LIFE CIRC-ELV

BOOSTING CIRCULAR ECONOMY OF PLASTICS FROM END-OF-LIFE VEHICLES THROUGH RECYCLING INTO HIGH ADDED-VALUE APPLICATIONS

Deliverable D_B7.3.

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Dissemination level		
PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

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LIST OF ABBREVIATIONS

ELV	End-of-Life Vehicle
ATF	Authorised Treatment Facility
PP	Polypropylene polymer
PE	Polyethylene polymer
OEM	Original Equipment Manufacturer
CPA	Circular Plastics Alliance
SRAHG	Standardization Request Ad-hoc Group

1. Summary and Objectives

LIFE CIRC-ELV project aims to develop a new management model for End-of-Life Vehicles (ELVs). This new model is focussed on the plastics that are present in ELVs for increasing their recovery ratio and their quality in an early stage, so they are suitable for recycling. Therefore, a new business model would arise for recycled plastics coming from ELVs, which is intended to be techno-economic and environmentally sustainable.

This deliverable is aimed for stablishing how standards for construction and automotive plastic products could include (or increase) recycled plastics.

2. Proposals at Standardisation Committees level

AIMPLAS belongs to several working groups in different plastic material standardization committees, where some of them are in addition chaired by AIMPLAS. These are based on Spanish level (UNE) but also mirroring European and International Committees (CEN and ISO).
Specifically, these are the working groups related to the recycled plastic (both PP and PE) and construction/automotive sectors where AIMPLAS participates

Table 1. Standardisation Committees which AIMPLAS belongs to.

Committee	Description
	UNE
CTN 53 / SC2	Plastics and Rubber / Plastic tubes and fittings
CTN 53 / SC6	Plastics and Rubber / Specifications on raw materials and test methods
CTN 53 / SC8	Plastics and Rubber / Plastics recycling
CTN 323	Circular Economy
	CEN
TC 155 / WG25	Plastic piping systems and ducting systems / Recycling of PVC-U, PE and PP materials
TC 249 / WG11	Plastics / Plastics recycling
	ISO
TC 61 / SC14 / WG5	Plastics / Environmental aspects / Mechanical and chemical recycling
TC 138 / SC5 / WG5	Plastics pipes, fittings and valves for the transport of fluids / General properties of pipes, fittings and valves of plastic materials and their accessories — Test methods and basic specifications / Polyolefin pipes

Standardisation Committees listed in Table 1 are more focussed in recycling and construction (piping) sector.

Specifically, for plastic pipes, there is a related standard where recycled content is allowed once it fulfils with technical characteristics (results from tests described in the standard text). The standard is UNE-CEN/TS 14541. Plastics pipes and fittings - Characteristics for utilisation of non-virgin PVC-U, PP and PE materials. In the same text, contrarily, there is a clear prohibition of using recycled plastics in pressure pipes.

Automotive standards which are used by plastic converters in this industry are mainly developed internally by OEMs. In that sense, using scraps for its own production in new pieces is allowed. On the other side, to validate a new material, as discussed in other deliverables (D4.1 for instance), it should be done following OEMs criteria. These standards are not open but only accessible to suppliers of OEMs.

However, OEMs and the automotive industry are waiting for the new ELV Directive text in which some attempts to include (and even boost) the use of recycled content have been appearing on discussions during its review. This text, still not in force, could speed up the OEMs standards for including post-consumer (and/or also pre-consumer/post-industrial) in plastic parts of vehicles.

By means of the validation of the LIFE CIRC-ELV project it is demonstrated that certain amount of post-consumer plastic could be recycled in new automotive parts. OEMs are the solely key actors for this to happen.

Regarding to the construction and recycling plastic standardisation committees, AIMPLAS, on each newly created or under review standard, proposes to include a specific text inspiring the use of recycled plastics, or at least make an open approach to do so. This happens at Spanish level but also at any other European or international standard that is being prepared/reviewed under the scope of action of AIMPLAS.

