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 additivation, 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.

Contact:
Dr. Felix Dillenberger
Group Manager Mechanics and Simulation
Phone: +49 6151 705-8753
felix.dillenberger@lbf.fraunhofer.de

Axel Nierbauer
Phone: +49 6151 705-8761
axel.nierbauer@lbf.fraunhofer.de

Fraunhofer Institute for Structural Durability and System Reliability LBF · Division Plastics
Schloßgartenstr. 6 · 64289 Darmstadt · Germany
www.lbf.fraunhofer.de · info@lbf.fraunhofer.de

OUR SERVICES
Characterizing the mechanical properties of thermoplastics is one of the core areas of competency at our institution. From injection molding the test specimens to the finished testing report, our accredited testing lab offers all services to fulfill your needs. Custom tailored to your material and purpose, we will work with you to create a testing plan to ensure that all necessary data for later applications is measured and calculated.

Completed mechanical tests will be evaluated, interpreted, and summarized for you in a test report. We will also provide a comprehensive preparation of the data for finite element simulations and prepare validated material cards for you.
USE LIGHTWEIGHT POTENTIAL

Because they are extremely well suited for lightweight construction, plastics are substituting for classic construction materials more and more frequently. Not only the favorable ratio of structural stability to weight, but also efficient injection molding manufacturing processes and the design freedom they provide make plastics highly attractive. Thermoplastics, however, display complex mechanical behaviors. Therefore, determining reliable mechanical properties is absolutely necessary in order to design dimensions in accordance with stresses and to efficiently use the potential of lightweight construction. Based on your particular material use, potential influencing factors (load condition, speed, moisture content, media influence, orientation, temperature, ...) will be taken into account when completing testing in order to receive practical information related to use. This is the only way to make extensive use of the outstanding characteristics of plastics.

MECHANICAL CHARACTERIZATION WITH OPTICAL MEASUREMENT METHODS

Services
- Tension, shear, pressure, ZDT, special process
- Temperatures from -30° C to 300° C
- Test speeds from 0.01 mm/min to 20 m/s
- Up to 250 kN and 4 kNm
- Displacement, force, time, and 2-d or 3-d optical measurement procedure for local distortion measurement (longitudinal strain, transversal strain, shear)

Evaluation
- Technical, isochoric and true stress
- Strain rates
- Poisson ratio vs. longitudinal strain
- Fracture analysis
- Report with all relevant data

AREAS OF APPLICATION
- Integrative finite element simulations
- Quasi-static and dynamic (Crash) finite element simulation
- Thermomechanical finite element simulations

SUPPLEMENTARY OFFERS
- Fibre structures analysis
- Validated material models for FE simulations
- Material data for simulating the injection molding process
- Validation of material models via component testing
- Material models for adhesives