

Sustainability criteria for plastic recycling technologies under the PPWR

EUMEPS welcomes the European Commission's work on sustainability criteria for plastic recycling technologies under Article 7 of Regulation (EU) 2025/40. The criteria should ensure that recycled plastic used in packaging delivers a clear environmental benefit while creating the regulatory certainty needed to secure and expand European recycling capacity.

The Commission should use a technology-neutral and performance-based approach. Mechanical recycling should remain the preferred route where it can treat the waste efficiently and provide material of the required quality. Physical purification, including dissolution, and chemical recycling should also qualify where they address waste streams or end-use requirements that mechanical recycling cannot adequately serve and where their environmental performance is demonstrated through a consistent life-cycle assessment.

Dissolution can separate polystyrene from other materials while preserving the polymer structure. Depolymerisation and thermolysis can recover monomers or feedstock from streams that require molecular conversion. The delegated act should assess these routes on evidence rather than place them in broad categories that predetermine their eligibility.

The criteria must also protect human health, ensure full traceability from collection to incorporation, and apply equivalent requirements to imported recycled material. Certification and verification should be credible and proportionate, building on established systems where they meet the PPWR requirements.

EUMEPS recommendations

- 1. Use common environmental criteria across recycling technologies** and assess each process against verified performance for the relevant waste stream and recycled output.
- 2. Give priority to efficient material recovery** and avoid diverting clean waste from a proven lower-impact route, while preserving complementary routes for contaminated, mixed or technically demanding streams.
- 3. Use a consistent assessment boundary** beginning when sorted waste enters the recycling process, with collection and transport addressed through separate representative scenarios where relevant.
- 4. Measure useful recycled output** including yield, quality, substitution of virgin raw material, energy demand, greenhouse-gas emissions, pollution, resource use and the treatment of residues.
- 5. Protect safety and sensitive-contact applications** by ensuring full consistency with EU food-contact, pharmaceutical and dangerous-goods requirements.
- 6. Require system-wide traceability and verification** while recognising suitable existing schemes and limiting unnecessary administrative costs.
- 7. Apply equivalent conditions to imports** supported by independent audits, market surveillance, reliable customs information and laboratory checks where documentary evidence is insufficient.
- 8. Review the framework periodically** so that criteria and benchmarks reflect operational evidence, improved sorting and decontamination, and technological progress.

Technology neutrality based on environmental performance

Technology neutrality should not be interpreted as equal treatment irrespective of impacts. It means that a technology should not qualify or fail solely because it is described as mechanical, physical or

chemical. Facilities within the same category can differ significantly in material yield, energy source, solvent recovery, emissions control, residue management and output quality. The Commission should therefore assess a defined process, feedstock and output against common requirements.

The choice of recycling route should follow life-cycle evidence. The EPS recycling overview supplied to EUMEPS, which is based on FprEN 18092:2025 for EPS insulation products, gives priority to the most energy-efficient options and identifies mechanical recycling as particularly suitable for clean EPS. The same document also recognises dissolution, depolymerisation and thermolysis as recycling pathways. Packaging-specific contamination and safety requirements must, however, be assessed separately.

The delegated act should protect the waste hierarchy through a feedstock-suitability requirement. An operator should explain why the selected process is appropriate for the incoming waste, taking account of technically feasible routes, expected yield, required output quality and local collection and sorting conditions. This approach would discourage unnecessary processing of clean waste without excluding technologies needed for difficult streams.

Assessment method

System boundary

The core assessment should begin when sorted post-consumer plastic waste enters the recycling process and end when a secondary raw material meeting a defined specification leaves the process. This boundary is consistent with the EPS pathway overview, which expressly excludes collection and sorting from the recycling-stage description. It also allows a fair comparison between technologies by separating process performance from differences in municipal collection systems.

Collection, transport, compaction and sorting should not be ignored. Where they materially influence the result, the Commission should include them through transparent standard scenarios or verified project-specific data reported separately. Compaction, densification and backhauling should be modelled under realistic European conditions.

Output quality and substitution

A sustainability assessment should measure the quantity of usable output rather than the quantity of waste entering a facility. Recycled plastic that meets a defined technical specification and replaces virgin polymer delivers a stronger circular outcome than an output requiring substantial further treatment or lacking a viable end use. The criteria should recognise both packaging-to-packaging recycling and high-quality open-loop applications. Restricting credit to closed-loop uses would disregard recycled polystyrene that replaces virgin plastic in durable products.

Mechanical and physical recycling

The Commission should classify dissolution according to the fact that it preserves the polymer structure, while requiring evidence on solvent recovery, emissions, energy use, removal of unwanted substances and the safe management of separated residues.

Chemical recycling

Chemical recycling technologies provide an important complementary pathway for achieving high-purity recycled materials suitable for sensitive applications. These processes operate by transforming the polymer's chemical structure, enabling the recovery of feedstock that meets stringent quality and safety requirements. Depolymerisation breaks the material down into its original monomers, allowing these recovered substances to partly replace virgin inputs while maintaining regulatory compliance for demanding uses. Thermolysis, through controlled thermal decomposition, produces valuable intermediates that can be refined into high-quality polymers with properties equivalent to virgin materials.

