

Food Contact Materials in the Era of ESPR, PPWR and Digital Product Passports

Integrating food safety, circularity, substances of concern, recycled content, packaging compliance and digital product data

PREPARED BY	Regulatory Strategy Consulting Kunz Dr. Erika Kunz
VERSION	2026 white paper edition
SCOPE	EU Food Contact Materials framework, ESPR, PPWR, Digital Product Passport, PFAS, recycled content and integrated compliance readiness
AUDIENCE	Packaging manufacturers, food producers, converters, retailers, brand owners, regulatory affairs, product stewardship, sustainability, packaging development, procurement, quality and IT/data leaders

CORE THESIS

Food-contact packaging is no longer regulated only through a food-safety lens. FCM compliance now intersects with PPWR, ESPR, Digital Product Passports, substances of concern, recycled content, recyclability, PFAS restrictions and supplier-data governance. Successful companies will connect these obligations into one evidence-based compliance model.

Legal note: This white paper provides strategic orientation and does not constitute legal advice. Detailed obligations depend on product type, material, intended food-contact use, packaging function, market role and applicable EU, national and delegated requirements.

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1. Executive Summary

Food Contact Materials (FCMs) are regulated in the EU to protect human health and ensure that materials and articles intended to come into contact with food do not transfer constituents to food in quantities that could endanger health, change food composition or affect taste, smell or appearance.

The existing FCM framework remains essential, but it is now increasingly linked with sustainability and circular economy requirements. PPWR adds lifecycle requirements for packaging, including recyclability, recycled content, minimisation, labelling and PFAS restrictions in food-contact packaging. ESPR introduces product-sustainability and information requirements across product groups, including Digital Product Passports and substances-of-concern logic.

For food packaging companies, the practical challenge is simultaneous compliance. A material may be food-contact safe but not recyclable. A packaging format may be recyclable but not suitable for food contact. A recycled material may support circularity but create contamination or migration-control questions. The future compliance model must demonstrate all dimensions at the same time.

EXECUTIVE INSIGHT

The central question is changing from "Is this material safe for food contact?" to "Can we prove that this packaging is food-safe, chemically controlled, recyclable, circularity-ready, technically documented and supported by reliable supplier data?"

2. Regulatory Background: FCM, ESPR, PPWR and DPP

FRAMEWORK	PRIMARY OBJECTIVE	TYPICAL EVIDENCE	STRATEGIC IMPLICATION
FCM Framework	Food safety and prevention of harmful migration into food.	Declarations of Compliance, migration testing, GMP evidence, traceability and technical documentation.	Food safety remains the non-negotiable foundation.
PPWR	Packaging waste prevention, recyclability, recycled content, reuse, labelling and substance restrictions.	Packaging technical file, recyclability assessment, recycled-content certificates, PFAS evidence and DoC.	Packaging design becomes a market-access compliance topic.
ESPR	Product sustainability, circularity, information requirements and substances-of-concern logic.	Product data, SoC information, environmental metrics and DPP-ready evidence.	Sustainability data becomes part of product governance.
DPP	Structured digital product information across lifecycle stakeholders.	Unique identifiers, material and substance data, access rights, registry links and evidence repository.	Product compliance becomes digital and continuously maintained where required by future sector-specific legislation, delegated acts or other applicable Union legislation.

3. Where Food Safety and Circularity Intersect

Food-contact packaging decisions now require integrated trade-off management. Circularity measures such as recycled content, mono-material design, reuse systems, lightweighting or fibre-based substitution can affect food-contact performance, migration behaviour, shelf life, barrier function and hygiene control.

BUSINESS OBJECTIVE	CIRCULARITY PRESSURE	FCM CONSTRAINT	INTEGRATED COMPLIANCE QUESTION
Increase recycled content	Use more recycled plastic or fibre.	Prevent contamination and unsafe migration.	Is the recycled input authorised, traceable and validated for intended food use?
Improve recyclability	Simplify structures and avoid incompatible layers.	Maintain oxygen, moisture, grease and aroma barriers.	Can recyclability improve without reducing food protection or shelf life?
Reduce packaging	Minimise material and empty space.	Protect food and maintain hygiene and transport performance.	Does minimisation increase damage, contamination or food waste?
Replace PFAS or coatings	Substitute substances of concern and improve end-of-life profile.	Validate alternative barrier chemistry for food contact.	Can alternatives meet migration, performance and recyclability requirements?
Develop reuse systems	Create reusable or refillable packaging.	Maintain hygiene through repeated cycles.	Are cleaning, inspection, traceability and consumer instructions validated?

