

# NETZSCH

Proven Excellence.



## GABOMETER®

Intelligent Universal Flexometer

Analyzing & Testing

# GABOMETER®

## *Intelligent Material Testing*

Our GABOMETER® system – developed on the basis of the established Goodrich Flexometer – provides accurate measurements of heat build-up as well as blow-out tests and determination of the thermal set. Both force- and elongation-controlled tests can be carried out with this state-of-the-art flexometer. The GABOMETER® is well suited to the task of improving the thermal dissipation and durability of semi-finished tire components, dampers or absorbers. Optionally, the new generation can also measure a material's stiffness (E modulus) and damping ( $\tan \delta$ ) values.



- Pair of insulated compression sample holders aimed for Flexometer tests equipped with a contact thermocouple for recording the sample temperature on the surface of the test specimen during heat build-up tests
- Recording of the sample "centre" temperature within the core of the test specimen during heat build-up tests with a needle type thermocouple (horizontal operation) manual mode (optional)
- Automatic recording of the sample "centre" temperature within the core of the test specimen after heat build-up tests with a needle type thermocouple (vertical operation) driven by a pneumatic penetration system in an automatic mode (optional)

- Heat build-up and blow-out tests according to Goodrich (DIN 53 533, ASTM D 623, ISO 4666/3, ISO 4666/4, BS 903 part A50 and JIS K 6265)
- Compression set
- Dynamic visco-elastic properties\*
- Tension flexometer tests\*
- Fatigue tests\*
- Programmable generator board for variable waveforms with automatic self-adjusting signal shape feedback loop\*
- Creep test\*
- Triple temperature measurement
  - Temperature sensor underneath the sample (standard)
  - Temperature sensor for chamber control (standard)
  - Temperature sensor at the core of the sample (needle type)\*

\* Optional

# Intelligent Universal Flexometer



# Your Advantages



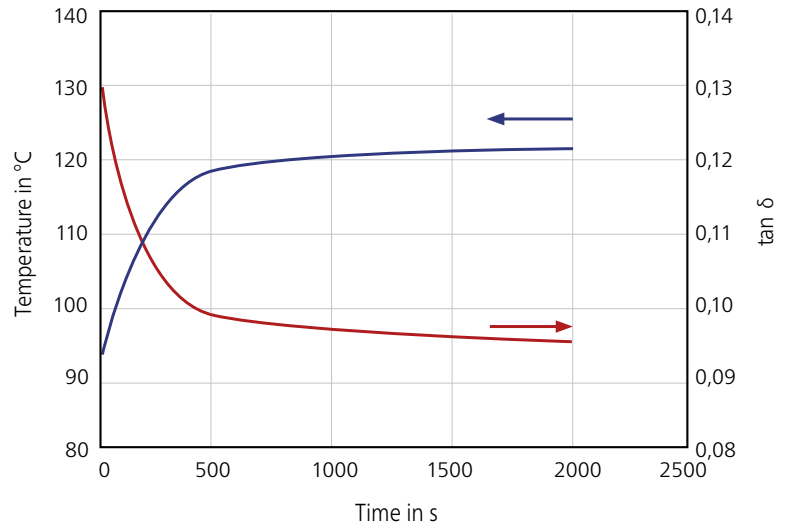
- Heat build-up and blow-out tests according to Goodrich (DIN 53 533, ASTM D 623, ISO 4666/3, ISO 4666/4, BS 903 part A50 and JIS K 6265)
- Goodrich flexometer tests
- Static: Strain- or stress-controlled load mode
- Dynamic: Strain- or stress-controlled load mode
- Wide frequency range\*
- Wide temperature range\*
- Automatic sample changer (ASC) for fully automatic testing (24h)\*
- Simultaneous measurement of the visco-elastic properties\*
- Visco-elastic properties in DMA mode\*
- Hysteresis analysis\*
- Pulse load mode\*

