



VITAL Fact Sheet: Foam Injection Moulding of PLA

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 Foam Injection Moulding (FIM) Solution

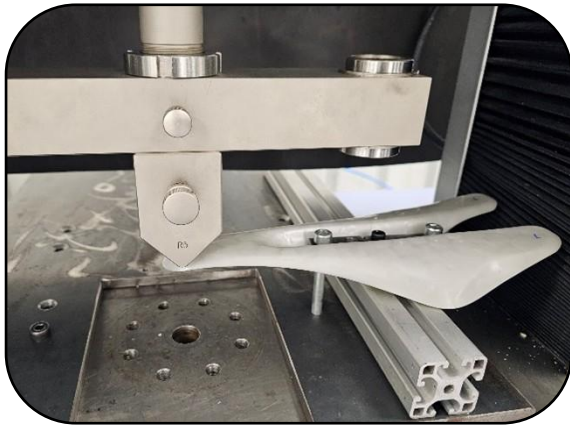
VITAL partner Floreon developed a durable PLA grade suitable for Foam Injection Moulding (FIM) development by PIEP, enabling lightweight, functional parts with reduced raw material use and improved recyclability.

Innovations and advancements of PLA in the FIM process:

- New **PLA formulation adapted for controlled foaming** and optimized mechanical performance.
- **Scalable process**, validated in industrial pilot environment (TRL 6).
- **Enhanced physical, mechanical, thermal, and optical properties** and integration into digital industrial databases such as MatWeb and Moldex3D.

Key Achievements

- Functional **prototypes produced at pilot scale**, successfully demonstrated process feasibility (including a functional bicycle saddle);
- Foaming agent concentration was optimized for a **balance between reduced density and mechanical performance**;
- Significant **weight reduction achieved** while maintaining adequate structural performance for practical applications;
- TRL progressed from lab-scale testing (TRL 3–4) to pilot validation in relevant industrial environments (TRL 6).



Benefits & Impacts

Automotive



Lighter parts
improve fuel efficiency and reduce emissions

Home Appliances



Recyclable, components with **reduced material use**

- Supports **circular economy** through recyclable, biobased materials;
- Reduces environmental footprint by **lowering energy use and raw material consumption**;
- Enables **cost-effective**, high-performance products for industry;
- Demonstrates **safe and sustainable** alternatives to conventional plastics.



Next Steps

- Scale-up PLA processing on industrial pilot lines;
- Expand case studies with industry partners (automotive, marine, appliances);
- Pre-commercial demonstrations of functional components with industry stakeholders (TRL 7-8).

Contact Us

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