 14. UML-Diagram for SML "WastePrevention"

Set of document identifiers.

idShort:	InformationOnCollection		
Class:	SubmodelElementList		
semanticId:	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#informationOnCollection		
Parent:	EndOfLifeInformation		
Explanation:			
Element details:	orderRelevant=No, typeValueListElement=SubmodelElementCollection		
[SME type]	semanticId	[valueType]	card.
idShort	Description@en	example	
[Prop]	urn:samm:io.admin-shell.idta.handover_documentation:2.0.0#DocumentIdentifier	[String]	1..*
DocumentIdentifier	Alphanumeric character sequence uniquely identifying a document.		

3.14. Properties of the SMC "AddressOfSupplier"

Figure 15 shows the UML-diagram for [SMC_addressOfSupplier](#).

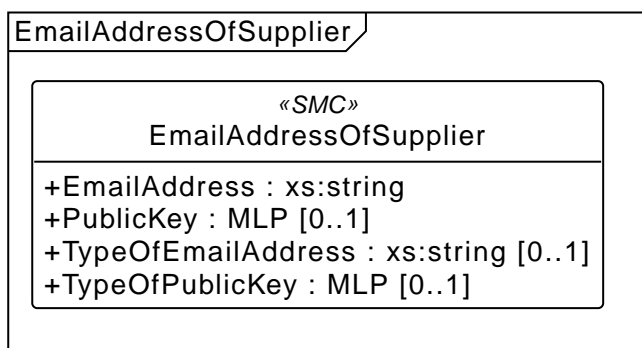


Figure 15. UML-Diagram for SMC "_addressOfSupplier"

Data points related to address of supplier of spare part sources.

idShort:	AddressOfSupplier
Class:	SubmodelElementCollection

semanticId:	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#addressOfSupplier		
Parent:	SparePartSupplier		
Explanation:			
Element details:	-		
[SME type]	semanticId	[valueType]	card.
idShort	Description@en	example	
[MLP] NationalCode	urn:samm:io.admin-shell.idta.contact_information:1.0.0#nationalCode supplementalSemanticId: urn:irdi:0173-1#02-AAO134#002 Code of a country (Country codes defined accord. to DIN EN ISO 3166-1).	[]	1
[MLP] PostalCode	urn:samm:io.admin-shell.idta.contact_information:1.0.0#postalCode supplementalSemanticId: https://schema.org/postalCode , urn:irdi:0173-1#02-AAO129#002 postal code of address.	[]	1
[MLP] Street	urn:samm:io.admin-shell.idta.contact_information:1.0.0#street supplementalSemanticId: https://schema.org/streetAddress , urn:irdi:0173-1#02-AAO128#002 Street name and house number.	[]	1

3.15. Properties of the SMC "EmailAddressOfSupplier"

[UML_for_SMC_emailAddressOfSupplier] shows the UML-diagram for [SMC_EmailAddressOfSupplier](#).

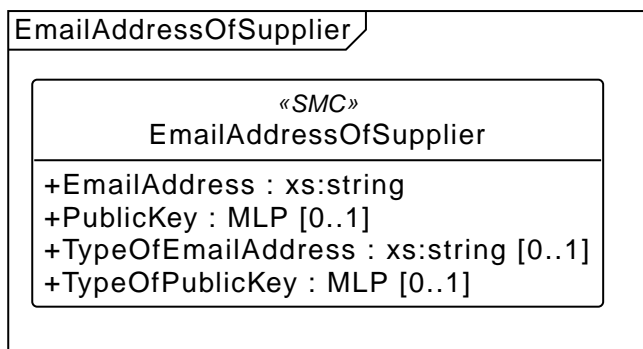


Figure 16. UML-Diagram for SMC "EmailAddressOfSupplier"

Data points related to e-mail of supplier of spare part sources.

idShort:	EmailAddressOfSupplier
-----------------	-------------------------------

Class:	SubmodelElementCollection		
semanticId:	urn:samm:io.admin-shell.idta.contact_information:1.0.0#email		
Parent:	SparePartSupplier		
Explanation:			
Element details:	-		
[SME type]	semanticId	[valueType]	card.
idShort	Description@en	example	
[Prop] EmailAddress	urn:samm:io.admin-shell.idta.contact_information:1.0.0#emailAddress supplementalSemanticId: urn:irdi:0173-1#02-AAO198#002 Electronic mail address of a business partner.	[String]	1
[MLP] PublicKey	urn:samm:io.admin-shell.idta.contact_information:1.0.0#publicKey supplementalSemanticId: urn:irdi:0173-1#02-AAO200#002 Public part of an unsymmetrical key pair to sign or encrypt text or messages. Public part of an unsymmetrical key pair to sign or encrypt text or messages.	[]	0..1
[Prop] TypeOfEmailAddress	urn:samm:io.admin-shell.idta.contact_information:1.0.0#typeOfEmailAddress supplementalSemanticId: urn:irdi:0173-1#02-AAO199#003 Characterization of an e-mail address according to its location or usage enumeration: 0173-1#07-AAS754#001 (office), 0173-1#07-AAS756#001 (secretary), 0173-1#07-AAS757#001 (substitute), 0173-1#07-AAS758#001 (home).	[String]	0..1
[MLP] TypeOfPublicKey	urn:samm:io.admin-shell.idta.contact_information:1.0.0#typeOfPublicKey supplementalSemanticId: urn:irdi:0173-1#02-AAO201#002 Characterization of a public key according to its encryption process.	[]	0..1

3.16. Properties of the SML "Components"

Figure 17 shows the UML-diagram for **SML components**.

