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**WORKSHOP**

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**AGREEMENT**

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## Guidelines to create a Digital Product Passport - the EU project CircThread experience

This CEN Workshop Agreement has been drafted and approved by a Workshop of representatives of interested parties, the constitution of which is indicated in the foreword of this Workshop Agreement.

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**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

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## **Foreword**

This CEN Workshop Agreement (CWA 18186:2025) has been developed in accordance with the CEN-CENELEC Guide 29 “CEN/CENELEC Workshop Agreements – A rapid way to standardization” and with the relevant provisions of CEN/CENELEC Internal Regulations - Part 2. It was approved by a Workshop “Guidelines to create a Digital Product Passport”, the secretariat of which is held by “UNI” consisting of representatives of interested parties on 2025-05-05, the constitution of which was supported by CEN following the public call for participation made on 2024-06-24. However, this CEN Workshop Agreement does not necessarily include all relevant stakeholders.

The final text of this CEN Workshop Agreement was provided to CEN for publication on 2025-05-13.

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The following organizations and individuals developed and approved this CEN Workshop Agreement:

- Rembrandt Koppelaar – Chairperson, EcoWise Ekodenge Ltd.
- Eniko Hajosi – Vice-Chairperson, WEEE Forum
- Fabio Rossi – Secretary, UNI Ente Italiano di Normazione
- Claudio Perissinotti Bioni – Secretary Support Team, UNI Ente Italiano di Normazione
- Lama Al Fakhri – Panasonic R and D center Germany
- Silvia Alessi – European Garden Machinery Industry Federation
- Natalie Alligier – L’Oréal S.A.
- Fabian Anzmann – DIN
- Iqbal Ashar – H & M HENNES & MAURITZ GBC AB
- Krstin Bartsch – RecycleMe GmbH
- Abhishek Basavaraj Veena – Panasonic R and D center Germany
- Eric Bayrhammer – Fraunhofer IFF
- Tami Benge – Shell Deutschland GmbH
- Cristina Berrocal – GSR-Services
- Geraldine Brennan – Irish Manufacturing Research
- Stéphan Bonnet – RENAULT
- Nicole Borho – DAW
- Emilja Bozhinovska – Ricoh Europe
- Larissa Budde – Chemical Check GmbH

## **CWA 18186:2025 (E)**

- Fernando Burgoa Francisco – Fundacion CARTIF
- Charles Cao – TÜV Rheinland LGA Products GmbH
- Ana Carolina Chaves – INESC TEC
- Andrea Centurioni – Erion Compliance Organization
- Gessica Ciaccio – ENEA – CROSS Laboratory
- Amba Concheso – DSS Sustainable Solutions UK Limited
- Radha Daniel – DSS Sustainable Solutions UK Limited
- Ann Dao – e.Circular ApS
- Piero De Sabbata – CSolutions
- Brent Deelkens – Toro Europe
- Gustav Dengel – Jokey Gummersbach SE
- Murphy Dermot – Irish Manufacturing Research
- Cristina Di Maria – UNI Ente Italiano di Normazione
- Michael Dill – GEFEG mbH
- Marcel Dutrieux – Toro Europe
- Slavko Dvoršak – Surovina d.o.o.
- Robert Eckert – Aliaxis Deutschland GmbH
- Marta Epifanio – Independent Professional
- Cintia Escandell – COMET GLOBAL INNOVATION
- Karin Eufinger – Centexbel
- Tim Farnham – Toshiba Europe Ltd
- Francesca Fattori – Erion Compliance Organization
- Adriano Ferrara – UNI Ente Italiano di Normazione
- Carla Fité Galan – Universitat Politècnica de Catalunya (UPC)
- Tina Frangez – Surovina
- Alessandro Fontana – SUPSI
- Federica Fugaroli – UNI Ente Italiano di Normazione
- Fatlum Gashi – ETRMA

- Andreas Gerstner – Webasto Roof % Components SE
- Heinz Graf – GS1 Switzerland
- Stefan Grossman – Sopro Bauchemie GmbH
- Dominik Halbeisen – GS1 Switzerland
- Sonja Hanebaum – Industrieverband für Hygiene und Oberflächenschutz in der prof. Reinigung
- Andreas Helm – DIN
- Lucia Herreras Martinez – WEEE Forum
- Stefan Kaessler – Mitsubishi Electric Europe B.V.
- David Keeley – Irish Manufacturing Research
- Maximilan Kuhn – Hydrogen Europe
- David Ladendorf – SELIT Dämmtechnik GmbH
- Margaux Le Galloux – Environmental Coalition on Standards
- Nicolas Lecocq – L'Oréal S.A.
- Peter Leinemann – European Pallet Association
- Deborah Leone – SUPSI
- Ronald Liebsch – Julius Blum GmbH
- Carissa Lim – SHEIN
- Edvin Lindgren – Hitachi Energy
- Niko Mainz – Hettich Management Service GmbH
- André Malitte – BSH Hausgeräte GmbH
- Julian Maras – GEFEG mbH
- Patricia Massey – BEAMA
- Janez Matavs – Gorenje
- Peter Mayer – IFT Rosenheim
- Zahra Medipour – TerraNEXT.io
- Ales Mihelic – Gorenje
- Bianca Mitsuoka – TÜV Rheinland LGA Products GmbH
- Elena Mocchio – UNI Ente Italiano di Normazione

## **CWA 18186:2025 (E)**

- Volker Molthan – BUND e.V.
- Claudia Mommer – Lenzing AG
- Jens Niessmann – Reclay Systems GmbH
- Ana Nunes Alonso – INESC TEC
- Kristina Obu Vazner – Gorenje
- Renato Ottone - ISONORM
- Dino Paolucci – Bridgestone Europe NV/SA Italian Branch
- Nino Papukashvili – Shell Deutschland GmbH
- Benedetta Piantoni – Sony Europe
- Rosario Pirrotta – SUPSI
- Pedro Portella – Fraunhofer-Institut für Werkstoffmechanik IWM
- Albertus Pretorius – Tonnjes ISI Patent Holdings GmbH
- Carolin Prinz – ECLASS Association
- Valentina Rangel Leon – Irish Manufacturing Research
- Anibal Reñones – Fundacion CARTIF
- Sophie Reynolds – Irish Manufacturing Research
- Giacomo Riccio – UNI Ente Italiano di Normazione
- Felix Riesemann – Seven Shots Creative Solutions e.U.
- Paula Rodrigues – CITEVE
- José Saenz – Fraunhofer IFF
- Fausto Sainz Salces – COMET GLOBAL INNOVATION
- Magnus Sandell – Toshiba Europe Ltd
- Jun Sato – Toshiba Europe GmbH
- Kelly Scherer – The German Cosmetic, Toiletry, Perfumery and Detergent Association
- Stephan Scheuer – TÜV Rheinland LGA Products GmbH
- Christian Schiller – Cirplus GmbH
- Christine Elisabeth Schneider – BASF SE
- Martina Schönnenbeck – VCI – German Chemical Industry Association e.V.

- Maximilien Schrub - Fairly Made
- Fried Schutze – Ifm efector GmbH
- Carla Silva – CITEVE
- Jagdeep Singh – Toshiba Europe Ltd
- Tomas Skersys – Faculty of Informatics, Kaunas University of Technology
- Anastasiia Skoropad – Cirplus GmbH
- Ye Song – SHEIN
- Cristovão Sousa – INESC TEC
- Juergen Steinhauser – ELESTA GmbH
- Peter Van Der Berghe – Associated Weavers Europe BV
- Kristiina Valtanen – VTT Technical Research Centre of Finland
- David Villamil – SEW-EURODRIVE
- Christian Vinson – Kalei
- Maximilian Voigt – ANEC
- Dirk Vogt – Toshiba Europe GmbH
- Michela Vuerich – ANEC
- Andrea Wade – Viessmann Climate Solutions SE
- Michelle Wagner – WEEE Forum
- Manfred Weidlich – GEA Group AG
- Ricardo Weigend Rodriguez – Ramboll UK
- Ulla Weissbach – Gemeinschaft umweltfreundlicher Teppichboden e.V. (GUT e.V.)
- Roman Winter – GS1 Germany GmbH
- Andreas Woest – IFT Rosenheim
- Emre Yontem – EcoWise Ekodenge Ltd.

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## Introduction

### Purpose of the CEN Workshop Agreement

The CEN Workshop Agreement is a guidance document designed to support SMEs and economic actors to understand how to design Digital Product Passports. It informs about the options available in configuring a DPP and the impact of particular DPP design decisions, including information exchange opportunities that can enhance sustainability and product circularity.

The CWA is intended for the person responsible in a company tasked with deciding on the DPP IT implementation or tasked with setting up a procurement brief to contract an external vendor to implement their DPP. The person effectively takes on a new role as ‘DPP designer’ which can become a formalized role in the future.

The CWA is also broadly useful for economic actors that manage or create information about a product during its life cycle, to understand how DPPs can unlock new information exchanges.

The Digital Product Passport (DPP) can be considered as a digital identity card for products, components and materials, that is officially registered with a government authority, which stores relevant information to support a product’s sustainability, promote their circularity characteristics and strengthen legal compliance. The official definition of a DPP under the Ecodesign for Sustainable Products Regulation under article 2 is “a set of data specific to a product that includes the information specified in the applicable delegated act adopted pursuant to Article 4 and that is accessible via electronic means through a data carrier in accordance with Chapter III.”

A DPP introduces on top of physical product labels a digital portal, as a single access point of information for a product, accessible via a scannable data carrier on the label, as well as via weblinks.

### Product groups requiring a Digital Product Passport under EU regulations

The EU Ecodesign for Sustainable Products Regulation (ESPR) is a framework regulation approved in June 2024 which considers new performance requirements and information provisioning requirements using DPPs for companies that place products on the EU market.<sup>1</sup> The first work programme under the ESPR regulation for the period 2025-2030 was released in April 2025 by the EU Commission, which outlines which product groups will require a DPP with ecodesign information to be released on the EU market. In 2028, the first work-programme will be reviewed and revised, which can result in the introduction of more product groups to require a DPP in the future.

The ESPR includes the possibility to set sustainability and circularity performance requirements that are wide-ranging. These can include environmental aspects such as water consumption and carbon emissions requirements, to product durability, reusability, upgradability and repairability requirements, as well as remanufacturing and recycling performance requirements. For example, an information requirement is the % of recycled content of a product, and a performance requirement is a minimum of 15% recycled content by a specific date.

The requirement for a Digital Product Passports does not only come from the ESPR regulation, but also from other regulations such as the EU battery regulation, the EU toy safety regulation, the EU construction products regulation, and so forth. Specific EU regulations can therefore mandate a DPP in the future with a difference in regulatory focus, where the ESPR focuses on product ecodesign and environmental performance, the toy safety regulation focuses on safety of substances contained in toys, for example.

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<sup>1</sup> Placing on the market is a legal term that refers to when a product is first made available for sale in the EU, while selling products on the EU market refers to the act of selling those products to consumers

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Based on the current EU regulatory landscape, product groups for which products should have Digital Product Passports to be sold on the EU market in the 2028-2033 period, include:

- Batteries with a capacity over 2 kWh, under the EU batteries regulation<sup>2</sup>,
- Iron, steel and aluminum products. under the EU ESPR regulation,
- Textiles focusing on garments (excl. footwear and home textiles), under the EU ESPR regulation,
- Furniture. under the EU ESPR regulation,
- Mattresses, under the EU ESPR regulation,
- Toys, under the revised EU toy safety regulation<sup>3</sup>,
- Detergents under the pending revised Detergent & Surfactant regulation, but – not -under the EU ESPR regulation <sup>4</sup>,
- Construction products, under the revised EU CPR regulation<sup>5</sup>,
- Motor vehicles by 2034/2035, under the pending EU regulation on end-of-life of vehicles<sup>6</sup>.

In addition to the above, tyres, most appliances, some electronic products including TV screens and electric motors and welding equipment, and other energy-using products such as electric vehicle chargers, are also covered under the first work-programme of the EU ESPR. These products will be required to update or introduce ecodesign requirements, however, a DPP for these products will not be mandatory given existing labelling under the EPREL database<sup>7</sup>, unless it is concluded after careful assessment by the EU commission that the existing energy labelling approach is unable to provide the most relevant information for consumers.

In the case of construction products, a dedicated 2-year work-program is in preparation for the 36 groups of construction products, which will set initial deadlines for the first sets of construction products required to have a DPP, and by when the standards for these will need to be delivered, that will define mandatory information requirements. This construction product work-program is expected to be released in Q2 2025 by the EU Commission.

Other products that are also considered for DPPs, but are expected to be prioritized in later ESPR work-programs or under other future EU regulations, include:

- Fertilizers
- Footwear
- Ceramic products
- Chemical products

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<sup>2</sup> The [EU regulation concerning batteries and waste batteries, amending Directive 2008/98/EC and Regulation \(EU\) 2019/1020 and repealing Directive 2006/66/EC.](#)

<sup>3</sup> Expected based on the revised [EU toy safety regulation](#) under negotiation by the EU institutions.

