From sustainability to safety: aligning espr ecodesign requirements with modern hazard communication standards

Connecting ESPR, product safety and sustainable product information

01 Why it matters • 02 How it connects • 03 What to do next



Presented by **Sherry Sachdeva, PhD, UKERT**

Opening

Why are these three suddenly connected?

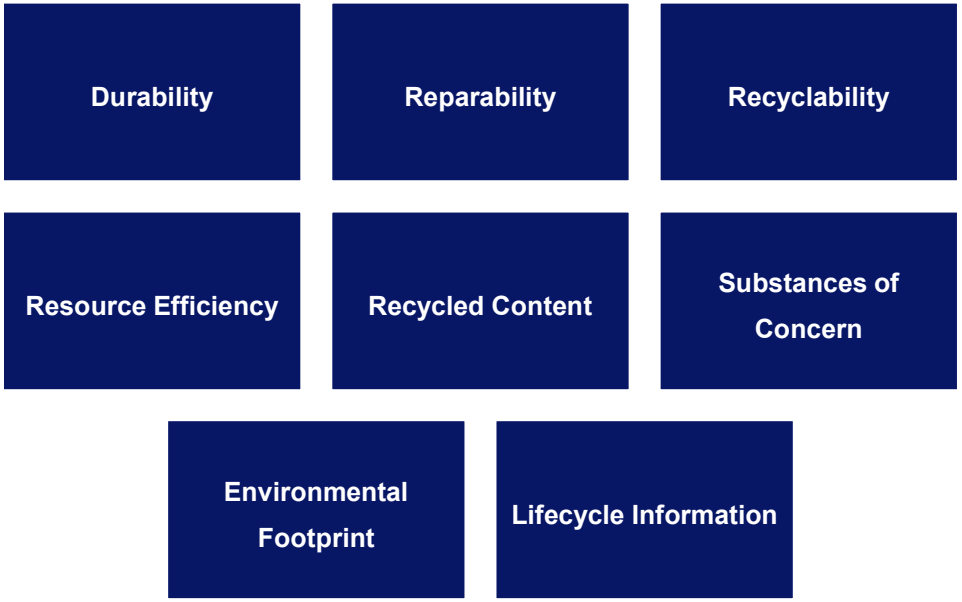
A product manufacturer today must answer three different questions at once:

ES	How sustainable is the product?	ESPR
Ha	What substances and hazards are associated with it?	Hazard Comm.
DP	How is that information communicated across the supply chain and lifecycle?	DPP

The story: ESPR sets product-level sustainability requirements → hazard communication supplies the safety data → the Digital Product Passport makes it accessible across the lifecycle.

ESPR – Regulation (EU) 2024/1781 • CLP – Regulation (EC) 1272/2008 • REACH – Regulation (EC) 1907/2006

Espr: what is changing?



Key message

ESPR moves the conversation **from** "**how do we regulate** the chemical?" **to**ward "how do we **manage information** about the product and its lifecycle?"

FROM OLD DIRECTIVES TO UNIFIED REGULATIONS

ESPR = Framework Regulation

It does not set product rules itself. It enables product-specific delegated acts, one product group at a time — directly applicable in all 27 Member States.

FRAMEWORK LEGISLATION
ESPR (EU) 2024/1781

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WORKING PLANS
Priorities 2025–2030

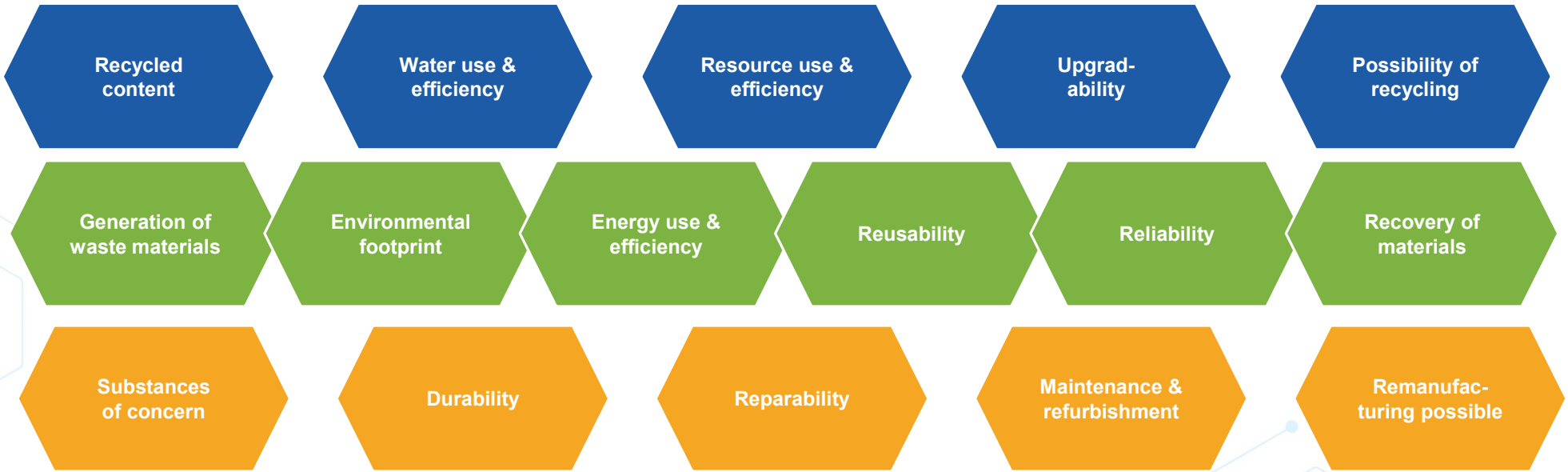
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DELEGATED ACTS
Product-specific rules