4. Key Risk Areas for Food-Contact Packaging

Migration and chemical safety

Every design change, coating substitution, recycled input or new barrier layer can affect migration and must be assessed against intended food-contact conditions.

Functional barriers

Functional barriers can support safe use of certain materials, but they require validation and a clear understanding of use conditions, temperature, storage time and food type.

Printing inks, coatings and adhesives

Non-obvious components can drive compliance risk because they influence migration, recyclability and substances-of-concern status.

Multi-material structures

Multi-layer packaging can be essential for shelf life but may create recycling problems. Redesign must balance circularity with food protection.

Reusable systems

Reuse creates promising circularity options but introduces hygiene, cleaning validation, inspection and traceability obligations.

5. Recycled Content and Recycled Plastic FCM

Recycled content is one of the most important points of tension between circularity and food-contact safety. PPWR encourages greater use of recycled materials in packaging, while food-contact legislation requires that food safety is maintained and that contaminants do not migrate into food at unsafe levels.

ISSUE	CIRCULARITY BENEFIT	FOOD-CONTACT RISK	CONTROL MEASURE
Post-consumer recycled plastic	Reduces virgin material demand.	Unknown contaminants from previous use.	Authorised recycling processes and decontamination evidence.
Mechanical recycling	Potentially scalable material supply.	Variable input quality and contamination.	Supplier qualification and batch traceability.
Functional barrier structures	May enable recycled layers.	Barrier failure or wrong use conditions.	Migration modelling and testing.
Mass balance or chain of custody	Supports recycled-content claims.	Evidence may not map to specific product performance.	Claim governance and certificate validation.
Fibre-based recycled inputs	Supports paper circularity.	Mineral oils, inks, additives or contaminants.	Material screening and intended-use validation.

6. Substances of Concern and PFAS

Substances of concern are becoming a bridge concept between FCM, PPWR, ESPR and DPP. A substance may be relevant because of toxicological risk, migration potential, persistence, recycling impact, customer restriction or future product information requirements.

PFAS are a particularly important example. In food-contact packaging, PFAS have historically been used in certain grease-resistant papers, barriers and specialty applications. PPWR introduces restrictions addressing PFAS in certain food-contact packaging applications subject to the detailed requirements laid down in the Regulation.

Action:

- Map PFAS risk by packaging family, supplier, coating and intended use.
- Distinguish intentionally used PFAS from impurities, residues and unknown upstream content.
- Validate alternatives for both food-contact safety and packaging performance.
- Keep test reports, supplier declarations and substitution decisions in a controlled evidence repository.

7. Digital Product Passport and Data Architecture

The DPP should be treated as a data architecture rather than a labelling tool. For food-contact packaging, future product data may need to connect material composition where required by future sector-specific legislation, delegated acts or other applicable Union legislation, , food-contact status, sustainability metrics, recycled content, PFAS or SoC status, recyclability, supplier declarations and technical documentation.

DATA DOMAIN	EXAMPLE DATA	SOURCE SYSTEMS	GOVERNANCE RISK
Product and packaging identity	SKU, packaging family, component, supplier, intended food use.	ERP, PLM, packaging BOM.	Inconsistent master data.
FCM compliance	DoC, migration reports, GMP evidence, use limitations.	Regulatory and quality systems.	Evidence not linked to packaging revisions.
Circularity data	Recyclability, recycled content, reuse status and end-of-life guidance.	Sustainability, packaging and supplier systems.	Claims not supported by evidence.

DATA DOMAIN	EXAMPLE DATA	SOURCE SYSTEMS	GOVERNANCE RISK
Substance data	PFAS, SoCs, additives, coatings, inks, adhesives.	Supplier declarations and regulatory databases.	Confidentiality and upstream data gaps.
Publication layer	Public, customer, authority and restricted-access data.	DPP platform and document management.	Disclosure without access-rights governance.

