

Product Circularity Data Use Case

Public Draft - BRS extension

What to review?

The Product Circularity Data Use Case described in this document which contains the new chapters (starting at chapter 5) to be added to the end of the document, named:

Part 2 of BRS “Traceability and Transparency in the Textile and Leather Sector, Use Cases and CCBDA Data Structures”

How to comment?

- Use the form titled: Product Circularity Data Use Case public draft comment log.docx which can be found via the UN/CEFACT public review web page at <https://uncefact.unece.org/display/uncefactpublicreview>
- Send comments, in the form, to: **Ms. Jie Wei e-mail: weij@un.org**

How to provide feedback?

- The extension starts with chapter 5, following the last chapter of the [existing BRS](#), part 2.
- We will add in the introduction chapter of the [existing BRS](#) part 2 information about this extension. We would like you to focus on the contents of this extension (i.e. the contents provided below) rather than into the existing use case for traceability and transparency.

What will be done with your feedback?

- The comments received will be processed and discussed with the project team during which decisions will be made.
- The comments that will lead to adjustments of the BRS extension and will end up in the final draft version for publication.

Other

- In this document a number of diagrams have been included, due to the requirements laid down in the UN/CEFACT Business Requirement Specification document and its [documentation template](#). If you have trouble reading these diagrams, do not hesitate to make a comment or contact us (Gerhard at gerhard.heemskerk@kpnmail.nl or Virginia at crammartos@triangularity.net) for clarification.
- Because of the generic design approach, a number of information attributes depend on a predefined value being available in code lists. Therefore it is important to look at the examples at the end of this document. If anyone has suggestions for existing code lists which could be used in implementations, this would be very helpful.

5 Business requirement view for product circularity

5.1 Business domain view

This section describes the extent and limits of the business processes within the textile and leather supply chain supporting product circularity. The use case for product circularity includes a description of the circular processes, the involved partners or actors, the information model and how the circularity data can be exchanged. The use case for product circularity relates to the traceability and transparency use cases and takes the BUY and SHIP part of UN/CEFACT International supply chain reference model (ISCRM)¹ as a basis. The PAY part of this reference model is not relevant yet. The use cases for traceability and transparency are about supply chain visibility and transparency based on evidence documents – i.e. documents that substantiate a product sustainability. For the product circularity use case the focus is on data supporting circular business models for a circular economy. The use case for the exchange of product circularity data connects the pre product-consumption phase of the supply chain with post product-consumption phase. This means that all actors in the complete supply chain may exchange data on products or materials.

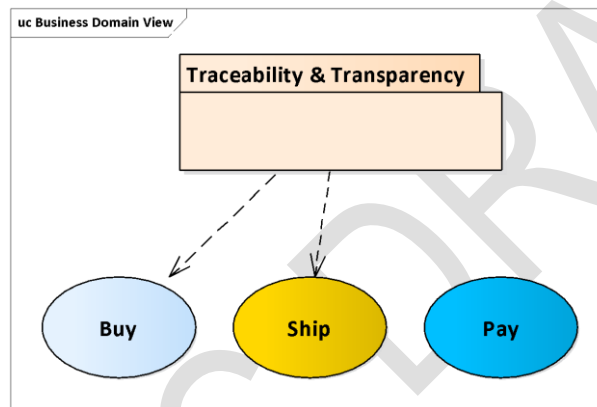


Figure 5 Domain view

Categories	Description and values
Business Process	Circular processes in the supply chain. BUY-SHIP-PAY/Sustainable Development and Circular Economy/ Product Circularity Data Exchange.
Product Classification	Garments and footwear products.
Industry Classification	Textile & Leather
Geopolitical	Global
Official Constraints	None
Business Process Role	Product Circularity Data Requestor Product Circularity Data Responder
Supporting Role	Farmer, Breeder, Spinner, Weaver, Designer, Manufacturer, Subcontractor, Brand Owner, Retailer, Trader, Wholesaler, Waste Exporter, Waste Importer, Governmental Authority, Recycler, Waste Collector, Waste Aggregator, Finishing provider, Tanner, Raw fibre treatments provider, Slaughterhouse, Warehouse, Transporter, Third Party Reseller, Product Identity Platform, Repair Provider, Retailer, Online Market Place, Agent, Consumer, Waste Sorter, Refurbishment Centre / Refurbisher, Collection Centre, Waste Disposal Provider, Third Party Manufacturer, Waste Sorter, Waste Incineration Facility, Landfill Site, Industrial Composting Facility, Waste Pre-Processor, Other Supplier, Tier-1-n Supplier/Manufacturer, Provider of IDs, Customer-Consumer

Table 5 Business Domain Context Categories

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<https://tfig.unece.org/contents/ISCRM.htm#:~:text=The%20International%20Supply%20Chain%20Reference,Buy%2DShip%2DPay%20Model.>

18 **5.2 Business Terms**

Acronym	Term
API	Application Programming Interface
B2B	Business to Business
B2G	Business to Government
BSP	Buy Ship Pay
C2C	Consumer to Consumer
G2C	Government to Consumer
CE	Circular Economy
DPP	Digital Product Passport
ESG	Environment, Social, Governance
ID	Identifier or identification.
ISCRM	International Supply Chain Reference Model
QR code	Quick Response (QR) code
SoC	Substances of Concern
UNECE	United Nations Economic Commission for Europe
UNCCL	United Nations Core Component Library (Library of information entities)
URL	Uniform Resource Locator
URI	Uniform Resource Identifier
URN	Uniform Resource Name

19 **Table 6 Business Terms**20 **5.3 Business requirement list**

21 Product circularity data will commonly be exchanged between parties based on their request. Parties
 22 could make use of a network of public and/or private databases where digital product identities and
 23 related information needed for circular processes, could be registered, searched for, updated and
 24 retrieved. The business requirements described below are specific to this use case. General business
 25 requirements on traceability and transparency can be found in part 1 of this BRS. In all cases, business
 26 partners always maintain control over access to their data.

#	Business requirement statement	
B.10	Support data exchange between stakeholders in circular economy	The product circularity data exchange structure must contain the minimum requirements of all stakeholders (waste generators and parties processing waste and post product-consumption products).
B.11	Aligned with existing initiatives	The product circularity data should be aligned with relevant initiatives on the product circularity as much as possible (such as the EU Digital Product Passport).
B.12	Design for global use by the involved sectors	The product circularity information entities should be designed for global and cross-industry use as much as possible. One way to support this objective is to allow the sender of information to use predefined values from code lists and to indicate to the receiver which code list is being used. Code lists also enable efficient processing and make data easy comparable.
B.13	Support for granularity levels: product (class), batch and serialized product (item)	The granularity levels are: product (or product class), product batch (a group of products considered or dealt with together or a serialized product (item)).
B.14	A digital product identity supporting circular business models	The product circularity data structure represents the digital identity of product and component materials in such a way that it supports circular business models, including resale, rental, collections, sorting, and recycling.
B.15	Weblinks to Digital product data supporting circular business models	It should be possible to link to digital product data, the product information needed to support circular business models including resale, rental, collection, sorting and recycling.
B.16	Support SME's	The product circularity data structure should support use by small and medium sized enterprises.

#	Business requirement statement	
B.17	Conformity information relevant for circularity	The product circularity data structure should also contain the necessary conformity information supporting circular business models of all stakeholders.

Table 7 Business requirements statement

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Product (model/class), serialized product (item) and product-batch data can be exchanged on a regular basis (e.g. for updating consumer information residing in a digital platform) or on an ad hoc basis (e.g. on request).

32 **5.4 Business partner view**

33 In principle, every economic operator or business partner (actor) within the supply chain may want
34 to exchange product circularity data for different reasons. This also includes consumers wanting to
35 buy or rent second hand or refurbished clothing. Figure 6 below contains all actors involved in the
36 circular economy of textiles and leather, both in the pre product-consumption or post product-
37 consumption phase of the value chain. The blue coloured actors are the ones especially active in the
38 post product-consumption phase of circular economy. Actors in the post product-consumption phase
39 of the value chain need product data from actors in the pre product-consumption phase of the value
40 chain to support their business models. Pre product-consumption actors, such as manufacturers and
41 suppliers, have crucial data about the materials used in textile and leather products. This data includes
42 information about the type of fibres, chemicals (dyestuff, auxiliaries, finishing, printing inks etc.) and
43 production processes used for a product.

44 Post product-consumption actors need this data to understand the composition of the textiles, which
45 is essential for effective sorting, recycling and repurposing, and determine whether the product can
46 be repaired, refurbished, or repurposed. The collaboration between pre and post product-consumption
47 actors allows pre product-consumption actors to provide consumers with more information about the
48 products they purchase, including details about the materials used and the potential for recycling or
49 reuse. This collaboration may or will inspire circular designs and innovations, leading to products
50 that are easier to recycle, disassemble, or upgrade. This empowers consumers to make more
51 sustainable choices. Post product-consumption actors may also need data on sustainability criteria of
52 products. Therefore, product data from pre product-consumption actors is essential for improving
53 both sustainability and circularity of textile and leather supply chains.

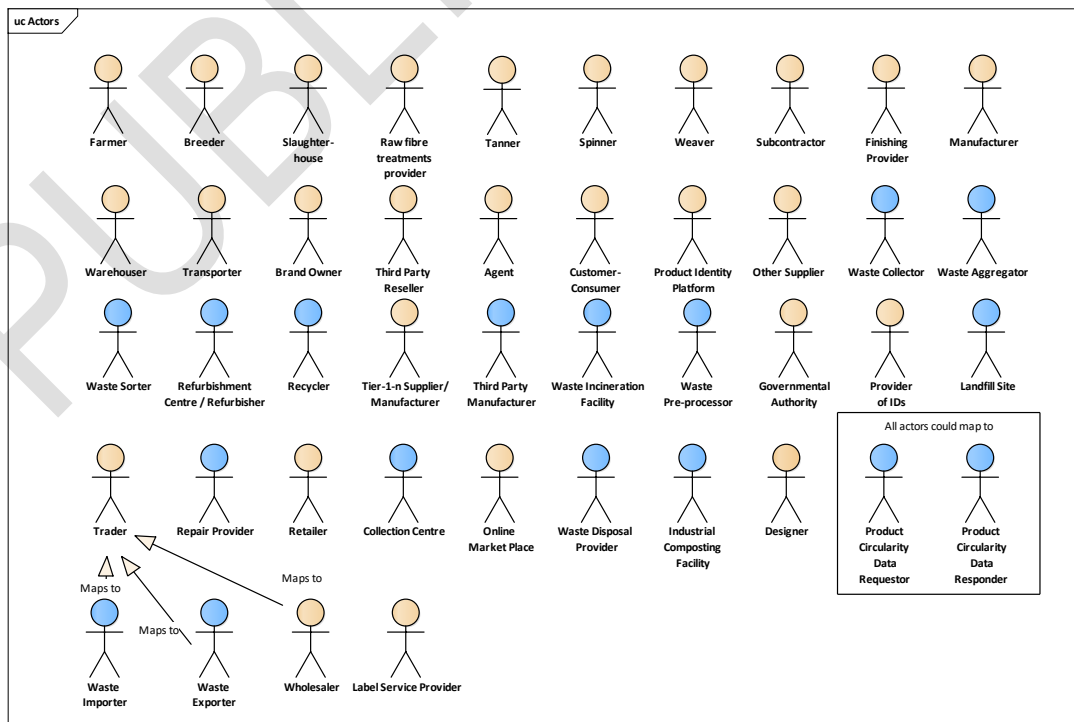


Figure 6 Actors

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Actor	Definition
Agent	A person or company who has been legally empowered to act on behalf of another person or an entity to buy or sell. An agent can be a buyer/customer or seller/supplier.
Brand Owner	Brand Owner: A person or company who sells any commodity under a registered brand label. A brand can be a buyer/customer or seller/supplier.
Breeder	A person or company engaged in agricultural business, focusing on selective breeding of animals or plants to produce offspring with specific desirable traits.
Collection Centre	A facility where items or materials are gathered and processed for further distribution or disposal. These centres can be used for a variety of purposes, such as collecting and sorting recyclable materials. Collection centres can be operated by governments, private organizations, or individuals, and may vary in size and scope depending on their intended purpose.
Customer-Consumer	A person or company who purchases goods and services <u>for their own use (e.g. a hospital buying working clothes).</u>
Designer	A (fashion) designer is a professional who creates designs and patterns for fabrics, leather and other materials. Designers work with a variety of materials such as cotton, wool, silk, synthetic fibres and leather, secondary raw materials ² and use different techniques to create unique and innovative designs.
Farmer	A person or company engaged in agricultural business, field crop growing, animal rearing for meat or other products (hides, milk, egg, wool, etc).
Finishing Provider	A person or company whose trade is the dyeing, bleaching, washing or other treatment of fabrics to improve their appearance or performance
Governmental Authority	A body or organization that has been granted the power to enforce, and sometimes to make, as well as to enforce laws on behalf of a government or state. Such authorities can be at the local, state, or national level and can take various forms in executive, legislative, or judicial branches. They are responsible for ensuring the safety and well-being of citizens, maintaining public order, and providing essential services such as healthcare, education, and infrastructure.
Industrial Composting Facility	A specialized facility that is designed to process large volumes of organic waste and convert it into compost, which can then be used as a soil amendment or fertilizer. These facilities use advanced composting technologies and processes to speed up the decomposition of organic waste, such as food scraps, yard waste, and other biodegradable materials.
Label Service Provider	A person or company that specializes in producing labels, tags, and other branding or identification materials. These labels can serve various purposes, including providing information about the product, its composition, care instructions, and branding for marketing and traceability purposes.
Landfill Site	A designated area of land that is used for the disposal of waste materials, including household waste, commercial waste, and industrial waste.
Manufacturer	A person or company who produces intermediary products or finished products using raw materials, secondary raw materials and/or intermediary products.
Online Market Place	An online Marketplace is a digital platform that connects buyers and sellers, allowing them to exchange goods and services. It is a type of e-commerce site where multiple third-party sellers offer their products or services to potential buyers, often facilitated by the marketplace operator which typically earns revenue by charging fees for transactions or by taking a percentage of each sale. This marketplaces can be B2B, C2C, B2G, G2C etc.
Other supplier	A person or company that provides something needed such as feed, equipment, materials, intermediary and finished products, chemicals or a service, etc.
Product Identity Platform	A product identity platform informs users about products. For example, their characteristics such as component materials, certificates, end-of-life instructions and if the product has been resold, repaired or recycled and more. These platforms may link to product information of tier-1-n suppliers, either on the level of a model, batch or item.
Provider of IDs	A party that provides identifiers such as for products, companies and locations. The provider of IDs can be a governmental authority or any economic operator within the value chain, such as a manufacturer, a supplier, a brand, an association or an organization that specializes in identifiers (such as GS1).