OLD RULES	NEW REGULATION
Ecodesign Directive 2009/125/EC	**ESPR (EU) 2024/1781** Wide product scope · DPP via delegated acts
Batteries Directive 2006/66/EC	**Batteries Reg. (EU) 2023/1542** Battery passport from 18 Feb 2027
Toy Safety Directive 2009/48/EC	**Toy Safety Reg. (EU) 2025/2509** DPP replaces the DoC · applies 1 Aug 2030
Construction Products Reg. (EU) 305/2011	**CPR (EU) 2024/3110** Applies from 8 Jan 2026 · DPP phased in
Detergents Reg. (EC) 648/2004	**Detergents Reg. (EU) 2026/405** DPP + digital label · applies 23 Sep 2029

One pattern, many laws: Each new regulation applies identically EU-wide and reuses the DPP as its information channel.

The 16 official ecodesign product aspects

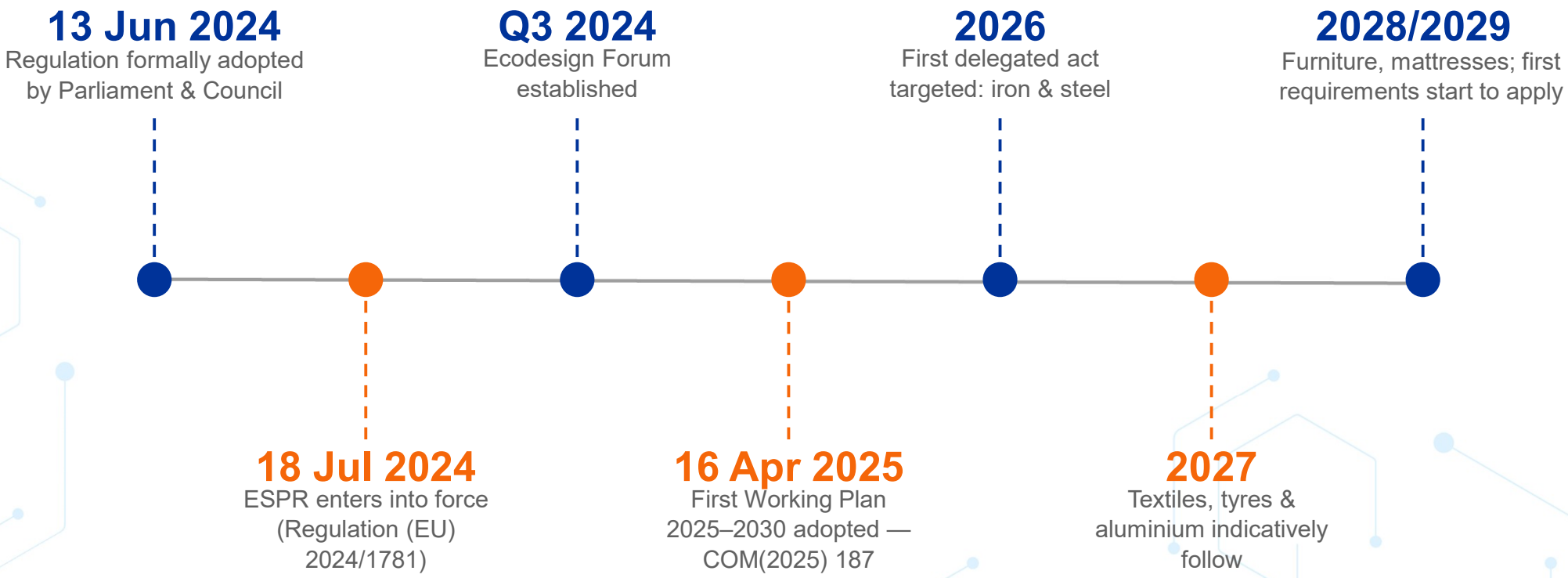


Every one of these 16 aspects can become the *basis of a binding delegated act* under Article 5 — durability and substances of concern are just two among sixteen levers.

