



Tailored Polymer Piloting Facilities

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We do application driven research and development of **materials and processes** which are **economical** and based on **circular economy principles**. We **tailor the processes** known in plastic and packaging industry using e.g. **natural fibres, thermoplastic materials and side streams** as raw materials to develop **novel solutions** for carbon neutral, recyclable or biodegradable **future products**.

VTT provides easy-access **material development, piloting and demonstration facilities** with world class material experts and unlimited material possibilities, including biopolymers, biocomposites and multilayer structures.

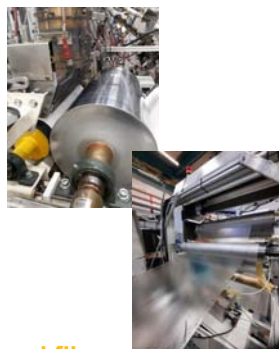
Film processing services include:

- Compounding
- Pilot-scale roll-to-roll cast film processing and extrusion coating, 500 mm wide
- Laboratory-scale thick cast film processing, 100 mm wide
- Blown-film processing (1-layer), die 60 mm
- Biaxial orientation of thick plastic sheets, for 80 * 80 mm samples



PlasCo – Tailorable piloting environment for thermoplastic materials

- Wet coating on various substrates
- Extrusion coating
- Monolayer cast film extrusion
- Multilayer extrusion up to 5 layers
- Machine direction orientation (MDO)
- On-line compounding with twin-screw extruder
- Two 35 mm single screw extruders
- Sheet die with width of 550 mm
- Main customer groups: Packaging, plastics, pulp & paper and construction industry, SME:s and start-ups

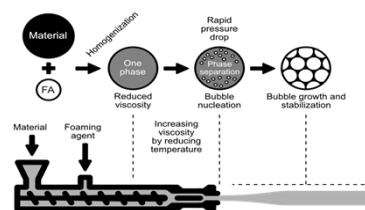


Foaming enables lightweight cellular structures

Foamed materials have improved thermal insulation and acoustic properties. Also, certain mechanical properties can be improved. In extrusion foaming both chemical and physical foaming agents can be used.

Foaming processes include:

- **Batch foaming (10 g)**
 - Assessment of foamability
 - Assessment of material suitability for bead foaming
- **Laboratory scale extrusion foaming (2-5 kg)**
 - Assessment of material foamability
 - Foaming agent selection and dosage
 - Finding suitable processing parameters (for pilot scale)
- **Pilot scale extrusion foaming (100 kg)**
 - Production of samples for extensive analysis
- **Bead foaming (50 kg)**
 - Production of micro-pellets
 - Production of foamed articles



Extrusion foaming technology at VTT



Examples of thermoplastic coatings and films



Heat sealable fluid package

- Multilayer co-extrusion
- Bio-based
- Heat-sealable
- Excellent barrier



Substrate film for printed electronics

- 4.5x MDO film & annealing
- Compostable
- Monolayer cast film extrusion
- Heat stable bio-based film with high crystallinity



Bio-based and biodegradable coating

- Monolayer cast film extrusion
- Wet coating + plasma treatment
- Biobased & biodegradable
- Heat-sealable



Bio-based and biodegradable blend film

- On-line compounding
- Studying effects of blending
- Bio-based & biodegradable



Coverlid for thermoformed food package

- Multilayer co-extrusion
- Bio-based and compostable
- Heat-sealable



Recycled film with virgin surface layers

- On-line compounding
- Multilayer cast film extrusion
- Viscosity analysis of different layers
- Impurities of recycled material remain in middle layer