3. Proposals at Circular Plastics Alliance level

The Circular Plastics Alliance (CPA) aims to recycle EU plastics up to 10 million tonnes by 2025. The alliance covers the full plastics value chains and includes over 300 organisations representing industry, academia and public authorities. AIMPLAS belongs to the CPA and it is actively participating in all sectorial working groups: packaging, construction, agriculture, electric-electronics and automotive.

The CPA is also working for each sector, on 5 different topics: R&D, Recycled content, Design for Recycling, Collection and Sorting and Monitoring.

Within these topics, reviews of standards dealing with different products for each sectors is being conducted focused on including recycled plastics.

These standards, for the construction sector are the following:

Table 2. European standards selected from the CPA and related to the LIFE CIRC-ELV.

Standard	Description
CEN/TC 15353:2007	PLASTICS - RECYCLED PLASTICS - GUIDELINES FOR THE DEVELOPMENT OF STANDARDS FOR RECYCLED PLASTICS
EN 15343:2007	Plastics. Recycled plastics. Plastics recycling traceability and assessment of conformity and recycled content
EN 15344:2021	Plastics - Recycled Plastics - Characterisation of Polyethylene (PE) recyclates (in revisión)
EN 15345:2007	Plastics - Recycled Plastics - Characterisation of Polypropylene (PP) recyclates (confirmed 2018)

One of the most interesting outcomes of this work from the CPA on recycled content deals with the ways recycled plastic could be incorporated into new products:

1. The product is made using only recycled plastic as input material, normally with a small amount of virgin plastic to provide additives to get the best quality material for the product. Additives can help stabilise the plastic, improve its processability during manufacture, add colour etc.
2. The product can be made using a mix of recycled and virgin plastics. This can be done in two ways, the recycled plastic and virgin plastic pellets are physically mixed at the start of the converting process or a blended material from a polymer producer is used (e.g. polymer pellets made with a certain amount of recycled plastic)
3. The product is made in a multi-layer structure (known as co-extrusion) where different layers are made from virgin, recycled or blend plastic to form one finished or semi-finished product.
4. The recycled plastic is used as a filler in the production of a plastic product

The outcome of the LIFE CIRC-ELV project is just fulfilling the 2nd point, where recyclates are incorporated to virgin materials (and additives) to generate recycled pellets ready to be converted into recycled plastic products.

3.1. Draft standardisation request from the CPA

The Standardization Request Ad-hoc Group (SRAHG) from CEN worked on a draft Standardization Request on 'Plastics recycling and recycled plastics in support of the implementation of the European Strategy for Plastics in a Circular Economy'.

The draft request was prepared by the Commission considering the analysis of standardisation needs by the Circular Plastics Alliance.

The draft document[1] contains a list of new European standards and European standardisation deliverables to be drafted, a list of existing European standards and European standardisation deliverables to be revised and list of draft standards to be completed.

4. Proposals from the LIFE CIRC-ELV project

Results obtained from the demonstrators of the LIFE CIRC-ELV project validated that plastic recyclates from ELVs can be used for fabricating wheel liners, pipes and pipe fittings when they a re properly mixed with virgin plastics and additives to enhance the pristine properties of recyclates.

In that sense, for the pipes it is covered by the standard UNE-CEN/TS 14541.

[1] https://ec.europa.eu/docsroom/documents/48814

For the automotive industry, these inclusions shall come from OEMs that are expectant to legally binding actions from the new ELV Directive if any.

In both cases, the use of limited amount of plastic recyclates from ELVs is validated. However, 25-30% post-consumer plastics is a relatively high quantity to be incorporated in plastic parts under the high exigent industries like automotive and construction.

In addition, same ratios of recycled plastics can be used in a less exigent applications, like baskets and traps, as demonstrated. In that case, no specific standards apply.

5. Conclusions

The validation of the use of plastic recyclates from ELV bumpers and fuel tanks, by means of industrially producing real plastic products for the automotive and construction industries allowed to boost the tasks for including sentences in standards for using recycled plastics.

In that sense, for pipes this is indeed in force, while for automotive industry, each material (even virgin ones) needs to be validated for each OEM. They are ready to adapt any specification once the ELV Directive is approved, although they are more open to use scraps from validated virgin plastics (pre-consumer).