Source: European Commission, "Ecodesign for Sustainable Products Regulation (ESPR) – Online Information Session," 22 May 2024 — ESPR Art. 5

Straight from the source — official milestones, as a figure

ESPR at a glance: the official timeline



EUR-Lex CELEX:32024R1781 • EC ESPR Webinar, 22 May 2024 • Working Plan per COM(2025) 187 (16 Apr 2025)

Where is the single source of truth?

Raw Material Supplier	Component Supplier	Manufacturer	Customer	Recycler
SDS/Regulatory Declarations	Material Composition & Compliance Info	Product Regulatory Assessment	SDS, Declarations, Tech Documentation	Limited Info of Product Composition

Where is the single, reliable source of product information?
Usually, there isn't one — and that gap is exactly what the Digital Product Passport is designed to fill.

REACH – Regulation (EC) 1907/2006, Art. 31 (Safety Data Sheets) • ESPR – Regulation (EU) 2024/1781

Modern hazard communcation

Traditional Model

SDS

↓

Label

↓

Worker/Customer

Modern Information Ecosystem

Chemical Identity → Hazard Classification → Regulatory Status → Product Composition → Restrictions → Safe Use → Lifecycle Information

Product-specific Restrictions

Digital Regulatory Data

GHS **SDS** **CLP** **Substances of Concern** **SVHC** **PFAS** **Regulatory Declarations**

An SDS communicates the hazards of a substance or mixture — it does not necessarily reveal the sustainability or circularity of the finished product.

CLP – Regulation (EC) 1272/2008 • UN GHS (Rev. 10) • REACH – Regulation (EC) 1907/2006, Annex II (SDS format)

Speaking from the trenches

This isn't theoretical for anyone who already lives in chemical regulatory compliance. The daily reality already includes:

SDS Authoring & Review

- Safety Data Sheets drafted, reviewed and revised for every new formulation and regulatory update

TSCA Compliance

- US inventory reporting, Section 5 new-chemical notifications, and import certifications for global market access

Compliance Platforms (e.g. WERCS)

- SDS authoring, hazard classification and regulatory data managed at scale across thousands of SKUs

SVHC / PFAS Declarations

- Tracking the REACH Candidate List and PFAS status across the supply chain, formulation by formulation.

Customer Regulatory Requests

- Full material disclosure, conflict minerals, Prop 65, RSL/MRSL and countless one-off customer questionnaires.

Global Inventory Compliance

- REACH, TSCA, K-REACH, China IECSC and more — the same substance, cleared against a dozen different lists.

ESPR and the DPP don't replace any of this work — they add a new consumer- and circularity-facing layer on top of it

Practitioner context — SDS, SVHC/PFAS, TSCA, customer RFIs, WERCS-style platforms, global chemical inventories

The legal bridge

What counts as a "substance of concern"

(a) Substances of very high concern (SVHC)

Meets Art. 57 criteria and is identified under Art. 59(1) of REACH — Regulation (EC) 1907/2006

(b) Harmonised CLP hazard classes

Classified in Part 3 of Annex VI to the CLP Regulation (EC) 1272/2008 — e.g. carcinogenicity, mutagenicity, reproductive toxicity, sensitisation, PBT/vPvB, PMT/vPvM categories 1–2

(c) Persistent organic pollutants (POPS)

Regulated under the POPs Regulation (EU) 2019/1021

(d) Product-specific circularity blockers

Negatively affects reuse or recycling of materials in the product — defined per product group in ESPR delegated acts (e.g. the halogenated flame-retardant ban for electronic displays)