<sup>4</sup> Proposal for a regulation of the European Parliament and of the Council on detergents and surfactants, amending Regulation (EU) 2019/1020 and repealing Regulation (EC) No 648/2004.

<sup>5</sup> Expected based on the revised [EU Construction Products Regulation](#) under negotiation by the EU institutions

<sup>6</sup> Expected based on the [EU regulation on circularity requirements for vehicle design and on management of end-of-life vehicles](#), amending regulations (EU) 2018/858 and 2019/1020 and repealing Directives 2000/53/EC and 2005/64/EC.

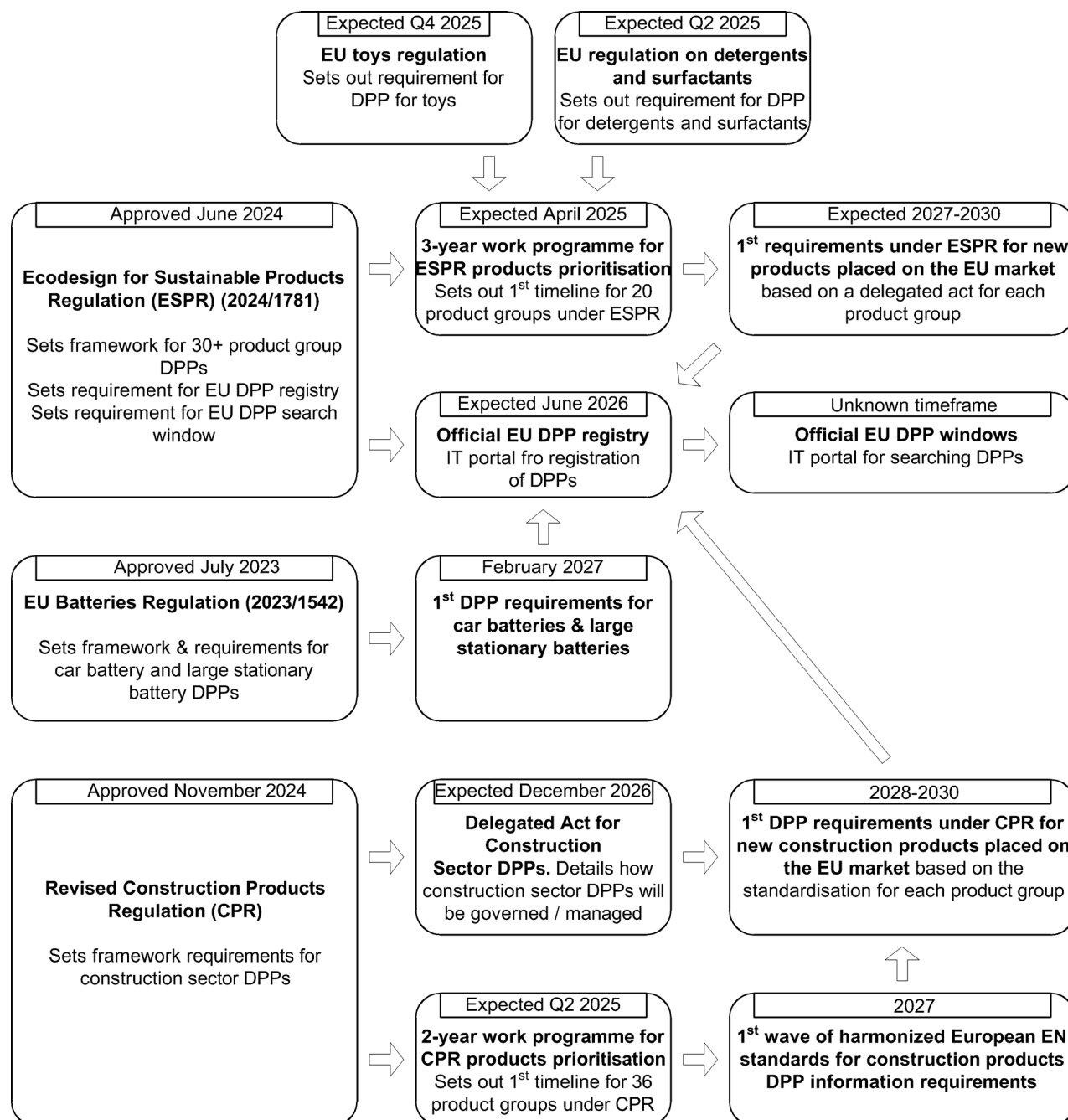
<sup>7</sup> <https://eprel.ec.europa.eu/screen/home>

- Paints and varnishes
- Lubricants
- Cosmetic products
- Fishing nets and gears
- Adsorbent hygiene products
- Nonferrous metals
- Plastics and polymers
- Pulp and paper and boards
- Glass

Products that are - excluded - from requiring a DPP in the future under EU regulations as listed in the ESPR regulations under Article 1 include food, feed, medicinal products, veterinary medicinal products, living plants, animals and micro-organisms, products of human origin, products of plants and animals, and vehicles.

Regardless of the product group, all DPPs will need to be registered and will be overseen in the same EU system, through first a central registry that will be in operation by 2026, and second a viewing portal for public and restricted data in the DPP for which a date has not yet been determined.

To make this more visual, an overview of the main regulations and DPP requirements as described above, and how they relate can be found in Figure 1 below:



**Figure 1 — Overview of EU regulations relating to Digital Product Passports and requirements**

**NOTE** The work programme for ESPR products prioritization has been approved in April 2025, and it has been extended to 5 years. It is highlighted that, due to the frequently changing regulatory landscape, some other information may be outdated over time.

### Background to the CEN Workshop Agreement: the CircThread project

The CEN Workshop Agreement has collected information from the experiences in the EU funded CircThread project, [www.circthread.com](http://www.circthread.com), lasting from 2021 to 2025. The main objective of CircThread is to advance a circular economy information system that can help make products sustainable from circularity, environmental and social perspectives. A key means to achieve this is by enabling the information flow across the product life cycle to swiftly increase product lifespan, reparability and reuse. And to ensure that products are properly recycled when they are no longer repairable. To ensure that

more materials and products stay in the economic loop, benefitting the sustainability of the economy and the environment and reducing carbon emissions. This is necessary since our economy is highly dependent on mining and extracting virgin resources in linear polluting systems. Overall, the European economy was estimated to be only 11.5% circular in 2022, in terms of used material resources being recovered and returning back into economic activity (Eurostat 2024).

The main work informing this CWA are the efforts the 34 CircThread partners spent on evaluating different information exchange requirements for a circular economy, and how these can be managed in an information system with all actors across the product life cycle, using various services including Digital Product Passports.

The CircThread route to solve this challenge, to make the economy more circular, is the delivery of an information platform that enables sharing of critical product information between all actors, including product designers, manufacturers, retailers, citizens, consumer organisations, repairers, reuse organisations, and recyclers. This is needed to alleviate the poor information flow at present about the end-of-use and end-of-life stages after a product is sold. For example, linked to the remaining value of end-of-use products or information for design or recyclability improvements. This can include a list of simplified parts in the product for recovery, a product's use & reuse history, and repair logs, or materials and chemicals content of particular components.

The information flow across all stages of a products life cycle is crucial for supporting circularity and promoting sustainable decision-making. This process helps consumers make better decisions, to extend product lifespan, and encourage decision making towards reuse and recycling. Ultimately, these actions contribute to enhanced circularity, resulting in reduced costs and improved product sustainability.

The core of this effort is to capture the journey of a product across its lifecycle, also referred to as a Circular Digital Thread, where information at each stage relevant to decision making for all actors involved in the life cycle of a product is captured and shared. Either during the same life cycle stage, or across stages as part of a feedback process, or for future information decision making about the product at end-of-use (for repair and reuse) and at end-of-life (for spare parts recovery and/or recycling).

The CircThread platform, product information management to enable greater circular economy of products, is under development as an open-source software platform. It will allow for orchestration of the different actors involved during the life cycle of products, as platform users, based on interoperable information management using core services including:

- Digital Product Passport services;
- A product documentation catalogues for information capturing and exchange;
- A dataspace for sensitive information sharing.

The CircThread project will deliver the platform in the cloud in 2025. Equipped with services for collaboration, trust and security. Tested before launch in three pilots, in Slovenia, Spain and Italy together with manufacturers, repairers, retailers, collectors, consumer organisations, recyclers and many others.

## **1 Scope**

This document defines guidelines for setting up Digital Product Passports (DPPs) based on different DPP design options. The scope of the CWA is product agnostic, in that most of the content can apply to any type of product. However, there are specific aspects provided in terms of information exchanges that relate only to particular products, such as repair information. Noting also that the EU ESPR regulation applies to both intermediate and final products placed on the EU market, depending on the requirements as set in a particular delegated act for a product group.

The guidelines provide the context under which DPPs are emerging in the EU market, a description of potential information sharing use cases, and a decision guidance for deciding on a DPP variant to implement for a company, either directly or through a third-party service. The variations in DPP in this CWA refer to the difference in DPP design choices due to the options available as outlined in Clause 5, which can result in many DPP variants. The guidance is informed by and contrasted with the CircThread project delivery of a user ecosystem for dynamic product life cycle information management for a circular economy.

The overall goals of the CEN Workshop developed CWA are:

- a) provide context and guidance for companies to setup DPPs for their products.
- b) provide information for wider product life cycle economic actors, in describing DPP based exchange possibilities that provide information sharing benefits for these actors. To improve companies and wider life cycle economic actors' ability to engage with each other in enhancing DPPs to unlock joint information sharing benefits.

This document is intended to be used first by a DPP designer, a new role necessary for companies that want to or are required legally to have a DPP for their products. Second, for economic actors that want to understand how DPPs can support their activities by enabling new information generation mechanisms and sharing for a circular economy. This document supports companies and economic actors in development of their digital product passport.

## **2 Normative references**

There are no normative references in this document.

## **3 Terms and definitions**

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <http://www.iso.org/obp/>
- IEC Electropedia: available at <http://www.electropedia.org/>

### **3.1**

#### **circular economy**

economic system that uses a systemic approach to maintain a circular flow of resources, by recovering, retaining or adding to their value, while contributing to sustainable development

[SOURCE: ISO 59004:2024, 3.1.1]

**3.2****digital product passport (DPP)**

digital identity card for products, components and materials, which is officially registered with a government authority, that stores relevant information to support a product's sustainability, promote their circularity characteristics, and strengthen legal compliance

**3.3****data carrier**

object or item that contains data

[SOURCE: ISO/IEC 21964-1:2018, 2.3]

**3.4****Product model DPP**

Digital Product Passport that contains information content relating to a version of a product for which several to many products are manufactured

**3.5****Product batch DPP**

Digital Product Passport that contains information content relating to a product batch, as well as content that it inherits from a product model DPP, suitable for event tracking and updating in logistics

**3.6****Product batch**

specific quantity of a product with uniform character and quality, within specified limits, and is produced according to a single manufacturing order during the same cycle of manufacture

[SOURCE: ISO 11615:2017, 3.1.8, modified]

**3.7****Product item DPP**

Digital Product Passport that contains information content relating to a unique instance of a product as well as content that it inherits from a product model, suitable for events tracking and updating in both supply chains and the product life cycle

**3.8****DPP designer**

role of a person who is made responsible for deciding on the DPP IT implementation or tasked with setting up a procurement brief to contract an external vendor to implement their DPP

Note 1 to entry: Whilst DPP designer is deemed the appropriate naming under this CWA, particular companies may have different wordings for this role such as DPP manager, DPP executive, or another naming.

## 4 Circular Information Exchange System Framework

### 4.1 DPP information exchange landscape

The utilisation of Digital Product Passports here is described from a communication and information exchange vehicle perspective, beyond regulatory requirements. There are many optional possibilities to use DPPs as an information capturing and exchange system in both B2B and B2C contexts that should be considered by a DPP designer.

DPPs strengthen and enables four distinct information exchange contexts:

- a. Supply chains. Product information generated and shared within supply chains in a B2B context. For example, technical product specifications shared between a manufacturing supplier and a manufacturer, or part of a bill of materials for declaring material or chemicals data for supply chain traceability.

Here, Digital Product Passport provide benefits in enabling standardisation of information, which can lower the cost of supply chain management, and support supply chain transparency, by creating more uniform data formats between supply chain tiers.

- b. Product sales & use. Product information generated by the manufacturer/producer and shared for sales and product use purposes in a B2B or B2C context. For example, an energy label, ingredients list<sup>8</sup>, use directions, or other available information for the product.

In this context, Digital Product Passports provide digital technology capabilities over physical labels with limited space on a product. This allows for sharing more information, more communicable media (e.g. pictures, video) and enables greater information transparency. They can also provide market benefits, outside of the regulatory requirements, by enabling users to provide usage feedback that can be uploaded to the DPP, for individual item DPPs.

