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Why permanent materials such as aluminium are perfectly suitable to a Circular Economy

The Circular Economy resonates with today's expectations to produce and consume in a more sustainable way. The adopted EU Circular Economy package including the amended Waste Framework and the Packaging and Packaging Waste Directives of June 2018, is a clear step towards achieving this transition without compromising Europe's competitiveness.

However, to move towards a true resource efficient and circular economy, it is essential to make a clear distinction between downcycling which leads to the gradual degradation of the material, and true recycling which keeps the material in the loop without losing its intrinsic material characteristics. The current approach to the circular economy oversimplifies the classification of materials and products as renewable or non-renewable, re-usable or non-reusable or even bio-degradable or non-biodegradable.

These classifications are insufficient for the development of good practices in sustainable resource management: it fails to account for material degradation and its impact on resource management.

In this respect, aluminium can claim to be a material with "permanent" characteristics or properties, to be abbreviated as "*permanent material*", one for which the inherent properties do not change during use and following repeated recycling into new products. Obviously used aluminium has to be collected and sorted properly, in order to make it available for its next use phase. Today's end-of-life recycling rates are already high: above 90% in construction and transport and 65% in packaging¹.

The permanent material concept is built on two pillars: inherent material properties and good material stewardship.

- **Inherent material properties** are related to basic chemical components which do not degrade during use or recycling. These components can be chemical elements (atoms) for most metals including aluminium, or chemical compounds (molecules) in the case of non-metallic materials like glass. In general, for a material to be permanent, the bond between the atoms in the molecule needs to be stronger than the link between the molecules. Since metals are atoms, they are basic chemical components per se so that the above condition is 'automatically' satisfied. This condition safeguards the inherent characteristics of the material and enables multiple recycling, even after crushing and melting. For metals like aluminium, after re-melting and re-solidification, the metallic bonds between the atoms are fully restored. As a result, there is no loss of characteristics and basic properties: recycled aluminium can be considered the same as virgin aluminium.
- **Good material stewardship** is the second dimension of a permanent material. With its [Sustainability Roadmap 2025](#), the aluminium industry has committed itself to source raw materials responsibly, from an environmental, economic and social perspective, promoting traceability best practices. Good material stewardship also covers the design, use and recycling phase in order to have products that, after their useful life, can be easily collected and sorted for recycling, in order to maximise their re-use for new applications. They should not end up in landfills. In this respect reference should be made to specific

¹ According to the current EU measurement methodology. As from 2020 onwards the calculation points will be after the final sorting phase, just before the scrap material enters the aluminium refining and remelting facilities.

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aluminium product recycling roadmaps (75% for all aluminium packaging in 2025 and towards 100% beverage can recycling in 2030), awareness initiatives such as Every Can Counts, and window recycling.

More info: [Carbotech study](#)