POSITION PAPER

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COMPOSITES IN THE PROPOSED END-OF-LIFE OF VEHICLES REGULATION

Supporting an effective ELV regulatory framework for composite materials and their circularity

The composite materials industry, representing stakeholders across the entire supply chain – from raw material suppliers to composite manufacturers – welcomes the European Commission proposal to review the End-of-Life of Vehicles Directive. Composites play a crucial role in vehicle lightweighting and emissions reduction, enhancing safety, and longevity, which are essential for advancing the circularity and environmental sustainability of vehicles. Furthermore, as the automotive industry transitions to electric vehicles, the indispensable role of composite materials in enabling the production and deployment of lightweight electric vehicles becomes paramount.

While the environmental benefits of composite materials are well-established, further progress is necessary to enhance their end-of-life management and their integration into circular economy frameworks. In this regard, the Commission's proposal has the potential to be transformative not only for the automotive waste management, but also for other sectors using composites such as the wind energy, hydrogen storage, boating industry, aerospace and defence. Accelerating the deployment of these technologies will reduce reliance on imports of some raw and processed materials, support the uptake of recycled content, and reinforce Europe's strategic resilience in sectors critical to the green and digital transitions.

To fully realise this potential, the composite industry is committed to working alongside policymakers to strengthen and implement the proposal. The composite industry fully supports the proposed measures that promote reuse and recycling of composite parts. Notably, the introduction of specific targets for plastics that include composite materials, mandatory removal of key vehicle components, and the implementation of Extended Producer Responsibility (EPR) schemes can catalyse the development of efficient and harmonized end-of-life treatment across Europe.

However, the composite materials industry believes that the recyclability of composites has been inaccurately assessed in the draft proposal, and that these materials have been unjustly portrayed as barriers to high-quality recycling. Such mischaracterisation overlooks both existing recycling solutions and ongoing innovation across the composite supply chain. As a result, certain provisions in the proposal risk discouraging the use of advanced, lightweight materials that are essential for the transition to electrified, and energy-efficient vehicles. To support a balanced and forward-looking regulatory framework, we recommend maintaining the inclusion of thermosets under the plastic recycling targets in **Article 6 (1)**. Additionally, we urge the removal of references to composites in **Article 21(1)** and **Annex IV**, as these currently undermine the role of composites in sustainable automotive design and circularity.

Composite materials are inherently durable and can be reused or repurposed when properly recovered. Several industry-led initiatives have demonstrated the feasibility of collecting and reusing composite components, although such practices remain limited and largely voluntary. In addition to reuse, recycling technologies for composites have advanced significantly, offering actionable solutions for material recovery. While composites and plastics differ in structure, they present synergies and complementary pathways in emerging recycling technologies. Mechanical recycling and pyrolysis are operated at industrial scale while other technologies such as solvolysis are proven at pilot scale. All require a supportive regulatory framework to scale up and be fully deployed at industrial level. There are also multiple examples of renewable raw materials being recycled into composites materials.

Where can composites be found in vehicles?

Composites are present in a large number of parts present in all vehicles or in parts which are specific to combustion engine or electric vehicles: dashboard, front end, central arm rest, door modules, headlamp reflector, hatchback, seat structures, frames, noise engine shielding parts, heat shields, pillars, headliners, airbag covers, roof frame, timing belt and V belt, rear shelves, spare wheel cover, PA air intake manifold, radiator caps, cylinder head (e.g. valve rocker, cam) covers, clutch disks, brake pads, fuel tank locking cover, printed circuit boards, and battery casing and cover in electric vehicles.

Proposed adaptations to the European Commission proposal:

The composite materials industry, representing stakeholders across the entire supply chain – from raw material suppliers to composite manufacturers - is willing to support the EU legislator in shaping an End-of-Life Vehicles (ELV) regulatory framework that fully enables and promotes the reuse and recycling of composite components. While the European Commission's proposal includes several promising provisions, it can be further strengthened by integrating composites in its circularity objectives.

In particular, we recommend the following amendments to ensure the Regulation enables the deployment of available solutions and further innovation across all composite materials used in automotive applications:

1. **Maintain the inclusion of thermosets under the plastic recycling targets (Article 6(1)):** It is essential that thermoset composites remain within the scope of plastic targets to preserve the regulatory incentive for their collection, sorting, and recycling. Thermoset and thermoplastic polymers, while different in structure, offer synergies and complementary pathways in emerging recycling technologies. We therefore strongly recommend that Article 6(1) maintain the inclusion of thermosets, as originally proposed by the European Commission.
2. **Remove the mischaracterisation of "composite plastics" in the Extended Producer Responsibility (EPR) (Article 21 point 1 e):** The mention of "composite plastics" as examples of materials that prevent high-quality recycling is not supported by current technical realities.
   - Composite materials do not inherently prevent high-quality recycling.
   - When dismantled, collected, and sorted properly – just like other automotive materials – composite parts can be reused or recycled using established and emerging technologies.
   - Penalising the use of composites through EPR mechanisms could discourage material innovation and undermine climate and circularity goals.

   We recommend that this reference be removed to ensure a fair, innovation-friendly EPR framework that incentivizes circular material flows rather than limiting them.
3. **Remove misleading references to composites in the "Circularity Strategy" (Annex IV Part A and Part B):** The current references to "fibre-reinforced materials" and "composite plastics" in Annex IV are inaccurate and misleading. These materials are cited as examples of components that hamper disassembly or complicate recycling, which does not reflect the reality of composite parts. In fact:
   - Several composite components (e.g., dashboards and printed circuit boards) are already included in the list of parts required for mandatory removal (Annex VII, Part C), specifically to facilitate reuse or refurbishment.
   - Composite parts can be reliably recycled when they are properly collected, sorted, and processed using existing technologies.
   - As acknowledged by the European Commission's Joint Research Centre (2023)[1], three composite recycling technologies have reached TRL9 (fully mature) and more are progressing rapidly toward industrial scale.

   To support evidence-based policy, these incorrect generalisations should be removed to avoid unfairly disincentivizing the use or recovery of valuable composite materials.
4. **Expand the list of "Mandatory removal of parts and components" (Annex VII Part C) to include additional composite components:** Many composite parts used in vehicles are durable, high-value, and suitable for reuse or recycling. Their removal before shredding helps avoid contamination, facilitates higher material recovery, and supports the development of closed-loop recycling.
   - In many cases, these components outlast the vehicle itself and can be remanufactured or reused as spare parts, especially in the context of accident repairs.
   - Separately collecting composite components also improves downstream recycling outcomes by limiting cross-contamination with incompatible materials.

   Therefore, we encourage the EU legislator to consider including a broader set of composite components in the mandatory removal list, beyond dashboards and printed circuit boards. A non-exhaustive list of such components is provided in the textbox above.

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[1] Joint Research Centre, 2023, *Towards a better definition and calculation of recycling*, JRC131531.