\* optional

# GOODRICH FLEXOMETER TESTS



COMPRESSION

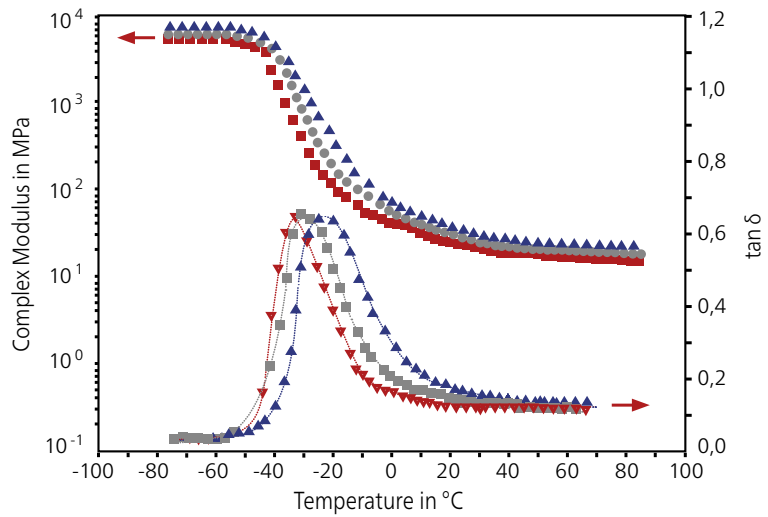


Heat build-up of ASTM D 623 SBR reference

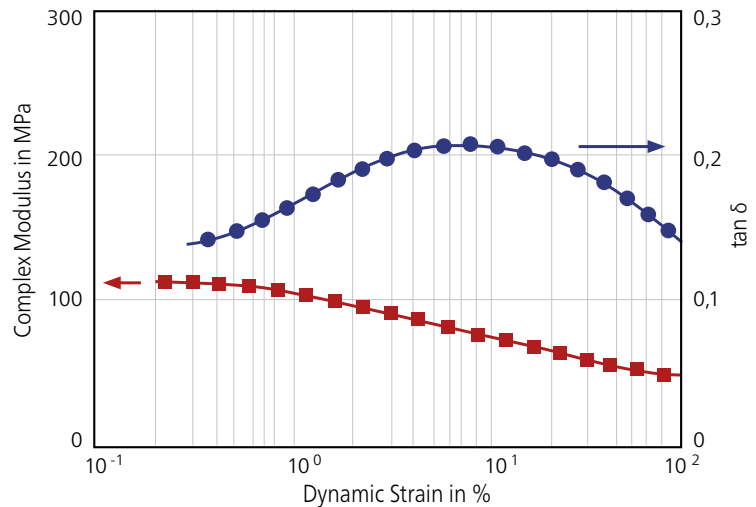
# DYNAMIC DMA TESTS



TENSION

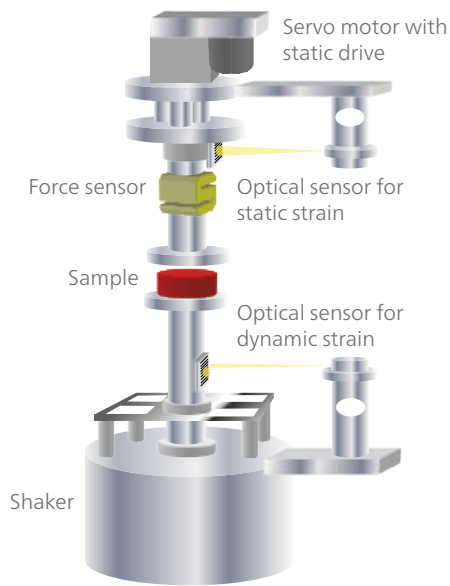


Glass transition

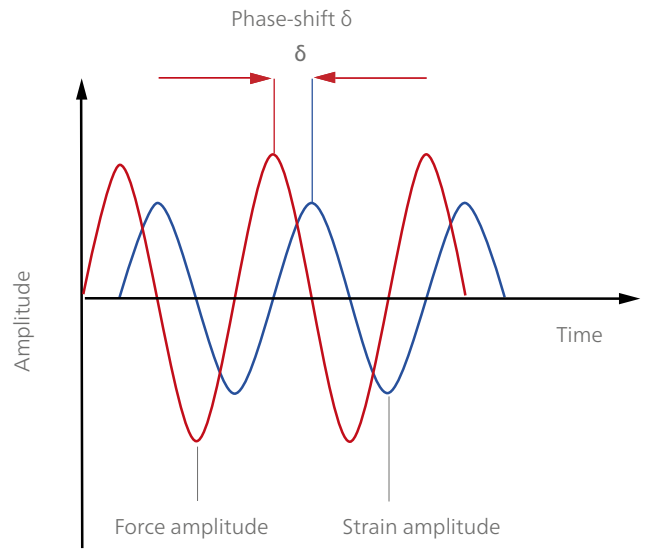


Dynamic strain sweep up to 100 %

# Measuring Principle



GABOMETER® measuring principle



Phase-shift between force and strain is a measured amount in DMA mode

# Automatic Sample Changer (ASC) Option


The optional automatic sample changer comprises a compression magazine for up to 60 specimens. A robot grip system pulls the samples out of the magazine and transfers them to the GABOMETER®.



# Technical Specifications

	GABOMETER® 2000	GABOMETER® 4000
Test specimen size (diameter/thickness)	17.8 mm/25 mm	30 mm (< 40 mm optional)/25 mm
Static load drive	Shaker for servo motor*	Shaker for servo motor*
Dynamic load drive	Electrodynamic shaker system	Electrodynamic shaker system
Frequency range	30 Hz 0.5 up to 50 Hz continuously*	30 Hz 0.5 up to 50 Hz continuously*
Static strain range	up to 60 mm	up to 60 mm
Dynamic strain range	± 1.5 mm up to ± 10 mm*	± 1.5 mm up to ± 10 mm*
Force range	up to 2000 N	up to 4000 N
Temperature range	(-160°C) RT up to 300°C	(-160°C) RT up to 300°C
