

PLASTICS & COMPOSITES

Main Topics



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- Research and Development in all Areas of Polymer Engineering
- Testing, Product Certification, On-site Inspection, Quality Surveillance for the Construction and Plastics Industry
- Failure Analysis and Consultancy.
- Research on Ageing and Fatigue of Plastics. Lifetime Analysis for Electrically Insulating Materials, Polymeric Materials and Plastic Products.
- Research on Additive Manufacturing and
- Cooperation with other Departments of CRA and TUD, as well as Universities and Companies in Germany and around the World.
- Multiple Membership in Technical and Scientific National and International Committees (e.g. DGM, ISO, IEC)

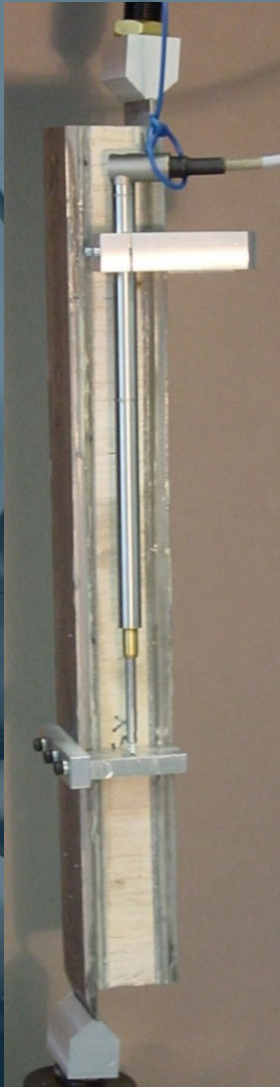


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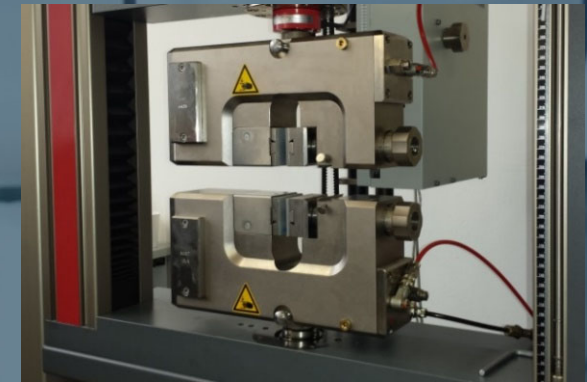
Mechanical Testing



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- Universal Testing Machines
- Impact-, Flexural, Tensile- and Compression Tests
- High-resoluted Strain Measurement, Laser- and Video Extensometry
- Shore-A and D Hardness, IRHD
- Internal Pressure Creep Rupture Tests on Plastic Pipes
- Creep and Fatigue Testing



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Thermal Testing



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- Glow Wire/Bar Test
- Melt Viscosity (MVR, MFR)
- HDT, Vicat, Martens
- Heating Cabinets and Muffle Furnaces
- Long-term Ageing up to 400 °C
- Endurance Tests in Autoclaves
- Lifetime Assessment based on Model-based and Model-free Thermokinetics



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Thermal Endurance



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Heating Cabinets / Determination of Temperature Indices

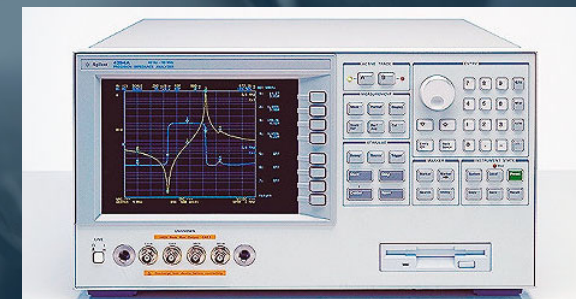
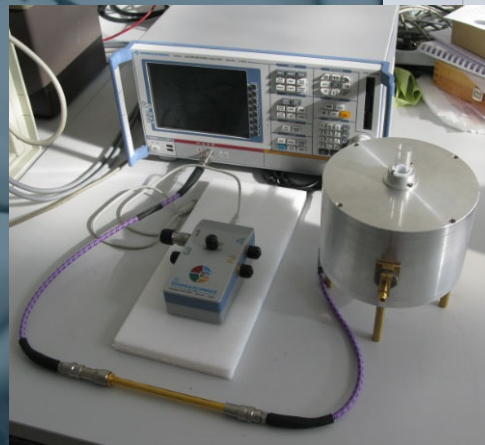
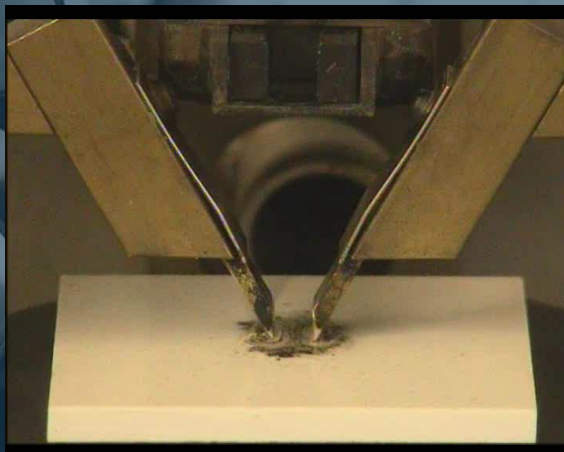
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Electrical Testing



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- Impedance Analyzers and Bridge Methods for the Determination of Permittivity and Dielectric Loss (ϵ , $\tan \delta$) (40 Hz to 100 MHz / 1 MHz to 3 GHz)
- Network Analyzer (up to 8 GHz)
- Determination of Volume, Surface and Insulation Resistance
- Conductivity of Conductive Plastics
- Comparative Tracking Index (CTI)



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Additive Manufacturing



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- Research on Processing of Polymers, Metals, and Glass by Additive Manufacturing
- Focussing Digitalization and Industry 4.0
- Digital Production Chain: Design – Process – Properties – Quality – Lifetime
- Short and Long-term Behaviour of Additive Manufactured Components
- AVK/DGM Joint Committee „Additive Manufacturing with Polymers“
- Membership in DIN and ISO Committees for Additive Manufacturing
- Polymer Processing with Additive Manufactured Metallic Moulds

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Thermal Analysis



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- Differential Scanning Calorimetry (DSC)
- Thermogravimetry (TGA)
- Simultaneous Thermal Analysis (STA) with Evolved Gas Analysis (EGA) by FT-IR-Spectroscopy and Mass Spectroscopy
- High Pressure DSC with coupled Chemiluminescence Analysis (CL)
- Rheometer (Viscosimetry and DMTA) coupled with Dielectric Thermal Analysis (DETA)



- Dynamic-mechanic Thermal Analysis (DMTA) by Torsion Pendulum
- Dynamic-mechanical Thermal Spectroscopy (DMTS) with High Forces (up to 5 kN)



Plastics and Composites

Further Analytical Methods

- FT-IR Spectroscopy (ATR, Transmission)
- UV/VIS Spectrometer
- Gas Chromatography and Mass Spectroscopy (GC-MS)
- Light Microscopy, Microtome and Preparation of Micrographs

