universidade de aveiro

CAPABILITY

Thermoplastic Composite Design

DEVELOPMENT OF THERMOPLASTIC COMPOSITES WITH REAL-TIME RHEOLOGICAL CONTROL

KEY WORDS

COMPOUNDING,

THERMOPLASTICS,

CIRCULAR ECONOMY

DESCRIPTION

The University of Aveiro has advanced compounding capabilities focused on the blending, dispersion, and optimization of thermoplastic and functional formulations, supporting knowledge transfer and the development of sustainable materials within circular value chains. Processing is performed using mixing and extrusion systems with precise control of torque, speed, and temperature, integrated with rheological monitoring software that records torque, melt viscosity, and shear stress in real time. These capabilities enable processing from small quantities (50 g) up to several kilograms (in batch) at pilot scale, allowing formulation adjustment with additives, reinforcements, or recycled polymers, and evaluation of compatibility, homogeneity, and thermal stability. The outcomes include optimized compounds in granule, sheet, or microfilament form, ready for further processing or pilot validation, ensuring reproducibility, traceability, and industrial scalability.

APPLICATIONS

- Optimization of thermoplastic or recycled formulations for industrial processability.
- Production of homogeneous composites for validation of mechanical or thermal properties.
- Thermal stability assessment and reproducible quality control.
- Compatibility and dispersion tests of additives or reinforcements.

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