

# RHEO LOGY.

OSCILLATE.  
ROTATE.  
SIMULATE.

**bareiss®**

Material testing. Trusted worldwide.

# RUBBER PROCESS ANALYZER



High sampling rate for improved FT-Rheology



Status indicator lights



Adjustable closing pressure



Ergonomic design for easy access and clear visibility

Dual testing modes:



Oscillation



Rotation

Extrusion-relevant (steady) shear rates possible



## REDEFINE WHAT RUBBER TESTING CAN DO.

The Bareiss RPA isn't just an upgrade — it's a new standard. Purpose-built for the demands of modern rubber and elastomer processing, it goes where no conventional RPA has gone before: beyond oscillation. Its fully rotating lower die uniquely combines oscillatory and rotational measurement in one instrument, delivering a complete rheological picture that was simply not possible until now. Whether you're pushing the boundaries of compound development, tightening quality control, or optimizing production in real time, the Bareiss RPA gives you the insight to move faster and formulate smarter.

RPA<sub>ultra</sub>

RPA<sub>select</sub>



All capabilities.  
Fully integrated.



Start with basics.  
Upgrade when ready.



# KEY FEATURES

## FULLY ROTATIONAL LOWER DIE FOR PROCESS RELEVANT SIMULATION

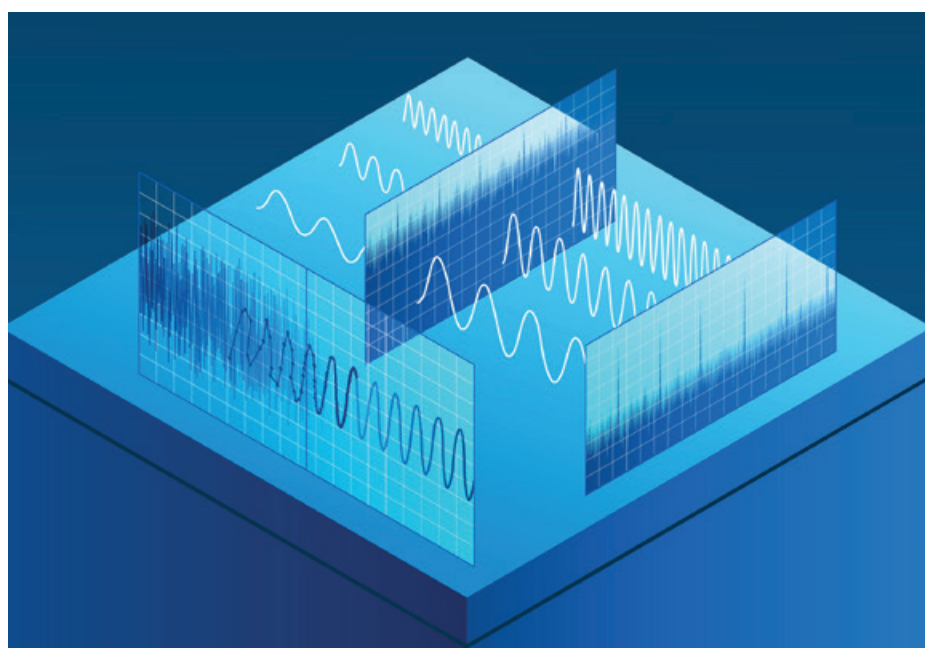
Experience testing that mirrors reality. Designed for extrusion-relevant shear rates, the Bareiss RPA simulates actual processing conditions, bridging the gap between lab results and production outcomes.