² Secondary raw materials are materials that have been previously used and then collected, processed, and prepared for reuse or recycling.

Actor	Definition
Raw Fibre Treatments Provider	A person or company who operates equipment that treats raw materials (e.g., a ginner using a machine which separates the seeds and hulls from the cotton fibre, a flax fibre pre-processor, a hemp fibre pre-processor etc.).
Recycler	A person or company who recycles or uses machines to recycle.
Refurbishment Centre / Refurbisher	A facility or person which provides services to correct or repair any defect or non-conformance in an item (cleaning, decorating, re-equipping or repairing a product to a condition in which the item can be re-used).
Repair Provider	A person or company that offers repair services for various products or equipment (e.g., that specializes in repairing and restoring clothing and accessories, including fixing damaged seams, replacing buttons or zippers, and restoring garments that have been stained, torn, or otherwise damaged).
Retailer	A person or company that sells goods to the public in relatively small quantities for use or consumption rather than for resale.
Slaughterhouse	A person (slaughterer) or company (slaughterhouse) who slaughters animals, most often to provide food for humans, but also for the skins (hides).
Spinner	A person or company occupied in making thread by spinning.
Subcontractor	A person or company that signs a contract to perform part or all of the obligations of another's contract.
Tanner	A tanner processes skins of animals. Tanning hide into leather is a process which permanently alters the protein structure of a skin, making it more durable and less susceptible to decomposition, and also possibly colouring it.
Third Party Manufacturer	A third-party manufacturer is a supplier that is not directly owned or controlled by the company that uses or sells its products.
Third Party Reseller	Third-party resellers are independent sellers who very often use online marketplaces. These sellers can be identified as authorized or unauthorized to sell branded products online that are new, used and sometimes refurbished (also known as Third Party Sellers).
Tier-1-n Supplier / Manufacturer	A person or company who is the direct supplier of the manufacturer who assembles a "finished product" that is for sale – keeping in mind that the "finished product" in question may, in reality, be an intermediate product. For example, a manufacturer of a yarn might be the Tier 1 supplier to a manufacturer who creates and sells fabric (an intermediate product); while the fabric manufacturer, in turn, is the Tier 1 supplier to a manufacturer who creates and sells garments.
Trader	A person or company who buys and sells goods.
Transporter	A person or company in a value chain who picks up, transports and delivers animals, products and materials such as chemicals and other supplies.
Warehouser	A person or company who stores goods that will be sold or distributed later.
Weaver	A person or company who weaves fabric.
Waste Aggregator	A company or organization that collects waste materials from multiple sources and aggregates them in a centralized location before transporting them to a processing or disposal facility. Waste aggregators typically operate at a larger scale than waste collectors, working across multiple municipalities or even regions to collect waste from a variety of sources.
Waste Collector	A person or a company that is responsible for collecting and transporting waste materials from residential, commercial, and industrial areas to designated facilities for further processing or disposal.
Waste Disposal Provider	A person, company or body having a role in waste disposal: e.g. the collection, processing or deposition of the waste materials. The waste disposal provider can have the role of a waste collector, collection centre, waste sorter, waste pre-processor, waste aggregator, landfill site or waste incineration facility.
Waste Exporter	A company who makes, or on whose behalf the export declaration is made, and who is the owner of the waste.
Waste Importer	A company who makes - or on whose behalf a customs clearing agent or other authorized person makes - an import declaration. This may include a person or company who has possession of the waste or to whom the waste is consigned.
Waste Incineration Facility	A waste incineration facility (also known as a waste-to-energy plant), burns waste materials to generate electricity or heat.

Actor	Definition
Waste Pre-processor	A person, company, machine or system that prepares waste materials for further processing, treatment, or disposal. The process of waste pre-processing involves separating and preparing different types of waste materials for specific recycling or disposal methods.
Waste Sorter	A person, company or machine that separates different types of waste materials into designated categories for recycling, composting, or disposal (landfilling or incineration).
Wholesaler	A company that sells products or services, often in large quantities, to be retailed by others.
Data Exchange	All actors above can be mapped to below actors.
Product Circularity Data Requestor	A person, company or body requesting product circularity data from the product circularity data responder. The requesting actor can be mapped to the more specific actors in this list.
Product Circularity Data Responder	A person, company or body responding to a product circularity data request sent by the product circularity data requestor. The responding actor can be mapped to the more specific actors in this list.

Table 8 Definitions of actors

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57 **5.5 Business entity view**58 **5.5.1 Conceptual Product Circularity Data Model**

59 The conceptual data model is used to identify the main information entities that are referred to in
60 the information exchange(s) that occur between actors within the circular economy. It is modelled
61 as a class diagram showing the relationships between the information entities. The *product* is the
62 most important information entity in the message. The relationships between the information
63 entities shown are the following:

- 64
- 65 ● The Product entity provides detailed information on:
 - 66 ○ Economic operator
 - 67 ○ Data Carrier
 - 68 ○ Digital Product Passport (DPP)
 - 69 ○ Label
 - 70 ○ Instructions
 - 71 ○ Bill of Materials
 - 72 ○ Component Materials (Composition)
 - 73 ○ Substances of Concern (SoC)
 - 74 ○ Recycled Material Content
 - 75 ○ Traceability Information
 - 76 ○ Conformity Assessment
 - 77 ○ Circularity Characteristics
 - 78 ○ Circular Design Strategies
 - 79 ○ Environmental Footprint
 - 80 ○ ESG Score Index
 - 81 ○ Emission Performance
 - 82 ○ Consumption Performance
 - 83 ○ Packaging
 - 84 ○ Size Matrix
 - 85 ● The Economic Operator entity provides detailed information on:
 - 86 ○ Address
 - 87 ○ Contact
 - 88 ○ Facility
 - 89 ○ ESG Performance
 - 90 ○ Environmental Footprint
 - 91 ■ ESG Score Index

- 92 ○ Conformity Assessment
- 93 ○ Referenced Waste Transports
- 94 ● The ESG Performance entity provides detailed information on:
- 95 ○ Environmental Footprint
- 96 ▪ ESG Score Index
- 97 ○ Emission Performance
- 98 ▪ Substances of Concern
- 99 ▪ ESG Score Index
- 100 ○ Consumption Performance
- 101 ▪ ESG Score Index
- 102 ○ Consumer Products Circularity Performance
- 103 ▪ Referenced Waste Transport
- 104 ● The Consumer Products Circularity Performance (e.g. unsold, repaired, refurbished) entity
- 105 provides detailed information, including on:
- 106 ○ Referenced Waste Transport
- 107 ▪ Referenced Regulation
- 108 ● Substances of Concern can be specified on the level of the:
- 109 ○ Product
- 110 ○ Component Materials
- 111 ○ Emission Performances
- 112 ○ Referenced Waste Transports
- 113 ● The Component Materials entity provides detailed information on:
- 114 ○ Bill of Materials
- 115 ○ Substances of Concern
- 116 ● The ESG Score Index entity can provide information for:
- 117 ○ Product
- 118 ○ Emission Performances
- 119 ○ Consumption Performances
- 120 ○ Environmental Footprint
- 121 ○ Circularity Characteristics
- 122 ● The Circularity Characteristic entity can provide information for:
- 123 ○ ESG Score Index
- 124 ● The Economic Operator entity provides detailed information on:
- 125 ○ Address
- 126 ○ Contact
- 127 ○ Facility
- 128 ○ ESG Performances
- 129 ○ Environmental Footprint
- 130 ▪ ESG Score Index
- 131 ○ Referenced Waste Transports
- 132 ▪ Referenced Regulation
- 133 ○ Conformity Assessments
- 134 ▪ Conformity Attestations
- 135 ▪ Referenced Standard
- 136 ▪ Referenced Regulation
- 137 ● The Facility entity provides detailed information on:
- 138 ○ Address
- 139 ○ Environmental Footprint
- 140 ○ ESG Performances
- 141 ● The Referenced Transport Waste entity can be used with the following entities:
- 142 ○ Consumer Products Circularity Performance
- 143 ○ Economic Operator

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○ Facility

- Examples of Conformity Attestations related to the Conformity Assessment entity are a certificate, declaration, licence, inspection reports, test reports. For these documents different attributes can be provided, such as the issue date, responsible agency, accreditation body.
- The Exchanged Document entity provides detailed information on the document being exchanged, such as issuance date time, the ID, the type code.

More details on the attributes of each information entity and their cardinalities can be found within the product circularity data model class diagram (Chapter 7). The Product entity continues at the right side of the diagram (coloured yellow too) due to the number of attributes this entity has.

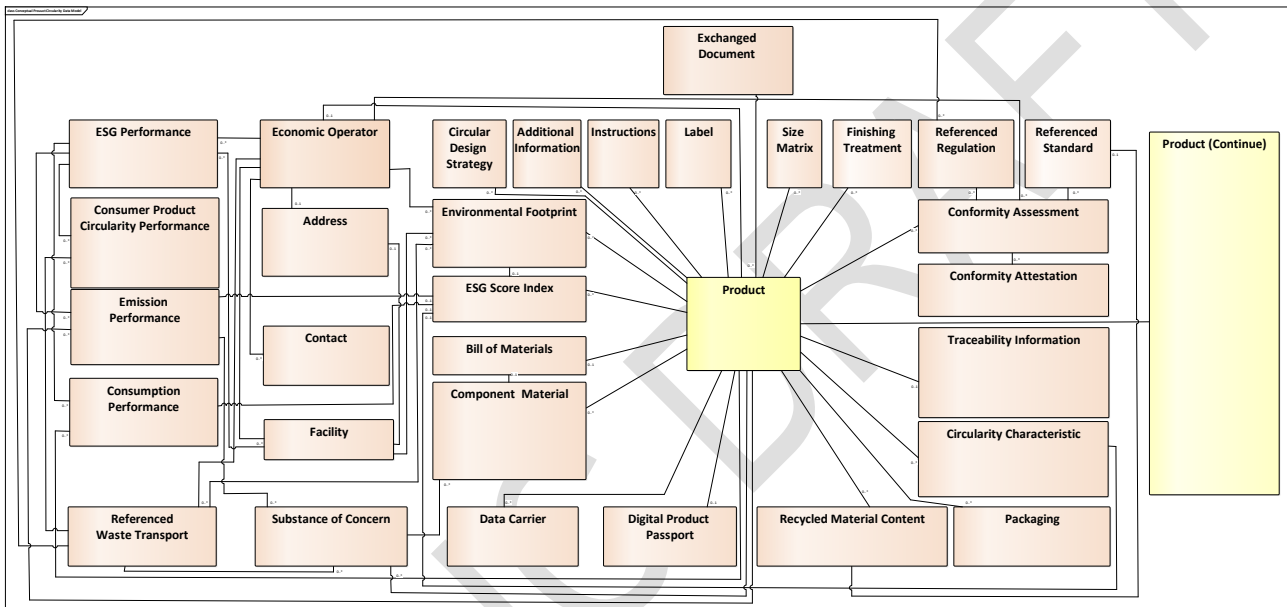


Figure 7 Conceptual Product Circularity Data Model

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The product circularity data model contains information entities that can be used in the context of digital twins and digital product passports, as the product circularity data model is built upon business and governmental requirements. Because of its global scope, the product circularity data model has been designed in this way. This chapter provides details on every information entity. Every information entity is built in a generic way, which means that they could be used by other industries. This is the reason why many information entities contain attributes identified using predefined (coded) values. The code values are part of code lists developed and maintained by UNECE and other agencies. Code lists developed and maintained by other organizations are known as external code lists.

