

THE END-OF-LIFE OF VEHICLES REGULATION AND GFR COMPOSITE PARTS

An enabling framework to glass fibre reinforced (GFR) composite parts reuse and recycling

Glass Fibre Europe, representing the continuous filament glass fibre manufacturing industry in Europe, welcomes the European Commission proposal to review the End-of-Life of Vehicles Directive. To our industry, it stands clear that glass fibre reinforced (GFR) composites must be sustainable to be part of our future. While the environmental benefits of GFR composites used in vehicles are incomparable, in particular their contribution to the reduction of vehicles' weight and emissions, progresses must be done on their end-of-life treatment. In that respect, the European Commission proposal can be a game changer.

Our industry firmly supports the European Commission proposal and the new measures proposed that will push for the reuse of GFR composite parts and the deployment of recycling solutions; in particular, the introduction of a specific target for plastics applicable to composites, the mandatory removal of certain automotive parts and the introduction of an Extended Producer Responsibility to ensure proper collection and treatment of the vehicles.

While the European Commission proposal correctly addresses major hurdles to the reuse and recycling of end-of-life vehicles, we believe that the proposal can further promote these objectives for the GFR composite parts. In particular, the Legislator could consider:

1. Extending the list of mandatory removal parts to cover additional GFR composite parts in vehicles either for reuse or to avoid contamination for recycling. The proposal currently covers only dashboards and printed circuit boards with a surface area larger than 10cm², while GFR composites are present in many more applications (see listing in the textbox, p.2).
2. Correcting the proposal with the updated information on recycling technologies available today for composites.
3. Make the legislation future proof considering the recycling technologies under development for GFR composite parts, in particular for close loop recycling.
4. Correcting a factual mistake in the European Commission proposal. The glass composition (soda lime silicate glass) of automotive glass (windshields, rear and side windows) is not compatible with the continuous filament glass fibre standards (ASTM D578 for E-glass). Therefore, the text should be adapted to incentivise automotive glass recycling into glass of similar composition.

GFR composites in automotive parts

Glass fibres are used to reinforce plastics in automotive parts. Car manufacturers have increasingly been using GFR composite parts to meet stringent new emissions regulations, improve the performance of the cars, and offer electric vehicles. This is reflected in the significant growth of GFR composites in transport applications over the last decade. Based on a recent statistics report¹, the global composites market in transportation has increased from 2.3 Mt in 2010 to 2.8 Mt in 2021, and it is expected to further increase to 3.7 Mt in 2027 and become the first market segment for composites in volumes. These increased volumes call for an adaptation of the waste management schemes for the end-of-life treatment of vehicles in Europe and set up of systems to dismantle, collect, reuse, repurpose and recycle.

¹ JEC, 2023, *JEC Observer: Overview of the global composites market 2022-2027*, January.

GFR composites can be found in a large number of vehicle parts (see text box, below). Innovations in the glass fibre industry have made possible the development of a vast array of products offering significant advantages in use, such as lightweighting, design flexibility, resistance to fire / chemicals / corrosion or changes in temperatures, soundproofing and durability.

One of the main features that makes glass fibre's reinforcement a material of choice in the automotive sector is its **contribution to the reduction of the weight of the vehicle**. This helps increasing the energy efficiency in vehicles (fuel or electric) on the road and reducing emissions. Glass fibre is also **instrumental to the production and deployment of light-weight electric vehicles**. In this applications area glass fibre is used for battery casing, to lower weight, while providing fire protection, underbody protection and optimum temperature conditions within the battery. Glass fibres are also present in thermoset plastic housings of electrical vehicle charging stations to make them robust.

The benefits of using GFR composites are well known from car manufacturers and the increasing ambition for emissions reductions in the automotive sector has further incentivised their use. Eventually, an electric vehicle is a vehicle using more GFR composites.

Where can GFR composites be found in vehicles?

GFR 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.

Reuse and recycling of GFR automotive parts

GFR composites are long-lasting materials designed to be sustainable, and they can be further reused. **The durability of GFR composite parts makes these perfect candidates for reuse provided they are properly collected and sorted before the car is shredded.** GFR composites parts are already collected and reuse to offer alternatives to new parts. However, these practices remain individual initiatives by certain operators. These initiatives could be further encouraged provided that the GFR composite parts suitable for reuse are clearly identified in the regulation, designs facilitating their removal are promoted and that their dismantling is made mandatory before shredding.

GFR composites parts can be reused, and they can be recycled. As highlighted in a recent report by the Joint Research Centre², **several recycling technologies are mature and available for GFR composites recycling – namely mechanical recycling, pyrolysis, and co-processing in cement.** The glass fibre industry is actively involved in projects to bring other technical solutions (recycling processes or technologies) to maturity. The Grail for the glass fibre industry is to achieve close loop recycling with recycled glass fibres replacing virgin raw material in the batch. These solutions will also offer potential synergies with the polymers industry (e.g. pyrolysis, gasification or solvolysis of polymers).