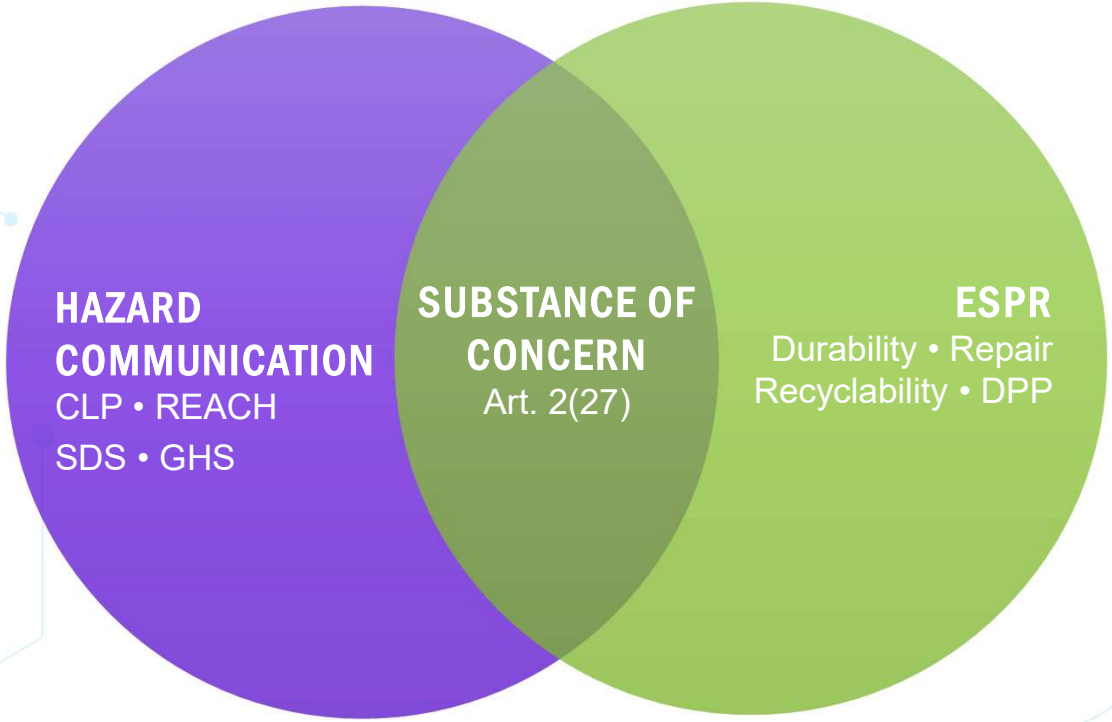
ESPR doesn't invent new hazard science — (a)–(c) borrow CLP and REACH's existing legal machinery wholesale. Only (d) is genuinely new, and it's product-specific.

What happens next, legally: Article 7(5)–(6) (Information requirements) then requires this substance-of-concern data to be disclosed through the Digital Product Passport — turning a hazard-communication concept into a circular-economy data requirement.

ESPR – Reg. (EU) 2024/1781, Art. 2(27) & Art. 7(5)–(6) (Chapter I & II, EUR-Lex CELEX:32024R1781)

How ESPR relates to hazard communication

Hazard communication tells you what a substance IS. ESPR tells you what to DO about it across the product's lifecycle. The overlap is exactly the substances that trigger both duties at once.



The bridge: the Digital Product Passport (Art. 9–15) is the delivery mechanism that carries hazard-communication data forward into ESPR's circular-economy requirements.

ESPR – Reg. (EU) 2024/1781, Art. 2(27), Art. 7, Art. 9–15 • CLP – Reg. (EC) 1272/2008 • REACH – Reg. (EC) 1907/2006

Where ESPR and hazard communication overlap

INFORMATION	HAZCOM	ESPR	DPP
Chemical Identity	✓	Potentially relevant	✓
Hazard Classification	✓	Relevant in some contexts	Potentially
Substances of Concern	✓	✓	✓
Product Composition	Limited	✓	✓
Recyclability	—	✓	✓
Repair Information	—	✓	✓
Product Durability	—	✓	✓
Safe handling / use	✓	Potentially	Potentially
Lifecycle information	Limited	✓	✓

The information doesn't change — the purpose, granularity, ownership and delivery mechanism do.

ESPR – Regulation (EU) 2024/1781 • CLP – Regulation (EC) 1272/2008 • REACH – Regulation (EC) 1907/2006

A digital gateway to product information

The Digital Product Passport (DPP) is a digital gateway to product information that follows the product through its lifecycle — manufacturer, model, materials, substances of concern, sustainability, repairability, recyclability, environmental and compliance data

Different stakeholders need different views of the same passport:

C **Consumer**
"Can I repair or recycle this?"

M **Manufacturer**
"What materials and components are inside it?"

R **Regulator**
"Does it comply?"

R **Recycler**
"What materials and substances do I need to know about?"

ESPR – Regulation (EU) 2024/1781, Art. 9–12 (Digital Product Passport)

The DPP's plumbing ("How") vs its content ("What")

DPP-SYSTEM — THE "HOW"

Developed horizontally, for every product group

- The DPP Registry
- A Searchable Web Portal
- Unique Identifiers & Data Carriers
- Access Rights, Security & Confidentiality
- Interoperability & Data Exchange Formats
- Data Storage, Authentication, & APIs

DPP-DATA — THE "WHAT"

Developed per product group, via dedicated delegated acts

- Technical Performance
- Environmental Sustainability Performance
- Circularity Aspects (Durability, Repairability)
- Legal Compliance
- Product-related Information (Manuals, Labels)

Four unique identifiers are always required:

Product Identifier | **Economic Operator Identifier** | **Facility Identifier** | **Registration Identifier (Not Public)**

ESPR – Regulation (EU) 2024/1781, Art. 9–12 (Digital Product Passport)

This just happened — no longer a future plan

The DPP registry is now live

20 July 2026 — the European Commission launched the DPP Registry together with a testing environment

1	Every DPP a company issues must now be registered in the Registry — the underlying product data still stays decentralized, but the unique identifier and metadata are centrally registrable.
2	Two ways to register: a secure user interface, or an API for companies that want to build registration into their own systems.
3	Proof of registration is issued as a secure electronic document — usable to demonstrate compliance in B2B transactions.
4	First real deadline: 18 February 2027, for certain types of large batteries — the countdown has already started.