The process of exchanging product circularity data is kept on a basic level. Data will be retrieved from a relevant economic operator (e.g. manufacturer) and made available for the requestor (e.g. repairer). The requested data could be stored in a database of a service provider, on behalf of the economic operator. In addition, a registry could be used to obtain information of the economic operator (EO) for establishing a connection (access to available product data of the EO). In all cases, it is obvious that the use of a global unique product and global unique economic operator identifiers is of great importance. The effort required for implementing information exchanges will depend upon the granularity of information (larger information packages will require more effort). To achieve interoperability, global semantic standards are important too.

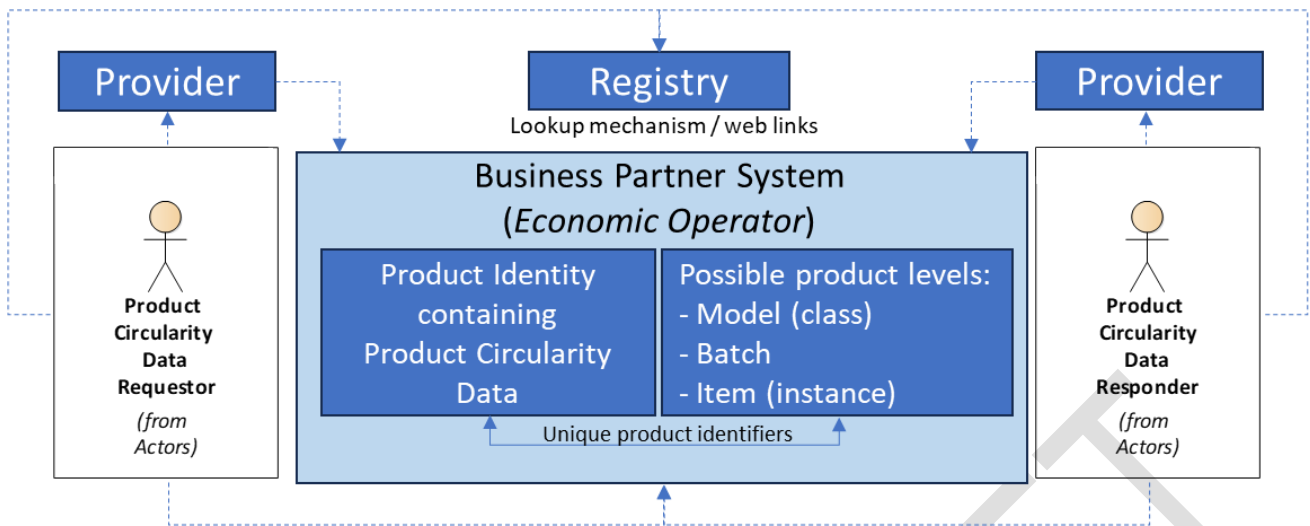


Figure 8 Basic Product Circularity data exchange model

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180 6 Business choreography for product circularity

181 6.1 Generic use case for product circularity

182 The product circularity data use case enables actors in the pre and post product-consumption phases
 183 of the value chains to improve their business models. The purpose of exchanging data is to keep
 184 waste to a minimum by extending the product life, minimizing the use of resources and designing
 185 products better. Brands, in particular, want to be able to exchange product and materials data,
 186 including data from the first point of sale, with resellers, sorters, recyclers and other players in the
 187 value chain. Moreover, consumers need information in order to make sustainable choices. For
 188 example, when consumers scan the product's data carrier (e.g. QR-code) by using a mobile app,
 189 they should be able to receive guidance on proper care and repair, extending the garment's or
 190 footwear's lifespan. Collectors, sorters, recyclers, using modern identification methods will also
 191 benefit from this data. The product circularity use case benefits from the use case of traceability and
 192 transparency. These last two use cases are focussing on supply chain visibility by retrieving data on
 193 traceability (what, where, when, who, why) and sustainability evidences through transparency
 194 (certificates, invoices, shipping notes, inspection reports, test reports etc.). However, this use case
 195 focusses on the collection product data supporting circular business models. This data can be made
 196 available by the economic operator, not necessarily the manufacturer (e.g. a brand providing
 197 product data to the consumer to support sustainable choices). Essential are the assurances that go
 198 along with this data. In addition, the link between the digital and physical world will be made on the
 199 basis of a data carrier containing the unique identifier of the product (e.g. QR-code). This can be
 200 established through the use of a so-called Uniform Resource Identifier (e.g. a URL)³. Figure 9
 201 below, illustrates the processes within the circular economy for textile and leather products. It also
 202 includes the actors involved in those processes, the product/material flows (see table 11) to and
 203 from those processes and the involved circular economy strategies.
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CE Strategy ⁴	Definition
R0 Refuse	Refusing to buy materials or products that cannot be recycled or reused or are not sustainable.
R1 Rethink	Thinking and designing products so that their manufacturing process consumes fewer raw materials, extends their lifecycle, and generates less waste or recyclable waste.
R2 Reduce	Using less resource intensive materials and products and recaptures "waste" as a resource to manufacture new materials and products.
R3 Reuse	Reusing a material or product in its current form over and over again without any structural changes (includes share, rental).
R4 Repair	Putting materials or products damaged, broken, or not working correctly back into good condition to enable continuation of its original function or make it work again.
R5 Refurbish	Cleaning, laundering clothing and other textiles, and, more broadly, their drying, ironing, modernizing (refashioning) as well as repairing to a condition in which the item can be reused.
R6 Remanufacture	Rebuilding of a product to specifications of the original manufactured product using a combination of reused, repaired and new parts.
R7 Repurpose	Giving new use to something for a different purpose than the one for which it was originally intended.
R8 Recycle	Collection and treatment of waste materials or products for use as input materials in the manufacture of new product. In other words, it involves breaking down old textiles or leather into raw materials that can be used to make new products.
R9 Recover	Obtaining materials or energy resources from waste.

205 **Table 9 Circular Economy Strategies**

³ This link could also be based on decentralized identifiers and universal resolvers. A decentralized identifier provides the economic operator control over the online product identity. A universal resolver makes it possible to retrieve and work with the decentralized identity information.

⁴ From the "R-Ladder" defined by the Netherlands Environmental Assessment Agency (page 11 in the document at <https://www.pbl.nl/sites/default/files/downloads/pbl-2018-circular-economy-what-we-want-to-know-and-can-measure-3217.pdf>)

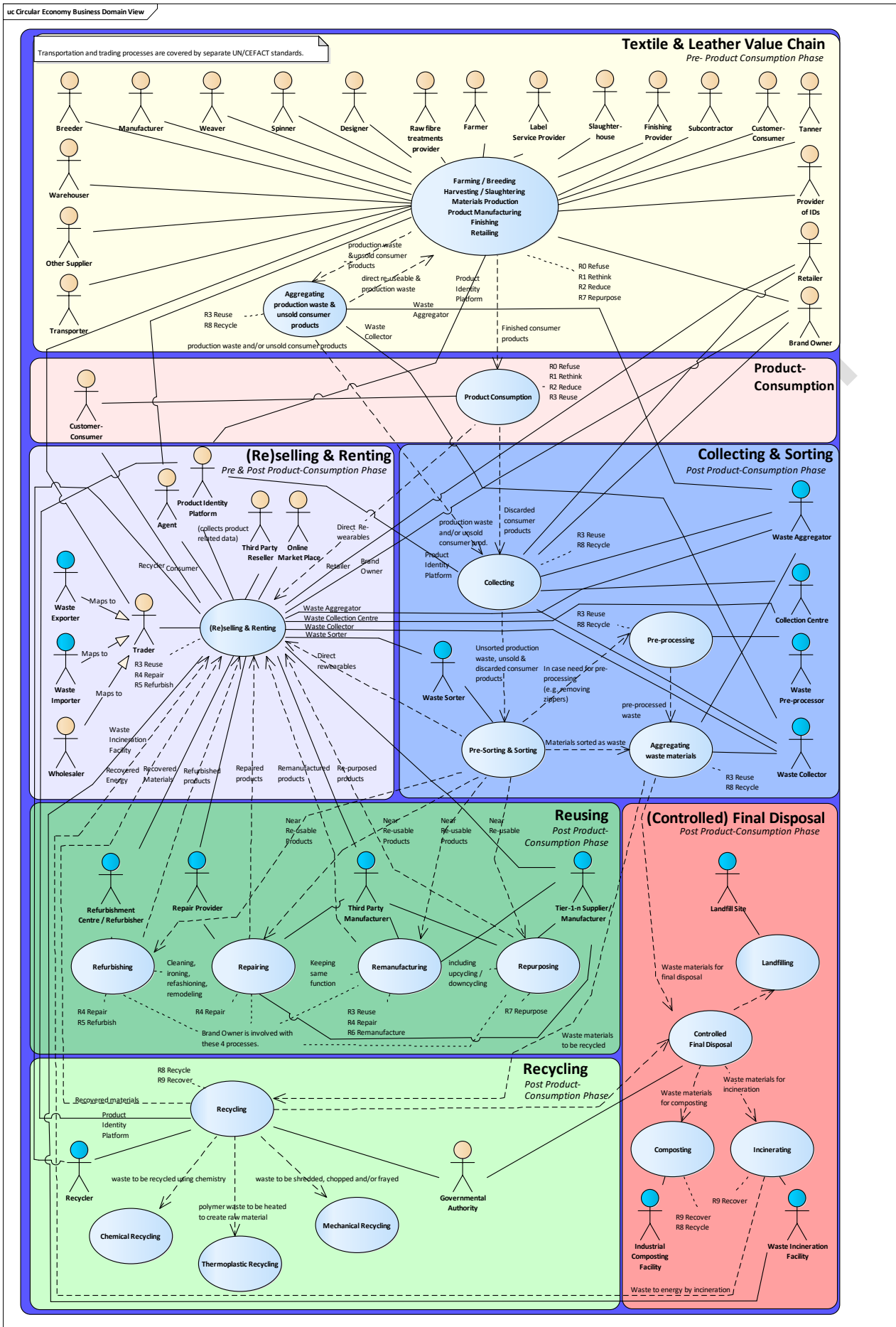


Figure 9 Generic product circularity use case

208 **Note:** A governmental authority could also be active in the pre product-consumption phase. The label service provider
209 could also be active in the post product-consumption phase.

Product/Material flows	
Unsold, returned, repaired, refurbished consumer products	Waste materials for compositing
Finished consumer product	Waste materials for recycling
Discarded consumer products	Recovered materials
Direct re-usable products	Recovered energy from incineration
Unsorted production waste	Near re-usable products
Production waste	Repurposed products
Pre-processed waste	Refurbished products
Materials sorted as waste	Remanufactured products
Waste materials for final disposal	Repaired products
Waste materials for incineration	

210 **Table 11 Product/Materials flows**

211 **6.1.1 Pre product-consumption, product-consumption and post product-consumption phases**

212 In Figure 9 above, different phases of product-consumption: pre product-consumption, product-
213 consumption and post product-consumption.

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215 Pre product-consumption is the phase that occurs before a product is used or consumed by a
216 customer-consumer. It encompasses all the activities and processes that take place in preparation for
217 the consumption of a product.

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219 Product consumption is the phase by which individuals, households, businesses, or societies utilize
220 products to meet their needs, desires, and demands.

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222 Post product-consumption is the phase that occurs after a product has been used or consumed by a
223 customer-consumer. It encompasses all the activities and processes that take place once a product
224 has been used, and it can include actions such as disposal, recycling, feedback, or any follow-up.

225 **6.1.2 Collecting and sorting**

226 Textile collection and sorting refer to the process of gathering used or discarded textiles, such as
227 clothing (garments and footwear) and other fabric materials, and sorting them based on their quality
228 and condition. This process is an important part of the textile recycling industry, as it enables the
229 reuse of textiles and reduces waste. The textile collection process usually involves placing
230 collection bins or containers in various locations, such as residential neighbourhoods, or
231 commercial areas (e.g. at fashion stores). People can then deposit their unwanted textiles into these
232 bins, which are later collected and taken to a textile sorting facility. During the sorting process,
233 textiles and footwear are inspected for defects, such as holes, tears, or stains. The quality of the
234 fabric, such as the type of fibre, weight, and texture, is also assessed. Textiles and footwear that are
235 still in good condition may be sorted for reuse, based on their quality, condition, composition, type
236 of finish and type of material, while those that are no longer wearable or damaged may be sorted for
237 recycling (such as mechanical recycling, e.g. shredding for insulation or using it as a raw material
238 for new textiles).