## HIGH SAMPLING RATE FOR IMPROVED FOURIER TRANSFORM (FT) RHEOLOGY

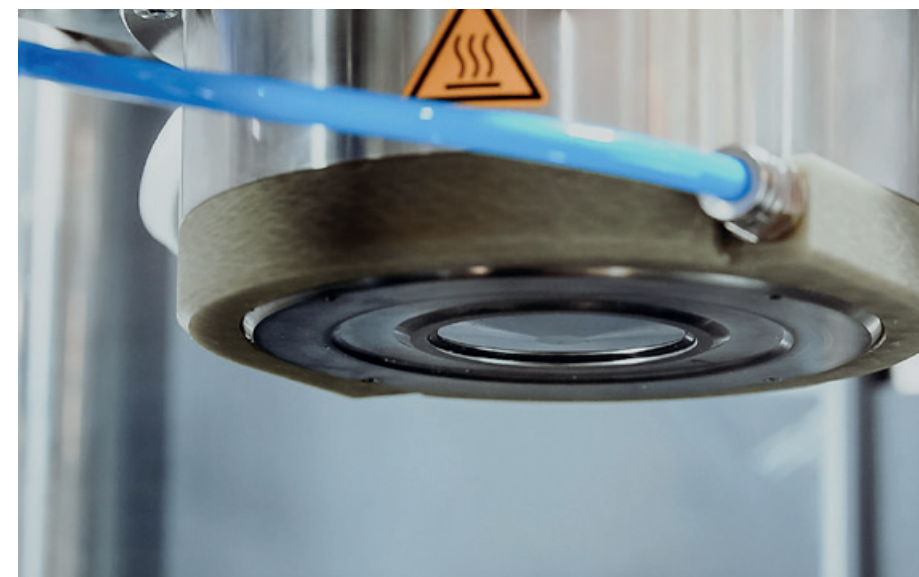
With a very high sampling rate, the Bareiss RPA enables precise analysis of material behavior and supports advanced **Fourier Transform Rheology** by converting time-domain data into frequency-domain viscoelastic information.

FT-Rheology is particularly useful for compounds with **recovered carbon black** and for evaluating **polymer branching and structure**, revealing key aspects of molecular architecture.



## PRODUCTION-LEVEL INSIGHTS WITH WALL-SLIP ANALYSIS

By replacing the standard die with a **biconical polished test die assembly** that replicates extruder wall surface roughness, the Bareiss RPA enables realistic simulation of processing conditions. This allows accurate quantification of wall slip, providing reliable data for more precise simulation models and improved understanding of material behavior.



## COMPATIBLE WITH BareissOne – THE SOFTWARE PLATFORM FOR YOUR MEASUREMENT DATA

Intuitive software simplifies complex testing procedures, allowing researchers to focus on analysis rather than instrument operation. Streamline your workflow and increase productivity.



## WORLD'S FIRST FLOOR STANDING MODEL

Move beyond the limitations of heavy benchtop systems. As the world's first floor-standing RPA with integrated rollers, the Bareiss RPA combines stability with true mobility—allowing it to be easily moved across the lab or between different testing locations with minimal effort.



