

New Life Cycle Assessment (LCA) data available for Unsaturated Polyester (UP) and Vinyl Ester (VE) resins

Executive Summary

With the recent Ecoinvent 3.11 release, updated Live Cycle Assessment (LCA) results are now becoming available from the Cefic UP/VE Sector Group for most important Unsaturated Polyester (UP) and Vinyl Ester (VE) resins chemistries. With this information, fabricators and users of composites components can calculate the eco-footprint of their products (cradle-to-gate), for demonstrating the positive impact composites bring to the environment.

Introduction

In the past year, a detailed Life Cycle Inventory (LCI) study has been done by EY consultancy, commissioned by five European resin manufacturers (AOC, INEOS Composites, Polynt, Scott Bader, SIR Industriale; all members of the Cefic UP/VE Sector Group). These resin manufacturers provided detailed information to EY for their respective products on energy consumption, emissions, and waste generation, per production plant and per product chemistry (Ortho, Iso, DCPD, Maleic, rPET, and Vinyl Ester resins).

EY aggregated the data and sent average datasets per chemistry to Ecoinvent. Then Ecoinvent calculated the footprint and published details on all relevant output categories, including the commonly used CO₂ emissions (GWP, Global Warming potential), and resource usage (ADP Fossil, Abiotic Depletion Potential). The calculation was conducted based on a representative average formulation as agreed by the manufacturers for each resin chemistry.

Great results

The GWP data for Unsaturated Polyester (UP) and Vinyl Ester (VER) resins from Ecoinvent 3.11 are shown to be 2-8 % lower than the equivalent values from Ecoinvent 3.10 (which is the combined effect of changes deriving from resin manufacturing and from raw material contributions). The GWP of resins based on rPET waste is 16 % lower than the GWP average of Ortho, DCPD, Iso, and Maleic resins, indicative of the positive effect of using recycled raw materials on the eco-footprint of resin manufacturing.

UP/VE

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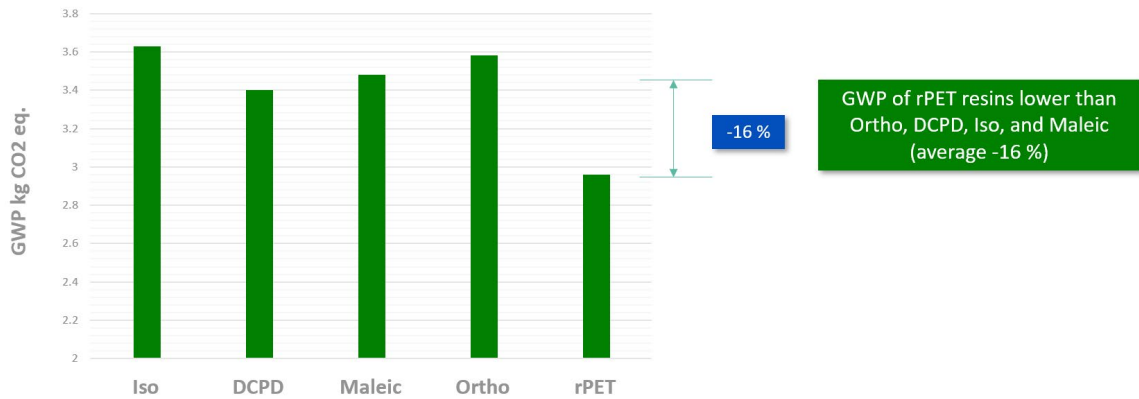
A sector group of Cefic 

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EU Transparency Register n° 64879142323-90



GWP of rPET resins lower than Ortho, DCPD, Iso, and Maleic (average -16 %)
Global Warming Potential (GWP) as per Ecoinvent 3.11



LCA data reliability

“Composite part manufacturers want to use reliable information for calculating the eco-footprint of their products”, comments Stefan Osterwind, Chair of the Cefic UP/VE group. “The new datasets are very representative for European manufacturing of UPR and EVER resins, and enable making these calculations with high level of confidence.”

“LCA calculations can be made with different software packages and by using multiple material databases, which may affect the calculation result”, adds Steven Brown, Chairman of the Working Group Sustainability of the Cefic UP/VE group. “We are convinced that this quality project that involved over 9 months of intense work from five resin manufacturers will set the new standard in resin LCA data.”