Together, these chemical pathways offer a robust route to achieving circularity where mechanical recycling alone cannot guarantee the necessary purity, decontamination performance, or regulatory assurance. As technologies mature, chemical recycling will play an increasingly important role in securing safe, traceable, and high-quality recycled content for applications where performance and safety cannot be compromised.

Safety and sensitive contact packaging

Circularity requirements cannot weaken the protection provided by sector-specific legislation. Recycled plastic intended for food-contact, cosmetics, pharmaceutical or dangerous-goods packaging must continue to comply with the applicable safety rules, including Regulations (EC) No 1935/2004, (EU) No 10/2011, (EU) 2022/1616 and (EC) No 1223/2009, as well as relevant pharmaceutical requirements and the rules governing the carriage of dangerous goods by road.

Output quality should therefore form part of the sustainability assessment. A process that produces safe material for a demanding application may justify additional purification where a simpler route cannot meet the same specification. Chemical recycling may be necessary for some contact-sensitive applications where mechanically recycled material cannot obtain the required authorisation or quality. The framework should permit that route when it meets the environmental criteria and all applicable product-safety requirements.

The Commission should assess, at Union level, the current and expected availability before 2030 of recycled raw materials suitable for contact-sensitive packaging. The assessment should distinguish polymers, packaging formats and authorised recycling processes. If verified supply or safety constraints make a target temporarily unattainable for a narrowly defined application, the PPWR review mechanisms should allow a targeted and time-limited adjustment. Such adjustments should be reviewed as sorting, decontamination and recycling capacity develops.

Traceability certification and mass balance

Every recycled-content claim should be traceable from the location where the post-consumer waste was collected, through regeneration and conversion, to incorporation in the final packaging. Traceability should apply to mechanical, physical and chemical recycling. It should identify the origin and classification of the waste, the quantities entering and leaving each relevant stage, conversion factors, losses and the allocation of recycled content. This is especially relevant to chemical recycling whose investment and legal security depends on recognizing credit mass-balance accounting; "...mass balance rules are a critical economic factor for chemical recycling technologies that co-produce material and fuel outputs, with a mixing of secondary (e.g. plastic waste) and primary (e.g. crude oil or naphtha) feedstock."

Existing systems such as RecyClass recycling-process certification, LNE certification for the incorporation of recycled plastics, RedCert2 and ISCC PLUS provide useful foundations. The Commission should recognise schemes that demonstrate the PPWR requirements, use competent independent auditors and provide access to records for enforcement. Recognition should avoid repeated audits of the same information. Certification costs fall across the value chain, including packaging converters that use recycled raw materials, so the requirements must remain proportionate to risk and company size without weakening verification.

Where recycled and virgin feedstocks are mixed in shared infrastructure, controlled mass-balance accounting can support the use of existing industrial capacity. It should be permitted only within a clearly defined system boundary and reconciliation period. Allocation must reflect eligible recycled input and verified conversion factors. Process losses and outputs used as fuel or energy must not receive recycled-content credit. The same input must not be claimed twice, and documentation should distinguish physically segregated content from attributed content.

Conclusion

EUMEPS supports sustainability criteria that direct plastic waste towards the route capable of producing useful secondary raw material with the best verified environmental performance. Mechanical recycling should be preferred for clean applications where it achieves the required quality efficiently. Dissolution, depolymerisation and thermolysis should remain available for waste streams and applications that require purification or molecular conversion, subject to common environmental thresholds and full traceability.

The final framework should protect health, support the waste hierarchy, recognise high-quality open-loop recycling and apply equivalent conditions to imports. It should build on credible certification systems and analytical controls while keeping compliance proportionate. These elements would give recyclers and packaging producers the certainty needed to invest while maintaining the environmental integrity of the PPWR.

References

- **European Commission.** [Packaging and packaging waste sustainability criteria for plastic recycling technologies Call for evidence Ares 2026 7896093](#)
- **European Union.** [Regulation EU 2025 40 on packaging and packaging waste](#)
- **ELIPSO.** Position paper on the EU consultation concerning Article 7 of the PPWR 2026
- **EUMEPS.** EPS Recycling Pathways overview 1 September 2026 based on CEN TC 88 WG 10 N 1220 and FprEN 18092 2025
- **European Commission.** [Environmental Footprint methods](#)
- **International Organization for Standardization.** [ISO 14040 and ISO 14044 life cycle assessment principles and requirements](#)
- Joint Research Centre, [Economic viability of chemical recycling](#), 2026
- **RecyClass.** [Recycling Process Certification](#)
- **LNE.** [Certification for the incorporation of recycled plastic materials](#)
- **ISCC.** [ISCC PLUS for plastics and packaging](#)

About EUMEPS

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