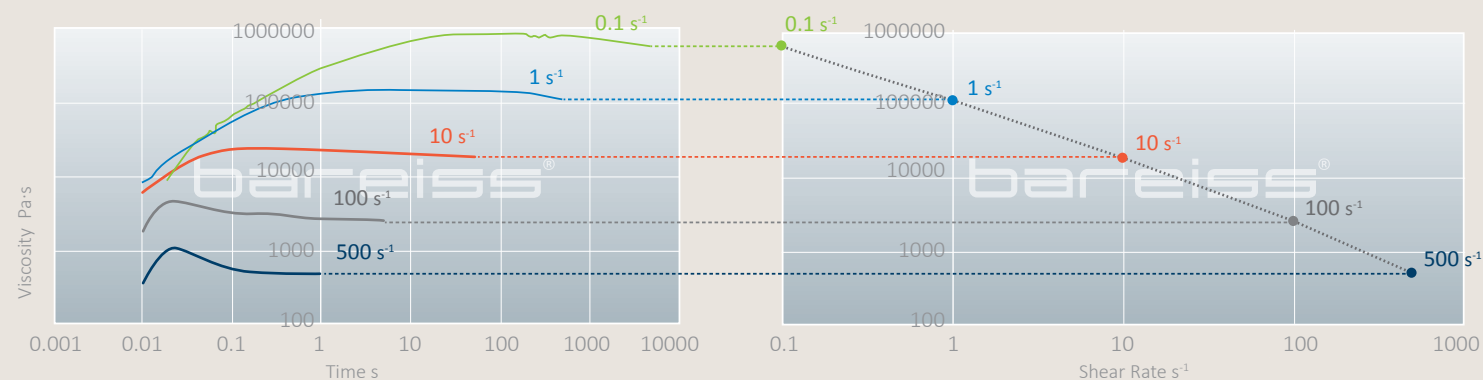


# MEASURING METHODS AND THEIR APPLICATION.

## STEADY SHEAR VISCOSITY

To better understand the **manufacturing process** of an unvulcanized rubber compound, the steady shear viscosity is one of the most important properties, especially crucial for determining the process parameters for extrusion and injection molding purposes.

The Bareiss RPA's rotating lower die with unlimited strain thus provides the user with a dual test mode: dynamic and steady shear.



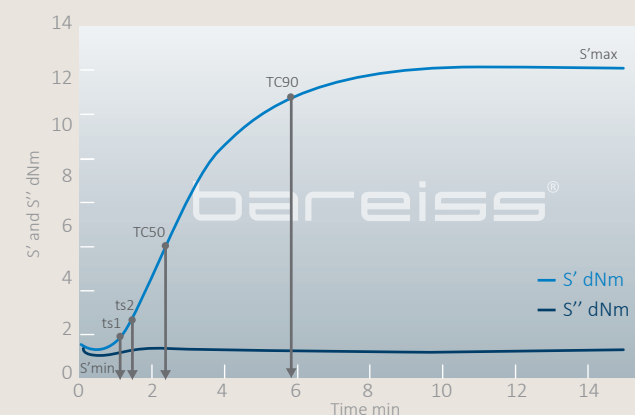
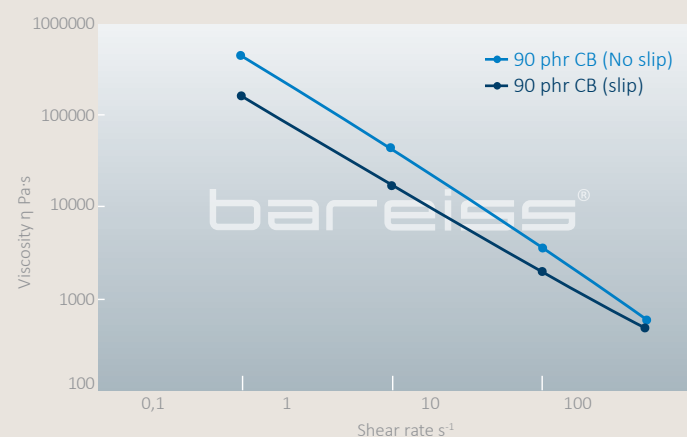
VISCOSITY OVER TIME

VISCOSITY OVER SHEAR RATE

## WALL SLIP

A significant challenge in the **processing of rubber compounds** is the issue of Wall Slip.

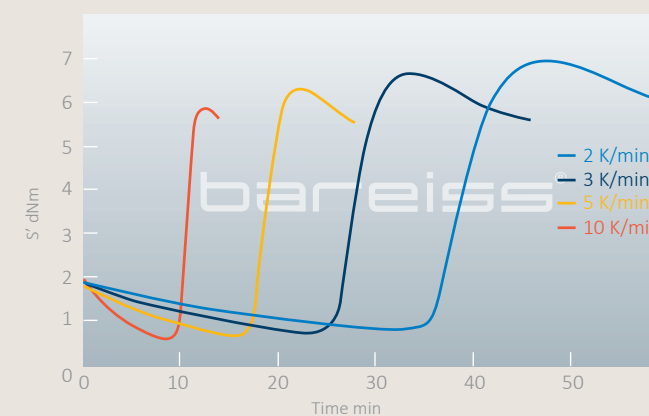
This is a rheological phenomenon where slippage occurs, for example, between the extruder wall and the flowing material. We offer an optional solution where the standard die/s is replaced by a defined polished die set. In combination with an adjustable closing pressure, this allows Wall Slip experiments to be carried out.



## ISOTHERMAL TEST

One of the most common and important tests performed on rubber compounds are the isothermal **cure tests**.