239 **6.1.3 Reusing**

240 Reusing refers to the practice of using textile and leather product again for its original purpose, or
241 for a different purpose without processing or changing the material significantly. Refurbishing,
242 remanufacturing, repairing and repurposing are processes that support reusing significantly.

243 Reusing textiles and leather products is a key component of the circular economy, as it helps to

244 keep materials in use for longer periods, thus reducing the need for virgin resources and minimizing
 245 waste. By extending the life of textile and leather products, reusing reduces the overall
 246 environmental impact associated with textile and leather production, such as the energy and
 247 resources required to make new textile and leather products. In addition, reusing textile and leather
 248 products can create new business opportunities and stimulate local economies. For example,
 249 second-hand stores, upcycling businesses, and repair services can all benefit from the practice of
 250 reusing textile and leather products.

251 **6.1.4 Reselling and Renting**

252 In the textiles circular economy, reselling and renting are two key strategies for extending the life of
 253 textile and leather products and reducing waste. Reselling in a circular economy can take many
 254 forms. For instance, second-hand stores and online marketplaces offer opportunities for people to
 255 sell their used clothing and other textile products. This practice allows textile and leather products
 256 to be reused and provides an alternative to buying new items. Renting is another strategy for
 257 extending the life of textile and leather products in a circular economy. Textile and leather rental
 258 services allow people to access high-quality clothing and other textile products without having to
 259 purchase them outright. This can be particularly beneficial for special occasions, such as weddings
 260 or formal events, where people may only need a particular item once. Textile rental services can
 261 also provide an alternative to fast fashion, which often relies on low-quality materials and
 262 production processes and can contribute to high levels of textile waste. Overall, selling and renting
 263 are important strategies for promoting a more sustainable and circular textile economy.

264 **6.1.5 Recycling**

265 Recycling is strategy for managing textiles at the end of their life cycle in a circular economy.
 266 Recycling textiles involves breaking down old textiles into raw materials that can be used to make
 267 new products. There are several methods for recycling textiles, including mechanical recycling,
 268 chemical recycling, and thermoplastic recycling.

269 **6.1.6 (Controlled) final disposal**

270 Final disposal is the last resort for managing textiles at the end of their life cycle. Landfilling is the
 271 most common form of final disposal, but it is also the least sustainable. Textiles that end up in
 272 landfills can take years to decompose, and may release greenhouse gases like methane as they break
 273 down. To minimize the environmental impact of final disposal, some companies are exploring
 274 alternative solutions like incineration, where textiles are burned to generate energy, or biological
 275 treatment, where textiles are broken down by microorganisms in a controlled environment.
 276 Controlled final disposal typically involves using specialized facilities and methods to contain and
 277 isolate hazardous or toxic waste, such as landfills or incinerators. Controlled final disposal is an
 278 important part of waste management, as it helps to prevent contamination of soil and water
 279 resources, reduces the risk of exposure to harmful substances, and minimizes the impact of waste on
 280 natural ecosystems. The process typically involves strict regulations and monitoring to ensure that
 281 waste is disposed of in a safe and responsible manner.

282 **6.1.6.1 Processes, actors and circular strategy**

Process	Definition	Actors involved	Circular Strategy
Value chain processes from farming to retailing.	The processes in a value chain consists of a series of activities that businesses or organizations carry out to create and deliver a product or service to customers.	All actors that generate waste or have unsaleable products or dead stock. In addition, some "Other suppliers" "Governmental	R0 Refuse R1 Rethink R2 Reduce R7 Repurpose

Process	Definition	Actors involved	Circular Strategy
		Authority” and “Providers of IDs” are actors even though they do not generate waste.	
Aggregating production material waste	The process of creating (commercial) quantities out of production waste or unsaleable products, dead stock in order to form piles of materials and products ready to be transported or to be collected by a collection centre.	All actors that design or produce, and in particular those who generate waste or have unsaleable products or dead stock Flow back: direct reusable waste. Waste collector Waste Aggregator	R3 Reuse R8 Recycle
Product-Consumption	The process of using, utilizing, or consuming a specific product to meet the needs, desires, and demands of individuals, households, businesses, or societies. It involves the process of taking a product and using it for its intended purpose.	Brand Owner Retailer Customer-Consumer Product Identity Platform	R0 Refuse R1 Rethink R2 Reduce R3 Reuse
Repurposing	The process of giving new use to something for a different purpose than the one for which it was originally intended.	Tier-1-n Supplier/ Manufacturer Third Party Manufacturer	R7 Repurpose
- Upcycling	The process of taking old or discarded materials and turning them into new, stylish and unique garments or accessories. This can involve cutting, sewing, embellishing, or even dyeing the materials to create something new and fashionable. Upcycling can be done by both individual designers and large fashion brands.	Brand Owner Designer Manufacturer (Third Party) Reseller Online Marketplace	R5 Refurbish R6 Remanufacture R7 Repurpose
- Downcycling	Downcycling in fashion refers to the process of converting waste or discarded materials into lower-quality products, typically with a lower value than the original materials.		R6 Remanufacture R7 Repurpose R8 Recycle
Repairing	The process of bringing something damaged, broken, or not working correctly back into good condition or making it work again.	Brand Owner Tier-1-n Supplier/ Manufacturer Third Party Manufacturer Repair Provider (e.g. Repair Shop)	R4 Repair
Remanufacturing	The process of rebuilding a product to the specifications of the original manufactured product using a combination of reused, repaired and new parts.	Brand Owner Tier-1-n Supplier/ Manufacturer Third Party Manufacturer	R3 Reuse R4 Repair R6 Remanufacture
Refurbishing	The process of cleaning/laundrying clothing and other textiles, and, more broadly, their drying and ironing as well as repairing to a condition in which the item can be reused.	Brand Owner Refurbishment Centre / Refurbisher	R4 Repair R5 Refurbish
- Cleaning - Ironing - Remodelling/ Refashioning	The process of transforming, cleaning, ironing or updating an existing garment or accessory to give it a new look. This can involve altering the shape, size, style, colour or texture, adding or removing embellishments, but keeping the same purpose or function.		R5 Refurbish
Reselling & Renting	The process of reselling previously sold and used products which may have been repaired,	Brand Owner Retailer	R3 Reuse R4 Repair

Process	Definition	Actors involved	Circular Strategy
	remanufactured or refurbished or selling recycled materials (feedstock) or renting products (for occasions and celebrations e.g., weddings, holiday parties).	Customer-Consumer Agent Trader (Waste Importer, Waste Exporter, Wholesaler) Third Party Reseller Online Market Place Product Identity Platform (collects product related data) Recycler Refurbishment Centre / Refurbisher Waste Aggregator Waste Collection Centre Waste Collector Waste Incineration Facility (energy from waste) Waste Sorter	R5 Refurbish
Collecting	The process of taking production waste and discarded used products out of circulation in order to be sorted and re-directed to the best circular-economy destination (reusing or recycling).	All actors that generate pre product consumption or post product-consumption waste or have unsaleable products or dead stock. Collection of waste is done by Waste collectors, Waste Aggregators or Collection Centre actors. Product Identity Platform (collects product related data)	R3 Reuse R8 Recycle
Pre-processing & Sorting	The process of separating post product-consumption and/or pre product-consumption waste into value-based grades.	Waste Sorter	R3 Reuse R8 Recycle
- Aggregating waste materials	The process of creating (commercial) quantities out of pre-processed waste in order to form a collection of feedstocks that can be sold for use in the economy again.	Waste Aggregator Waste Collector	R3 Reuse R8 Recycle
- Pre-processing	The process of removing hard parts, prints and/or sanitizing / laundering and/or right sizing which is done after sorting	Waste Pre-processor	R3 Reuse R8 Recycle
Recycling	The process of converting production waste materials or discarded used products (e.g., fabrics, garments, footwear) into new materials (feedstocks).	Recycler Governmental Authority	R8 Recycle R9 Recover
- Mechanical Recycling	The process of shredding, chopping and fraying using heavily sorted post product-consumption waste into fibres.	Recycler Governmental Authority	R8 Recycle R9 Recover
- Chemical Recycling	The process of utilizing chemistry and water/heat to break down and reconstitute cotton/polyester feedstocks into raw cellulose and/or polyester.	Recycler Governmental Authority	R8 Recycle R9 Recover

Process	Definition	Actors involved	Circular Strategy
- Thermoplastic Recycling	The process of heating thermoplastics (polymer waste) to create raw material in the form of granules ready for extrusion or injection.	Recycler Governmental Authority	R8 Recycle R9 Recover
(Controlled) Final Disposal	The process of managing and disposing of waste materials in a way that minimizes their impact on the environment and public health. The goal of “controlled” final disposal is to ensure that waste is handled and disposed of in a manner that meets regulatory requirements and reduces the risk of harm to people and the environment.	Governmental Authority - Waste Incineration Facility - Landfill Site - Industrial Composting Facility	R9 Recover
- Incinerating	Incineration of waste is the process that involves the burning of solid, liquid, or gaseous waste materials at high temperatures to convert them into ash, gases, and heat. The primary purpose of incineration is to reduce the volume and weight of waste, as well as to dispose of hazardous or non-recyclable materials.	Waste Incineration Facility	R9 Recover
- Landfilling	Landfilling is a method of waste disposal where solid waste is buried in a designated area of land. It involves depositing waste into a landfill site and compacting it to reduce the volume of the waste. The compacted waste is then covered with soil to prevent odors, litter, and the spread of disease, and to control pests.	Landfill Site	-
- Composting	Composting is the process of breaking down natural textile fibres such as cotton or linen, or scraps of leather, into nutrient-rich soil through the process of composting.	Industrial Composting Facility	R8 Recycle R9 Recover

Table 12 Process definitions, involved actors and circular strategy

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285 **6.2 Business transaction: Product Circularity Data Exchange**

286 In Figure 10 below, the use case for exchanging product circularity data is shown. Figure 11 shows
287 a more details version of this use case, dividing the use case in request and response process for which
288 the process of correcting data could occur. Figure 12 details the process activity of both the
289 information requestor and the information responder in case of the exchange of a message.

290

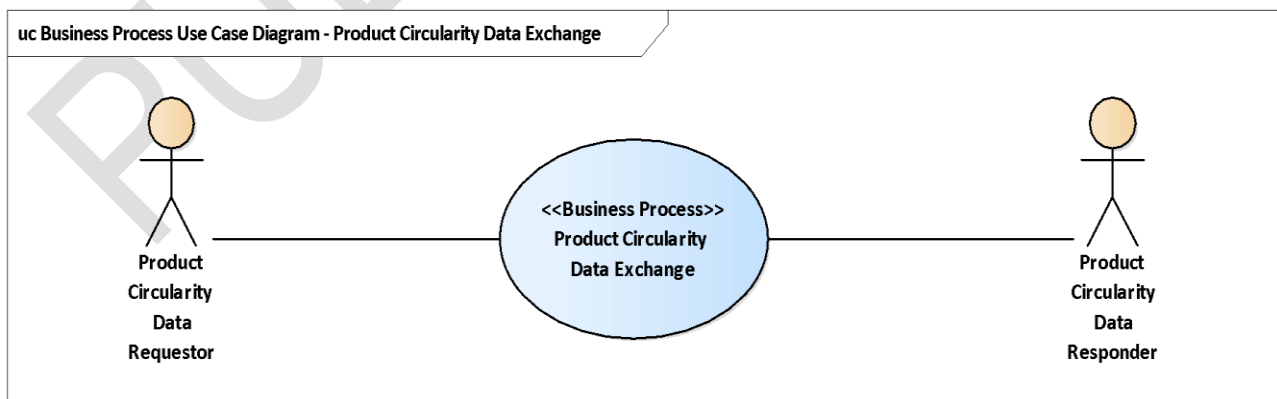
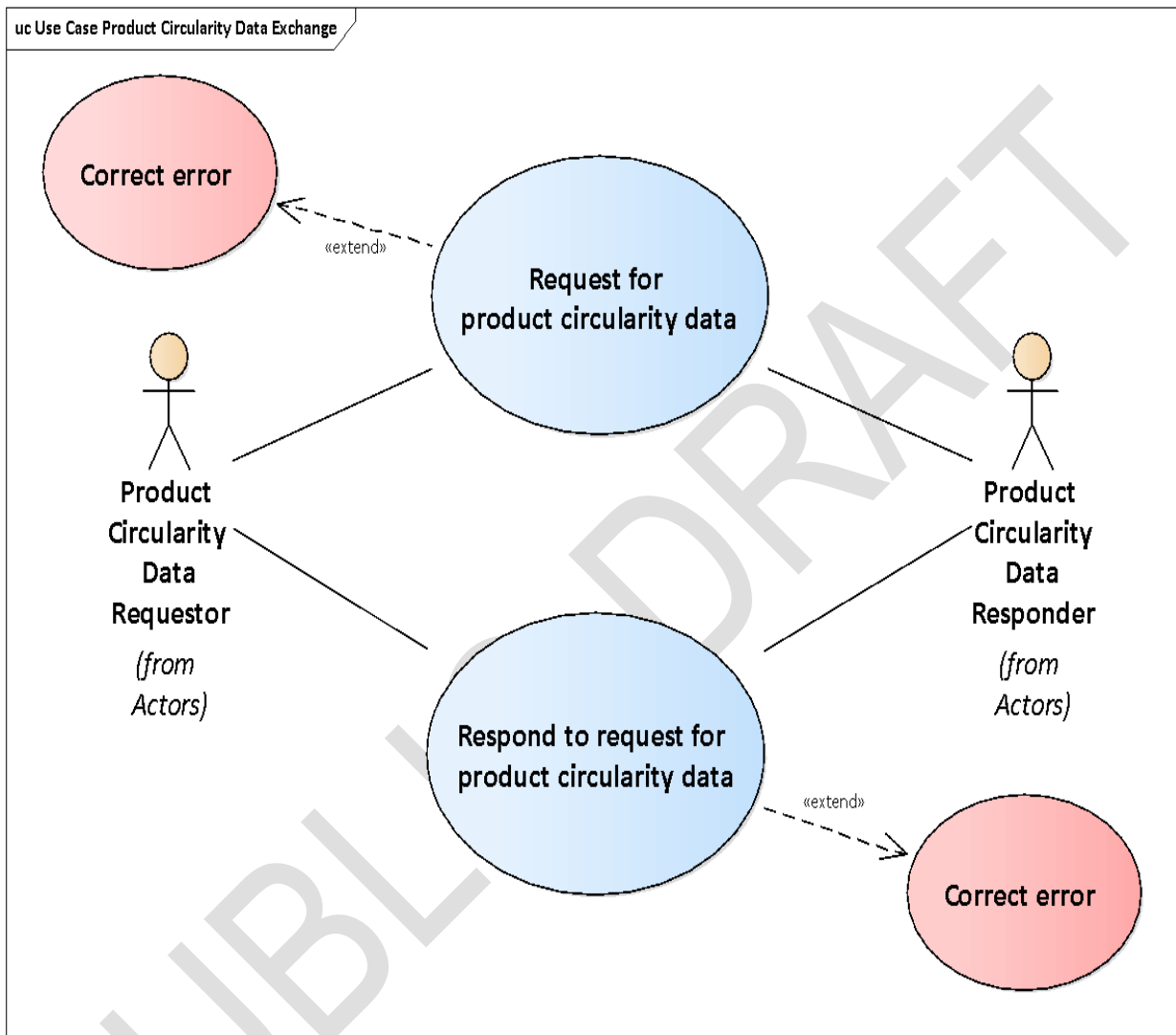