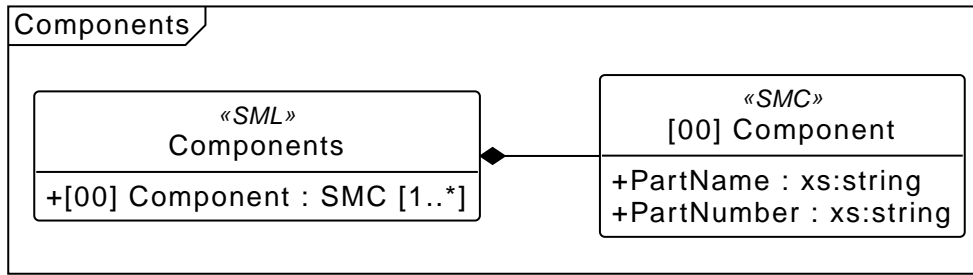


Figure 17. UML-Diagram for SML "componentsr"

List of data points related to components of spare part sources.

idShort:	Components		
Class:	SubmodelElementList		
semanticId:	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#components		
Parent:	SparePartSupplier		
Explanation:			
Element details:	orderRelevant=No, typeValueListElement=SubmodelElementCollection		
[SME type]	semanticId	[valueType]	card.
idShort	Description@en	example	
[SMC]	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#Component	[]	1..*
Component	Components available at supplier	2 elements	

3.17. Properties of the SMC "Component"

[UML_for_SMC_Component] shows the UML-diagram for **SMC Component**.

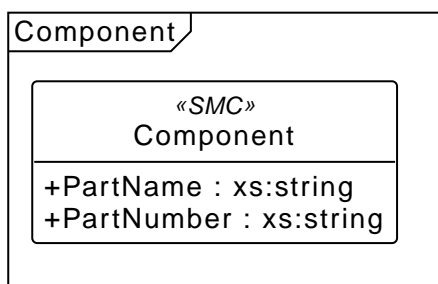


Figure 18. UML-Diagram for SMC "Component"

Data points related to a component of spare part sources.

idShort:	Component
Class:	SubmodelElementCollection
semanticId:	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#Component

Parent:	Components		
Explanation:	Components available at supplier		
Element details:	-		
[SME type]	semanticId	[valueType]	card.
idShort	Description@en	example	
[Prop] PartName	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#partName Name of the part.	[String]	1
[Prop] PartNumber	urn:samm:io.admin-shell.idta.batterypass.circularity:1.0.0#partNumber Part number of Component.	[String]	1

Annex A. Explanations on used table formats

1. General

The used tables in this document try to outline information as concise as possible. They do not convey all information on Submodels and SubmodelElements. For this purpose, the definitive definitions are given by a separate file in form of an AASX file of the Submodel template and its elements.

2. Tables on Submodels and SubmodelElements

For clarity and brevity, a set of rules is used for the tables for describing Submodels and SubmodelElements.

- The table heads abbreviate 'cardinality' with 'card'.
- The tables often place two informations in different rows of the same table cell. In this case, the first information is marked out by sharp brackets [] from the second information.
- The types of SubmodelElements are abbreviated (see [Table 1](#)):

Table 1. Abbreviations for SubmodelElements

SME type	SubmodelElement type
Blob	Blob
Cap	Capability
Ent	Entity
Evt	Event
File	File
MLP	MultiLanguageProperty
Opr	Operation
Prop	Property
Range	Range
Ref	ReferenceElement
Rel	RelationshipElement
RelA	AnnotatedRelationshipElement
SMC	SubmodelElementCollection
SME	SubmodelElement
SML	SubmodelElementList

- Multi-language strings are represented by the text value, followed by '@'-character and the ISO 639 language code: example@EN.
- The [valueType] is only given for Properties.

Annex B. Changes to the submodel template

General

This annex lists the changes from version to version of the Submodel, together with major changes in the overall document.

Changes Version 1.0

- First Version conformant to DIN DKE SPEC 99100

Bibliography

- [1] DIN DKE SPEC 99100, "Requirements for data attributes of the battery passport". February 2025.
- [2] "OMG Unified Modeling Language (OMG UML)", Formal/2017-12-05, Version 2.5.1. December 2018. [Online] Available: <https://www.omg.org/spec/UML/>
- [3] "Specification of the Asset Administration Shell", Publisher: Industrial Digital Twin Association (IDTA). [Online]. Available: <https://industrialdigitaltwin.org/en/content-hub/aasspecifications>
- [4] "Submodel Templates", Publisher: Industrial Digital Twin Association (IDTA). [Online]. Available: <https://industrialdigitaltwin.org/en/content-hub/submodels>
- [5] "How-to create a Submodel Template Specification", Publisher: Industrial Digital Twin Association (IDTA). June 2025. V1.1. [Online]. Available: https://industrialdigitaltwin.org/en/wp-content/uploads/sites/2/2025/06/IDTA_How-to-write-a-SMT-v1.1.pdf
- [6] "Semantic Aspect Meta Model (SAMM)", V2.2.0. [Online]. Available: <https://eclipse-esmf.github.io/samm-specification/2.2.0/index.html>
- [7] "Semantic Aspect Models - smt-semantic-models", Publisher: Industrial Digital Twin Association (IDTA). [Online]. Available: <https://github.com/admin-shell-io/smt-semantic-models>
- [8] "Semantic Aspect Models - BatteryPassDataModel", Publisher: BatteryPass Consortium. [Online]. Available: <https://github.com/batterypass/BatteryPassDataModel>
- [9] "Semantic Aspect Models - Tractus-X - sltd-semantic-models", [Online]. Publisher: Catena-X. [Online]. Available: <https://github.com/eclipse-tractusx/sltd-semantic-models>