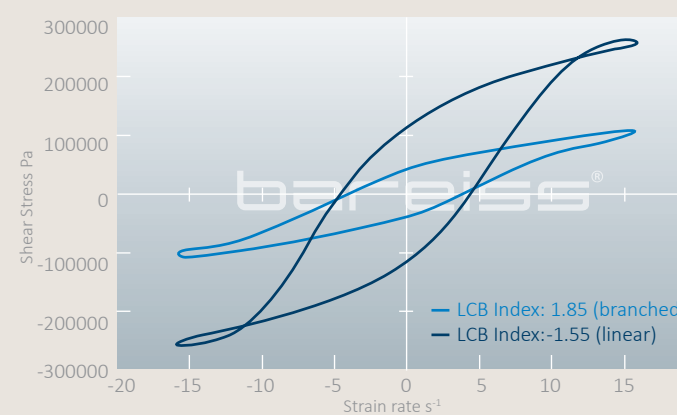
All important test parameters such as maximum and minimum torque, TC values, reaction time and rate, etc. are determined and made available to the user in tabular and/or graphical form for further analysis in the BareissOne software.



## NON-ISOTHERMAL TEST

In order to evaluate the behavior of a sample over a **wide temperature range**, non-isothermal measurements (temperature sweep) are typically performed at different heating rates.

This measurement at different heating rates also paves the way for **non-isothermal kinetic calculations** – a module that is also integrated into the BareissOne software.



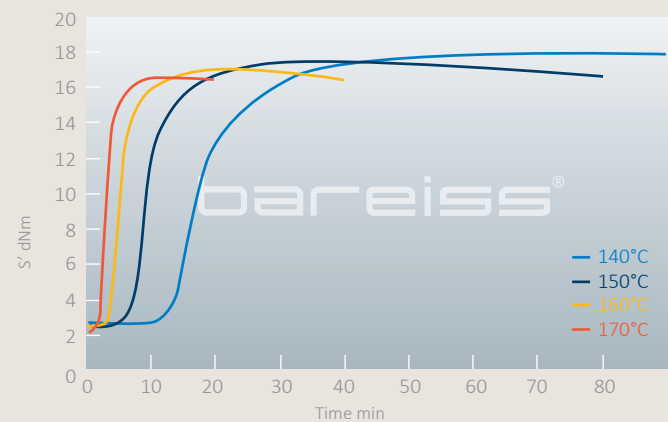
## LARGE AMPLITUDE OSCILLATORY SHEAR (LAOS)

LAOS is essentially a strain sweep performed at relatively **large amplitudes** to investigate and evaluate the nonlinear viscoelastic behavior of a sample.

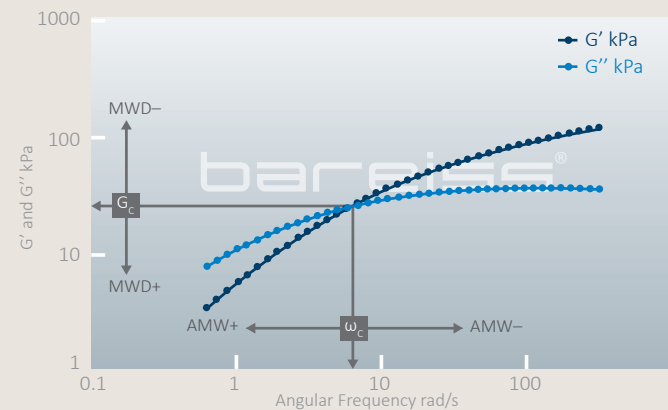
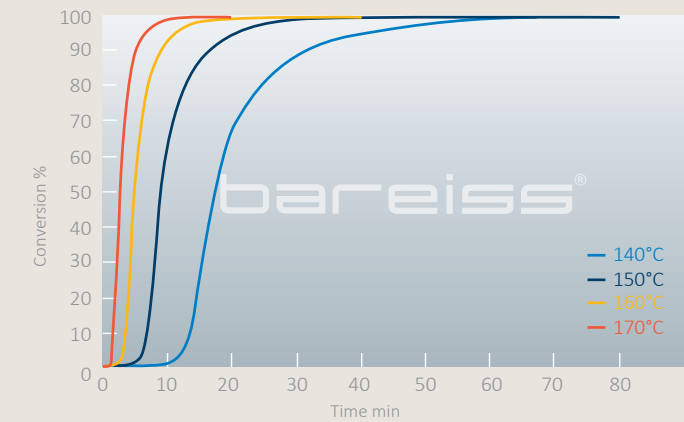
The nonlinear behavior of a material is based on its polymer architecture → linear or branched polymer. The LAOS results are also used for **FT- Rheology**. The calculation of the **LCB index** (Long Chain Branching) or the **Q-parameter** is performed using the harmonic spectrum from Fourier analysis (FFT).

