

FOR INJECTION MOLDING SIMULATION

MATERIAL DATA FOR INJECTION MOLDING SIMULATION

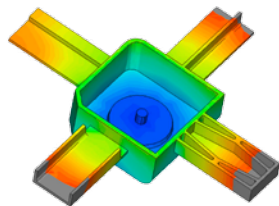
OFFERS

Our services:

- Material data for simulating the entire injection molding process (filling–packing–cooling–shrinkage and warpage)
- Orientation-dependent material data for fiber-reinforced polymers
- Material data for highly-filled compounds
- Complete material cards for injection molding simulation (Moldflow®, Moldex3D, Cadmould® 3D-F, SIGMASOFT®)
- Experimental validation

Supplementary offers:

- Material cards and models for structural mechanics
- Microcomputer tomography for structural analysis of short-fiber reinforced materials



Certified QM system ISO 9001:2008

Contact:

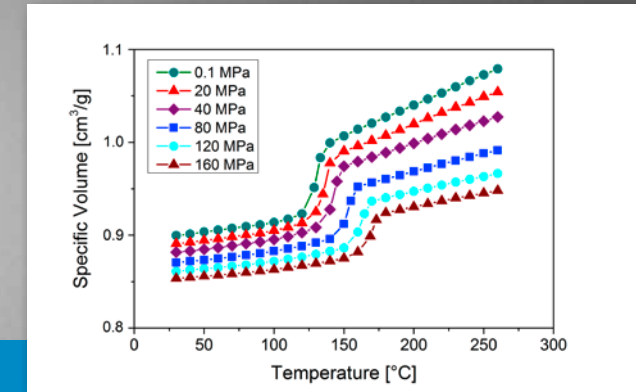
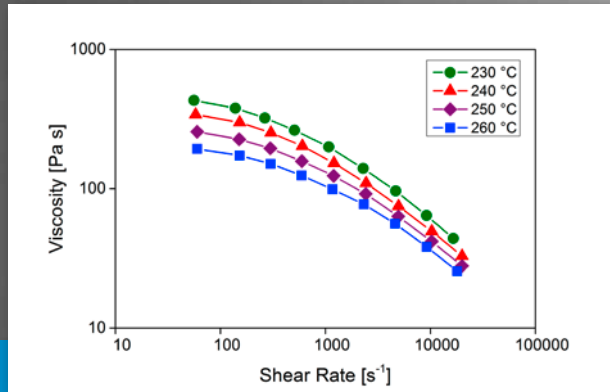


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Fraunhofer LBF's **plastics research division**, which evolved out of the German Plastics Institute [Deutsches Kunststoff-Institut DKI], supports its customers along the entire added value chain. We specialize in the management of complete development processes and advise our customers at all stages of development. As an identified skills center for questions regarding addition, formulation and hybrids, we offer extensive expertise in analyzing and characterizing plastics and the changes in their properties during processing and in use, and also in developing methods for time-resolved processes.





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A realistic simulation of the entire injection molding process up to shrinkage and warpage of the molded part requires complete and detailed material cards that reflect the specific characteristics of polymers as precisely as possible. When preparing such material cards, rheological and thermal material data, as well as pvT data and – in the case of fiber reinforced polymers – orientation-dependent material characteristics (elastic properties and thermal expansion coefficients) must be determined by standardized methods and adapted to the material models implemented in simulation programs.

Fraunhofer LBF has a modern testing laboratory and extensive lab equipment, machinery and simulation software. Fraunhofer LBF offers all methods for determining material data relevant for injection molding simulation from a single source.

Precise material data for better simulation results!

METHODS

- Determination of true viscosity dependent on shear rate and temperature (ISO 11443)
- Determination of thermal conductivity or thermal diffusivity in melt and solid phase (ASTM D5930 or ASTM E1461 or DIN EN 821)
- Determination of specific heat capacity and transition temperature (ASTM E2716 or ASTM E1269)
- Determination of specific volume (pvT) dependent on pressure and temperature (ISO 17744)
- Determination of orientation-dependent elastic properties (Young's moduli, Poisson's ratios)
- Determination of orientation-dependent thermal expansion coefficients (DIN 53 752)
- Numerical approximation of experimental data for various material models
- Validation of complete material cards based on experimental mold filling studies
- Production of all required test specimens

EQUIPMENT

- Capillary rheometer and rotational rheometer (viscosity, room temperature (RT) up to 400°C)
- Measurement devices for determination of thermal conductivity and thermal diffusivity (RT up to 300°C, 0 to 60 MPa)
- Differential scanning calorimeter (DSC) (specific heat capacity, RT up to 400°C)
- High pressure dilatometer (specific volume pvT, RT up to 400°C, 0 to 200 MPa)
- Tensile testing machines (RT up to 250°C)
- Quartz tube dilatometer (coefficient of linear thermal expansion CLTE, RT up to 120°C)
- Injection molding simulation programs, software for data adaptation
- Injection molding machines and presses, molds for test specimens, measurement data acquisition system