- c. Product life cycle. Production information generated and shared during the product life cycle between economic actors and the manufacturer/producer. For example, a repair status update and repair log.

Here, Digital Product Passports provide benefits at batch and individual item level, by enabling information updates across the life cycle such as event updates and log updates. DPPs unlock this capability for a broad range of product categories, which can greatly support circularity decision making by company and economic actor employees. For example, by introducing repair logs or adding product usage information in the DPP, linked to repair or usage events.

- d. Compliance with the EU market. Product when placed on the EU market needs to undergo a procedure to prove its compliance with the EU market rules, and also once sold their compliance needs to be verified by customs for import/export purposes, and by market surveillance authorities.

Here, Digital Product Passports provide benefits to automate compliance checks, both improving the scale at which compliance can be established and to lower the cost of compliance management for public authorities. Significantly benefitting companies that have processes in place to ensure compliance by creating a level playing field.

In each of these contexts the DPP designer can establish what information is useful to manage within their DPP, so as to provide value-added information exchange benefits of their DPP system. Here the DPP

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<sup>8</sup> An ingredients list is a listed overview of ingredients in foodstuffs (not covered by the requirement to have a digital product passport), chemical products and personal care products, where an ingredient can be defined as any substance deliberately added which will remain in the finished product, even in an altered form.



designer should consider both the mandatory data requirements, and value-added information data and their exchanges for their company that is optional.

**NOTE** Mandatory data requirements are at the time of this CWA not yet available. They should be established in delegated acts per product group under the ESPR, and in standards per construction product group under the CPR, as described in the section “Purpose of the CEN workshop agreement”.

In the next sections a systematic overview is provided of information exchange possibilities for each context. DPP information management here includes deciding upon what information is publicly available and which information on a restricted basis only to particular parties. To this end software user roles can be set to determine for restricted data who has access to which data with a login or other forms of authentication, whilst public data should be available without requiring any logins and personal data collection.

## 4.2 DPP information exchange possibilities for supply chain context

The supply chain for a product can be split into different tiers from the original material source to the final product. To simplify we refer to raw material supplier, manufacturing supplier, and manufacturer, as stages in producing a final product that can be sold in a B2B or B2C context. Each of the three actors can setup a DPP for their product with information that can be exchanged between them. A complex product manufacturer, or a large multinational with many products, could thereby receive DPP managed information from 1000s of manufacturing suppliers. Or a raw material supplier could provide materials specifications in their DPP for batches of sold materials to manufacturing suppliers.

A number of information exchange possibilities for the supply chain are specified in table 1 below. Actors involved include Raw Material Supplier (RMS), Manufacturing Supplier (MS), Chemical Manufacturing Supplier (CMS), Manufacturer (M), Reuse Operator (REU), and Recycler (REC). This is not an exhaustive list but provides for many common exchange needs.

**Table 1 — Supply chain information exchange possibilities for DPPs**

No.	Exchange actors*	Information set	Possible content	Related standards or technical reports
1.	RMS → MS REC → MS	Raw material or secondary raw material sourcing data	RMS name, address, Global Location Number (GLN), latitude & longitude, transport data between locations.	ISO/IEC 6523-1:2023 <sup>9</sup> ISO/IEC 15459-1:2014 GLN allocation rules standard <sup>10</sup>
2.	MS → M	Component sourcing data		
3.	CMS → M	Process chemical sourcing data		
4.	RMS → MS REC → MS	Raw material or secondary raw material composition data	Material class, Mass information, mass content range, mass content threshold	ISO/IEC 82474-1:2025 <sup>1</sup>
5.	MS → M	Component material composition data		

<sup>9</sup> <https://www.iso.org/standard/82246.html>

<sup>10</sup> <https://www.gs1.org/standards/gsl-gln-allocation-rules-standard/current-standard>

No.	Exchange actors*	Information set	Possible content	Related standards or technical reports
6.	MS → M	Component critical raw materials data		
7.	CMS → M	Process chemical declaration data	Declarable substance(s), Declarable substance group(s), Other substance(s), Process chemical, product life cycle stage, process name, mass content, mass content range, mass content threshold	
8.	MS → M	Component substance declaration	Declarable substance(s), declarable substance group(s), mass content, mass content range, mass content threshold	
9.	RMS → MS	Raw material production environmental data	Functional unit, unit amount, boundary process description, reference period, geographic scope, global warming potential, ozone depletion, acidification, eutrophication freshwater, eutrophication marine, eutrophication terrestrial formation potential of tropospheric ozone, eco-toxicity (freshwater), human toxicity, ionising radiation, PM emissions, abiotic depletion of minerals & metals, depletion of fossil fuels, hazardous waste disposed, non-hazardous waste disposed, radioactive waste disposed	EN ISO 14044:2006 <sup>11</sup>
10.	MS → M	Component production environmental data		
11.	REU → M	Reusable component recovery environmental data		
12.	CMS → M	Process chemical environmental data		
13.	RMS → MS REC → MS	Raw material or secondary raw material production resource use data	Use of primary material, use of secondary material, use of renewable energy, use of fossil fuels, use of fossil fuels as raw materials, use of water, use of net fresh water	
14.	MS → M	Component production resource use data		
15.	CMS → M	Process chemical resource use data		
16.	RMS → MS REC → MS	Raw material or secondary raw material production carbon data	Declared unit, unit amount, boundary process description, reference period, geographic scope, product carbon footprint incl.	GHG Product Life Cycle Accounting & Reporting Standard <sup>12</sup> ;

<sup>11</sup> <https://www.iso.org/standard/38498.html>

<sup>12</sup> <https://ghgprotocol.org/product-standard>

No.	Exchange actors*	Information set	Possible content	Related standards or technical reports
17.	MS → M	Component production carbon data	biogenic carbon, product carbon footprint excl. biogenic carbon, fossil carbon content, fossil GHG emissions, direct land use GHG emissions, indirect land use change GHG emissions, land management GHG emissions, other biogenic GHG emissions, biogenic carbon withdrawal, aircraft GHG emissions, characterisation Factors, IPCC characterization factor sources.	ISO 14067:2018 <sup>13</sup> ; PACT Methodology v2 data model <sup>14</sup>
18.	REU → M	Reusable component recovery carbon data		
19.	CMS → M	Process chemical carbon data	Reference years, functional unit, system boundaries description, life cycle stages covered, social impact indicators, social performance per indicator.	Product Carbon Footprint Guideline for the Chemical Industry v2.1 <sup>15</sup>
20.	RMS → MS REC → MS	Raw material or secondary raw material production social data		UNEP guidelines for social life cycle assessment of products <sup>16</sup> ; PCR for Social Product Declaration. <sup>17</sup>
21.	MS → M	Component production social data		
22.	REU → M	Reusable component recovery social data		
23.	CMS → M	Process chemical production social data		

NOTE RMS to MS exchanges could also be directly linked to M or indirectly as RMS → MS → M

### 4.3 DPP information exchange possibilities for Product Sales & Use contexts

The communication about a final product from a manufacturer using a DPP has enhanced possibilities over physical labels and over information accessible through a manufacturer's website. The DPP information portal linked to the data carrier on the product label allows for making available helpful product information in one access point, so as to easily find the information for the specific product via a mobile device. It also allows to provide greater information over solely physical labels in a wider variety of media formats (e.g. pictures, video's, PDFs).

The DPP information portal can also be equipped with the possibility to update information about the product if it includes interactive capabilities. This can include customer survey or product use survey capabilities, as a dynamic feature to make it easier to obtain direct feedback about the product for a manufacturer, and potentially also a retailer if given access rights to survey capabilities by the manufacturer. In case of implementing such surveys, the DPP provider should adhere to personal data management regulations, and it is recommended to draw upon recently developed privacy by design

<sup>13</sup> <https://www.iso.org/obp/ui/#iso:std:iso:14067:ed-1:v1:en>

<sup>14</sup> <https://www.carbon-transparency.org/pact-methodology>

<sup>15</sup> <https://www.carbon-transparency.org/resources/the-product-carbon-footprint-guideline-for-the-chemical-industry>

<sup>16</sup> <https://www.unep.org/resources/report/guidelines-social-life-cycle-assessment-products>

<sup>17</sup> <https://www.environdec.com/spd>

standards such as EN 17529:2022, ISO 31700-1:2023 and ISO/TR 37100-2:2023, as outlined in section 5.19.

Specific information exchange possibilities for product sales & use contexts are specified in table 2 below. Actors involved include Manufacturer (M), Retailer (R), Consumer (C), and Consumer Organisation (CO), for purposes of reference to these actors in the table below. This is not an exhaustive list but provides for many common exchange needs.

**Table 2 — Product sales & use context information exchange possibilities for DPPs**

No.	Exchange actors*	Information set	Possible content	Related standards or technical reports
1.	M → R	Product information sheet	Product technical and functional specifications in a specification sheet	Not available
2.	M → R	Product sales information	Availability, prices, photographs, specification details	ISO 9735-10:2022
3.	M → R	Product marketing materials	Brochure, marketing pager, brand information	Not available
4	M → R M → C	Product circularity information	Durability, recyclability, repairability, reusability statements or scores	ISO 59040:2025 ISO 59020:2024
5.	M → R M → C	Product durability information	Durability, expected average lifespan, lifespan under optimal and under suboptimal conditions, ease of maintenance to maintain lifespan.	EN 45552:2020
6.	M → R M → C	Product recycled content	% of recycled content in product, % of recycled content in product parts	EN 45557:2020
7.	M → R M → C	Product repairability information	Product repair score, ease of repairability during lifespan, availability of spare parts, required repair tools, repair instructions to reach, check and extract broken components, OEM/manufacturer authorised and independent repairers.	EN 45554:2020
8.	M → R M → C	Product reusability information	Product quality indications and checks for reusability, Product cleaning and refurbishment instructions to enhance reusability, reusability options for product components.	EN 45556:2019
6.	M → R M → C	Product environmental information	Functional unit, unit amount, boundary process description, reference period, geographic scope, global warming potential, ozone depletion, acidification, eutrophication freshwater, eutrophication marine, eutrophication terrestrial formation potential of tropospheric ozone, eco-toxicity (freshwater), human toxicity, ionising	EN ISO 14044:2006

No.	Exchange actors*	Information set	Possible content	Related standards or technical reports
			radiation, PM emissions, abiotic depletion of minerals & metals, depletion of fossil fuels, hazardous waste disposed, non-hazardous waste disposed, radioactive waste disposed	
7.	M → R M → C	Product carbon information	Declared unit, unit amount, boundary process description, reference period, geographic scope, product carbon footprint incl. biogenic carbon, product carbon footprint excl. biogenic carbon, fossil carbon content, fossil GHG emissions, direct land use GHG emissions, indirect land use change GHG emissions, land management GHG emissions, other biogenic GHG emissions, biogenic carbon withdrawal, aircraft GHG emissions, characterisation Factors, IPCC characterization factor sources.	GHG Product Life Cycle Accounting & Reporting Standard; ISO 14067:2018; PACT Methodology v2 data model
8.	M → R M → C	Product social environment	Reference years, functional unit, system boundaries description, life cycle stages covered, social impact indicators, social performance per indicator.	UNEP guidelines for social life cycle assessment of products <sup>18</sup> ; PCR for Social Product Declaration. <sup>19</sup>
9.	R → M	Product stock information	Product model identifier, Stock keeping unit identifier, stock number, start stocking date,	ISO/IEC 15459-4:2014
10.	R → M	Product sales information	Sales event, sales price	ISO 9735-10:2022
11.	R → M	Product damaged in transit or during retail information	Damage type, damage extent, working condition	Not Available
12.	R → M	Unsold product information	Unsold reason, start stocking date, end stocking date, expiry date threshold, unsold product management route	Not Available
13.	R → C	Product purchase evaluation information	Purchase costs, usage costs, main features, product labels, product certificates	Not Available
14.	R → C	Product purchase		

<sup>18</sup> <https://www.unep.org/resources/report/guidelines-social-life-cycle-assessment-products>

<sup>19</sup> <https://www.environdec.com/spd>

No.	Exchange actors*	Information set	Possible content	Related standards or technical reports
		comparison information		
15.	C → M	Product ownership registration <sup>20</sup>	Name, surname, address, email, phone number, product owner identifier number	Not Available
16.	C → M → C	Product ownership transfer		ERC-721 (NFT standard)
17.	C → M	Product warranty registration	Name, Surname, birthdate, address, warranty duration, warranty start date	ISO 22059:2020
18.	C → M → C	Product warranty transfer		
19.	M → C	Usage instructions	Usage manual, usage instructions, usage troubleshooting documentation, usage video, usage summary	EN IEC/IEEE 82079-1:2020
20.	M → C	Maintenance instructions	Cleaning instructions, washing instructions, maintenance checklist, periodic part replacement requirements, maintenance video	ISO 21600:2019
21.	M → C	Installation instructions	Installation manual, installation checklist, installation troubleshooting	ISO 21600:2019
22.	CO → C	Product expert review score	Expert review score, expert review data	Not Available
23.	M → C	Product ownership verification	Name, surname, birthdate, address, country	ERC-721 (NFT standard)
24.	M → C	Product warranty verification	Name, surname, birthdate, address, country	ISO 22059:2020
25.	C → M C → R	Product usage feedback	Product satisfaction score, product features used, product use questions	Not Available
26.	C → M	Product usage log	Product use frequency, product features used	Not Available
27.	C → M	Product maintenance log	product maintenance frequency, product parts replaced	ISO 13374-1:2003

<sup>20</sup> Product ownership registration would in all cases need to be an optional offering to consumers.