ESPR – Regulation (EU) 2024/1781 • CLP – Regulation (EC) 1272/2008 • REACH – Regulation (EC) 1907/2006

Machine-readable material and hazard data

MATERIAL DATA

- Material & polymer identity
- Substance identity (CAS / EC no.)
- Concentration & location in the product
- Recycled content & origin

HAZARD DATA

- CLP hazard class & H-statements
- SVHC > 0.1 % w/w (REACH Art. 33)
- PFAS & other restricted substances
- Safe use, disassembly & end-of-life

ONE DPP-READY RECORD

```
{
  "material": "PVC compound",
  "substance": {
    "cas": "117-81-7",
    "name": "DEHP",
    "conc_pct_w": 0.25,
    "svhc": true,
    "clp": ["Repr. 1B",
            "H360FD"]
  },
  "recycled_pct": 30
}
```

Illustrative — the real data model comes from each delegated act.

Machine-readable = structured, identifier-based, validated. A PDF SDS behind a QR code is human-readable — not machine-readable.

ESPR (EU) 2024/1781, Art. 7 (information requirements) & DPP rules • CLP (EC) 1272/2008 • REACH (EC) 1907/2006, Art. 33 — record shown is illustrative only

The DPP sounds simple until you ask: where does the data come from?

Supplier A
"PFAS: No"

Supplier B
"PFAS: Not intentionally added"

Supplier C
"No reportable PFAS"

Supplier D
Incomplete declaration

Can these four answers safely populate a Digital Product Passport?

- Data ownership
- Data validation
- Version control
- Supplier declarations
- Conflicting definitions
- Confidential business info
- Changing legislation
- Material/product changes
- Traceability

REACH – Regulation (EC) 1907/2006, Annex XVII (PFAS restriction) • ECHA SVHC Candidate List, Art. 59

Standardize traceability across the entire supply chain

The Digital Thread



Raw material supplier	Component supplier	Manufacturer	Distributor or customer	Recycler
Substance IDs, SDS Data & CLP Classification	Material Declaration with SVHC / PFAS Status	Product & Facility IDs; Complies & Registers the DPP	Scans the Data Carrier; Proof of Registration for B2B	Reads Materials & Substances of Concern to Sort & Recover

Common identifiers
Product, Economic-operator & Facility IDs on a QR / Data Carriera

One data model
Shared Vocabularies from the Commission's Free Semantic Repository

One declaration format
Standard Supplier Declarations (e.g. IEC 62474, IPC-1752A) — Not One-off Questionnaires

Same chain as the single-source-of-truth problem — but now the data travels with the product, not re-requested at every hand-off

ESPR (EU) 2024/1781 — DPP unique identifiers & data carriers • CEN-CENELEC DPP standards • IEC 62474 / IPC-1752A material declarations

The future state

From SDS to digital regulatory data

TODAY

Supplier → SDS → Regulatory specialist → Customer

EMERGING MODEL

Supplier data → Regulatory rules / automated assessment → Validated product regulatory data → DPP → Customer / regulator / recycler

This shift connects day-to-day regulatory work directly to the larger sustainability and product-information trend.

REACH – Regulation (EC) 1907/2006 • CLP – Regulation (EC) 1272/2008 • ESPR – Regulation (EU) 2024/1781 (DPP)

Practical industry example

One dataset, three regulatory questions

Example: a plastic component containing additives

SUPPLIER PROVIDES

- Polymer identity
- Additives
- SVHC information
- PFAS information
- Recycled content
- Regulatory declarations

Manufacturer combines these into the finished product.

SDS ASKS

"What hazards does the product present?"

ESPR ASKS

"What sustainability characteristics need to be addressed?"

DPP ASKS

"How can this information be digitally accessed throughout the lifecycle?"

The same underlying data supports all three systems — the value is in connecting it, not recreating it.

REACH – Regulation (EC) 1907/2006, Art. 33 (SVHC in articles) • CLP – Regulation (EC) 1272/2008 • ESPR – Regulation (EU) 2024/1781

Implementation challenges for industry

The hard part isn’t the passport. it’s the data.

