



Thermal analysis

DSC Analysis (differential scanning calorimetry)

- Temperature range -170 °C to 600 °C DIN EN ISO 11357-1
- Glass transition temperature DIN EN ISO 11357-2
- Melting temperature DIN EN ISO/DIS 11357-3
- Melting enthalpy, specific warmth capacity DIN EN ISO 11357-4
- Crystallization behaviour



TGA-FTIR (thermal gravimetric analysis)

- Temperature range 23 °C to 1,000 °C DIN EN ISO 11358
- FTIR (infrared spectroscopy) with ATR Analysis
- Decomposition temperature, analysis of gas phases and solid materials DIN 51006
- DIN EN ISO 9924-1; DIN EN ISO 9924-2; DIN EN ISO 21870



DMA (dynamic mechanical spectroscopy)

- Temperature range -170 °C to 600 °C
- Frequency range 0.01 Hz to 100 Hz
- Tensile test, three-point bend test and shearing test
- Dynamic viscosity, glass transition temperature and temperature resistance
- DIN 53440, DIN 53513, DIN EN ISO 6721-1



TMA (thermomechanical analysis)

- Temperature range -170 °C to 600 °C
- Temperature-dependent dimension variation
- Glass transition temperature DIN 53752; ISO 11359-2, DIN EN 14617-11



Plastics and Lightweight Design

2. Measurement Systems



Thermal analysis

Light-Flash-Apparatur

- Thermal conductivity measurements
- ASTM E1461, ASTM E2585, DIN EN 821-2, DIN 30905, ISO 22007-4, ISO 18755, ISO 13826; DIN EN 1159-2, etc.
- Temperature range -100 °C to 500 °C

HDT Vicat

- Softening temperature measuring system DIN EN ISO 306
- Heat deflection temperature DIN EN ISO 75-1, -2, -3

High pressure capillary viscometry

- Temperature range 23 °C to 400 °C
- Shear rate range 1 /sek to 10000 /sek
- Rheological behavior of polymer melts
- Viscosity testing
- DIN 54811



Rotation and oscillation type rheometer

- Temperature range 23 °C to 300 °C
- Shear rate range 0.0001 /sek to 1,000 /sek
- Flow curves, curing behaviour of resin systems with plate/plate and cone/plate
- DIN 53018, ISO 3210, DIN 53019, ISO 3219, DIN 54453



Melt Index Test

- MFI, MFR DIN EN ISO 1133



Plastics and Lightweight Design

2. Measurement Systems



Material analysis

Gel permeation chromatography (GPC)

- Molecular weight distribution, chain lengths analysis
- Molecule chains degradation, ageing experiments

Oxygen transmission rate measurement

- Barrier properties of plastics versus oxygen
- Oxygen permeability measurements at foils and containers
- DIN 53380, ASTM F2622

Water vapour transmission rate measurement

- Barrier properties of plastics versus water vapour at foils and containers
- Water vapour permeability measurements
- ASTM F-1249, TAPPI T557, JIS K-7129

Moisture analyzer

- Measurement of residual humidity content
- DIN EN ISO 15512

Density analyzer scale

- Density determination of products with buoyancy force
- DIN EN ISO 1183-1

Sieve analysis

- Grain size determination and grain size distribution
- DIN 66165

Infrared spectroscopy

- To analyse the composition

Sample preparation

- Microtome, grinding and polishing

Sample conditioning

- Mobile granulate dryer with dry air technology
- Dynamic clima chamber for standard-compliant material tests under dynamic conditions (5 K/min, -40 ° C to 180 ° C, 10 to 98% r. h.)
- 30 litre cool box up to a temperature of -40 °C
- Muffle/preheating/ashing furnaces and accessories



Plastics and Lightweight Design

2. Measurement Systems



Analysis of the mechanical properties and behaviour of materials

Universal test machine

- Tensile test, compression test, torsion test and bend test up to 20 kN
- Optional thermal stress test (20 °C to 200 °C)
- DIN EN ISO 527-1, -2; DIN EN ISO 178



Universal test machine

- Tensile test, compression test, torsion test and bend test up to 50 kN
- DIN EN ISO 527-1, -2
- Special tests possible

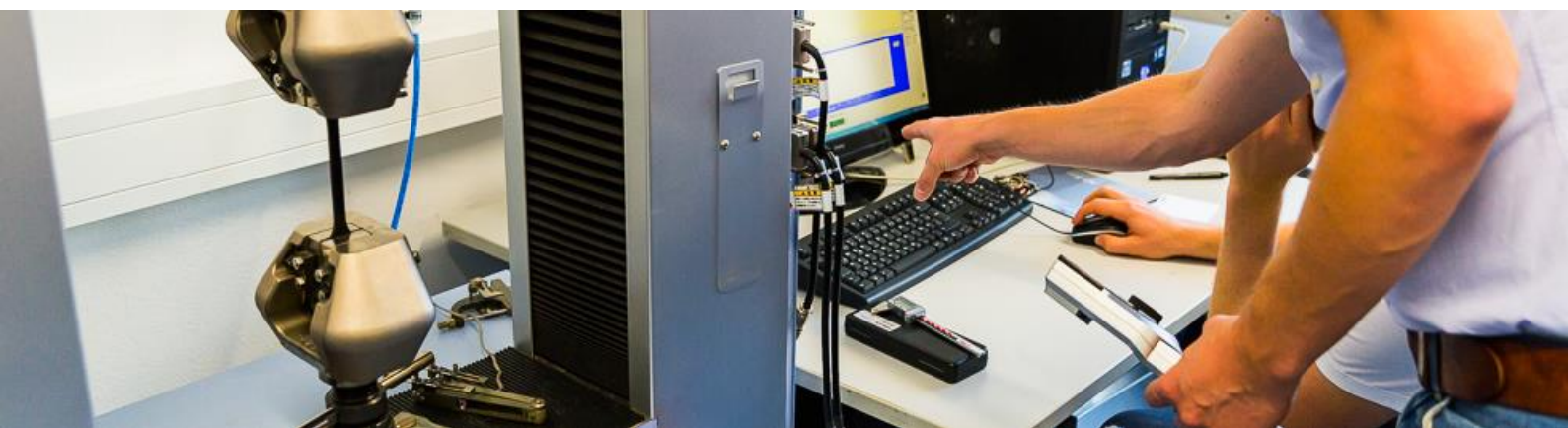
Pendulum machine

- Impact strength test
- CHARPY DIN EN ISO 179-1
- IZOD DIN EN ISO 180



Hardness tester

- Testing the Shore hardness: Shore A, D and A0
- DIN EN ISO 868 and DIN ISO 7619-1
- Ball impression hardness DIN EN ISO 2039-1
- Microhardness of surface layers DIN EN ISO 4516



Plastics and Lightweight Design

2. Measurement Systems



Analysis of surface functionalities

Stereomicroscope

- Optical assessment of damage cases
- Measurements and visual inspections
- Detail and overview shots

Polariscope

- Evaluation of stress conditions in transparent structural components

Roughness measurement

- Single test: 20 mm +/- 300 μ m
- R_z , R_{ar} , A_{Max} ; waviness; DIN EN ISO 4287

Contact angle measurement with different test liquids

- Camera supported system, Sessile-Drop-Methode
Pendant-Drop-Methode; DIN EN 828; DIN EN ISO 15989
- Wettability analysis; incl. temperature chamber



Microhardness and Mechanical Properties

- Measurement of thin film systems, surface properties
- DIN EN ISO 4516

Wallthickness analysis

Gloss and Colour Meter

- Lab values with and without gloss trap