#### 4.4 DPP information exchange possibilities for the product life cycle

The product once, it is sold, may have a lifespan from a few weeks up to several decades depending on the product group. During its lifespan a product may be handled by a wide range of economic operators, which can include distributors, logistics operators, installers, repairers, collectors, collection points, reuse operators, refurbishers, reverse logistics operators, and recyclers. Each of these actors could interact with a DPP at product model, batch or individual item level depending on the information exchange use case. Either to retrieve specific information or to provide specific information to the DPP. For example, in case of repairers, a repair manual could be retrieved from a DPP, or a repair log provided to a DPP.

Specific information exchange possibilities for the product life cycle context are specified in table 3 below. Actors involved include Manufacturer (M), Distributors (D), logistics operators (L), installers (I), consumer (C), repairers (REP), collectors (COL), collection points (CP), Product Responsibility Organisation (PRO), reuse operators (REU), refurbishers (REF), reverse logistics operators (RL), and recyclers (REC), for purposes of reference to these actors in the table below. This is not an exhaustive list but provided for many common exchange needs.

**Table 3 — Product life cycle information exchange possibilities for DPPs**

No.	Exchange actors*	Information set	Contains	Related standards or technical reports
1.	M → D	Product information sheet	Product technical and functional specifications in a specification sheet	Not Available
2.	M → D	Product sales information	Availability, prices, photographs, specification details	Not Available
3.	D → M	Product stock information	Product model identifier, Stock keeping unit identifier, stock number, start stocking date	ISO/IEC 15459-4:2014
4.	D → M	Product sales records	Sales event, sales price	
5.	M → L	Product transport management information	Handling instructions, transport documentation	EN ISO 780:2015
5.	M → L L → M	Product transport events	Economic operator name, pickup address, destination address, Global Location Numbers (GLN), latitude(s) & longitude(s), transport distance, transport mode, transport vehicle	GS1 GLN Allocation rules standard; GS1 Scan4Transport Implementation Guideline; EPAL Euro Pallet QR; CEN/TS 17073:2020; ISO/IEC 19987:2024
6.	D → L L → D	Product transport events		

No.	Exchange actors*	Information set	Contains	Related standards or technical reports
7.	L → M	Damaged during transport product information	Damage type, damage extent, working condition	N/A
8.	M → I	Installation instructions	Installation manual, installation tools, installation diagrams	ISO 21600:2019
9.	I → M	Installation log	Date, Installer information, Installation configuration, Installation checklist	Not Available
10.	M → REP M → C	Repair information	Repair manual, repair hints, repair codes, repair tools requirements, disassembly map per repair	EN 45554:2020
11.	REP → M REP → C	Repair logs	Repair type, repair success, components replaced, repair duration, repair date	EN 45554:2020
12.	C → M	Self-repair log		
13.	REP → M M → REP	Spare parts request	Spare part name, spare part identifier, spare part photo, spare part selection list, spare part selection diagram, spare part price	IEC 62550:2017
14.	C → M M → C	Spare parts request		
15.	REF → M	Spare parts request		
16.	C → M C → C	Product end-of-use log	End-of-use date, working condition, photo, reason for end-of-use	Not Available
17.	C → REU	Product resale information	Working condition, photos, usage description, quality status description, defects description, price for resale	Not Available
18.	C → L L → REU REU → L L → C	Product transport events	Economic operator name, pickup address, destination address, Global Location Numbers (GLN), latitude(s) & longitude(s), transport distance, transport mode, transport vehicle	GS1 GLN Allocation rules standard; GS1 Scan4Transport Implementation Guideline; EPAL Euro Pallet QR; CEN/TS 17073:2020; ISO/IEC 19987:2024
19.	C → C	Product transport events		
20.	COL → CP	Product collector log	Collection date, photos, quality status description	Not Available



No.	Exchange actors*	Information set	Contains	Related standards or technical reports
	COL→PRO			
21.	CP → PRO CP → M	Product screening log	Screening date, loose and missing components, scratches, tears and holes, functional quality, aesthetic quality, working condition, quality score	Not Available
22.	PRO → CP PRO → RL	Product reverse logistics instructions	Destination type, destination address, Global Location Numbers (GLN), latitude(s) & longitude(s), transport distance	GS1 GLN Allocation rules standard;
23.	CP → RL RL → CP	Product transport events	Economic operator name, pickup address, destination address, Global Location Numbers (GLN), latitude(s) & longitude(s), transport distance, transport mode, transport vehicle	GS1 Scan4Transport Implementation Guideline; EPAL Euro Pallet QR; CEN/TS 17073:2020; ISO/IEC 19987:2024
24.	RL → REU RL → REF RL → REC	Product transport events		
25.	RL → PRO	Product reverse logistics updates	Number of transports, number of products processed, end-of-use/end-of-life destination of products, distance travelled	Not Available
26.	REU → M REF → M	Product used quality assessment	Assessment date, working condition, photos, usage description, quality status description, defects description, critical broken components, product age	DIN SPEC 91472:2023
27.	REU → C	Product used quality assessment		
28.	REF → C	Product post refurbishment quality assessment	Quality status before and after refurbishment, warranty condition, photos	Not Available
29.	M → REU M → REF M → REC	Product disassembly or dismantling information	Part numbers for components, exploded diagram with location of components, disassembly sequences & number of techniques + tools, disassembly safety measures + warnings for risk of damaging parts, modularity information, use of standard components information, ease of non-destructive disassembly and re-assembly	ISO 8887-1:2017 ISO 8887-2:2023
30.	REF → M	Spare parts extraction log	Spare part name, spare part identifier, spare part photo, spare parts extraction time, spare parts extraction challenges	IEC 62550:2017

No.	Exchange actors*	Information set	Contains	Related standards or technical reports
31.	M → REF	Priority spare parts list	List of priority spare parts of interest	
32.	REU → C REF → C	Product sales evaluation information	Product functional condition, product aesthetic condition, brand, age, production year, performance characteristics, price, price difference from new	Not Available
33.	REU → C REF → C	Product sales comparison information		Not Available
34.	M → REC	Product Recyclability information	Information on use of easily recyclable materials, possibility for high purity sorting, product substance content impacting recyclability, ease of product dismantling, dismantling depth.	ISO/TR 17098:2013
35.	REC → PRO	Product recycled batch log	Batch received, product category, batch identifiers, recycling process category	Not Available

#### 4.5 Information exchange possibilities for compliance with the EU market

The product when placed on the EU market needs to undergo a procedure to prove its compliance with the EU market rules, which includes delivery by the manufacturer or its representative in the EU of technical documentation showing how it complies, a EU declaration of conformity, and a CE mark where applicable. Specific information exchanges can be needed to provide for the technical documentation and EU declaration of conformity to actors as described in Table 4 below. The actors can include Manufacturers (M), importers of the product (IMP), Customs Authorities (CA), Notified Body (NB), national market surveillance authorities (MS), certification bodies (CB), EPR registry body (ERB), Producer Responsibility Organisations (PROs), for purposes of reference to these actors in the table below. In case of products imported into the EU market an Authorised Representative can also act on behalf of the manufacturer.

**Table 4 — Market compliance information exchange possibilities for DPPs**

No.	Exchange actors*	Information set	Contains	Related standards or technical reports
1.	M ↔ IMP	Product DPP registration identifier	EU DPP central registry identifier	Not Available, central registry requirements to be set by EU commission, based on JTC 24 identifiers standard under development
2.	M → IMP	Product customs information requirements	Product identifiers, product commodity code	
3.	IMP → CA			
4.	MS → M	Product market compliance information request	Reference to DPP information contents	Not Available, varying per product

No.	Exchange actors*	Information set	Contains	Related standards or technical reports
			relating to additional information requirements	category standards linked to market regulation
5.	M → MS IMP → MS	Product market compliance information	Technical documentation on market compliance requirements	
6.	M → NB	Product market compliance information	Declaration of Conformity, Technical documentation of conformity	Not Available
7.	NB → M	Product market compliance verification for CE marking for products requiring a CE mark	Verification documentation, CE mark	Not Available
8.	M → CA M → PRO	Registration number & associated data that the manufacturer has fulfilled their EPR obligations under product specific regulations	EPR registration number from their authority in the managed compliance registration portal; PRO name for their compliance	Not Available, varying per product EPR scheme
9.	M → CB	Product certification technical documentation	Product technical documentation	Not Available, varying per product certification requirement
10.	CB → M	Product certificate	Certification statement, certificate, certificate label, certification registry link	EN ISO 14024:2018 <sup>21</sup>

<sup>21</sup> <https://www.iso.org/standard/72458.html>

## 5 Digital Product Passport design guidance

### 5.1 General

The design and setup of a Digital Product Passport should consider several design choices which have implications for its software implementation. In this section for each DPP design consideration possible options are discussed.

Each design choice has an impact on how the target audience can use the DPP. Therefore, whilst designing the DPP and its implementation the target audience should be taken into consideration, where possible including user feedback during the implementation process. In all situations, consumers and economic operators as general target audiences can be considered, as both groupings should utilise the DPP. Specific subgroups can be identified of these as per the actors described in Clause 4 and their contexts for information exchanges.

### 5.2 General sources for DPP requirements

This design guidance draws upon a number of key sources that the DPP designer should be familiar with to consult if and when needed. Starting with the EU ESPR regulation (EU 2024/1781). The framework regulation was approved in April 2024 and sets out the scope of the EU Digital Product Passport system and the range of possible information requirements in a Digital Product Passport, also referred to as the DPP Data.

The DPP system itself refers to the IT system requirements and its implementation for DPPs across Europe. This includes IT requirements for DPP providers and IT requirements for managing the use of DPPs in other IT systems such as customs, market surveillance, and other online portals. A large part of these requirements may be laid down in 8 separate standards that are under development by CEN/CENELEC as requested by the EU commission, with works on-going by Joint Technical Committee (JTC) 24 with a fixed deadline of March 2026. The DPP designer should be familiar with these standards once they are available to adopt the technical requirements for the IT deployment of the DPPs.

The legally required DPP content requirements under ESPR may vary depending on the product group based on a specific delegated act, which sets both performance requirements and information requirements for a product, including information that should be made available in the product's DPP. At the time of writing no specific product information requirements are available, except for >2 kW size batteries as laid out in the EU batteries regulations (EU 2023/1542).

The EU commission adopted a five-year working plan published in April 2025 that sets out which product groups will be first required to have a DPP with ecodesign requirements information. The DPP designer should consult this working plan when available to be aware of the planning for their respective product group and be informed as to the development of the delegated act for the product group to respond timely to incorporate product information requirements in their respective DPP.

Finally, the EU DGs Environment, Grow and Energy published in September 2024 a FAQ on the ESPR and DPPs which clarifies a number of aspects, which is also considered in this guidance.<sup>22</sup> It is also recommended for the DPP designer to consult this and future FAQs as published by the EU commission under the ESPR and delegated acts.

### 5.3 Type of passport (model, item, batch)

The first decision that should be made is if the Digital Product Passport is implemented at a product model, product batch or product item level. The decision should be informed by regulatory requirements, how the product is handled (as a batch or individual product), and the required interactive capability needs of the Digital Product Passport.

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<sup>22</sup> [https://environment.ec.europa.eu/news/new-eu-sustainability-rules-explained-ecodesign-regulation-faqs-2024-09-27\\_en](https://environment.ec.europa.eu/news/new-eu-sustainability-rules-explained-ecodesign-regulation-faqs-2024-09-27_en)

EU regulatory requirements set the requirements on what type of DPP to place a product on the market for each product group, to determine if the minimum required DPP is at model, batch or item level.

The three types of DPPs can be distinguished as follows:

- The model DPP is the closest to the current physical labelling system, where each product of a certain series or model receives the same label. The data carrier is placed on the product, but it is the same data carrier on each product of the model. In this case, the data carrier and information portal are similar across many products and no unique aspects can be provided in the DPP.
- The batch DPP is a DPP for a uniquely identifiable batch of products, that could be linked to one or many logistics batches. The data carrier can be placed on the product with a unique product identifier at the batch level. The product batch DPP can be used for cases where information should be provided about the batch, or should be captured about the batch itself, which can include supply chain purposes or logistics for traceability of a batch. The most common case is where the product is sold in batches in B2B contexts.
- The item DPP is a DPP that is uniquely identifiable for each individual product. The data carrier placed on each product is unique. Each event can be captured and for every context in the supply chain, purchasing & use, and product life cycle, information can be captured and introduced in the DPP. It is the most versatile option for the DPP, but only useful for cases where unique identification at product level is needed.