Temperature measurement	Mode A: Temperature in the furnace PT 100 or type K thermocouple Mode B: Temperature at the bottom of the cylindrical test specimen (type K thermocouple) Mode C: Vertical needle-type thermocouple at the center of the sample after measurement with automatic pneumatic drive* Mode D: Horizontal needle-type thermocouple at the center of the sample during measurement with manual mode*	
Measurement	<ul style="list-style-type: none"> <li>■ Heat build-up or blow-out of the test specimen</li> <li>■ Compression set</li> <li>■ Energy loss*</li> <li>■ Visco-elastic properties only during the heat build-up tests (E', E'', tan δ, E*)*</li> </ul>	<ul style="list-style-type: none"> <li>■ Heat build-up or blow-out of the test specimen</li> <li>■ Compression set</li> <li>■ Energy loss*</li> <li>■ Visco-elastic properties only during the heat build-up tests (E', E'', tan δ, E*)*</li> </ul>
DMA Mode	Visco-elastic properties (E', E'', tan δ, E*)*	Visco-elastic properties (E', E'', tan δ, E*)*
Autosampler	<ul style="list-style-type: none"> <li>■ Magazine for 20 to 60 compression samples*</li> <li>■ Tension, bending, shear tests for DMA*</li> </ul>	<ul style="list-style-type: none"> <li>■ Magazine for 20 to 60 compression samples*</li> <li>■ Tension, bending, shear tests for DMA*</li> </ul>
Electrical supply	3 phases, 400 V, 50/60 Hz, 32A	3 phases, 400 V, 50/60 Hz, 32A
Max. dimensions (height x width x thickness)	1800 mm x 1200 mm x 1200 mm	1800 mm x 1200 mm x 1200 mm
Max. weight	750 kg	750 kg

\* optional



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.

Proven Excellence. ■

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