Figure 10 Product Circularity Data Exchange use case diagram

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293 In Figure 11 below, the product circularity data requestor could be any economic operator (e.g. the
294 recycler). The use case represents the common request/response model. The request/response model
295 in information technology is a communication pattern or protocol used between two actors or business

296 partners, often in a client-server architecture, where one actor sends a request for some information
 297 or action, and the other actor provides a response in return. This model is fundamental to many IT
 298 systems and applications, including web services, APIs (Application Programming Interfaces), and
 299 network protocols. In case of an error, the process of each actor extends to an “extension use case”
 300 for correcting the occurred error. Both the requestor might cause the error (e.g. by sending a non-
 301 existing product identifier to the receiver) or the responder (e.g. using invalid values for the product
 302 attributes).



303
 304 **Figure 11 Product Circularity Data Exchange - Request & Respond**

305 **6.3 Business process flow: Data Exchange activity diagram**

306 The product circularity data requestor or initiating entity (e.g. a recycler, consumer), typically referred
 307 to as the "client", sends its generated request message to the product circularity data responder (e.g.
 308 the manufacturer), often referred to as the "server". Upon receiving the request, the product circularity
 309 data responder processes it according to the defined rules, logic, or instructions. This can involve
 310 retrieving data from a database, performing a computation, or carrying out any other necessary
 311 operation. Commonly, the responder will send an acknowledgement, especially in case of an error.
 312 After successful processing the received request, the necessary data will be collected and send to the
 313 requestor. The activity diagram validates the received request on e.g. the existence of the product
 314 identifier which might cause an error acknowledgement. The requestor receives the error
 315 acknowledgement or the requested data. Processing the received data might involve displaying
 316 information to the user, using the received data for further computation, or taking appropriate actions
 317 based on the response content. Once the acknowledgement and/or necessary data has been processed

318 the activity ends. In case the requestor receives an error report, he will correct the error and resend
 319 the message. Commonly the requestor only sends the unique product identifier on which the receiver
 320 can collect the needed data. The needed data will vary amongst actors in the supply chain (e.g. a
 321 consumer needs other data than a recycler). To keep the exchanged data restricted to what really is
 322 needed, a user community will probably create their actor profile. This actor profile will be registered
 323 for the actor involved or sent in the request with the unique product identifier.

324

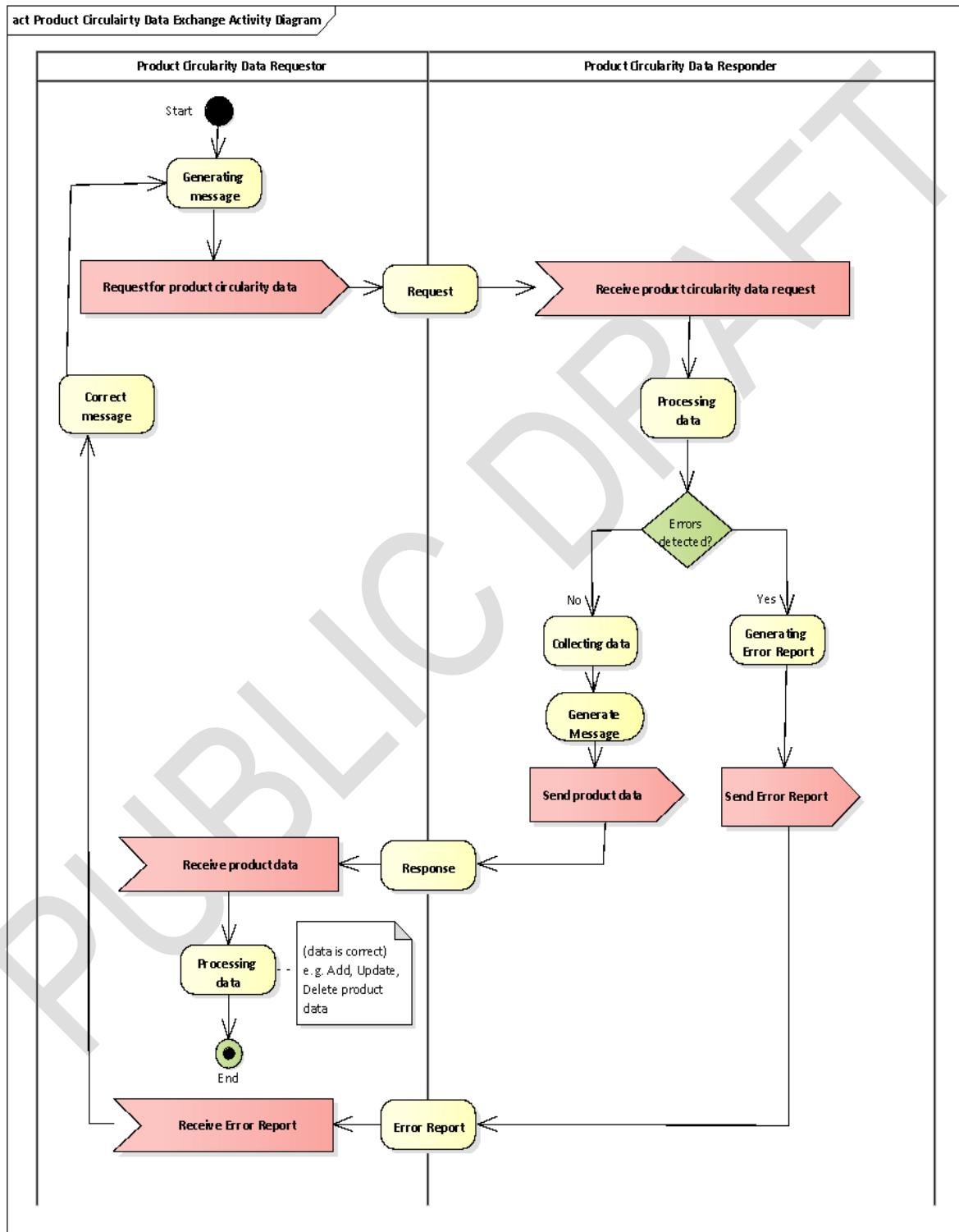
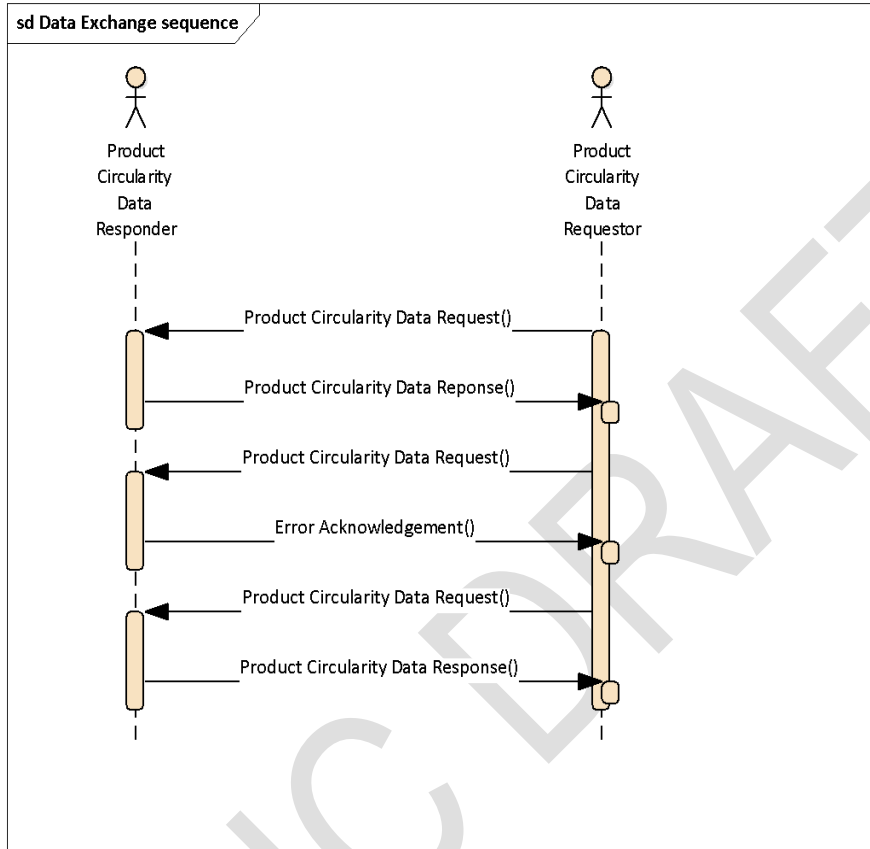


Figure 12 Product Circularity Data Exchange Activity Diagram

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327 **6.4 Business transaction sequence**

328 Figure 13 below shows the sequence of information transactions related to the process of exchanging
 329 product circularity data. The sequence of messages below start with a ‘happy flow’, followed by an
 330 exchange where the request caused an error (e.g. mismatch of product ID). The requestor solves the
 331 error and the flow of data end successfully.



