

Recycling and Recovery of Polyurethanes



RECYCLING & RECOVERY OF POLYURETHANE FOAMS FROM CARS

Legislation

The EU waste regulation for the automotive sector is Directive 2000/53/EC. The End-of-Life Vehicles (ELV) Directive has a target timeline of 2015, at which point quotas will increase from the more moderate 2006 quotas.

In 2015, the re-usable and/or recyclable components of a vehicle must constitute a minimum of 85 wt % (weight percentage) and the recoverable parts a minimum of 95 wt % per vehicle.

There are several other legislations dealing indirectly with plastics and plastic waste, be it safety or emissions related. The second most important driver for polyurethanes (PU) waste reduction will come from the present debate on a more sustainable transport industry. Different CO₂ reduction targets for the years to come are still being debated. The 2015 EU target already requires a number of elements: engine efficiency increases, the use of bio fuels and weight reduction, in which PU plays a major supporting role.

Market Size

For polyurethanes, automotive passenger cars and other transport applications such as buses and trucks are the second most important market sector, next to buildings and furniture. The EU27 passenger car production reached a record level in 2010 with 16 million vehicles. Average plastic

content is approximately 150 to 120 kg/car, of which PU constitutes a rather large, but widely varying share. On average, polyurethane represent around 10 to 15 %, depending on the OEM preference and manufacturing technology.

Application Description

There are many different types of PU used in cars given the broad performance standards requiring reduced weight, increased fuel economy and comfort and improved resistance, insulation and sound absorption. The variety of applications is equally broad, including items such as seating cushions, steering wheels, sound/energy absorbing elements, ceilings and dash boards.

PU Product Characteristics

The numerous and varied PU automotive applications leads to a rather broad product mix being utilised in cars. The product properties vary from light foam, as used for seating, to very rigid and tough thermo-set materials, as in steering wheels.

Recycling & Recovery Technologies

At present the 80 % reuse and recycling quota and the 5 % energy recovery quota can be achieved without a special effort to dismantle plastic parts.



Early initiatives by the OEMs and ELV interest groups in the smaller EU countries have shown that dismantling of seat cushions or larger parts containing PU, such as the instrument panel, are not eco-efficient.

Shredder treatment technology and the further refinement by companies such as Salyp or Sicon, and new post shredder technologies have shown the cost and limits of achieving the 85 % R&D quota.

Eco- Considerations

The automotive sector is currently facing major challenges due to its tremendous fossil fuel use, and resultant green house gas emissions. PU materials reduce the fuel consumption directly through light weight design, either in conventional models or in new hybrid metal or plastics designs. PU bonding capabilities enable new manufacturing techniques, such as replacing welding, and improved design, light weight metals and technology.

A classic conflict exists between legislative demands on climate change and lower CO₂ emissions, and resource conservation through recycling, which needs to be evaluated together with a total life cycle balance.

Cost-effective sustainable results are achieved by applying the quota to all materials. The overall quota for car waste allows many options to be combined and the careful weighing of dismantling, logistics and R&R technologies to achieve cost-effective sustainable results.

References

See fact Sheet List of References and suggested reading material.

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