1. Data availability
2. Data quality
3. Supplier cooperation
4. Different regulatory definitions
5. Confidentiality
6. Changing regulations
7. Legacy products
8. System integration
9. Data ownership
10. Keeping information current

espr – regulation (eu) 2024/1781 • european commission ecodesign implementing / delegated acts

This is already moving — officially adopted, not hypothetical

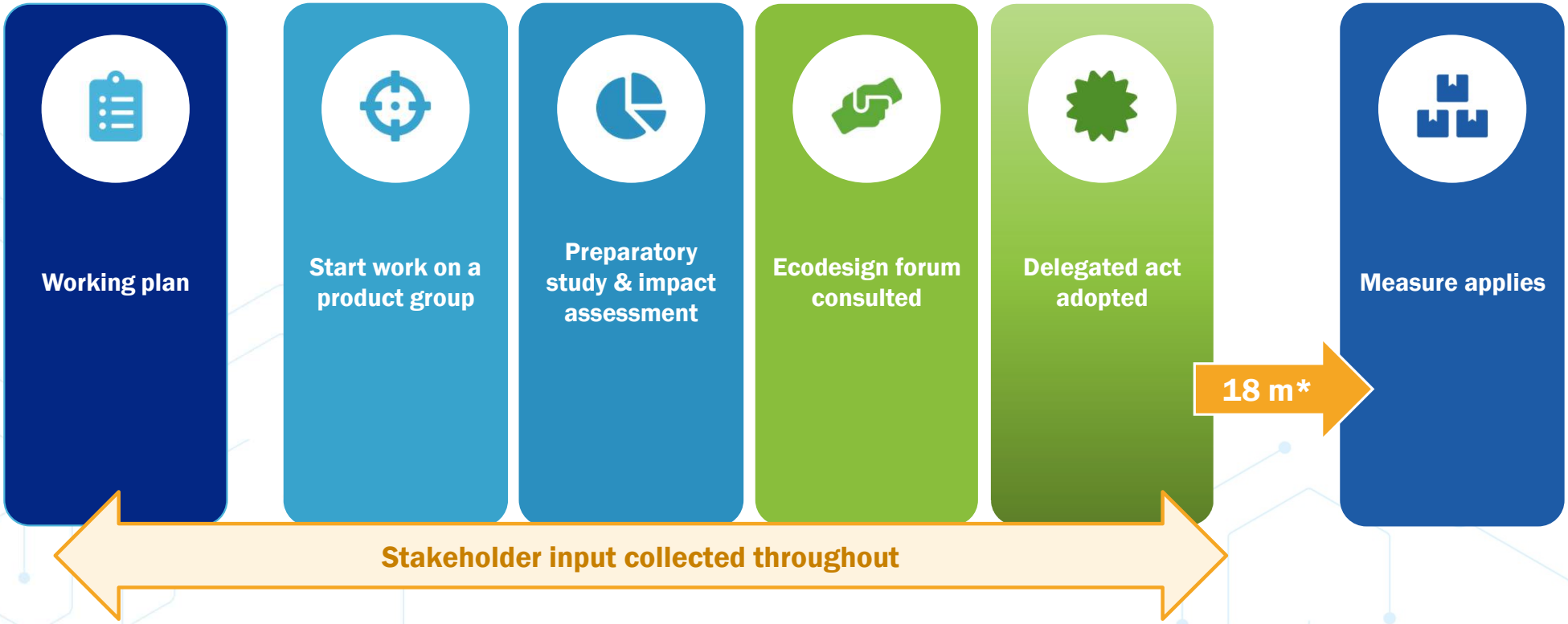
The first ESPR working plan (2025–2030)

2026	Iron & steel — first delegated act targeted under the new Working Plan
2027	Textiles & apparel, tyres, aluminium — plus a horizontal repairability measure for electrical & electronic equipment (EEE)
2028	Furniture — alongside the Working Plan's scheduled mid-term review
2029	Mattresses — plus a horizontal recycled-content measure for EEE

Dates are indicative until each delegated act is formally adopted — chemicals, footwear & construction remain under preparatory study.

European Commission, first ESPR & Energy Labelling Working Plan 2025–2030, COM(2025) 187, adopted 16 Apr 2025

