

Thermoplastic Processing Methods in Combination

INJECTION MOULDING

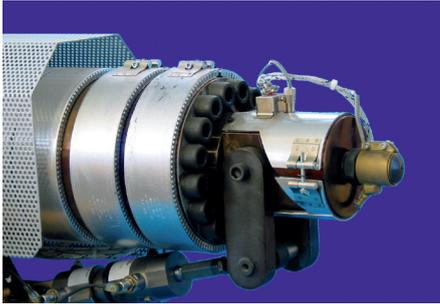


Fig 1 Injection moulding unit

COMBINATIONS OF METHODS

Injection moulding, foam injection moulding with physical or chemical foaming agents and thermoforming of long-fibre reinforced thermoplastics are manufacturing processes which have – each for itself – a great importance for the manufacturing of extensive moulded parts. They all have in common a high adaptability and cost-effective production.

The combination of different processes in one tool leads to the combination of the specific advantages in one finished part. For the field testing of these manufacturing potentials, the Technikum of Neue Materialien Fürth GmbH has installed a press-injection moulding machine. A moulding tool realizes the process combinations and thus enables near-product trials.

FOAM INJECTION MOULDING

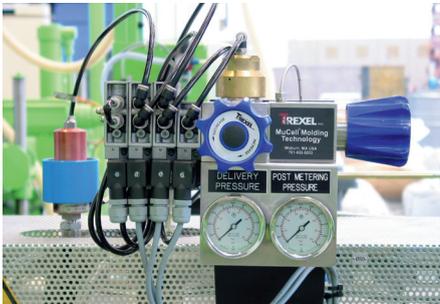


Fig 2 MuCell®-foaming unit

EXTRUSION

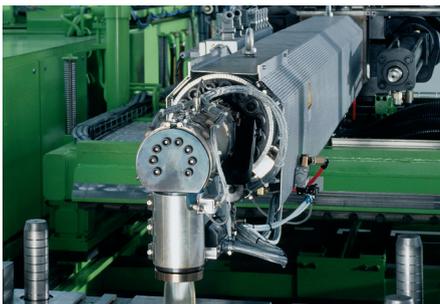


Fig 3 Melt deposition unit

PRESSING AND FORMING



Fig 4 Vertical press unit



Fig 5 Mould for process combinations

MOULD SPECIFICATIONS

- Primary shaping and forming of moulding materials, long-fibre reinforced granulates, fibre-glass reinforced prepregs and foils or decor fabric
- Procedures for two- and three-component constructions
- Sliding table in upper tool
- Mould with shearing edges
- Mould size 320 x 640 mm or 225 x 450 mm
- Thickness of finished product from 2 to 6 mm
- Realization of product-like geometries by the use of mould inserts
- Mould inserts for hybrid structures
- Two multi-nozzle hot runner systems with nozzles in the lower tool for processing of foamed polymers
- 12-fold cascade control unit
- Detailed data logging

MOTIVATION

Shortening the process chain:

Often, primary formed structural parts made of thermoplastic materials have to fulfil their technical function as well as optic or haptic functions, for which additional, costly processing steps like painting, padding, laminating or overlaying are necessary. The integration of these processes into the forming process leads to cost-effectiveness especially for medium and large quantities. For a successful realization, the processing has to be tested and adapted.

Lightweight Construction:

The use of high performance materials – like glass fibre reinforced thermoplastic prepregs – and innovative processing techniques – like injection moulding of thermoplastic materials with physical foaming (MuCell® method) – lead to constructions, in which materials with enhanced lightweight potential are used. The existing possibilities are used effectively whenever material synergies prevail, e.g. in the combination of a reinforced textile semi-finished part, which is then re-formed in the mould, with an injection moulded rib structure of foamed thermoplastic material.

MATERIALS

Semi-finished products made of glass or carbon fibre fabric, which are pre-consolidated in a thermoplastic matrix, can easily be used as a third component in the injection moulding or pressing process. Additionally, foiles and loose fabric can also be used as a third component.



Fig 7 Broad range of application for semi-finished products

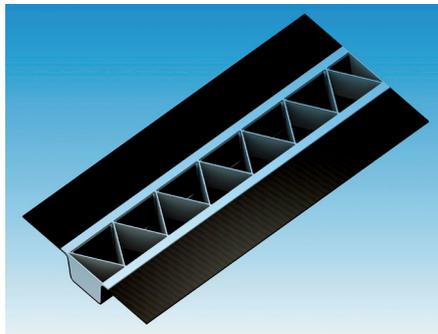


Fig 6 Hybrid structure in fibre-reinforced processing

WE OFFER

Testing of alternative construction:

Based on your application we assess the potentials of alternative construction methods, create test specimen and test improvements, e.g. the use of lightweight construction.

Evaluation of a combined process:

Based on your product specific needs, we realize a production oriented process cycle and evaluate the efficiency and the production capability.

Manufacturing of pre-series parts:

With tool inserts for your product-specific geometry we realize manufacturing close to the series-production status and produce pre-series for usability testing.

Contact

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