332 **Figure 13 Product Circularity Data Exchange transaction sequence**

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347 7 Business information view product circularity

348 7.1 Product Circularity

349 In figure 14, the class diagram⁵, all information entities (classes) are optional and occur unbounded, except below information classes for which the occurrence is restricted to 1:

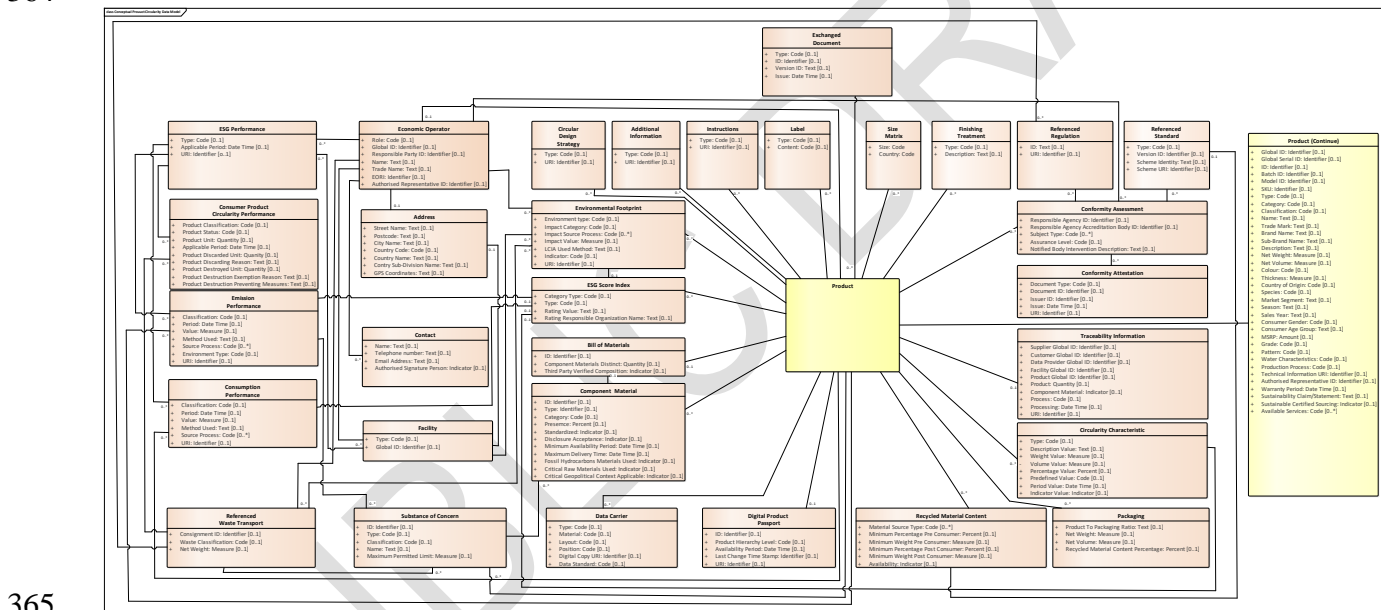
- 351 ● Digital Product Passport
- 352 ● Traceability Information
- 353 ● Address of the economic operator⁶

354 Mandatory attributes can be found within the following information entities (classes):

- 355 ● Size Matrix, where the attributes size and country are mandatory.

356 The following attributes may occur unbounded:

- 357 ● Recycled Material Content *Material Source Type* (e.g. from PET bottles)
- 358 ● Product *Available Services Code* (e.g. code for repairing, refurbishment)
- 359 ● Consumption Performance *Source Process Code* (e.g. code for washing and drying)
- 360 ● Emission Performance *Source Process Code* (e.g. code for dyeing and transportation)
- 361 ● Conformity Assessment *Subject Type Code* (e.g. product, process)



365 Figure 14 Product Circularity Data class diagram

366 7.2 Circularity Characteristics

368 Although the above class diagram contains a number of information entities carrying circularity data, such as Circular Design Strategies, Recycled Material Content, Consumer Product Circularity Performance, the product circularity information entity may contain additional circularity data. Most of the information entities in the class diagram, if not all, have been designed for global and cross-industry. Because of this, they commonly use predefined values from code lists to provide more meaning to the information entity (e.g. the type of circular design strategy supported by a code lists containing different types of design strategies (see table 15). The use of predefined (coded) values enables efficient processing and makes data easy comparable. The information entity Circular Characteristics uses the type code attribute which also uses predefined coded values, such as for Remanufactured Item Availability Guarantee. The value you for this type of attribute can be

⁵ The entities (classes) and their attributes, including definitions and examples can be found in table 14.

⁶ The facility can occur unbounded, as an economic operator may have 1 or more facilities, each with address details.

378 expressed as an indicator (e.g. yes/no) or as a period (duration of the availability guarantee. Because
 379 of this structural design, this information entity is flexible for incorporating a lot of circularity
 380 characteristics which may be necessary in the future. It is important to use the appropriate type of
 381 characteristics for this information entities. For example, minimum energy consumption is a
 382 performance and therefore is a type of consumption within the entity Consumption Performance.

383 7.3 Business document: Product Circularity Data message (assembly)

384 In table 12 below, the so-called root entities of the product circularity message are specified. As the
 385 class diagram shows, many entities are related to the product entity. As each message can not be
 386 send without information about the type of message, its identification, issue date time, the
 387 standardized entity named *Exchanged Document* is part of the message assembly.
 388

Entity	Min	Max	Name	Description
Message			Product Circularity Data Message	Product circularity information exchanged between parties involved in the circular economy.
Entity	1	1	Exchanged Document	Meta data of document being exchanged.
Entity	0	Unbounded	Product	Product circularity data.

389 **Table 13 Product Circularity Data message assembly**

390 7.3.1 Business information entities

391 In the table 14 below all information entities, including their attributes, definitions and examples, are
 392 listed. The number of all information entities is quite extensive. As mentioned before, there are many
 393 actors active within the circular economy, each with their own data requirements. The use of profiles
 394 for each type of actor or group of actors will probably limit the amount of data to be exchanged.
 395 Commonly, such a profile will be made by industry associations along which an implementation
 396 guide.

397 For the table below, the cardinalities of the all information entities and their attributes including
 398 relationships between entities can be found in figure 14 showing a class diagram. More examples for
 399 the content of attributes with a data type “Code” or “Measure” can be found paragraph 7.2.2 (Business
 400 code lists).

#	Name	Data Type	Example	Definition
1	Additional Information	Entity		Additional facts or details about a subject.
2	Type	Code	e.g. code for logo, digital picture etc.	The code specifying the type of additional information.
3	URI	Identifier	e.g. URL or URN	The Uniform Resource Identifier (URI) of this additional information, such as a product presentation, brand logo for this product.
4	Address	Entity		The location at which a particular organization or person may be found or reached.
5	Street Name	Text		The name, expressed as text, of a street or thoroughfare in the address.
6	Postcode	Text		The postcode, expressed as text, in the address.
7	City Name	Text	e.g. London	The name, expressed as text, of the city, town or village in the address.
8	Country Code	Code	e.g. UK etc.	The code specifying a country for this address (Reference ISO 3166 and UNECE Rec 3).

#	Name	Data Type	Example	Definition
9	Country Name	Text		The name, expressed as text, of the country in the address.
10	Country Sub-Division Name	Text		The name, expressed as text, of the sub-division of a country in the address.
11	GPS coordinates	Text		The Global Positioning System) (GPS) coordinates in the address.
12	Bill of Materials	Entity		A reference to the structured list that outlines all the components, materials, parts, and sub-assemblies required to manufacture, assemble, or build a product.
13	ID	Identifier	e.g. 78261876382	The identifier of this bill of materials.
14	Component Material Distinct	Quantity	e.g. 7	The distinct number of component materials for this bill of materials.
15	Composition Verified	Indicator	e.g. Yes	The indication of whether or not the composition of this bill of materials component has been verified.
16	URI	Identifier		The Uniform Resource Identifier (URI) of this bill of materials.
17	Circularity Characteristic	Entity		The defining attributes and principles associated with a circular economy, aiming to create a closed-loop system.
18	Type	Code	e.g. code for Disassembling Skills Level, Reusability Purpose, Remanufactured Item Availability Guarantee, Refurbished Item Availability Guarantee, Product Expected Life Time Period, Material Homogeneity	The code specifying the type of circularity characteristic.
19	Description Value	Text	e.g. Low reparability.	The description of the value for this circularity characteristic.
20	Weight Value	Measure	e.g. 100 KGM	The value of the weight, expressed as a measure, for this circularity characteristic.
21	Volume Value	Measure	e.g. 100 M3	The value of the volume, expressed as a measure, for this circularity characteristic.
22	Percentage Value	Percent	e.g. 10 %	The value, expressed as a percentage, for this circularity characteristic.
23	Predefined Value	Code	e.g. code for low reparability	The code specifying a predefined value for this circularity characteristic.
24	Period Value	Date Time	e.g. code for a UNECE period date format.	The period value for this circularity characteristic.
25	Indicator Value	Indicator	e.g. Yes	The value, expressed as an indicator, for this circularity characteristic.
26	Circular Design Strategy	Entity		An approach in product and system design that aims to create products, services, and processes that align with the principles of the circular economy.

#	Name	Data Type	Example	Definition
27	Type	Code	e.g. code for Repairability, Reliability, Reusability, Modularity, Transformability, Upgradability, Recoverability, Minimum Water Consumption, Minimum Energy Consumption, Use of Sustainable Chemicals, Use of Safe Chemical, Light Weight Packaging etc.	The code specifying the type of circular design strategy.
28	URI	Identifier	e.g. URL or URN	The Uniform Resource Identifier (URI) for this circular design strategy.
29	Component Material	Entity		A material that is used as a part or element in the creation or construction of a larger product.
30	Global ID	Identifier	e.g. 1324343243	The global identifier of this component material.
31	Type	Code	e.g. code for cotton, wool etc.	The code specifying the type of material for this component material.
32	Category	Code	e.g. code for syntactic or natural fibres etc.	The code specifying the category of material for this component material.
33	Presence	Percent	e.g. 10%	The presence, expressed as a percent, for this component material.
34	Standardized	Indicator	e.g. Yes	The indication of whether or not the use of standard component materials, for those materials that are prone to break, have been applied for this component material.
35	Disclosure Acceptance	Indicator	e.g. Yes	The indication of whether or not an acceptance for disclosure of this component material exists.
36	Minimum Availability Period	Date Time	e.g. code for a UNECE period date format.	The minimum period a component material will be available after the product is discontinued.
37	Maximum Delivery Time	Date Time		The maximum period needed for the delivery of a component material.
38	Fossil Hydrocarbons Materials Used	Indicator		The indication of whether or not fossil hydrocarbons materials are used for this component material.
39	Critical Raw Materials Used	Indicator		The indication of whether or not critical raw materials are used for this component material.
40	Critical Geopolitical Context	Indicator		The indication of whether or not a critical geopolitical context applies for this component material.
41	Conformity Assessment	Entity		A systematic process used to determine whether a product, system, service, or process conforms to established

#	Name	Data Type	Example	Definition
				standards, regulations, specifications, or other relevant requirements.
42	Responsible Agency ID	Identifier		The identifier of the responsible agency for this conformity assessment.
43	Responsible Agency Accreditation Body ID	Identifier		The identifier of the accreditation body attesting to the competency of the agency responsible for this conformity assessment.
44	Subject Type	Code	e.g. code for product, process, organization etc.	The code specifying the subject for this conformity assessment.
45	Assurance Level	Code	e.g. code for certified by third party, verified by third party etc.	The code specifying the assurance level, such as third party certified, third party verified, for this conformity assessment.
46	Notified Body Intervention Description	Text		The textual description of the intervention of the notified body of this certification.
47	Conformity Attestation	Entity		A formal document or declaration issued by a manufacturer, supplier, or responsible party stating that a product, system, or process complies with specific standards, regulations, or requirements. It affirms that the entity in question has taken the necessary measures to ensure that their product or process meets the prescribed criteria and conforms to established quality, safety, or regulatory standards.
48	Document Type	Code	e.g. code for a Conformity Declaration, Test Protocol Conditions, Chemical Safety Assessment, Test Results, Inspection Results	The code specifying the type of document of this conformity attestation.
49	Document ID	Identifier	e.g. 1324343243	The identifier of the document of this conformity attestation.
50	Issuer ID	Identifier		The identifier of the issuer of this conformity attestation.
51	Issue	Date Time		The date or date time of issuance of this conformity attestation.
52	URI	Identifier	e.g. URL or URN	The Uniform Resource Identifier (URI) for this related certification document.
53	Consumer Product Circularity Performance	Entity		Efforts and metrics provided by an economic operator related to circularity in consumer products, such as for unsold, returned, refurbished or repaired items.
54	Product Classification	Code	e.g. code for garments, footwear etc.	The classification of products specified in this consumer product circularity performance.

#	Name	Data Type	Example	Definition
55	Product Status	Code	e.g. code for unsold, repaired, refurbished, returned etc.	The code specifying the product status specified in this consumer product circularity performance.
56	Product Unit	Quantity	E.g. code for 200000 pieces	The number of units of products specified in this consumer product circularity performance.
57	Applicable Period	Date Time	e.g. code for a UNECE period date format.	The period applicable specified in this consumer product circularity performance.
58	Product Discarded Unit	Quantity	e.g. 500000 pieces	The number of discarded units of products specified in this consumer product circularity performance.
59	Product Discarding Reason	Text		The discarding reason of products specified in this consumer product circularity performance.
60	Product Destroyed Unit	Quantity	e.g. 250000 pieces	The number of destroyed units of products specified in this consumer product circularity performance.
61	Product Destruction Exemption Reason	Text		The destruction exemption reason of products specified in this consumer product circularity performance.
62	Product Destruction Preventing Measures	Text		The measures taken to prevent destruction of products specified for this consumer product circularity performance.
63	Consumption Performance	Entity		The process by which individuals, households, businesses, or societies utilize goods, services, resources, and commodities to meet their needs, desires, and demands.
64	Classification	Code	e.g. code for water usage, energy usage, chemicals usage, pesticides usage, fertilizers usage, low carbon energy usage etc.	The code specifying the classification for this consumption performance.
65	Period	Date Time	e.g. code for a UNECE period date format.	The period of this consumption performance.
66	Value	Measure	e.g. 1800 LTR (UNECE volume measure)	The value, expressed as a measure, of this consumption performance.
67	Method Used	Text		The method used, expressed as text, used for measuring this consumption performance.
68	Source Process	Code	e.g. code for washing, drying, transporting, etc.	The process, such as weaving, of this consumption performance.
69	URI	Identifier	e.g. URL or URN	The Uniform Resource Identifier (URI) of this consumption performance.
70	Contact	Entity		A person or department that acts as a point of contact with another person or department.