Each of the three types of DPPs can contain the same information when setup about the product, but for the batch and item level DPP the DPP can be updated at specific points as designed in the DPP system. If the DPP is intended to be used for product life cycle traceability, meaning to trace events occurring during the life cycle of a product, and information capturing and exchanges during or after these events, an item level DPP is required. If the DPP is intended to be used for batch level traceability, such as for product recall, a batch level DPP is sufficient.

## 5.4 Identifiers

The DPP designer should ensure the DPP has four mandatory unique identifiers as per article 12 of the EU EPR:

- 1) the product identifier,
- 2) the operator identifier,
- 3) the facility identifier where the product is made,
- 4) the DPP registration identifier.

The fourth identifier should be hidden and is provided to a DPP provider upon the registration of the DPP in the EU central registry, for the unique identification of the particular DPP (see section 5.11 about the EU central DPP registry).

Therefore, a selection should be made by the DPP designer of which identifiers to use to identify products. The identification of products should be made interoperable with the EU DPP system based on a standard under development by CEN/CENELEC JTC24, that will be provided in Q1 2026, which will prescribe which identifiers can be used within the EU DPP system for products, operators and facility identification.

To illustrate, currently commonly used identifiers in use as examples include:

- Bespoke identifier of a manufacturer, referred to as a Manufacturer Part Number (MPN) which can contain letters or numbers or both. Note that these are by nature not interoperable and unique, and

usually used for internal company and enterprise use, limiting their suitability for DPP identification purposes.

- The Global Trade Item Number (GTIN) provided by GS1 offices, governed by the standard ISO/IEC 15459-4:2014<sup>23</sup>, used in different industry sectors globally, e.g. retail, healthcare, fashion, toys, chemical, logistics and rail industries, often in association with barcodes. GTIN numbers are formed out of 12, 13 or 14 digits and form the basis of UPC, EAN and ISBN identifiers.
- Universally Unique Identifiers (UUIDs), which are globally unique 128-bit identifiers used for a wide variety of purposes, as governed by the standard ISO/IEC 9834-8:2014.<sup>24</sup>

The DPP designer should ensure that these DPP identifiers are compliant with the JTC24 working group 2 standard 'Digital product passport - Unique identifiers' that should be available by March 2026. The DPP designer should also consider how the product identifier is included in the DPP weblink which enables access to the DPP information portal both directly and through its integration in the data carrier placed on the product. Considering also that access from the data carrier to the weblink should be provided to consumers using native smart device capabilities without the need for additional software or applications.

The DPP designer should also consider additional identifiers that could be integrated in the DPP weblink, such as to provide routing to private access or to provide for additional offline information. For example, expiry dates. Existing standards to this end for managing identifier data in weblinks for utilisation in data carriers can be consulted, including IEC 61406-1:2022, IEC 61406-2:2024, ISO/IEC 18975:2024 and ISO/IEC 15418:2016. These include standard methods for integrating identifiers based on character set and length of data elements inside a weblink, to enable offline identification of values, such as commonly done in retail for lot numbers. Another standard for managing identifier systems in terms of syntax, semantics and resolution has been established in ISO 8000-115:2024, which is a standard that identifies how a weblink to exchange product master data should be formatted, made resolvable, and semantically unambiguous.

### 5.5 Data carrier

The data carrier is used on the product label and also online for accessing the DPP information portal.<sup>25</sup> Main options for data carriers that a DPP designer should consider include QR codes, DataMatrixes, passive RFID tags like NFC and RAIN RFID<sup>26</sup>, and active RFID like Bluetooth Low Energy (BLE), and further variants of these. RFID tags use radio waves to communicate between the scanning device at different frequencies, and the tag can either use the energy of the device it communicates with (passive) or utilise a battery to generate their own radio signals (active). Note that whilst all smartphones today support native reading QR-codes and NFC tags, they do not yet natively support RAIN RFID, which is expected to change for most mobile device brands in the near-term future based on chipset support updates. Equally so, DataMatrixes are not yet commonly read natively by mobile devices without installing a dedicated software. This could change in the near-term future depending on the decisions of OS operators and chipmakers.

The DPP designer in order to select the data carrier technology should compare across different characteristics for these options including:

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<sup>23</sup> The ISO/IEC 15459-4 standard also normatively references NASI MH10.8 Data identifiers.

<sup>24</sup> <https://www.iso.org/standard/62795.html>

<sup>25</sup> The most commonly used data carrier today are barcodes, which can use GS1 GTIN identifier or a manufacturer specific identifier or another identifier system. Barcodes for retail products will transition to 2D data carriers by end of 2027, as planned by GS1 globally, including QR Codes and DataMatrixes (commonly used in healthcare and required by regulations). During a transition period barcodes will be placed alongside QR-codes on retail products.

<sup>26</sup> Also referred to as UHF/RAIN RFID

- **Reading modes and context.** Is one-by-one manual reading of data carriers sufficient, which is supported by QR codes, DataMatrixes, and NFC, or is batch and automated reading required which necessitates RAIN RFID tags or similar solutions. The automated capability of RAIN RFID to read many tags at once makes it suitable for supply chain and manufacturing contexts, but less suitable for consumer contexts, where usually one product needs to be scanned at a time in an isolated manner. Research is underway on how to solve this challenge within the RAIN Alliance that governs RAIN RFID tags.
- **Reading distance.** Is it sufficient to be within approximately 50 cm of the data carrier to read it with a mobile device, for which QR-codes, DataMatrixes, or within 2 cm on average for contactless reading for which NFC tags are suitable<sup>27</sup>, or are long reading distances needed of up to 15 meters in area for which RAIN RFID is reliable.
- **Lifespan of the data carrier.** The lifespan of QR-codes and DataMatrixes depends on the print quality or direct marking (etching) method, size of the data carrier, substrate the data carrier is printed or etched upon, and the environmental conditions to which they are exposed. High quality laminated prints with epoxy inks can last up to 10 years or more. Passive RAIN RFID tags using the scanning device electromagnetic field for energy with a lifespan of 10 to 20 years versus a data retention time of 10 to 200 years for NFC tags, depending on the chip selected. Active RFID tags with a battery that have a typical 10-year lifespan.
- **Data capacity.** The advantage of 2D data carriers, such as QR-codes, is the increased information capacity that can be made available. Up to 4296 and 2335 alpha-numeric characters for a QR-code and DataMatrix as a theoretical limit, respectively, versus only 48 alpha-numeric characters in a standard 128-barcode. However, this is without error correction for QR-codes, and at the highest error correction level a QR-code can only hold 1852 alphanumeric characters. RAIN RFID tags combine several different memory banks, the first contains 96 or 128 bits of programmable memory designed to contain the Electronic Product Code (EPC), which is the GS1 standard that uniquely identifies retail products, and other freely chosen information; the second is the Tag Identifier (TID) that is used only to store the identity of the company that produces the chip; and the third is user memory which is optional. Larger user memory RAIN RFID tags may provide up to 6144 bits (768 characters). However, moving RAIN RFID tags such as on a conveyor belt scenario typically deliver 640 bits circa of readable data, depending on speed and reader capacity.

It should be taken into account that QR-code or DataMatrixes with large amounts of characters negatively affect the printing/encoding and scanning/reading of the data carrier. The more information contained in the QR-code or DataMatrix the longer it will take to scan and the larger their dimensions need to be. For example, QR-codes with 70, 200, and 500 alphanumeric characters are 1,9 x 1,9 cm, 2,8 x 2,8 cm, 3,6 x 3,6 cm, at a module size of 0,33 mm, to maintain readability and mandatory quiet zones and a high level of error correction.<sup>28</sup> Because of this challenge the relative advantages of QR-codes and DataMatrixes are limited in terms of capacity, since most product labels are constrained to a data carrier space of typically 2 cm and in the best case 3 cm width and length.

- **Reading speed.** RAIN RFID readers can identify around 1 000 tags per second in the best-case scenario thanks to the anticollision algorithm. The actual reading speed may vary for NFC and RAIN depending on the amount of information that should be read from the data carrier, but is normally around 5 milliseconds per tag. Reading a QR-code or DataMatrix takes around 1/4 of a second or 250 milliseconds.

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<sup>27</sup> Note that the Certified Compliant range of NFC connections based on the NFC Forum is 5 mm. <https://nfc-forum.org/learn/nfc-technology/>

<sup>28</sup> The module size are the individual square dots that are black and white in the QR-code. A module size of 0.33 mm as the standard for industrial/retail printing for cases where the QR-code is scanned from a relatively close distance.

- **Reader-to-data-carrier alignment:** QR-codes and DataMatrixes require line-of-sight with the reading device. NFC tags require alignment in close proximity (usually less than 2 cm), RAIN RFID does not require line of sight for its reading range but no obstruction due to radiofrequency conducting surfaces or absorbing substances. For example, this can be a challenge in recycling environments with significant metal obstruction (metal clash) that hampers RFID reading unless carefully considered in the used products processing design.
- **Information contents.** The data carrier can be setup to allow for accessing information in offline contexts (on-tag or within the local server network) or online contexts (with cloud access). The offline information can be displayed as plain text on the mobile device. The DPP designer should consider if additional offline information beyond mandatory identifiers under EU ESPR regulation is useful to incorporate on the data carrier. This could include product expiry date, lot number, counterfeit check hints or other relevant product information, within the constraints of the data carrier.

The main disadvantages of RFID and the subset NFC tags are increased costs over printed data carrier solutions such as QR-codes and DataMatrixes, and additional environmental burdens from using electronics especially in the context of millions to billions of products. An important consideration if choosing RFID tags is to look at selecting tags without using silver as a conductor but using alternative emerging conducting materials like Graphene or conductive polymers, given resource availability and environmental cost of silver.

### 5.6 Label on the product

The data carrier should be placed on the product, which can include integration in the product label. Several aspects should be considered to create product labels to incorporate DPP data carriers and associated information access.

Key considerations for the DPP designer include:

- Placing additional guidance alongside the data carrier, so that it is clear to a user that scanning it allows for accessing the product information portal of the DPP.
- In case of printed data carriers (e.g. QR-codes or data-matrixes or similar), consider choosing a label with durable qualities for long lasting products, such as in case where the data carrier should be scannable for ten years or more.
- Managing the product information complementarities between the information on the product label, and the information available on the online DPP information portal.
- The location of the data carrier on the product, which if placed on the product label also relates to the location of the label on the product, and space allocation of the data carrier, to enable ease of access for scanning it.
- There is a need to provide multiple ways to represent information and user interaction considering vulnerable consumers for which the standard EN 301549:2021 “Accessibility requirements for ICT products and services”, can be consulted (e.g. the blind, physically disabled, dyslexia and other vulnerabilities). For example, the ability for visually impaired consumers to access the data carrier, can be addressed through available technologies to scan data carriers from several meters distance with mobile devices.

At a general level, the DPP designer can inform themselves based on the requirements for the placement of data carriers and their formatting on physical labels as governed in standard ISO 22742:2010 and standard ISO 28219:2017. Specific requirements may also be included in the delegated act for the product group on the DPP data carrier placement on the product label, with the scope set in the EU ESPR under



article 16. In addition, aspects could be introduced in EU labelling regulations for particular product groups, where such regulation applies. For example, the on-going revision of the EU textile labelling regulation for which a first proposal by the EU commission is expected in 2025.<sup>29</sup>

## 5.7 Digital Labelling Management

Products placed on the EU single market have specific per product group physical labelling regulations, which includes foodstuffs, chemicals, cosmetic products, electrical and electronic products, and textiles. As well as horizontal requirements for affixing the CE mark to products based on the regulation for market surveillance and compliance of products (EU 2019/1020). The provisioning of information on physical labels can be complemented by digital labels for a growing number of product groups, including fertilisers and chemicals, under amended regulations EU 1727/2008 and EU 2019/1009.

A digital label is different from a DPP in that it is voluntary and complementary to the physical label, whilst a DPP is mandatory once the delegated act for the product group comes into force. The digital labelling regulations do not impose new information requirements, in contrast to the ESPR DPP requirements. Digital labels thus form a digital version of the existing physical labels. A digital label should be made accessible similar to a DPP through a data carrier on the product that is accessible through mobile devices. A DPP can thus also provide for a digital label for products where this is applicable, given the existence of such a regulation for a product group, and if the specific additional digital labelling requirements are taken into account.

## 5.8 Online DPP information portal access

The data carrier and/or weblink to the DPP information portal can also be used in the manufacturer website or a 3<sup>rd</sup> party website, which would typically be a reference to a product model level DPP. An example use case are online marketplaces, which based on the ESPR guidance are required to make DPPs accessible to potential customers in the EU market<sup>30</sup>.