Setting product requirements under ESPR

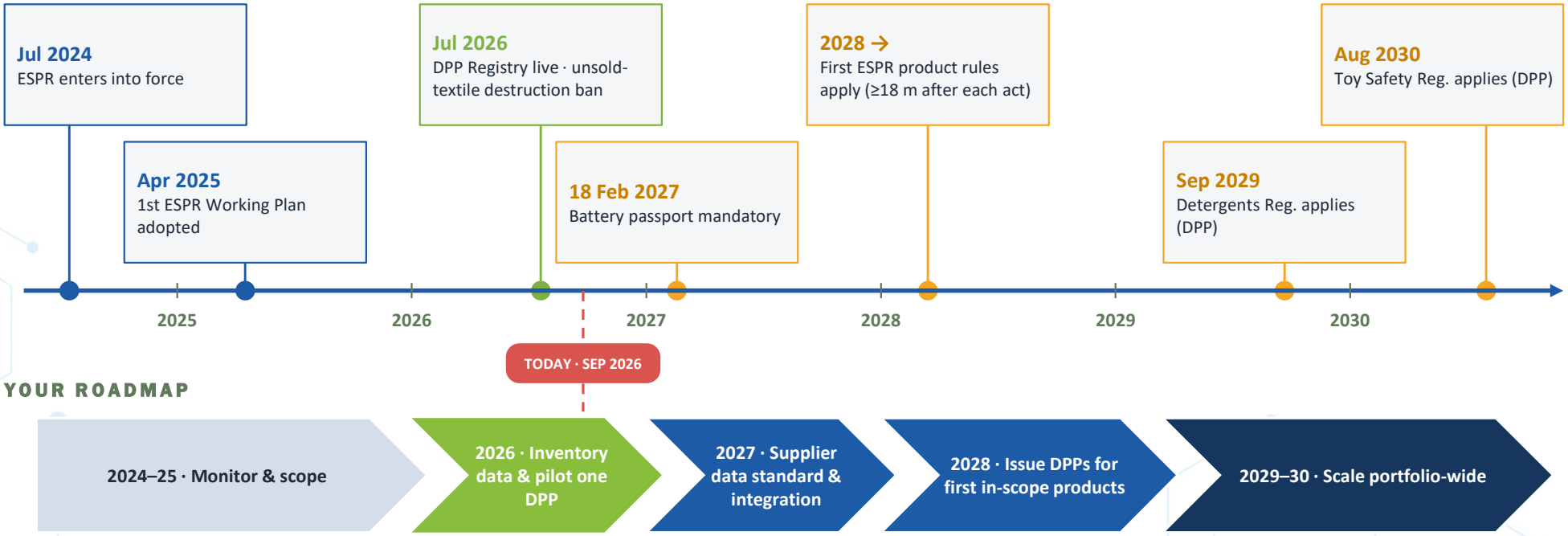


***Requirements normally apply no earlier than 18 months after the delegated act enters into force; shorter periods only in duly justified cases.**

European Commission, ESPR online information session (22 May 2024) — process for setting product requirements • ESPR (EU) 2024/1781

Align your roadmap with EU enforcement timelines

EU enforcement milestones



Rule of thumb: *each ESPR delegated act normally allows at least 18 months to comply — data programmes take longer. Start before adoption, not after*

EC DPP page & Registry launch (20 Jul 2026) • COM(2025) 187 • Reg. (EU) 2023/1542, 2025/2509, 2026/405 • ESPR Art. 25 — ESPR product dates indicative

Five imperatives for product compliance



Implement the DPP — start in 2026

Registry is live since 20 Jul 2026. Pilot one passport now; batteries are mandatory from 18 Feb 2027.



Align roadmaps with EU timelines

Map every product line to its delegated act and its ≥18-month transition.



Machine-readable material & hazard data

Structured substance IDs, CLP classes, SVHC & PFAS status — not PDFs.



Unified regulations replace old directives

ESPR, Batteries, Toys, CPR, Detergents share one DPP logic: build once, comply many times.



Standardized traceability, end to end

Common identifiers and declaration formats from raw material to recycler.

All five rest on one foundation: *trustworthy, connected regulatory data.*

ESPR (EU) 2024/1781 • EC Digital Product Passport Registry (live 20 Jul 2026) • Batteries Reg. (EU) 2023/1542 • COM(2025) 187

Recommendations

What should companies do now?

1. Inventory existing product regulatory data
2. Identify gaps in substance / product information
3. Standardize supplier questionnaires and declarations
4. Establish clear data ownership
5. Create consistent substance identifiers and attributes
6. Connect regulatory data with product lifecycle systems
7. Design systems with DPP requirements in mind

Don’t build the DPP first. Build the data foundation first.

ESPR – Regulation (EU) 2024/1781 — product-specific delegated acts phased from 2027

Zooming back out — the whole argument in one place

The story, in six steps

1. Regulations are demanding more product information
2. Companies already hold enormous amounts of chemical and regulatory data
y. That data is fragmented across SDSs, declarations, ERP systems, PLM systems and spreadsheets
4. ESPR increases the need for product-level information specifically
5. The Digital Product Passport provides a mechanism for making that information accessible
6. ***The real industry challenge isn't compliance — it's creating trustworthy, connected regulatory data***

Conclusion

Three ideas to take back to your desk

1

HAZARD COMMUNICATION AND ESPR NOW SHARE A LEGAL SPINE

ESPR's "substance of concern" definition [Art. 2(27)] borrows CLP and REACH's existing hazard machinery almost wholesale — your SDS/CLP expertise is not being replaced, it's being extended.

2

THE DIGITAL PRODUCT PASSPORT IS THE DELIVERY MECHANISM, NOT A NEW HAZARD REGIME

Art. 7 and Art. 9–15 turn existing hazard and compliance data into a machine-readable record that follows the product — the data mostly already exists; the job is connecting it.