As well as for the reuse, the proper collection and sorting is a crucial step to recycling, not the least to limit the contamination of the material. This step is **particularly relevant for close-loop recycling solutions** which will be increasingly important in the future. The glass fibre manufacturing process is extremely sensitive to variations in the composition of the batch and impurities should be strictly avoided to prevent the generation of glass waste in the installation. **The Legislator can support the reuse and large-scale deployment of recycling solutions by adapting its legislative framework to include material specific targets, in particular for non-hazardous lightweight materials.** Should the regulatory framework focus remain on the total weight of vehicle objective only, the regulatory incentive will remain on the recycling of heavy material only and an opportunity missed for the collection, sorting and reuse/recycling of composites parts.

About Glass Fibre Europe – EU Transparency Register n°635608817518-09.

Glass Fibre Europe, founded in 1987, is the voice of the European continuous filament glass fibre industry. It is composed of 8 companies: 3B the fibreglass company, Envalior, FYSOL SAS, Johns Manville, Nippon Electric Glass, Owens Corning, Valmiera Glass, and Saint-Gobain Vetrotex. Glass Fibre Europe represents all the major producers of continuous filament glass fibre in Europe.

² Joint Research Centre, 2023, *Towards a better definition and calculation of recycling*, JRC131531.

Appendix: Recommendations for the End-of-Life of vehicles regulation

Proposed adaptations to the European Commission proposal

Glass Fibre Europe is willing to support the Legislator to contribute making the end-of-life of vehicles regulatory framework conducive to Glass Fibre Reinforced (GFR) composites reuse or recycling. While very positive on many aspects, the proposal made by the European Commission can be further improved by making full use of the mandatory removal and Extended Producers Responsibility (EPRs) requirements for GFR composites parts. In particular, the Legislator should consider the following improvements to the proposal:

1. **Keep GFR composites covered under the plastic definition (Article 3 (9)):** The inclusion of GFR composites in the plastic definition is crucial to preserve the incentive to collect, sort and deploy recycling solutions for GFR composites. Regulation (EU) No 10/2011 could be considered for replacing the legal basis used for the plastic definition in the proposal, considering that it includes the reference to additives or other substances (like GF) which may have been added.
2. **Further support the reuse of parts and components via the “Circularity Plans” (Annex IV Part A and Part B):** The waste hierarchy in the EU Waste Framework Directive should be the guideline to the “Circularity Plans” and measures for waste prevention and preparing for re-use further promoted. In particular, the “measures to address the challenges posed by the use of certain materials and techniques” should be decided considering their impact on all targets set in the regulation, starting from reuse. For instance, a durable and resistant material will make mechanical shredding more demanding, but the same properties can contribute extending the lifetime of a vehicle and make it a better candidate for reuse.
3. **Remove from the “Circularity Strategy” (Annex IV Part A and Part B) the references to “fibre-reinforced materials” and “composite plastics” wrongly used to exemplify materials which hamper easy removal or make recycling very challenging:** GFR composites parts do not hamper the removal of other parts or make recycling very challenging. Some parts made out of GFR composites are in fact already listed in the Annex VII Part C of the proposal for mandatory removal (i.e. dashboard and printed circuit boards) to facilitate their reuse, remanufacturing or refurbishment. GFR composite parts can also be recycled provided there are well collected, sorted and treated. As recognised by the European Commission Joint Research Centre in a recent report (2023)¹, 3 recycling process for composites are already at TRL9 and other processes are currently under development and expected to be brought to technological maturity in the coming years.
4. **Remove from the Extended Producer Responsibility (EPR) (Article 21 point 1 e) the reference to “composite plastics” wrongly used to exemplify materials which prevent a high-quality recycling process:** GFR composite parts do not prevent a high-quality recycling process. GFR composite parts can be dismantled for reuse or recycled if properly collected and sorted (as other materials). Therefore, it is not justified to penalise financially car manufacturers using GFR composite parts.
5. **Include additional GFR composite parts to the list of “Mandatory removal of parts and components” (Annex VII Part C):** GFR composite parts are durable and long-lasting, with a lifetime potentially exceeding the one of vehicles. Some of these parts can also be easily dismantled after road hazard and find a market for parts replacement. In addition, their separate collection could contribute limiting their contamination which is a major hurdle to certain recycling processes in particular close loop recycling. Therefore, further consideration should be given to include additional GFR composite parts to the ones already listed in the proposal (i.e. dashboards and printed circuit boards with a surface area larger than 10 cm³). A list of GFR composite parts to be considered for a revised mandatory removal (Annex VII Part C) is available on page 2 of this position paper.
6. **Amend the Treatment Requirements “Specific treatment requirements of the removed parts, components and materials” (Annex VII part F) to automotive glass to make these compatible with the glass compositions:** The composition of automotive glass cullet (soda lime glass cullet) is not compatible with the composition of the continuous filament glass fibre composition (as defined in standards ASTM D578). Therefore, the reference to “fibre glass” should be removed from the annex and replaced by a reference to recycling “into glass products which have a technically compatible glass composition”.

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