#	Name	Data Type	Example	Definition
71	Name	Text		The name, expressed as text, for this contact.
72	Telephone number	Text		The telephone number, expressed as text, for this contact.
73	Email Address	Text		The email address, expressed as text, for this contact.
74	Authorised Signature Person	Indicator	e.g. Yes	The indication of whether or not this contact is authorised to sign documents.
75	Data Carrier	Entity		A physical or digital object designed to store, transmit, or transport data in various forms.
76	Type	Code	e.g. code for QR, NFC, RFID etc.	The code specifying the type of data carrier.
77	Material	Code	e.g. code for on product label, on tag, on fabric etc.	The code specifying the material used for this data carrier.
78	Layout	Code	e.g. code for the layout that enables compare product performance.	The code specifying the layout of this data carrier.
79	Position	Code	e.g. code for in collar, in zipper etc.	The code specifying the positioning of the data carrier.
80	Digital Copy URI	Identifier	e.g. URL	The Uniform Resource Identifier (URI) for the digital copy of this data carrier.
81	Data Standard	Code	e.g. code for GS1 Standard etc.	The code specifying the data standard for this data carrier.
82	Digital Product Passport	Entity		A concept or technology which enables sharing of key product related information that are essential for products' sustainability and circularity, including those specified in regulations, across all the relevant economic actors.
83	ID	Identifier	e.g. 213213i321	The identifier of this digital product passport.
84	Product Hierarchy Level	Code	e.g. code for product hierarchy level, such as model, batch, item.	The product hierarchy level (model, batch, item) of this digital product passport.
85	Availability Period	Date Time	e.g. code for a UNECE period date format.	The period the digital product passport shall remain available.
86	Last Change Time Stamp	Date Time		The time stamp of the last change of this digital product passport.
87	URI	Identifier	e.g. URL or URN	The Uniform Resource Identifier (URI) of the referenced document for this digital product passport.
88	Economic Operator	Entity		Any entity, individual, or organization that engages in economic activities within a market or business context.
89	Role	Code	e.g. code for manufacturer, importer, retailer etc.	The code specifying the role of the economic operator.
90	Global ID	Identifier		The globally identifier of the economic operator.

#	Name	Data Type	Example	Definition
91	Responsible Party ID	Identifier		The identifier of the party responsible for the impact of its operations on society and the environment of this economic operator.
92	Name	Text		The name, expressed as text, of the economic operator of this product.
93	Trade Name	Text		The trade name, expressed as text, of this economic operator.
94	EORI ID	Identifier		The Economic Operator Registration and Identification (EORI) identifier of the economic operator.
95	Authorised Representative ID	Identifier		The identifier of the authorised representative of this economic operator.
96	Emission Performance	Entity		The release of waste materials, pollutants, or contaminants into the environment. It involves the discharge of waste substances from sources such as industrial processes, transportation, agricultural activities, and other human activities.
97	Classification	Code	e.g. code for plastic production waste, packaging waste, waste water release, microplastics release etc.	The code specifying the classification for this emission performance.
98	Period	Date Time	e.g. code for a UNECE period date format.	The period for this emission performance.
99	Value	Measure	e.g. 200 KGM	The value, expressed as a measure, for this emission performance.
100	Method Used	Text		The method used, expressed as text, used for measuring this emission performance.
101	Source Process	Code	e.g. code for washing, drying, transporting etc.	The source process, such as production, for this emission performance.
102	Environment Type	Code	e.g. code for soil, water, air.	The code specifying the type of environment for this emission performance.
103	URI	Identifier	e.g. URL or URN	The Uniform Resource Identifier (URI) of this emission performance.
104	Environmental Footprint	Entity		The effect that human activities, processes, products, or events have on the natural environment.
105	Environment type	Code	e.g. code for soil, water, air.	The code specifying the type of environment for this environmental footprint.
106	Impact Category	Code	e.g. code for deforestation, carbon footprint etc.	The code specifying the impact category of this environmental footprint.
107	Impacting Source Process	Code	e.g. Dyeing	The code specifying a process being the source process of impact for this environmental footprint.
108	Impact Value	Measure	e.g. 500 KGM	The value, expressed as a measure, for the impact of this environmental footprint.

#	Name	Data Type	Example	Definition
109	Indicator	Text	e.g. comparative toxic unit for humans UTCn etc.	The indicator, expressed as text, for this environmental footprint.
110	LCIA Method Used	Text	e.g. USEtox model etc.	The Life Cycle Impact Assessment (LCIA) method used for this environmental footprint.
111	URI	Identifier	e.g. URL or URN	The Uniform Resource Identifier for this environmental footprint.
112	ESG Score Index	Entity		The result on how well products, services, systems or organizations are doing in achieving various environmental, social and governance (ESG) indicators in comparison to established standards, benchmarks, or expectations.
113	Category Type	Code	e.g. CDP, EPI, SDG, OHI	The category code, expressing the type of ESG score index.
114	Type	Code	e.g. code for Sustainable Sensitivity, Stress and Aging Resistance, Repairability, Resource Consumption, Recyclability, Re-usability, Disassembly etc.	The code, expressing the type of ESG score index.
115	Rating Value	Text	4.6	The rating value, expressed as text, for this ESG score index.
116	Rating Responsible Organization Name	Text		The organization responsible for the rating of the ESG Score Index.
117	ESG Performance	Entity		Information about an organization's performance in relation to Environmental, Social, and Governance (ESG) factors.
118	Type	Code	e.g. code for Sustainability Report, Due Diligence Report etc.	The type of document for this ESG performance.
119	Applicable Period	Date Time	e.g. code for a UNECE period date format.	The period applicable for this ESG performance.
120	URI	Identifier	e.g. URL or URN	The Uniform Resource Identifier (URI) for this ESG performance.
121	Exchanged Document	Entity		Structured information that provides context and details about the data being exchanged.
122	Type	Code	e.g. code for the type of document, such as product circularity data.	The code specifying the type of document for this exchanged document.
123	ID	Identifier		The identifier for this exchanged document.
124	Version ID	Identifier	V4.0	The identifier of the version of this exchanged document.
125	Issue Date	Date Time		The issue date or date time of this exchanged document.

#	Name	Data Type	Example	Definition
126	Facility	Entity		A structure or place that provides a production or service for this economic operator.
127	Type	Code	e.g. code for Production Facility, Retail Facility etc.	The code specifying the type of facility.
128	Global ID	Identifier	e.g. GS1 "GLN", OAR ID, etc.	The global identifier of the facility.
129	Instructions	Entity		Information of an instructive or teaching nature that tells someone how to manage, manipulate, control, or cope with something.
130	Type	Code	e.g. code for safe use instructions, care instructions, return instructions, handling instructions, repair instructions, recycling instructions etc.	The code specifying the type of instruction.
131	URI	Identifier	e.g. URL or URN	The Uniform Resource Identifier (URI) for this Instruction.
132	Label	Entity		An attachment to an object, person or animal which provides identification information for the object.
133	Type	Code	e.g. code for EU product label, care label, EU eco label, CE mark label, brand labels, size label etc.	The code specifying the type of label.
134	Content	Code	e.g. code for Product Composition, Product Composition & Importer details etc.	The code specifying the content of this label.
135	URI	Identifier		The Uniform Resource Identifier (URI) of this label.
136	Packaging	Entity		Any material with which supply chain goods are packaged, such as a box or bubble wrap.
137	Product To Packaging Ratio	Text	e.g. Weight/Utility Ratio	The product to package ratio, expressed as text, of this packaging.
138	Net Weight	Measure	e.g. 1,6 KGM, etc.	The measure of the net weight of this packaging.
139	Net Volume	Measure	e.g. 1 M3, 10 LTR etc.	The measure of the net volume of this packaging.
140	Recycled Material Content Percentage	Percent	e.g. 35%	The recycled material content percentage of this packaging.
141	Product	Entity		Any physical good that is placed on the market or put into service.
142	ID	Identifier	e.g. 7216821638	The identifier for this product.
143	Global ID	Identifier	e.g. GS1 "GTIN"	The global identifier for this product.
144	Global Serial ID	Identifier	e.g. GS1 "SGTIN"	The global serial identifier for this product.

#	Name	Data Type	Example	Definition
145	Batch ID	Identifier		The batch identifier for this product.
146	Model ID	Identifier		The identifier for the model of this product.
147	SKU	Identifier		The Stock Keeping Unit (SKU) for this product.
148	Type	Code	e.g. code for clothing, footwear, accessories or animal-based fibres, plant-based fibres, synthetic fibres etc.	The code specifying the type of product.
149	Category	Code	e.g. code for jacket, pants, blouse, shirt or cashmere, wool, cotton, latex etc.	The code specifying the category for this product.
150	Classification	Code	e.g. taric code	The code specifying the classification for this product.
151	Name	Text		The name, expressed as text, of this product.
152	Trade Mark	Text		A term, phrase, or symbol, expressed as text, that is legally protected by statute for this product.
153	Brand name	Text		The brand name, expressed as text, of this product.
154	Sub-Brand name	Text		The sub-brand name, expressed as text, of this product.
155	Description	Text		The textual description of this product.
156	Net Weight	Measure	e.g. 1,5 KGM etc.	The measure of net weight of this product.
157	Net Volume	Measure	e.g. 1 M3,2 LTR etc.	The measure of net volume of this product.
158	Colour	Code	e.g. code for brown etc.	The code specifying the colour of this product.
159	Thickness	Measure	e.g. thickness of leather in mm, etc.	The measure of thickness, commonly in millimetre, of this product.
160	Country of Origin	Code		The country of origin of this product.
161	Species	Code	e.g. for code for products-based products, such as crocodile shoes etc.	The code specifying the species of this product.
162	Market Segment	Text		The market segment, expressed as text, for this product.
163	Season	Text	e.g. Summer	The season, expressed as text, for this product.
164	Sales Year	Text	e.g. 2024	The year of sales, expressed as text, of this product.
165	Consumer Gender	Code	e.g. code for female, male etc.	The code specifying the consumer gender for this product.
166	Consumer Age Group	Text		The consumer age group, expressed as text, for this product.
167	Manufacturer Suggested Retail Price (MSRP)	Amount	e.g. 25 with ISO currency code e.g. EUR etc.	The monetary value of the manufacturer suggested retail price of this product.

#	Name	Data Type	Example	Definition
168	Grade	Code	e.g. code for grade of leather products, such as top-grain leather etc.	The grade for this product.
169	Pattern	Code	e.g. code for dotted etc.	The pattern for this product, such as the pattern used for a fabric.
170	Water Characteristic	Code	e.g. code for water proof, water resistant etc.	The code specifying the water characteristics, such as water resistance, for this product.
171	Production Process	Code	e.g. code for a process type or step, such as weaving etc.	The code specifying the process type, such as weaving, finishing for this product.
172	Technical Information URI	Identifier	e.g. URL to technical data especially relevant for repairers and recyclers etc.	The Uniform Resource Identifier (URI) for this technical information.
173	Warranty Period	Date Time	e.g. code for a UNECE period date format.	The warranty period of this product.
174	Authorised Representative ID	Identifier	e.g. the importer may represent the manufacturer.	The identifier of the authorised representative of this product.
175	Sustainability Claim/Statement	Text	e.g. This product is made of 100% organic cotton. Should be accompanied with evidences of fulfilment of criteria and/or requirements	The sustainability claim of this product.
176	Sustainable Certified Sourcing	Indicator		The indication of whether or not sustainable sourcing is certified for this product.
177	Available Services	Code	e.g. Repairing, Refurbishing, etc.	The available services for this product.
178	Product Finishing Treatment	Entity		Improving measures for manufactured components or products to meet end use requirements.
179	Type	Code	e.g. code for: Dyeing Printing Coating Embossing Oil-repellent Water-repellent	The code specifying the type of product finishing treatment.
180	Recycled Material Content	Entity		Materials that have been recovered or reclaimed from products, waste materials, or byproducts and then processed to be used as inputs in the manufacturing of new products.
181	Material Source Type	Code	e.g. code for PET bottles etc.	The code specifying the source type, such as PET bottles, for this recycled material content.
182	Minimum Percentage Pre-Consumer	Percent	e.g. 10%	The minimum percentage of pre-consumer for this recycled material content.

