

# Investigation Possibilities



Barcode zu  
Ansprech-  
partner und  
Infomaterialien

With its wide spectrum of analytical methods, the Institute of Polymer Technology offers a holistic approach to plastic product observation. Only the knowledge of the interaction between material, construction and processing enables the creation of a successful product.

That is why we offer a wide range of analysis options to designers, processors, testers and users in order to gain their necessary knowledge. Experienced staff will be pleased to assist you with your versatile questions regarding plastics technology.

## Analytical Examination

With the available analytical testing equipment, the physical and chemical behaviour of the materials can be described comprehensively.

## Mikroskopische Examination

Microscopic examination methods are used in pure research work, in quality assurance as well as in damage analysis. It can explain connections between the structure of a polymer material and its mechanical properties and show the influence of processing parameters on the material or damage that led to failure.

The detection and identification of different polymers and other impurities is of particular interest in investigations on recycled materials.

## Mechanical Examination

Mechanical testing provides the basis for comprehensive sample characterization and reliable component design. In addition to a wide selection of conventional mechanical testing devices, the Institute of Polymer Technology also has its own test setups, which enable characterization based on individual requirements. Static testing is equipped with computer-aided universal testing machines, test systems for characterizing impact and shock behavior, and systems for determining long-term properties under various ambient conditions. Dynamic testing comprises several servo-hydraulic testing machines and a clamping plate for testing larger components. With the help of spatially resolved deformation measuring systems, load analyses on more complex components and structures are also possible and can show local effects accordingly. The test machines can also be adapted to special load tasks due to their largely free programmability of load profiles and evaluation methods. In the field of fatigue testing, for example, the hysteresis measurement method can be used to make quick and differentiated statements about the fatigue and damage behaviour of materials and components.

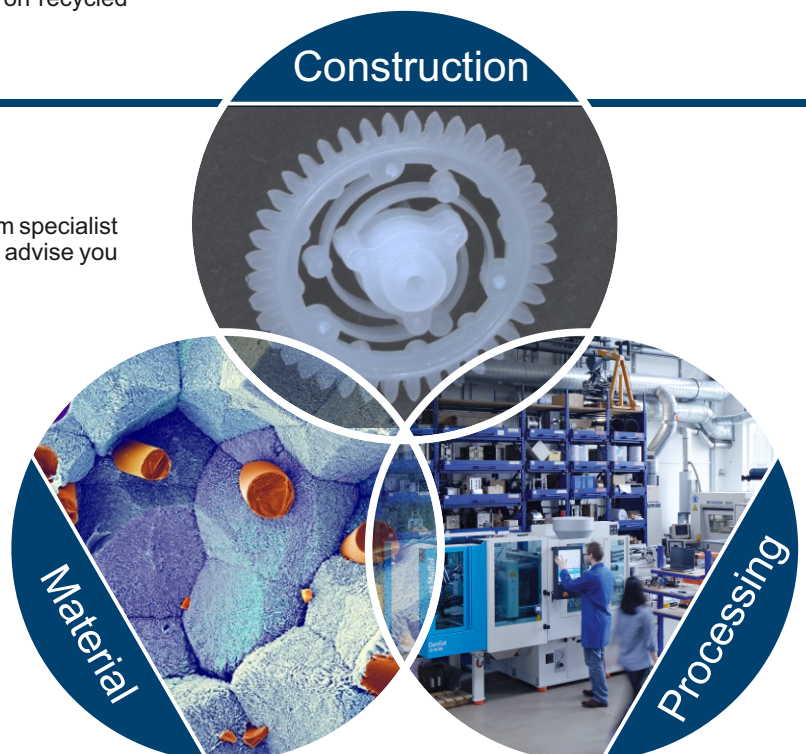
## What we can offer to you

Within the scope of short-term industrial orders, from specialist seminars to long-term cooperation, we support and advise you holistically with regard to materials, construction and processing.

## This helps you with...

- ... Quality assurance measures
- ... your research and development
- ... Process optimization
- ... and much more!

Contact us and we will find a suitable solution for you!



