

Adhesives and Sealants in Circular Economy

Recycling

Adhesives and sealants support recycling through separation and compatibility with recycling.

A contradiction that isn't one!

Strong Bonds

Adhesives and sealants are **often assumed** to hinder recycling because they can create very strong bonds between materials.



Recycling



In reality, adhesives and sealants can be **compatible with recycling** while also allowing for **debonding before recycling**.

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'Many adhesives are already designed to be compatible with common recycling operations – for example, in packaging made of paper, plastic, metal and glass. In some but not in all cases, debonding plays an important role. The recycling compatibility of adhesives in these applications is assessed using recognised industry frameworks and testing protocols, helping ensure compatibility with established recycling. Similar frameworks are under development for end-of-life vehicles, WEEE, construction products, furniture and other sectors.'



As adhesives and sealants rarely represent more than 5% of the weight of any product, it is not the adhesive or the sealant that is the target of recycling. Recycling is always focused on the materials to which the adhesive or sealant is applied.

Adhesives and sealants in recycling



Recycling-compatible adhesive systems and material combinations that are intrinsically compatible with the recycling processes, or that can even enhance recycling performance, contribute to closing material loops.

Manual mechanical loosening



Automated / Robotic disassembly



Controlled Disassembly

Even strong bonds can be released.

Debonding on Demand

Strong bonds can be weakened or completely broken when required.

Electrically debondable battery adhesive



Adhesives and sealants on metal packaging



Recycling-compatible adhesives in vehicle recycling



Recycling-compatible adhesives on plastic packaging



Adhesives and sealants on mineral materials

Compatibility with Recycling

In many applications, debonding is not required for recycling to occur.

Product regulations should recognise the diverse role of adhesives and sealants and maintain a technology-neutral approach.

- Recyclability requirements in regulation should be based on a case-by-case technical assessment, rather than on the counterfactual assumption that adhesives and sealants are, by default, an obstacle to recycling.
- The waste hierarchy should be considered and respected. Focusing solely on recycling misses the numerous and important contributions of adhesives and sealants to higher priority waste hierarchy steps, e.g., in terms of material reduction, durability, repair and reuse.