#	Name	Data Type	Example	Definition
183	Minimum Weight Pre Consumer	Measure	e.g. 3 KGM	The minimum measure of weight of pre-consumer for this recycled material content.
184	Minimum Percentage Post Consumer	Percent	e.g. 30%	The minimum percentage of post-consumer for this recycled material content.
185	Minimum Weight Post Consumer	Measure	e.g. 4 KGM	The minimum measure of weight of post-consumer for this recycled material content.
186	Availability	Indicator	e.g. Yes	The indication of whether or not recycled material content is available.
187	Referenced Regulation	Entity		A principle, rule, or law.
188	ID	Text	e.g. ESPR art. 20 etc.	The identifier, expressed as text, of this referenced regulation.
189	URI	Identifier	e.g. URL or URN	The Uniform Resource Identifier (URI) of this referenced regulation.
190	Referenced Standard	Entity		A referenced norm or requirement that establishes uniform criteria, methods, processes, rules and practices, such as in engineering or technical areas.
191	Type	Code	e.g. code for GOTS	The code specifying the type of referenced standard.
192	Version ID	Identifier	e.g. 6.1	The identifier for the version of this referenced standard.
193	Scheme Identity	Text		The scheme identity, expressed as text, for this referenced standard.
194	Scheme URI	Identifier		The scheme Uniform Resource Identifier (URI) for this referenced standard.
195	Referenced Waste Transport	Entity		A reference to a conveyance of unused or unwanted physical matter from one place to another.
196	Consignment ID	Identifier		The identifier of the consignment of this referenced waste transport.
197	Waste Classification	Code		The code specifying the type of waste of this referenced waste transport.
198	Net Weight Measure	Measure	e.g. 20 Tonnes etc.	The measure of the net weight of this referenced waste transport.
199	Size Matrix	Entity		A structured arrangement of elements in rows and columns, forming a rectangular grid-like structure for expressing the country and size such as for a garment or footwear product.
200	Size	Code	e.g. XL	The code specifying the size for this size matrix.
201	Country	Code	e.g. USA	The code specifying the country for this size matrix.
202	Substances of Concern	Entity		Substances of concern are chemicals or materials that raise environmental, health, or safety risks due to their potential adverse effects on ecosystems, human health, or both.

#	Name	Data Type	Example	Definition
203	ID	Identifier	e.g. CAS number	The identifier of this substance of concern.
204	Type	Code	e.g. code for heavy metals, persistent organic pollutants (POPs), pesticides and herbicides, volatile organic compounds (VOCs) etc.	The code specifying the type of substance of concern.
205	Classification	Code	e.g. CO2, CH4, N2O, SO2, microplastics etc	The code specifying the category of this substance of concern.
206	Name	Text	e.g. CAS name	The name, expressed as text, of this substance of concern.
207	Maximum Permitted Limit	Measure	e.g. in ppm	The measure of the maximum permitted limit for this substance of concern.
208	Traceability Information	Entity		Information referring to the ability to track and document the history, origin, and movement of a product or item throughout its entire lifecycle, from raw materials or inception to the point of consumption or disposal.
209	Supplier Global ID	Identifier	e.g. EORI, GLN	The global identifier of the supplier specified in this traceability information.
210	Customer Global ID	Identifier	e.g. EORI, GLN	The global identifier of the customer specified in this traceability information.
211	Data Provider Global ID	Identifier	e.g. EORI, GLN	The global identifier of the data provider specified in this traceability information.
212	Facility Global ID	Identifier	e.g. GLN, OARID	The global identifier of the facility specified in this traceability information.
213	Product Global ID	Identifier	e.g. GTIN	The global identifier of the product specified in this traceability information.
214	Product Unit	Quantity	e.g. 100 pieces	The number of product units specified in this traceability information.
215	Component Material	Indicator	e.g. Yes	The indication of whether or not this traceability information relates to a component material.
216	Process	Code	e.g. code for Weaving	The code specifying the process specified in this traceability information.
217	Processing	Date Time		The date or date time of processing specified in this traceability information.
218	URI	Identifier	e.g. URL or URN	The Uniform Resource Identifier (URI) specified in this traceability information.

Table 14 Business Information Entities of the Product Circularity Data structure

401

402 7.3.2 Business code lists

403 Codes and identifiers are essential components of any Machine-To-Machine information flow. They
 404 have been developed over time to facilitate the flow of standardized data that can be easily validated
 405 for correctness to ensure consistent semantics (e.g., plain text versus coded text).

406 In the table 15 below, all code lists are listed which can accommodate many of the attributes used
 407 within the product circularity data structure. A number of code lists are already available at UNECE,
 408 such as the unit of measure (UoM). Most, if not all, UNECE code lists can be used globally and by

409 different industries. A number of code lists might be specific for the textile and leather sectors, such
 410 as for product and material classification. Because of this UNECE published the Reference Guide on
 411 Code Lists and Identifiers in the Textile and Value Chain⁷. This use case expresses additional
 412 requirements for code lists. In the table 15 below, the agency ‘external’ is used to indicate that the
 413 code list is not available at UNECE. The code list might be maintained by an external agency but
 414 could be developed by UNECE. UNECE maintains a number of recommended code lists which are
 415 adopted by many standards development organizations. The sub-components of a code list allow the
 416 specification of the code list ID, the name of the code list, the agency of the code, the version of the
 417 code list when exchanging data. This makes the data structure also reusable for other industries,
 418 especially concerning the industry code lists code lists, such as for product classification.
 419

Code list details		
Agency	Code List	Examples
UNECE	Additional Information Type Code (Document Name Coded)	e.g. code for Digital picture Logo etc
External	Assurance Level Code	e.g. code for Certified by Third Party Verified by Third party Verified by Second Party Self-Assessed Self-Declared etc.
UNECE	Available Services (Process Code)	e.g. code for Repairing Refurbishing etc.
External	Certification Referenced Standard	e.g. code for GOTS version 6.1 ZDHC version 1.0 etc.
UNECE	Conformity Subject Type Code	e.g. code Product Process Organization etc.
External	Circular Design Type Code	e.g. code for Designed for Modularity Designed for Transformability Designed for Durability Designed for Reliability Designed for Use of Sustainable Chemicals Designed for Use of Safe Chemicals Designed for Minimum Water Consumption Designed for Minimum Energy Consumption Designed for Upgradability Designed for Recoverability Designed for Light Weight Packaging Designed for easy non-destructive disassembly and re-assembly etc
External	Circularity Characteristic Type Code	e.g. code for: Disassembling Skills Level Reusability Purpose Type

⁷ [https://unece.org/sites/default/files/2023-07/ECE TRADE C CEFAC T_2022_INF1E_0.pdf](https://unece.org/sites/default/files/2023-07/ECE_TRADE_C_CEFAC T_2022_INF1E_0.pdf)

Code list details		
Agency	Code List	Examples
		Remanufactured Item Availability Guarantee Refurbished Item Availability Guarantee Product Expected Life Time Period Material Homogeneity etc
External	Consumer Gender Code (Gender Code)	e.g. code for: Male Female Not known Etc.
External	Consumption Classification Code	e.g. code for: Low Carbon Energy Use Source Percentage Per KG of Product Maximum Pesticides Crop Protection Materials Weight Measure Maximum Fertilizer Crop Protection Materials Weight Measure Maximum Chemical Consumption Per kg or Product Unit Washing & Drying Energy Consumption Renewable Energy Sources Use Percentage Maximum Chemical Consumption Measure Per KG/Unit Maximum Energy Consumption Measure Per KG/Unit Annual Maximum Energy Consumption Maximum Chemical Consumption Measure during Production Maximum Energy Consumption Measure during Production etc.
UNECE	Consumption Source Process Code (Process Code)	e.g. code for: Washing Drying Transporting etc.
UNECE	Country Code	e.g. UK NL etc
UNECE	Country Code for Size (Country Code)	e.g. UK NL etc
UNECE	Country of Origin Code (Country Code)	e.g. UK NL etc.
UNECE	Currency Code	e.g. EUR, USD (from ISO 4217)
External	Data Carrier Data Standard	e.g. code for GS1 Standard etc.
External	Data Carrier Layout Code	e.g. code for layout that enables compare product performance.
External	Data Carrier Material Code	e.g. code for Product Label Tag Fabric (printed/woven on/in the fabric) etc.
External	Data Carrier Position Code	e.g. code for Collar Zipper Etc

Code list details		
Agency	Code List	Examples
External	Data Carrier Type Code	e.g. code for QR NFC RFID etc.
UNECE	Date or time or period format code	e.g. 710 (from UNECE 2379 code list)
External	Disassembling Skills Level Code	e.g. code for High Trained Staff Medium Trained staff Low/Basic Trained staff etc.
External	Emission Classification Code	e.g. code for: Plastic Waste, Annual Plastic Waste Packaging Waste Annual Packaging Waste Waste Water Release Microplastics Release etc
External	Environment Type Code	e.g. code for: Soil Water Air
External	Environment Type Code	e.g. code for Soil Water Air
External	Environmental Impact Category Code	e.g. code for Carbon (e.g. for footprint per value chain stage) Climate Change Deforestation etc
External	ESG Report Type Code (Document Name Codes)	e.g. code for: Sustainability Report Due Diligence Report etc.
External	ESG Score Index Category Type	e.g. CDP EPI SDG OHI etc.
External	ESG Score Index Type	e.g. code for Sustainable Sensitivity Stress and Aging Resistance Repairability Resource Consumption Recyclability Re-usability Disassembly Consumer Waste Ease of Re-Use etc.
UNECE	Exchanged Document Type (Document Name Codes)	e.g. code for Product Circularity Data
UNECE	Facility Type Code (Location Function Code)	e.g. code for: Production Facility

Code list details		
Agency	Code List	Examples
		Retail Facility Waste Incineration Facility Industrial Composting Facility Waste Collection Centre Refurbishment Centre etc.
External	Instructions Type Code	e.g. code for Safe Use Instructions Care Instructions Return Instructions Handling Instructions Repair Instructions Disassembling Instructions Recycling Instructions Producers Disposal Instructions Consumer Disposal Instructions End of lifetime instructions etc.
External	Label Content Code	e.g. code for Product Composition (e.g. 80% Cotton, 20% Polyester) QR code etc.
External	Label Type Code	e.g. code for: Care Label EU Product Label EU Eco Label and Parameters CE Mark Brand Label Flag label (buyer's brand name) Size Label Composition label etc.
External	Leather Product Grade Code	e.g. code for grade of leather products Top-grain etc.
External	Material Category	e.g. code for: Syntactic fibres Natural fibres etc
External	Material Type	e.g. code for: Cotton Wool etc.
UNECE	Party Role	e.g. code for: Manufacturer Importer Retailer etc.
External	Product Category Code	e.g. code for: Jacket Pants Blouse Shirt etc or cashmere, wool, cotton, latex ect.
External	Product Classification Code	e.g. taric code

Code list details		
Agency	Code List	Examples
External	Product Colour	e.g. code for: Brown White etc
External	Product Finishing Treatment Code	e.g. code for: Dyeing Printing Coating Embossing Oil-repellent Water-repellent etc
External	Product Hierarchy Level Code	e.g. code for: Product Model (class) Product Batch Product Item (instance)
External	Product Pattern Code	e.g. code for: Dotted etc.
UNECE	Product Status Code	e.g. code for Unsold Returned Refurbished Repaired Etc.
External	Product Type Code	e.g. code for: Clothing Footwear Accessories etc or for animal-based fibres, plant-based fibres, synthetic fibres.
UNECE	Production Process (Process Code)	e.g. code for: Washing Drying Transporting etc.
UNECE	Referenced Document Type (Document Name Coded)	e.g. code for: Conformity Declaration EU Conformity Declaration Inspection Results Test Results Chemical Safety Assessment Test Protocol Access Conditions etc.
External	Re-use Purpose Type	e.g. code for: Suitable for repair Suitable for remanufacture Suitable for refurbishment Suitable for repurpose etc.
External	Size Code	e.g. S M XL Etc.

Code list details		
Agency	Code List	Examples
UNECE	Source Process Code (Process Code)	e.g. code for: Washing Drying Transporting etc.
External	Source Type	e.g. code for: PET bottles etc
External	Species Code	e.g. for code for products-based products Crocodile species Snake species etc.
External	Substance Classification Code	e.g. CO2 CH4 N2O SO2 Microplastics Dyeing Stuff Print Material etc
External	Substance of Concern Type Code	e.g. code for: Heavy Metals Persistent Organic Pollutants (POPs) Pesticides and Herbicides Volatile Organic Compounds (VOCs) etc
External	Consumer Products Classification	e.g. code for: Garments Footwear etc.
UNECE	Volume Unit of Measure Type	e.g. LTR, M3
		H87 = Piece 58 = Net Kilogram MTR = Meter etc
External	Water Characteristic Code	e.g. code for: Water Proof Water Resistant etc.
UNECE	Weight Unit of Measure Type	e.g. code for: KGM etc.

Table 15 Code Lists for Business Information Entities of the Product Circularity Data structure