



VITAL Fact Sheet: Low Energy Bead Foaming of PLA and TPU

The Challenge

While the use of biobased thermoplastics (b-bTP) in biodegradable packaging applications is now well-established, their adoption in more durable applications has been slower due to challenges such as:

- Limited large-scale **availability**;
- Higher **cost**;
- **Processing** difficulties;
- **Performance** limitations in some areas.

Despite these challenges, use of b-bTP has clear benefits for reduction of environmental footprint of products, and manufacturing processes.

Furthermore, the anticipated **near-term increase in global production capacity** is expected to mitigate current limitations related to supply and cost.

Within this context, the VITAL project addressed the outstanding challenges associated with material performance and processing. We focused on the development of **lightweight, thermoplastic products**, where foaming is used to reduce raw material consumption. Thermoplastics are also much easier to recycle compared to conventional foamed materials such as thermosets.



Project at a Glance:

Project Name:	VITAL
Type:	Research & Innovation Action
Funding:	Horizon Europe CL4 "Twin Transition"
Timeline:	June 2022-Nov 2025
Technology:	Biobased Thermoplastic Foams
Industry Sectors:	Automotive, White Goods, Marine Leisure
No of Partners:	14

The Solution

In VITAL, we are developing new, **biobased bead foams** for automotive applications. The focus lies on the development of **biobased TPU**-foams as a substitution for standard **polyurethane foams**. Alongside the new material, we developed a manufacturing and moulding process for these foams, which is more **efficient**, does not need steam for the moulding and in general consumes **less energy**.

Key Innovations:

- **Recyclable biobased bead foams** for technical applications (automotive)
- **Steam-free moulding process** consuming **less energy** than standard steam-based moulding processes

Key Achievements

- Development of a **steam-free manufacturing** and moulding process for **biobased TPU bead foams**
- **Reduced energy use** for the moulding process.
- **Suitable density** range (100 – 150 kg/m³), similar to of commercially available, non-biobased TPU bead foams.
- Around **60% biobased content** (compared to 0% for existing materials).



Benefits & Impacts

Automotive



Lighter parts improve fuel efficiency and reduce emissions

- Substitution of non-recyclable, standard polyurethane foams
- **Reduction in the use of non-recyclable, fossil-based polymer materials.**
- First bills and legislations from the EU parliament are either in place or on the horizon: this development will support future compliance.



Next Steps

We are currently in the process of developing a modified tool, to be able to mold a testable demonstrator for the seat cushioning, together with CRF. This demonstrator shall show, how the newly developed biobased TPU foams can be used as cushioning material and how far the development has come during VITAL project.

The test results will help us improve the material further in future projects and together with our customers and partners from different industries and applications.

Contact Us

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