## Analytical Examination

### Thermal analysis

- Differential Scanning Calorimetry (DSC), TMDSC, OIT,
- Flash-DSC combined with laser unit
- 3D-Calvet calorimeter
- Thermisch-mechanical-/ thermo-Gravimetric-/ dynamic-mechanical-analysis (tension, bending, torsion, shear)
- pvT-analysis
- Thermal/ temperature conductivity

### Rheology

- Melt flow index (Melt flow rate/ Melt volume rate)
- Rotational viscometer combined with IR spectroscopy
- High pressure capillary rheometer
- Counter-pressure viscometer
- Ubbelohde solution viscosity

### Chemical-physical analysis

- Fourier transform infrared spectrometer with microscope
- UV/VIS spectroscopy
- Abbe refractometer
- Optical particle size measuring system
- Surface tension
- Karl Fischer Titration
- Incineration
- Density measurement
- Gloss and color measurement

### Electrical testing

- Low/High impedance measurement
- Dielectric measurement

## Microscopic Examination

### Sample preparation

- Slide and rotary microtome
- Sawing and grinding technology

### Transmission and reflection light microscopy

- Bright-, darkfield, phase contrast, polarization
- Differential interference contrast, fluorescence

### Stereomicroscopy

### Scanning electron microscopy (REM- EDX)

### Computed tomography ( $\mu$ CT)

### Confocal laser scanning microscopy

## Mechanical Examination

### Quasistatic testing

- Universal testing machines
- Tensile, compression and bending tests
- Torsion machines
- Heat deflection temperature
- Optical deformation measuring devices

### Static long-term behavior

- Creep tensile testers

### Abrupt stress

- Pendulum impact testers

### Cyclic load/fatigue behavior/component testing

- Servo-hydraulic longitudinal cylinders

### Hardness measurement

- Vickers, Knoop, Shore, Barcol

### Determination of the environmental stress crack formation

- Pin pressing method/ bending strip method

### Non-destructive testing of plastics and components

- Ultrasonic immersion testing station
- CNC coordinates measuring machine

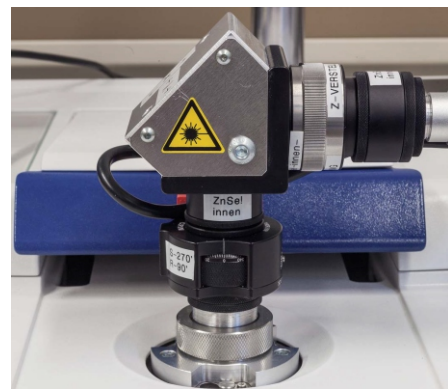


Fig. 1: Flash-DSC with laser unit

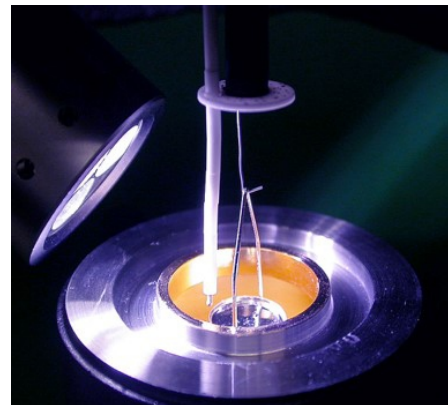


Fig. 2: Thermogravimetric analysis of polymers

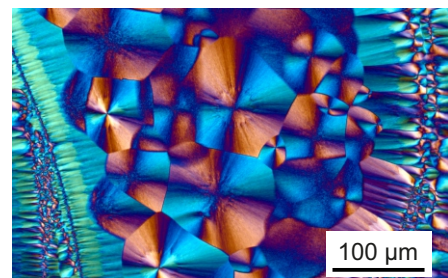


Fig. 3: Polyamide-spherulite in polarised transmitted light



Fig. 4: Tensile testing on a universal testing machine

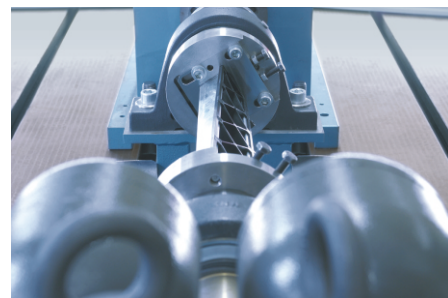


Fig. 5: Hybrid component during load test