## KINETICS

From an isothermal test, values such as incubation time, reaction order and conversion rate constant can be determined for each temperature. The calculation is according to the DIN 53529 standard. With the help of the incubation time and the conversion rate constant at at least 3 different temperatures,



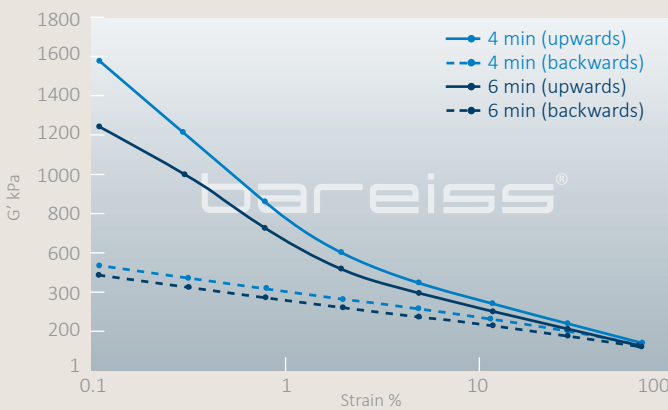
the activation energies of the incubation and the conversion can also be determined. These are essential parameters for the **computation of the heating time** for the test specimen and also finds its use in production line.



## FREQUENCY SWEEP

By characterizing a sample over a wide range of frequencies, the user obtains a comprehensive overview of the viscoelastic behavior as well as the molecular structure (**molecular weight and molecular weight distribution**).

Viscoelastic properties such as complex modulus, elastic modulus, loss modulus, complex viscosity, phase angle, etc. are calculated at each frequency as a result of the frequency-dependent behavior of the sample.



## STRAIN SWEEP

Measuring a specimen over a wide strain range shows the **strain-dependent behavior**, e.g., the linear viscoelastic range (LVE) up to Large Amplitude Oscillatory Shear (LAOS).

The Payne test, which is performed at small strain amplitudes to investigate the (filler/polymer) filler networks, reveals information about the **filler content** and the **filler dispersion levels**.

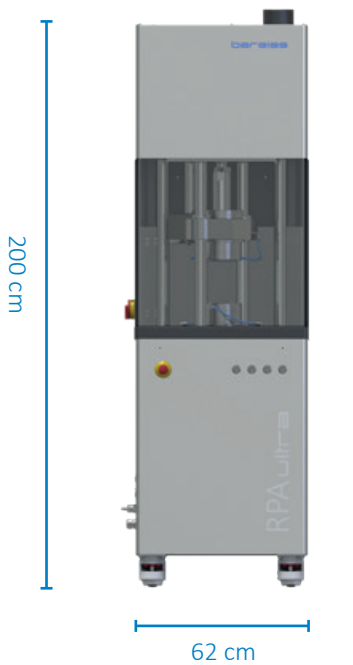
## MATRIX TEST

In the frequency and strain sweeps described above, one parameter (frequency or strain) is held constant while the other parameter (frequency or strain) is changed over a range.

Matrix testing allows the user to change both parameters – frequency and strain – during a sweep, making the **test method more flexible** and thus providing **more information with a single measurement**.