3

THIS IS A LIVE, DATED, MOVING TARGET

ESPR entered into force 18 Jul 2024; the first Working Plan was adopted 16 Apr 2025 [COM(2025) 187]; iron & steel is targeted for 2026 and textiles, tyres and aluminium for 2027 — there is no "wait and see" window left.

ESPR – Reg. (EU) 2024/1781, Art. 2(27), 7, 9–15, 18 (EUR-Lex CELEX:32024R1781) • COM(2025) 187

Closing

Reliable data is the real product passport

ESPR

Sustainable product requirements

Hazard communication

Chemical / product safety information

DIGITAL PRODUCT PASSPORT

Digital access to product information

The future of product compliance is not simply communicating more information. It is creating reliable, connected and reusable regulatory data that can follow a product throughout its lifecycle.

ESPR – Reg. (EU) 2024/1781 • CLP – Reg. (EC) 1272/2008 • REACH – Reg. (EC) 1907/2006 • UN GHS

THANK YOU

Questions?

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START THE DISCUSSION

- What is the first obstacle to your DPP strategy?
- Which data challenge would you fund first?
- What is one thing you will act on this week?

THE FIVE IMPERATIVES

- Implement the DPP — start in 2026
- Align roadmaps with EU timelines
- Machine-readable material & hazard data
- Unified regulations replace old directives
- Standardized traceability, end to end

THE COMPLETE OFFICIAL RECORD — FROM EUROPEAN COMMISSION SOURCES

The complete ESPR timeline (2019–2026)

11 Dec 2019 Adoption of the European Green Deal

11 Mar 2020 Adoption of the new Circular Economy Action Plan *(more →)*

Sep 2020–Jun 2022 Public consultation & roadmap for the Sustainable Products Initiative *(more →)*

30 Mar 2022 Adoption of the ESPR proposal, as part of the Sustainable Products Initiative

31 Jan–12 May 2023 Open Public Consultation on new product priorities for ESPR *(more →)*

5 Dec 2023 Commission welcomes provisional political agreement on ESPR *(more →)*

18 Jul 2024 ESPR enters into force

Oct/Nov 2024 Ecodesign Forum established; call for membership applications published *(more →)*

19–20 Feb 2025 First Ecodesign Forum meeting held

16 Apr 2025 First ESPR & Energy Labelling Working Plan adopted and published

9 Feb 2026 Delegated & implementing acts on destruction of unsold consumer products adopted *(more →)*

19 Jul 2026 Ban on destruction of unsold clothes & shoes enters into application (large companies)

European Commission, ESPR official timeline (Green Forum / environment.ec.europa.eu; ec.europa.eu) — compiled Sep 2026

STRAIGHT FROM THE SOURCE — THE OPERATIONAL DETAIL

DPP Registry: what's actually built

Product scope now live: ESPR products (textiles, steel & aluminium, tyres, furniture, ICT, energy-related) plus other legislation requiring a DPP — certain large batteries, construction products, toys, detergents, end-user surfactants.

6 of 8 standards published

CEN-CENELEC harmonised standards for unique identifiers, interoperability, data carriers, APIs, data exchange protocols and data storage are already out.

Free semantic repository

Machine-readable data models, definitions and vocabulary across product groups, available through documented APIs.

Verification & logging

A verification framework and logging system strengthens security, accountability and reliable access management.

Support now available

Testing environment, technical documentation, implementation guidelines, webinars and a dedicated helpdesk via the new DPP website.

European Commission, "The Digital Product Passport Registry is now live," 20 Jul 2026; Implementing Regulation (OJ L_202601778)

WHY LIFECYCLE ASSESSMENT ISN'T OPTIONAL

LCA: the evidentiary backbone of ESPR compliance

Up to 80% of a product's lifecycle environmental impact is locked in at the design stage — a figure the European Commission has used since its original Ecodesign guidance and repeated in the 2022 ESPR proposal itself.

ISO 14040 / 14044

The LCA framework

The international standard methodology for assessing environmental impact across a product's full lifecycle — materials, manufacturing, transport, use, end-of-life.

ISO 14067

Product carbon footprint

Specifies how to quantify and report a product's carbon footprint in kg CO_2e, stage by stage.

EU PEF Method

Product Environmental Footprint

The Commission's own harmonised method for measuring and comparing product environmental performance across the single market.

Where that impact concentrates differs by product category — sometimes it's the use phase, sometimes manufacturing, sometimes raw materials — which is exactly why ESPR sets requirements product-group by product-group (Art. 6–8) rather than with one universal rule.

The practical bottleneck: if your organisation doesn't yet have product-level LCA data, that gap — not the delegated act's publication date — is what actually limits how fast you can comply.

European Commission (ESPR proposal COM(2022) 142; Ecodesign guidance) • ISO 14040/14044 • ISO 14067 • EU PEF Method