To enable visibility the DPP designer should consider how the DPP is referenced for online purposes. No universal approach has been developed to present. It is likely that different approaches may emerge, and possibilities could include:

- A weblink is encoded in a QR-code symbol with DPP reference explainers;
- A new iconography designed to indicate that the icon references a DPP weblink;<sup>31</sup>
- A simple textual wording with a referenced weblink.

Once setup by the DPP Designer the approach can then be universally deployed for websites and 3<sup>rd</sup> party purposes. The approach to referencing a DPP online may also be imposed on the DPP provider, such as by a large online marketplace who provides for a format, so as to standardise the reference to the DPP of products sold on that particular marketplace.

<sup>29</sup> The revised textile labelling Regulation is expected to introduce specifications for physical and digital labelling of textiles, including sustainability and circularity parameters based on the EU ESPR regulation.

<sup>30</sup> The ESPR states under article 9 that a delegated act will need to clarify for a product group the manner in which the DPP needs to be made accessible before purchase, including in the case of online selling and other situations where the customer cannot physically access the product in a distance selling context. Also on the 25<sup>th</sup> of September 2024 the EU commission [released a FAQ on the ESPR](#) that under question 58 states that: “Online marketplaces will need to make DPPs accessible to potential customers in the EU market”.

<sup>31</sup> Note that it is important when using the icon in conjunction with a data carrier, that this does not impact the quality of data carriers such as QR-codes, or impact the empty space around them also referred to as the quiet zone which is necessary for scanning.

## 5.9 Ease of access of the DPP information

The DPP Designer also should consider ease of access of the DPP information contents in the portal in terms of directly or quickly accessing it when entering the DPP weblink, as opposed to being routed through several other pages that should be clicked through, prior to landing on the DPP information contents. This is especially the case when the DPP also provides for digital labelling information. The current CLP draft regulation amending 1272/2008 (EU) requires that information on a digital label is accessible in no more than two clicks, such that a consumer can readily find digital labelling information.

The article 7 of the EU ESPR regulatory text, that provides for first horizontal DPP requirements, specifies that product information should be provided in a *'language which can be easily understood by consumers and other end-users, as determined by the Member State in which the product is to be made available on the market or put into service.'*<sup>32</sup> DPP language requirements are thus set based on the countries in which the product is made available on the market. The information in the DPP may require full translation to all official EU languages if sold across the European Union.

To facilitate language requirements, a DPP designer should consider making provisions for setting and switching from/to different languages. Both for the DPP menu and product information. Default language settings should primarily be based on the user's language settings for a mobile device. In case the DPP also fulfils the role of a digital product label, the decision should also be informed by specific digital labelling rules, which as a standard clause prohibits localisation. Regulations on Classification, Labelling and Packaging of substances and mixtures (CLP) and EU fertiliser product labelling<sup>33</sup>, state that "where the digital label is available in more than one language, the choice of language shall not be conditioned by the geographic location from which that information is accessed." Based on this requirement localisation-based language setting is not an available option for digital labelling.

## 5.10 DPP information portal setup

The information portal should consider regulatory information needs, IT aspects, and can also consider specific company requirements.

Regulatory information required for DPPs is described under the EU ESPR article 5. This article describes 16 information categories that, may be requested to be provided in a DPP, relating to environmental sustainability and circularity of products.<sup>34</sup> Out of these 16 information categories, the minimum required for all product groups is category (g) the presence of substances of concern. Further specific requirements may vary per product group for the DPP, based on each delegated act for the specific product group. Therefore, one product group may for example require (d) upgradability, whereas another may exclude this category. Also, the information requirements may change over time as delegated acts can be revised, as was also the case in the previous EU Ecodesign regulation that included appliances, with revisions in approximately a 10-year cycle. The DPP designer should consult the delegated act for the specific product group once finalised to understand the information requirements in the DPP information portal.

In addition to the 16 categories above, the EU commission may introduce in the future social information categories as described under article 75 of the EU ESPR. A public evaluation to this end should be carried out by the EU commission at the latest by 19 July 2028, to be presented to the EU Parliament, EU Council and Committee of the Regions. Social information categories can relate to 40 different impact

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<sup>32</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022PC0142>

<sup>33</sup> COM(2022) 748 amending regulation (EU) No. 1727/2008 on the classification, labelling and packaging of substances and mixtures. And COM(2023) 98 regulation amending Regulation (EU) 2019/1009 as regards the digital labelling of fertiliser products.

<sup>34</sup> Including: (a) durability; (b) reliability; (c) reusability; (d) upgradability; (e) repairability; (f) the possibility of maintenance and refurbishment; (g) the presence of substances of concern; (h) energy use and energy efficiency; (i) water use and water efficiency; (j) resource use and resource efficiency; (k) recycled content; (l) the possibility of remanufacturing; (m) recyclability; (n) the possibility of the recovery of materials; (o) environmental impacts, including carbon footprint and environmental footprint; (p) expected generation of waste.

categories<sup>35</sup>, as defined in the UNEP guidelines for social Life Cycle Assessment (S-LCA), a widely used reference for product social impact calculations.

IT aspects for the DPP information portal relate to the viewing accessibility of the DPP information portal on a wide range of devices, as it should be accessible both on mobile devices and stationary IT devices. The DPP designer should consider if the DPP should be implemented in a dynamic manner, using a responsive design standard, so that the layout is automatically adjusted for readability depending on the user IT device and operating system. Or if a simpler uniform layout is sufficiently tailored to mobile devices, without substantial adjustment for stationary IT devices. The requirements may depend on the complexities and use cases of the DPP. The DPP designer can find relevant recommendations for digitally providing product information in standards ISO/IEC 22603-1:2021 and ISO/IEC 22603-2:2022.

The DPP designer also can consider specific information requirements relating to the company that produces the product described in the DPP. These can include branding style requirements, information about the company itself, product experience information, and so forth. The DPP is in this context also a means to communicate about the product and the company, in addition to existing channels.

### **5.11 Acquisition, calculation and estimation of DPP information contents**

The way that an information category should be provided for in a DPP should be determined in the specific delegated act, which should also cover specific KPIs and related standards or referenced calculation methods for its calculation. DPP designers should consider periodically evaluating any available updates on what may be required for their product group, and how the information should be established, as determined in the respective delegated act.

To provide a specific example, for information category (k) recycled content there is a specific standard for calculating this for energy relating products (EN 45557:2020). The future EU delegated act for energy related products may refer this standard to set a common calculation approach for calculating the recycled content in this context. Similarly, there is a specific EU commission implementing Act under the Single Use Plastics Directive (SUPD) for calculating recycled content of plastics single use beverage bottles. Therefore, depending on the product group and thus the delegated act there may be a different methodology used for calculating a particular product category.

### **5.12 DPP information searchability**

The information in the DPP should be findable in various ways, including EU information systems. Also ease of access to third parties to product model DPP data should be considered where this is of relevance by the DPP designer (e.g. for automated information provisioning or routing to retail portals, distributor portals, consumer organisation comparison websites, and others).

The standards providing the means of interoperability are under development under CEN/CENELEC JTC24 which should govern key aspects including setting an API standard for product passport life cycle management and searchability. Once available in March 2026 this API is expected to become the standard for DPP information searchability. The JTC24 standards will also outline the extent to which the DPP data will be semantically interoperable based on the data formats that are allowed to be used for data exchanges.

Two EU information systems are under development as governed by the EU ESPR under article 13 and article 14. The EU central registry and the EU DPP web portal. All DPPs provided for products placed on the EU market should be linked to these IT systems. The EU central registry should contain a lookup database with the identifiers and commodity codes of each DPP. When a product is first placed on the EU market it should be registered here, and a unique EU registry identifier should be provided for searchability. This system should be linked with other EU systems, such as the customs IT system for

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<sup>35</sup> The UNEP guidelines for social life cycle assessment of products covers 40 impact categories linked to six stakeholders: (A) Local community, (B) Value Chain Actors, (C) Consumers, (D) Workers, (E) Society, (F) Children.

verification that a product when imported has a DPP. The EU central registry should be launched by 19 July 2026.

The EU DPP web portal should be a type of read only search engine to find information contents in a DPP and across DPPs based on the 16 categories, and future categories of information, as established under the delegated act, described in section 5.9. The EU DPP web portal described under article 14 in the EU ESPR is intended firstly for public information for consumers. It may also work to provide privately restricted contents, if such information is required as per a delegated act for a product group, to specific stakeholders which may include market surveillance authorities and other economic operators as defined in article 11 of the EU ESPR.<sup>36</sup> The searches made possible in the EU DPP web portal are presently unknown, e.g. if it will be possible to search across all DPPs of a particular product group for information category (a) durability for example. The time frame for implementation of the EU DPP web portal is also not yet defined.

A DPP designer should consider how their DPP system may register to the EU registry and provide the required identifiers and product commodity code. The EU central registry process should be clarified in an implementing act by the EU commission.

The DPP designer could also consider how to connect their information contents to make it findable through the EU DPP web portal. And consider what information in the DPP is public and restricted as also defined in the EU delegated act. Once the procedure for this is further clarified by the respective EU institutions managing the setup of the EU DPP web portal, as per the respective delegated act that is forthcoming by the end of 2025.

### 5.13 DPP information exchange management

The EU ESPR under Article 10 requires product passports to be fully interoperable with other product passports, as required by to be adopted delegated acts, pursuant to EU ESPR Article 4 in relation to the technical, semantic and organisational aspects of end-to-end communication and data transfer. A key reason for interoperability is that DPP information contents should be comparable with each-other within a product category, so that the performance and environmental impacts of similar products can be directly compared. Interoperability can also enable backing up of DPP data information so that it can be exchanged with a DPP back-up system provider, as defined in the same article 10, and further described in section 5.15.

At minimum the DPP designer should consider that its DPP IT implementation follows the JTC 24 standards for the DPP system which are intended for ensuring interoperability. The DPP designer could also consider if there are specific interoperability cases they would like to deploy with their DPPs, especially in relation to product information categories and calculation needs as described in section 5.9 and 5.10. This could include interoperability ERP/PLM systems as well as supply chain management IT systems including those governing supplier-manufacturer ESG data management, and potentially novel circularity information management or product life cycle ecosystems. Specific sector level interoperability cases may also be needed.

To enable interoperability the DPP designer should consider three key IT aspects of interoperability in relation to the above:

- The data format used to represent the data and make the DPP machine readable, for example in a JSON, JSON-LD or XML data format. A similar data format or a conversion protocol is needed to enable interoperability.

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<sup>36</sup> The list of economic operators covers customers, manufacturers, importers, distributors, dealers, professional repairers, independent operators, refurbishers, remanufacturers, recyclers, market surveillance authorities and customs authorities, civil society organisations, trade unions and other relevant actors.

- The data structure used for the DPP machine readable data format, as also defined in ISO/IEC TR 10032:2003, which outlines the way the data itself is organised, which could include key value pairs, lists of data, tags, attributes, elements, and the hierarchy among them,
- The data dictionary used for the DPP, which provides an overview of the objects in the data structure and their name, definition, data type, and possible relations, in a metadata structure (e.g. a description of the data), as also defined in ISO/IEC 11179 series and ISO/IEC 19988:2024, which specifies the structure of vocabularies.

To make a DPP interoperable it should be designed with a common data format or a convertible data format, with an open data structure that is made available, and a common data dictionary. Beyond horizontal interoperability across DPPs there may also be a need for sectoral level interoperability that the DPP designers should consider. For example, in construction for BIM objects that are included in the DPP that are implemented according to EN 17549-2:2023.

### 5.14 Traceability

Traceability in supply chain management is needed for aggregating information across a supply chain for raw materials to intermediary products suppliers to the final product. The traceability concept can be broadened using DPPs to both the supply chain side, up to the manufacturing of a final product, and the product life cycle after sales, up to the end-of-life crushing of a product for materials recycling.

DPPs can support traceability use cases due to four characteristics:

- DPPs form an information container about a product, such as a manufacturing location, that can be passed to another party in a supply chain or in the product life cycle;
- DPPs are linked to the physical product through the data carrier placed on it;
- DPPs can contain the traceability information itself or previous stages in a supply chain or in the product life cycle;
- DPPs can be updated through digital means allowing for traceability event updates.

Due to these characteristics, item level and batch level DPPs can support traceability. DPPs at product model level do not allow for traceability event capturing as they are not unique but generic across all products manufactured under a product model, and can thus per definition not be used for traceability. Batch level DPPs can be used for shipment type traceability between two or more logistics or reverse logistics nodes, similar to shipments today, as they are uniquely identifiable for the specific batch. Item level DPPs can be used as a full solution for traceability during the product life cycle, as they are uniquely identifiable for the individual product. And both batch and item level DPPs can interlink with supply chain traceability solutions that oversee digitally logging of any physical transactions of a product at item or batch level between two parties, where there are many supply chain nodes as part of supply chain management.

To use DPPs for traceability, companies first should determine what traceability requirements they have for their product. What regulatory compliance needs are fulfilled through traceability, what supply chain risks are lowered, and what value-added traceability use cases are unlocked. Based on these needs it can be determined what traceability systems approach should be integrated with the DPP.

