Thermal Analysis, Calorimetry, Determination of Thermophysical Properties
The Broadest Portfolio for THERMAL

Differential Scanning Calorimetry (DSC)  
Differential Thermal Analysis (DTA)  

-180°C to 2000°C  

The various types of NETZSCH DSC instruments all operate in accordance with the heat flow principle. They are characterized by a three-dimensional symmetrical design with homogeneous heating. Sensors with high calorimetric sensitivity, short time constants and a condensation-free sample chamber in the DSC cell ensure high detection sensitivity.

Thermogravimetric Analysis (TGA)  

10°C to 1100°C  

NETZSCH TGA instruments are equipped with digital balances and are vertically designed, featuring a top-loading sample arrangement and direct temperature measurement at the sample.

Simultaneous Thermal Analysis (STA)  
TGA-DTA/TGA-DSC/TGA  

-150°C to 2400°C  

With the STA instrument series NETZSCH is setting high standards. Unlimited configurations and unmatched performance are the foundations for a great variety of application possibilities in fields such as ceramics, metals, plastics and composites over a broad temperature range.
Evolved Gas Analysis (EGA)

By coupling the thermal analysis instrument with a Quadrupole Mass Spectrometer (QMS 403 Aëolos Quadro or SKIMMER), GC-MS or FT-IR (Fourier Transform Infrared Spectrometer by BRUKER Optics), the detection of evolved gases and identification of the separated components can be precisely time-correlated with the thermal analysis signals.

Dilatometry (DIL)

-180°C to 2800°C

When it comes to the determination of linear thermal expansion in solids, liquids, powders, pastes or fibers, the DIL 402 Expedis series of pushrod dilatometers leaves no measurement problem unsolved. The interchangeable furnaces cover all applications for high-precision expansion control in many fields, including high-tech ceramic and metallic materials in the areas of material development, basic research and quality control.
Dynamic Mechanical Analysis (DMA)

-170°C to 600°C

The robust construction of the DMA 242 and the high resolution of its deformation measuring system enable precise measurements on both very rigid and very soft samples. Its unparalleled variety of deformation types, digital signal filtering and frequency extrapolation make the DMA 242 the most versatile system available for measuring viscoelastic properties of polymers and composites.

High Force Dynamic Mechanical Analysis (DMA)

-160°C to 1500°C

The testing instruments of the EPLEXOR® series enable the mechanical characterization under high loads at temperatures up to 1500°C. Under such conditions properties such as rolling resistance of tires or fatigue testing of composites and adhesive joints can be investigated. The technique can be applied to a wide range of different materials: From elastomers, thermoplastics, composites, metals, glasses, and ceramics to biomaterials and even foods. The instruments can be equipped with a humidity generator and an automatic sample supply system for tension, compression, bending or shear mode.
Thermomechanical Analysis (TMA)

-150°C to 1550°C

The TMA 402 F1 and F3 Hyperion® have been developed for the highly precise measurement of dimensional changes to the specimen as a function of temperature under a defined load. A wide variety of sample holder types and a double furnace hoist make the Hyperion® the most flexible TMA on the market.

Cure Monitoring by Dielectric Analysis (DEA)

-140°C to 400°C

For the investigation of thermosetting resins, composites, adhesives and paints, Dielectric Analysis has stood the test of time. An important value in describing curing processes is the ion conductivity. In order to address all possible needs, NETZSCH offers both single- and multiple-channel DEA systems.

Calorimetry (ARC/MMC/IBC)

RT to 500°C

The MMC 274 Nexus® is a diverse instrument platform with multiple calorimeters capable of testing samples using a variety of calorimetric methods including scanning (differential available), adiabatic and isothermal. Endotherms, exotherms, heat capacity, and sample pressures can be measured accurately on gram-sized samples and mixing and stirring are available. Additionally, the IBC or our well-proven ARC 244/254, with the patented VariPhi® technology, are high-end systems investigating data relevant to chemical process safety and battery safety and development.
Determination of Thermal Conductivity and R-Values with Heat Flow Meter (HFM)

-20°C to 90°C

With our HFM 446 Lambda the thermal conductivity, thermal resistance and specific heat capacity of insulating materials can be measured. The unmatched instrument software can be used for the complete workflow from measurement to documentation. Our report generator contains standard reports for QA as well as the Lambda-90/90 calculation for CE-Declaration. Our flushable measurement cell is the optimal solution for handling QA-measurements in sub-ambient conditions without condensation.

Laser/Light Flash Analysis (LFA)

-125°C to 2800°C

Thermal conductivity and diffusivity are the most important thermophysical material parameters for the description of the heat transport properties of a material or component. The Laser/Light Flash technique has proven itself as a fast, versatile and precise absolute method for measuring thermal diffusivity. NETZSCH offers three LFA models, covering the widest temperature range for the broadest spectrum of materials.

Simultaneous Determination of Seebeck Coefficient and Electrical Conductivity

RT to 1100°C

One approach in the field of thermoelectricity is to generate electrical energy from heat which has been released to the environment. For applications such as these, it is necessary to develop thermoelectric materials with high working temperatures and optimized efficiency. The SBA 458 Nemesis® allows for the simultaneous measurement of the Seebeck coefficient and electrical conductivity under identical conditions.

Laser/Light Flash Analysis (LFA)
Determination of Thermal Conductivity with Guarded Hot Plate (GHP)

-160°C to 250°C

The GHP 456 Titan® allows for determination of the thermal conductivity of insulation materials with outstanding reliability and accuracy across a broad temperature range. Innovative plate materials and temperature sensors, special design features and an improved data acquisition and control system make this GHP the new benchmark in the field of insulation testing.

Refractory Testing by RUL and HMOR

RT to 1700°C

Special strength-testing methods have been established for refractory ceramics. The Refracto-riness under Load (RUL) and Creep in Compression (CIC) identify the deformation resistance of a test piece under a defined load and with a specified temperature/time program. The Hot Modulus of Rupture (HMOR) at high temperatures is determined as the amount of force applied to a rectangular test piece at high temperatures until failure occurs.
The NETZSCH Group is a mid-sized, family-owned German company engaging in the manufacture of machinery and instrumentation with worldwide production, sales, and service branches.

The three Business Units – Analyzing & Testing, Grinding & Dispersing and Pumps & Systems – provide tailored solutions for highest-level needs. Over 3,500 employees at 210 sales and production centers in 35 countries across the globe guarantee that expert service is never far from our customers.

When it comes to Thermal Analysis, Calorimetry (adiabatic & reaction) and the determination of Thermophysical Properties, NETZSCH has it covered. Our 50 years of applications experience, broad state-of-the-art product line and comprehensive service offerings ensure that our solutions will not only meet your every requirement but also exceed your every expectation.