8. Technical File and Declaration Architecture

The future compliance file for food-contact packaging should connect FCM documentation with PPWR technical files and DPP data. Companies should avoid separate evidence islands.

EVIDENCE LAYER	TYPICAL CONTENT	MAIN OWNER
FCM file	DoC, migration testing, GMP evidence, traceability, use limitations.	Regulatory / quality
Packaging specification	Component BOM, drawings, materials, coatings, inks, labels and adhesives.	Packaging development
Supplier evidence	Material declarations, certificates, substance declarations, recycled-content proof.	Procurement / supplier quality
PPWR file	Recyclability assessment, minimisation rationale, labelling, PFAS screening and packaging DoC.	Packaging / regulatory
Sustainability file	PCF, recycled content, circularity metrics and claim substantiation.	Sustainability
DPP publication file	Access layers, product identifiers, public data, restricted data and version history.	IT / DPP governance

BEST PRACTICE

Build one controlled evidence repository and publish multiple regulatory views from it: FCM DoC, PPWR technical file, customer declaration, sustainability evidence and DPP data should draw from the same source of truth.

9. Business Impact and Risk Areas

Data fragmentation

FCM, packaging, sustainability and DPP data are often owned by different teams and systems.

Supplier dependency

Critical composition, coating, recycled-content and substance evidence may sit several tiers upstream.

Redesign risk

Circularity-driven redesign can trigger new migration, performance, stability and shelf-life questions.

Claims risk

PFAS-free, recyclable, recycled-content, compostable or reusable claims must be supported by defensible evidence.

Market-access risk

A packaging format may fail if one dimension is missing: food safety, recyclability, substance compliance or documentation.

10. Enterprise Readiness Roadmap

PHASE	OBJECTIVE	KEY ACTIVITIES	OUTPUTS
1. Discover	Create portfolio visibility.	Map packaging families, materials, intended food uses, suppliers and markets.	FCM/PPWR/DPP exposure map.
2. Prioritize	Identify highest-risk packaging.	Rank by food-contact status, recycled content, PFAS risk, recyclability and volume.	Priority heat map.
3. Build evidence	Connect technical documentation.	Collect FCM DoCs, migration data, supplier declarations, substance and recyclability evidence.	Integrated evidence repository.
4. Redesign	Close gaps and validate alternatives.	Assess PFAS substitution, recycled inputs, mono-material redesign and reuse models.	Validated redesign roadmap.
5. Implement	Operationalise compliance workflows.	Create DoC process, technical files, supplier clauses and DPP data model.	Operating model and pilot.
6. Operate	Maintain continuous compliance.	Monitor regulatory change, supplier updates, material changes and claims.	Compliance dashboard.

11. Board-Level Priorities

- Treat FCM, PPWR, ESPR and DPP as one integrated packaging compliance agenda.
- Map all food-contact packaging families, materials, suppliers and intended uses.
- Screen PFAS and SoC risks in coatings, barriers, inks, adhesives and recycled inputs.
- Build one evidence repository for FCM DoC, PPWR files and DPP data.
- Validate circularity-driven redesign from a food-contact perspective before launch.
- Integrate supplier data obligations into procurement and quality agreements.
- Create an executive dashboard covering food safety, circularity, substances, claims and data readiness.

12. Outlook and Conclusion

Food-contact packaging regulation is entering a new phase. Food safety remains the foundation, but sustainability, circularity, substances of concern, packaging waste reduction and digital product information are becoming inseparable from market access and customer trust.

Companies that integrate these frameworks early will be better positioned to redesign packaging, validate alternatives, secure supplier evidence and respond to both authorities and customers. Companies that manage FCM, PPWR, ESPR and DPP in separate silos will face higher cost, slower response times and greater documentation risk.

FINAL MESSAGE

The future of food-contact packaging compliance is integrated, evidence-based and data-driven. Safe packaging must also be circularity-ready, substance-controlled and digitally explainable.

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AI-assisted content generation was used during drafting. All technical, regulatory and strategic conclusions were reviewed and approved prior to publication