In supply chains, in many cases a DPP may not be needed, as the intermediary product does not need to be scanned between the sender and receiver, but a simpler document-based traceability portal system where documents are shared between sender and receiver could be sufficient. In other cases, the scanning of the data carrier with updating of location-based events in the DPP is needed for verification that the intermediary product was at specific locations. DPP based traceability for supply chains can build upon the ISO/TR 17370:2013 standard on applications of data carriers in this context. As well as the

evolving UN Transparency Protocol recommendation no. 49. Similarly, for final products a DPP may not be needed to provide for supply chain traceability information, but in other cases, providing this transparency associated with the product itself can become essential for regulatory compliances or supply chain risks. For example, to provide for the origin in a standardised manner on a DPP for every branded garment of the location of garment, fabric and yarn producing stages.

In the product life cycle, the DPP unlocks the ability to link information across each life cycle stage. Not only to a manufacturer's information system, but also to existing or new information systems managed by parties across the life cycle, such as those of logistics companies, consumer organisations, repairers, refurbishers, remanufacturers, producer responsibility organisations, collectors and recyclers. Traceability at each life cycle stage here has the DPP at its core, and the need for it depends on whether information should be captured, retrieved or provided at any life cycle stage by other parties. For example, for capturing end-of-use or repair logs. Ideally, DPP data in a life cycle updating context should work like a journaled database, in which new data or corrections can be appended but where after a DPP is issued no data is ever changed or deleted from the historical journal log.

Once the traceability system needs are determined, the specifics of the traceability approach can be determined in terms of what events should be captured, and what information should be managed using the DPP for traceability purposes. Several standards are already in place in relation to events management which can be incorporated for traceability:

- ISO/IEC 19987:2024 is a standard developed for product event definitions in tracking and tracing, aggregation between individual items and batches and timestamping<sup>37</sup>.
- ISO 22095:2020 is a chain of custody specification for setting up a traceability system's accounting approach for materials and products in a supply chain.

Standards that contain information requirements at each point for traceability have been developed for specific sectors in a supply chain context. ISO 22005:2007 provides for a standardised feed and food chain traceability information questionnaire.<sup>38</sup> UNECE has developed recommendation 46 a technical specification for traceability in the garment and footwear sector.<sup>39</sup>

### **5.15 Longevity of DPP data access**

The availability of the DPP is set tied to product model data in a flexible manner in the EU ESPR regulatory text. Specific time windows should be determined for each product group based on a delegated act given the product characteristics and circumstances.<sup>40</sup> Two levels of general guidance are available in the ESPR:

- First, under article 9 it is defined that the Digital Product Passport availability shall correspond to at least the expected lifetime of a specific product”.
- Second, a period of 10 years is referred to as a standard period under article 21 manufacturers (and under article 23 importers), which specifies that technical documentation and EU declaration of conformity of the product should be provided for 10 years after the product is placed on the market or put into service.

Therefore, a DPP designer can already consider at least the minimum expected lifetime of the product, as well as a 10-year period. And later when the specific delegated act for the product group is available, evaluate if a longer or shorter than 10-year period of availability is needed in line with the DPP specific availability requirement.

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<sup>37</sup> <https://www.iso.org/standard/85557.html>

<sup>38</sup> <https://www.iso.org/standard/36297.html>

<sup>39</sup> <https://unece.org/trade/traceability-sustainable-garment-and-footwear>

<sup>40</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022PC0142>

As a specific product group example, the revised EU Construction Products Regulation (EU) 2024<sup>41</sup> specifies under article 75 a period of at least 25 years is required to maintain the DPP for construction products when the last item of that product type has been placed on the market.

Manufacturers therefore should consult the specific delegated act for their product group, where available, to understand the timeline for which their DPPs should be maintained. If not available a period of 10 years can be assumed as a minimum. In particular cases, for products with a lifespan significantly greater than 10 years, far longer periods may be meaningful, if the DPP is used across the product life cycle to capture, retrieve and exchange data, so as to have the DPP available across the entire lifespan. Equally, in particular cases, for products with a lifespan less than a year and rapid changes in the product, a shorter timespan may be needed as also determined in the delegated act.

### 5.16 Availability of DPP data access

The EU ESPR under article 10 requires the economic operator placing the product on the market to make available a back-up copy of the DPP information contents with a DPP service provider that is an independent third party. The provision should ensure that if the original version of the DPP disappears due to bankruptcy or another IT system failure, a back-up is still available.

The DPP designer should consider who manages the back-up of the DPP and its information contents, how it is managed IT wise, and under what conditions the back-up system would take-over from the original DPP hosting information system.

### 5.17 Security of the DPP

The EU ESPR regulatory text specifies under article 10 that a high level of security and privacy is required for product passports and that fraud is avoided. Security in the DPP context can be considered at five levels:

1. The DPP management system of a manufacturer or its 3<sup>rd</sup> party;
2. The authenticity of the data carrier itself;
3. The access to the DPP for restricted information or features or uploading of data;
4. The process in which organisations are issued with access rights;
5. The security of accessing the information managed within the DPP information portal.

1. The DPP management system is where the DPP information is initially entered. From a security perspective, it's crucial that representatives (employees) of all stakeholders who have the rights to upload information, are properly identified. These may either be purely backend systems, which can be linked to an ERP/PLM IT system<sup>42</sup> for information access, or frontend interfaces where data is entered, or a combination of both. For frontend interfaces with registration, two-factor or multi-factor authentication measures can be put in place to reduce the likelihood of fraudulent access. The degree to which a DPP provider and its management system has considered cybersecurity can be assessed based on compliance with particular security standards, including ISO/IEC 27001:2022, and the adherence of their cloud computing provider to security standards such as ITU-T X.1603 and ITU-T 1752.

2. The DPP system can result in new cases of fraud, where a criminal organisation creates a copy-cat of the DPP information portal, with an associated fake data-carrier. Either as part of a product counterfeit sales effort, or for information fishing reasons to retrieve personal financial information (e.g. a fake

<sup>41</sup> [https://www.europarl.europa.eu/doceo/document/TA-9-2024-0188\\_EN.html](https://www.europarl.europa.eu/doceo/document/TA-9-2024-0188_EN.html)

<sup>42</sup> Enterprise Resource Planning (ERP) and Product Lifecycle Management (PLM) software solutions.



subscription service in a fake DPP). To reduce the risk of fake data carriers for high-risk products, a data carrier authentication system could be setup, such as through a public-private key authentication.

3. The security of the DPP as accessed through the data carrier should depend on how the DPPs are used for information exchanges. If the DPP contains restricted and/or commercially sensitive data that should be only privately accessible to specific users, or if specific parties need to interact with a DPP to upload data to it, an access rights system is necessary on top of the DPP. Traditionally this is done through user administration systems, which can be built on top of the data carrier access, with user roles and access restriction through logins and multi-factor authentication. Additional security can be introduced by utilising the recently introduced secure FIDO PassKey system, which is now commonly in place in all main mobile operating systems. PassKey options include login access through a mobile phone password or biometric fingerprint solution, once a PassKey is generated that allows references to a software service and the mobile access credentials. This also has the benefit of ease of access for users to the DPP of mobile devices. The PassKey system is based on a technical specification managed by the FIDO Alliance, which is supported by all major IT operator system providers.<sup>43</sup> Even more advanced cases would rely on decentralised identities such as under the European eIDAS 2.0 identity framework for individuals, or future EU Digital Business Wallets as expected in a proposal by the EU commission to be launched at the end of 2025.

4. The initial issuing of authorisation access to organisational entities and the rules to access the DPP or write data to it is also critical. To ensure that fraudulent entities do not gain access, or to prevent a company's competitor to not gain access to commercially sensitive entity. Otherwise, for example, company A can setup a subsidiary as a recycler or repairer to access information about procedures from company B under access rules for recyclers or repairers. To solve this a trusted identity lookup registry can be an option, which allows to verify the identity of each party and its access rights. Either as a centralised portal, or through decentralised identity registry methods, as pioneered by the European Blockchain Services Infrastructure (EBSI).

5. To enhance access security, private data encryption should be considered where the data is sensitive using a cryptographic standard. It is also a minimum requirement in case of processing private data under EU GDPR regulations. The most common encryption standard today is the Advanced Encryption Standard (AES) algorithm that specifies three lengths of cryptographic keys (128,192 and 256 bits) to encrypt and decrypt data.<sup>44</sup> Thereby the data is only accessible in a readable mode through decryption algorithms at the point of viewing it for the particular user that has the decryption keys, and otherwise stored in encrypted form making it more secure from data leakages during cyber-attacks. To make this approach work the decryption key needs to be made available to the counterparty, such as through public key registries following modern cloud architecture, and a mechanism to access them.

### **5.18 Trust in the DPP information**

The information contained in the DPP provided to its users should be trustworthy. Information provided in it should be accurate, verification systems should be in place to improve trust, and the information should not be tampered with intentionally or unintentionally. To this end digital signatures can support tamper detection as well as non-repudiation of data. Information also should be up to date to increase trust, and to facilitate this it is important to consider third party updates to product information in the DPP across its life cycle.

The EU ESPR places the responsibility of providing the required information in the DPP on the economic operator placing it on the EU market, normally the manufacturer of the product or an authorised representative of the manufacturer registered in the EU. The procedure is that before placing it on the market a conformity assessment is carried out by the responsible party, which draws up the technical documentation showcasing that the product covers the requirements as set in the EU delegated act, provides for the information in its DPP, and signs its declaration of conformity and affixes the CE mark,

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<sup>43</sup> <https://fidoalliance.org/specifications-overview/>

<sup>44</sup> <https://www.nist.gov/publications/advanced-encryption-standard-aes>



as defined in article 27 of the ESPR. The technical documentation and EU declaration of conformity needs to be kept and made available for 10 years from the point at which a product is first placed on the EU market. An importer into the EU of the product is required to check the market conformity as provided by the manufacturer or its representative, prior to importing it into the EU, as per article 29 of the EU ESPR. It should not import the product if it is not conformed to market rules.

The challenge with this approach is that the accuracy of the information in the DPP may vary significantly depending on the quality of the processes in place of a manufacturer, or an authorised representative or of an importer. No certification or independent verification of the information is foreseen under the EU ESPR, although provisions for certification may be included in specific EU delegated acts. A DPP designer should consider if it wants to include a typically voluntary process for third party verification of one or more product information categories as calculated as per section 5.8, so as to improve trust in the information provided in its DPP, or even outsourcing the calculation in the first instance to a third party to enable trust.

The procedure by which products should be checked and verified for being in line with the EU market including EU ESPR delegated act requirements, is after they are placed on the EU market by national market surveillance bodies. Manufacturers, their representatives, as well as importers should provide the technical documentation and EU declaration of conformity within 15 days of a request from a market surveillance body. Here also a potential role is foreseen for the EU DPP web portal as described in section 5.11 to route restricted data through a search from the DPP provider to market surveillance authorities via the web portal, to improve the ease of access to information needed.

The DPP designer should consider if the DPP should include restricted and/or public access to technical documentation, the certificate of conformity and the CE mark, also following future guidance on how this should be interlinked with the EU DPP web portal once more information is available. Or if the required information for market surveillance authorities is made available through other means within the 15-day time limit.

The information contained in the DPP itself should be secure and that efforts to tamper with the DPP intentionally or unintentionally can be detected. A possibility is to setup a DPP information versioning and time-stamping system linked to events where the related information is generated. Through a version control system information change can be made visible and managed. For example, for changes in information available for a product model.

### 5.19 Ensuring adequate personal data protection for DPPs

The DPP designer should ensure that the DPPs are managed adequately under the EU General Data Protection Regulation (GDPR) requirements, in collaboration with existing GDPR compliance officers such as a data controller. To access public DPP data consumers should not be required to download an application or provide their personal data. In cases where personal data is collected or an application is needed to access specific data held in DPPs or to provide information utilising DPPs by consumers, the principle of necessity and proportionality should apply, where personal data is only collected on an adequate lawful basis as required under GDPR.<sup>45</sup>

The European Data Protection Supervisor (EDPS) has made available an "EDPS quick-guide to necessity and proportionality" to help assess the compatibility of personal data management measures and how

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<sup>45</sup> **Necessity is defined by [the European Data Protection Supervisor](#)** as a fundamental principle when assessing the restriction of fundamental rights, such as the right to the protection of personal data. According to case-law, because of the role the processing of personal data entails for a series of fundamental rights, the limiting of the fundamental right to the protection of personal data must be strictly necessary. Necessity shall be justified on the basis of objective evidence and is the first step before assessing the proportionality of the limitation. Necessity is also fundamental when assessing the lawfulness of the processing of personal data. The processing operations, the categories of data processed and the duration the data are kept shall be necessary for the purpose of the processing.

they impact the fundamental rights to privacy and to the protection of personal data with the EU Charter of Fundamental Rights.

