GABOMETER®
Intelligent Universal Flexometer

Analyzing & 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 δ) 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
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

Heat build-up of ASTM D 623 SBR reference

DYNAMIC DMA TESTS

Glass transition

Dynamic strain sweep up to 100 %
Measuring Principle

GABOMETER® measuring principle

Phase-shift δ 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

<table>
<thead>
<tr>
<th></th>
<th>GABOMETER® 2000</th>
<th>GABOMETER® 4000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test specimen size</td>
<td>17.8 mm/25 mm</td>
<td>30 mm (&lt; 40 mm optional)/25 mm</td>
</tr>
<tr>
<td>(diameter/thickness)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Static load drive</td>
<td>Shaker for servo motor*</td>
<td>Shaker for servo motor*</td>
</tr>
<tr>
<td>Dynamic load drive</td>
<td>Electrodynamic shaker system</td>
<td>Electrodynamic shaker system</td>
</tr>
<tr>
<td>Frequency range</td>
<td>30 Hz</td>
<td>30 Hz</td>
</tr>
<tr>
<td>0.5 up to 50 Hz continuously*</td>
<td>0.5 up to 50 Hz continuously*</td>
<td></td>
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<tr>
<td>Static strain range</td>
<td>up to 60 mm</td>
<td>up to 60 mm</td>
</tr>
<tr>
<td>Dynamic strain range</td>
<td>± 1.5 mm up to ± 10 mm*</td>
<td>± 1.5 mm up to ± 10 mm*</td>
</tr>
<tr>
<td>Force range</td>
<td>up to 2000 N</td>
<td>up to 4000 N</td>
</tr>
<tr>
<td>Temperature range</td>
<td>(-160°C) RT up to 300°C</td>
<td>(-160°C) RT up to 300°C</td>
</tr>
</tbody>
</table>

### 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
- Heat build-up or blow-out of the test specimen*
- Compression set*
- Energy loss*
- Visco-elastic properties only during the heat build-up tests (E', E'', tan δ, E*)*

### DMA Mode
- Visco-elastic properties (E', E'', tan δ, E*)*

### Autosampler
- Magazine for 20 to 60 compression samples*
- Tension, bending, shear tests for DMA*

### Electrical supply
- 3 phases, 400 V, 50/60 Hz, 32A

### Max. dimensions (height x width x thickness)
- 1800 mm x 1200 mm x 1200 mm

### Max. weight
- 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.