# SPECIFICATIONS

|            |            |            |            |            |            |            |            |          |           |           |
|------------|------------|------------|------------|------------|------------|------------|------------|----------|-----------|-----------|
| ASTM D5289 | ASTM D6048 | ASTM D6204 | ASTM D6601 | ASTM D7050 | ASTM D7605 | ASTM D8059 | ASTM D8491 | ISO 6502 | ISO 13145 | DIN 53529 |
|------------|------------|------------|------------|------------|------------|------------|------------|----------|-----------|-----------|



|                                |                                                                                                                                                             |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Torque range                   | 0.001 to 250 dNm                                                                                                                                            |
| Drive System                   | High-dynamic servo motor,<br>High-resolution measurement technology                                                                                         |
| Temperature range              | Ambient to 235°C                                                                                                                                            |
| Max. heating rate              | 1.33°C/s (80°C/min)                                                                                                                                         |
| Die config.                    | Sealed biconical die<br>Optional: biconical polished, plate-plate                                                                                           |
| Die gap                        | 0.48 mm nominal                                                                                                                                             |
| Sample volume                  | 4.5 cm <sup>3</sup>                                                                                                                                         |
| Max. shear rate in oscillation | 100 s <sup>-1</sup>                                                                                                                                         |
| Max. shear rate in rotation    | 750 s <sup>-1</sup>                                                                                                                                         |
| Test modes                     | Isothermal, Non-isothermal, Frequency Sweep, Strain Sweep, LAOS, Steady Shear/Ramp, Stress Relaxation, Matrix Test                                          |
| Measured data                  | Torque, temperature, frequency, strain;<br>Optional: Normal force/ sample pressure                                                                          |
| Calculated data                | G', G'', G*, S', S'', S*, tan delta, n', n'', n*, process-relevant parameters (ex. S' min, S' max, TC values etc.), LCB Index, reaction rate, and many more |

**Measurements**  
W x D x H: 80 X 62 X 200 cm

**Weight** approx. 420 kg



## ACCESSORIES



BICONICAL, POLISHED DIE ASSEMBLY

This test die assembly is available for evaluating wall slip behavior in rubber compounds. By comparing measurements from standard and polished dies on the Bareiss RPA, wall slip effects can be precisely quantified.

This data provides valuable input for simulation engineers, enabling the development of more accurate models that better reflect real processing conditions.



PLATE-PLATE DIE ASSEMBLY

This test die assembly is available for advanced testing under high shear rate conditions. The adjustable die gap allows precise control of shear conditions, enabling users to tailor the test setup to specific material and application requirements.

 For further information on the test method and application, please contact the application team at Bareiss.

## CONSUMABLES



### SEAL

Precision-engineered rubber seals for RPA/MDR test dies, ensuring leak-free operation, consistent test conditions and reliable material characterization every time.



### TEST FILM

Melinex (polyester) and Dartek (polyamide) test films ensure effortless sample handling, minimize die cleaning, and deliver clean interfaces for consistent, reliable, and faster RPA/MDR test results.



# MOVING DIE RHEO- METER

## MDR<sub>vario</sub>

ASTM  
D5289

DIN  
53529

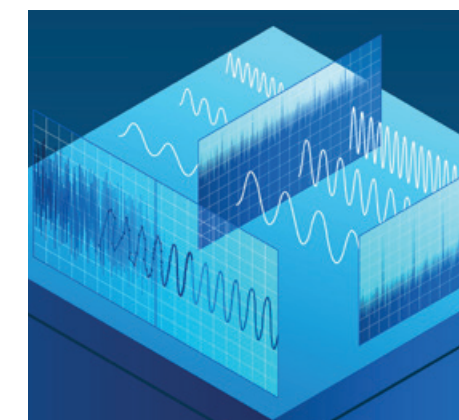
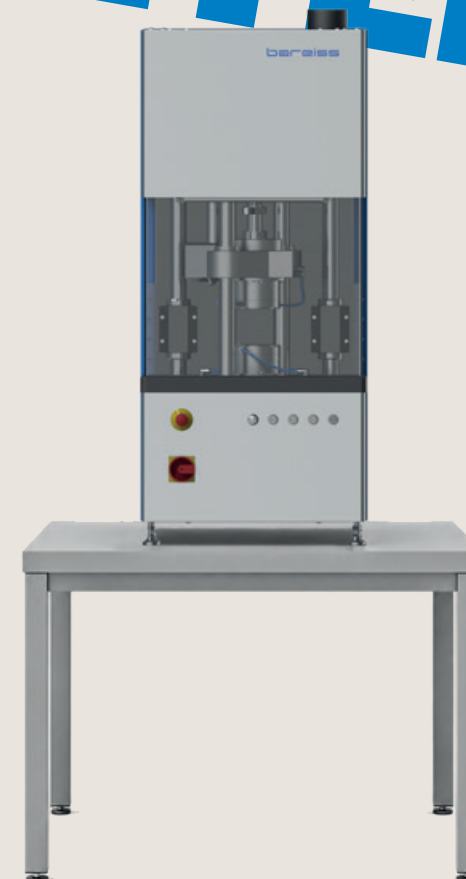
ISO  
6502