NOTE The quick-guide is available from the EDPS website as follows: [https://www.edps.europa.eu/data-protection/our-work/publications/factsheets/edps-quick-guide-necessity-and-proportionality\\_en](https://www.edps.europa.eu/data-protection/our-work/publications/factsheets/edps-quick-guide-necessity-and-proportionality_en)

When assessing the processing of personal data and ensuring the security of personal data EDPB Guidelines should be taken into account such as Guideline 4/2019 on Article 25 Data Protection by Design and by default available as follows: [https://www.edpb.europa.eu/our-work-tools/our-documents/guidelines/guidelines-42019-article-25-data-protection-design-and\\_en](https://www.edpb.europa.eu/our-work-tools/our-documents/guidelines/guidelines-42019-article-25-data-protection-design-and_en).

Designers of DPP software can also consult the ISO 31700-1:2023 and ISO/TR 31700-2:2023 privacy by design standards or the European standard EN 17529:2022<sup>46</sup>, which form the most up to date reference on the development of features that enable consumers to enforce their data protection rights and the management of privacy in software products and applications.

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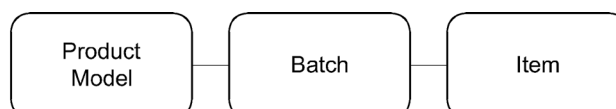
<sup>46</sup> ISO 31700-1 Consumer protection — Privacy by design for consumer goods and services – Part 1: High-level requirements; ISO/TR 31700-2 Consumer protection — Privacy by design for consumer goods and services — Part 2: Use cases; EN 17529 Data protection and privacy by design and by default

## 6 DPP designer guidance summary

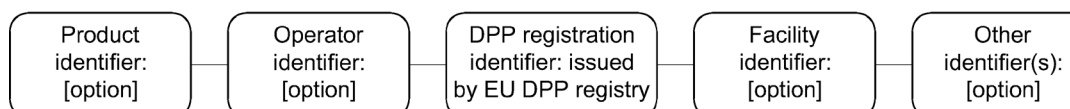
The DPP design guidance results in 15 design choice contexts that can be structured in multiple closed and open options. A closed option means where one or more options are selected out of the other options available in the design choice context. An open option is noted in [brackets] where there are degrees of freedom for selecting the choice of implementation, or where requirements are not yet determined at the time of writing of the CWA.

The 15 design choice contexts are as follows:

1. Type of  
Passport:



2. Identifiers:



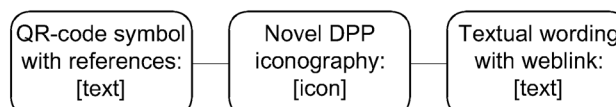
3. Data carrier:



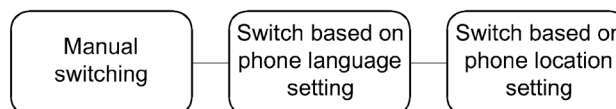
4. Product  
label:



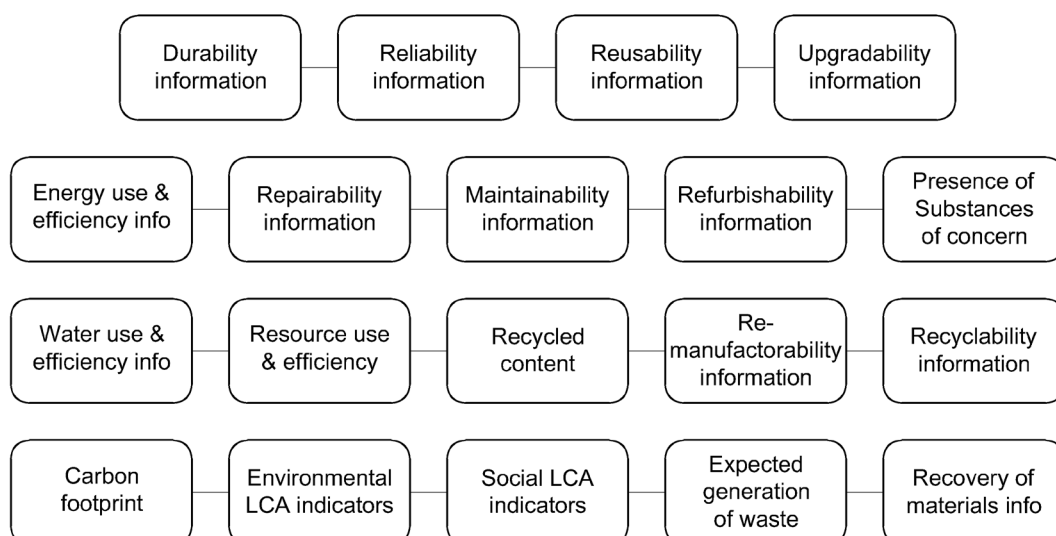
5. Online  
portal  
access:



6. Language  
switching:



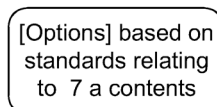
7a.  
Information  
portal content  
setup:



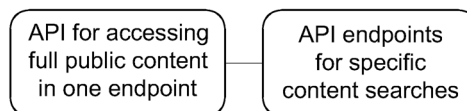
b) IT setup:



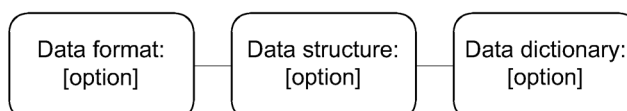
8. Calculation of information portal content:



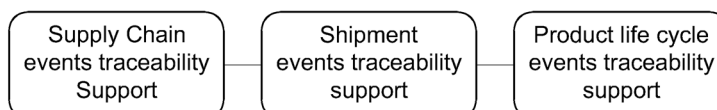
9. Information searchability:



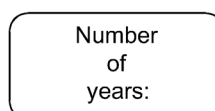
10. Information exchange management:



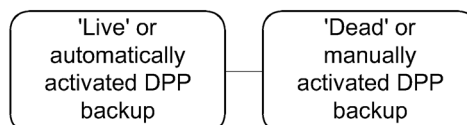
11. Traceability:



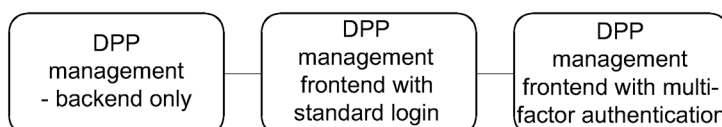
12. Longevity of DPP information access:



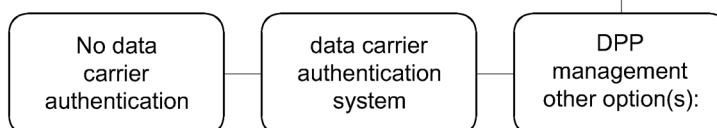
13. Availability of DPP data access:



14. DPP security:  
a) data carrier authentication:



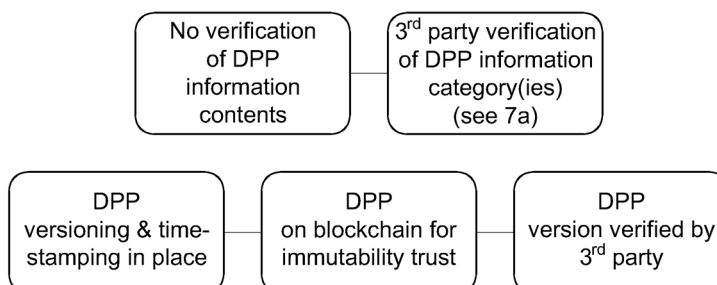
b) DPP authentication:



c) Data encryption:



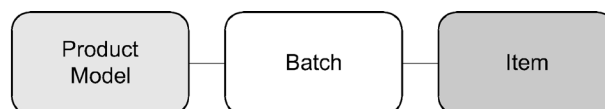
15. DPP information trust:



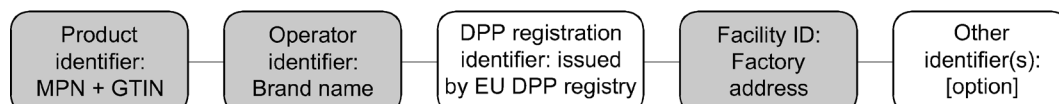
## 7 CircThread Project Example

The EU funded CircThread project (2021-2025), [www.circthread.com](http://www.circthread.com), has piloted the delivery of a Digital Product Passport service, [www.tracid.net](http://www.tracid.net), within a product life cycle services platform context. The Digital Product Passport service in CircThread developed by project partners EcoWise & Ekodenge focused on functionalities needed for electrical appliances, solar glass and batteries. Below in the diagram the selected options in grey define the CircThread DPP design choice as an example.

1. Type of Passport:



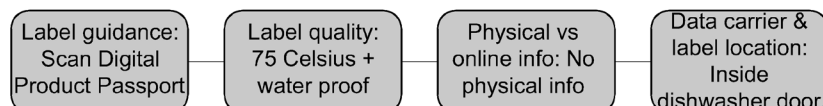
2. Identifiers:



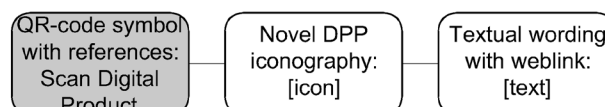
3. Data carrier:



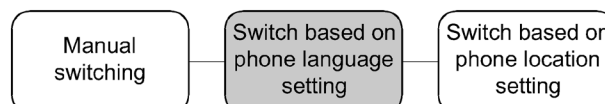
4. Product label:



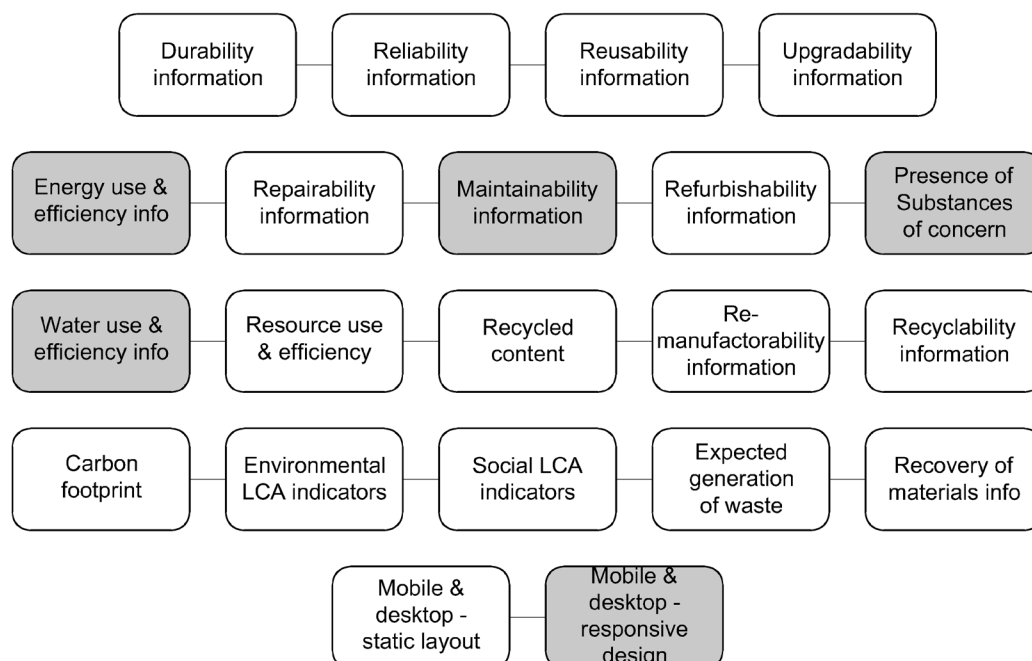
5. Online portal access:



6. Language switching:



7a. Information portal content setup:



b) IT setup

8. Calculation of information portal content:

[Options] based on standards relating to 7a contents

9. Information searchability:

API for accessing full public content in one endpoint

API endpoints for specific content searches

10. Information exchange management:

Data format: JSON

Data structure: Bespoke

Data dictionary: Bespoke

11. Traceability:

Supply Chain events traceability Support

Shipment events traceability support

Product life cycle events traceability support

12. Longevity of DPP information access:

Number of years: N/A (pilot)

13. Availability of DPP data access:

'Live' or automatically activated DPP backup

'Dead' or manually activated DPP backup

14. Security of the DPP:  
a) data carrier authentication:

DPP management - backend only

DPP management frontend with standard login

DPP management frontend with multi-factor authentication

b) DPP authentication:

No data carrier authentication

data carrier authentication system

DPP management other option(s): verifiable credentials

c) Data encryption:

DPP Database encryption 128 bits

DPP Database encryption 192 bits

DPP Database encryption 256 bits

DPP Database encryption other: [options]

15. DPP information trust:

No verification of DPP information contents

3<sup>rd</sup> party verification of DPP information category(ies) (see 7a)

DPP versioning & time-stamping in place

DPP on blockchain for immutability trust

DPP version verified by 3<sup>rd</sup> party

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