

TECHNIQUES AVAILABLE THROUGH THE BURLINGTON, MA LABORATORY

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**Accredited to ISO/IEC 17025:2017

Method (ASTM where applicable)	Recordable Information	Temperature range	Gases	Sample size
Thermogravimetry (TGA) ASTM E1131**	Mass changes, decomposition, thermal stability	-180°C to 2400°C	Inert, oxidizing, reducing, static, dynamic, vacuum	Crucible volume: up to 5 ml
Differential Scanning Calorimetry (DSC) – ASTM E1269**, E793**, E794**, D3895**	Phase transformation temperatures and enthalpies, specific heat capacity, oxidative-induction time	-180°C to 1650°C	Inert, oxidizing, static, dynamic, vacuum	Crucible volume: up to 190 µl
High-Pressure DSC (up to 15 MPa, 150 bar) ASTM E1782**	Phase transformation temperatures and enthalpies, determination of vapor pressure and evaporation heat	-50°C to 600°C	Inert, reducing, oxidizing, other gases on request	Crucible volume: up to 190 µl
Photo-DSC	Analysis of photo-initiated reactions, influence of UV stabilizers, UV-light curing	-100°C to 200°C	Inert, oxidizing, dynamic	Crucible volume: up to 85 µl
Differential Thermal Analysis (DTA)	Phase transformation temperatures	-180°C to 2400°C	Inert, oxidizing, reducing, static, dynamic, vacuum	Crucible volume: up to 900 µl
Simultaneous Thermal Analysis (STA)	Phase transformation temperatures and enthalpies, specific heat capacity, mass changes, thermal stability	-180°C to 2400°C	Inert, reducing, oxidizing, static, dynamic, vacuum	DSC pan: 190 µl DTA crucible: 900 µl
Evolved Gas Analysis (EGA)	Characterization of gases emitted by means of MS, GC-MS or FT-IR, coupled to a TGA or STA	-180°C to 2000°C		On request
Dilatometry (DIL) and Thermomechanical Analysis (TMA) ASTM E228**, E831**, E1545**	Thermal expansion, CTE, density changes phase transition temperatures, sintering process, softening, visco-elastic properties	-180°C to 2800°C	Inert, oxidizing, reducing, vacuum	Standard size: 25 mm*, Ø 6 mm*
Dynamic Mechanical Analysis (DMA) ASTM D5023**	Visco-elastic behavior, elastic modulus, loss modulus	-170°C to 600°C	Inert, oxidizing	On request
Heat Flow Meter (HFM) and Guarded Hot Plate (GHP) ASTM C177**, C518**	Thermal conductivity of insulating materials	-160°C to 600°C	GHP: inert, oxidizing or vacuum	HFM: 305 x 305 mm* GHP: max. 300 x 300 mm
Guarded Heat Flow Meter (GHFM) ASTM E1530**	Thermal conductivity, thermal resistance	-50°C to 200°C	Ambient	Ø 50 mm
Laser/Light Flash Analysis (LFA) ASTM E1461**	Thermal diffusivity and thermal conductivity	-125°C to 2000°C	Inert, oxidizing, static and dynamic	Standard size: Ø 12.7 mm*

* Special sample sizes on request

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NIB - Commercial Testing - EN - 0923 - Subject to change

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Time-Domain Thermoreflectance (TDTR)	Thermal diffusivity and effusivity, interfacial resistance	RT to 500°C	Inert, oxidizing	Thin films (100 nm to 20 µm) with mirror polished surfaces (roughness < 5 nm) on substrate
Dielectric Analysis (DEA) ASTM E2039	Curing behavior of reactive polymers, dielectric loss factor, ion viscosity, ion conductivity	RT to 400°C	Ambient	On request
Seebeck Analyzer (SBA)	Seebeck coefficient, electrical conductivity for thermoelectric materials	-125°C to 1100°C	Inert, oxidizing, reducing	Max. Ø 25.4 mm
Rotational Rheology ASTM D2196**	Viscosity curves, flow curves, yield stress, visco-elastic modulus, creep & recovery, thermal stability	-40°C to 350°C	Ambient	25 - 50 g
Capillary Rheology ASTM D3835**	Melt viscosity, Cogswell extensional viscosity, Mooney wall slip assessment, flow instability, die swell ratio, material degradation/thermal stability, specific volume of polymer melts, ultra-high shear rates viscosity measurements of fluids	RT to 500°C	Ambient	300 - 1000 g
Accelerating Rate Calorimetry (ARC®) ASTM E1981	Thermal and pressure hazard evaluation, exotherm onset, Self-Accelerating Decomposition Temperature (SADT), Time-to-Maximum Rate (TMR), Emergency Relief Design (ERS) Data	RT to 500°C	Inert, oxidizing, reducing	1 ml to 130 ml
Multiple Module Calorimetry (MMC)	Scanning, isothermal and adiabatic calorimetry on gram-sized samples, pressure measurement	ARC/Scanning: RT to 500°C, Coin Cell: RT to 300°C	Inert, oxidizing, reducing	ARC Module: 0.1 to 8.5 ml; Scanning: 0.1 to 8.5 ml; Coin Cell: Typically CR2032, Diameter: 5 to 25 mm, Thickness: 1 to 5 mm
Isothermal Battery Calorimetry (IBC)	Isothermal battery calorimetry, heat management, efficiency, performance and in-situ cycling	-30°C to 60°C	Inert	Max. Battery Size: 30 x 20 x 15 cm 6.5 mm x 3.0 mm x 70-150 mm, rod-shaped specimen 52 mm x 140 mm, flat specimens, thickness as manufactured
Oxygen Index Analyzer (LOI) ASTM D2863	Limited oxygen index, flammability of plastics, burning time, burning distance	Ambient	O ₂ , N ₂ measuring gasses	70-150 mm, rod-shaped specimen 52 mm x 140 mm, flat specimens, thickness as manufactured
Kinetics as a Service	Comprehensive package for kinetic evaluation, prediction and process optimization. Available for different methods incl. DSC, TGA, STA, DIL, etc.	Depending on process	Depending on process	Depending on method

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