MEASURING METHODS  
Isothermal, Non-isothermal

SAMPLE TYPES  
pure polymers, polymer blends, rubber compounds

 **Measurements**  
W x D x H: 76 X 57 X 132 cm

 **Weight** approx. 350 kg



The Bareiss MDR vario delivers fast, accurate rubber characterization under isothermal and non-isothermal conditions. Its rigid frame, sealed biconical dies, and precise temperature control ensure ASTM-, ISO-, and DIN-compliant measurements, while BareissOne software converts cure data into actionable quality insights.

### EXTENDED STRAIN RANGE

Allows material-specific amplitude testing for improved reproducibility, resulting in more accurate and meaningful cure data.

### FT-RHEOLOGY AS STANDARD

Captures torque and strain harmonics in every test, making measurement artifacts immediately visible for more transparent analysis.

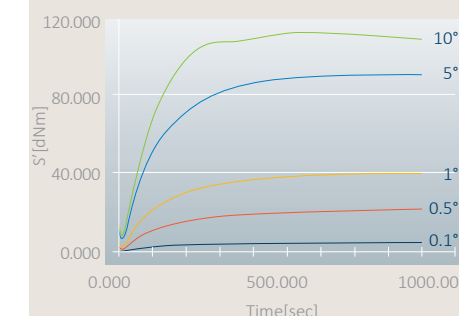
### AIR COOLING AS STANDARD

Reduces cooling times to increase testing efficiency while enabling precise non-isothermal temperature control.

### ULTRA-RIGID TEST FRAME

Minimizes instrument compliance to ensure accurate torque and strain measurements, delivering reliable and reproducible results across all material types.

### EXTENDED STRAIN RANGE





# SCALABLE RHEOLOGY – TAILORED TO YOUR GROWTH

- ✓ INCLUDED.

Standard.  
Built in. Ready to run.
- + ADD IT WHENEVER YOU  
NEED IT.

Upgrade instantly. No hardware.  
No hassle.
- NOT AVAILABLE.

Testing capability not included  
in this configuration



RPA ultra      RPA select      MDR vario

| MODEL TYPE                           | Floor standing                     |  | Table top               |
|--------------------------------------|------------------------------------|--|-------------------------|
| FREQUENCY RANGE                      | 0.001- 100 Hz                      |  | 1.667 Hz                |
| STRAIN RANGE                         | 0.001°- 360°<br>± 0.014 % – 5000 % |  | 0.1° – 10°<br>1.4%–210% |
| TORQUE TRANSDUCER                    | 0.001–250 dNm (0.0001-25 Nm)       |  |                         |
| TEMPERATURE RANGE                    | Ambient to 230°C                   |  |                         |
| CLOSING PRESSURE                     | Standard<br>4.5 Bar                |  |                         |
| NORMAL FORCE/ SAMPLE PRESSURE SENSOR | upto 10 kN                         |  |                         |
| TEST METHODS                         | Isothermal, Non-isothermal         |  |                         |
| TEST STANDARDS                       | Standard                           |  |                         |
| Optional                             |                                    |  |                         |

# SOFTWARE ONE SOLUTION FOR EVERYTHING.

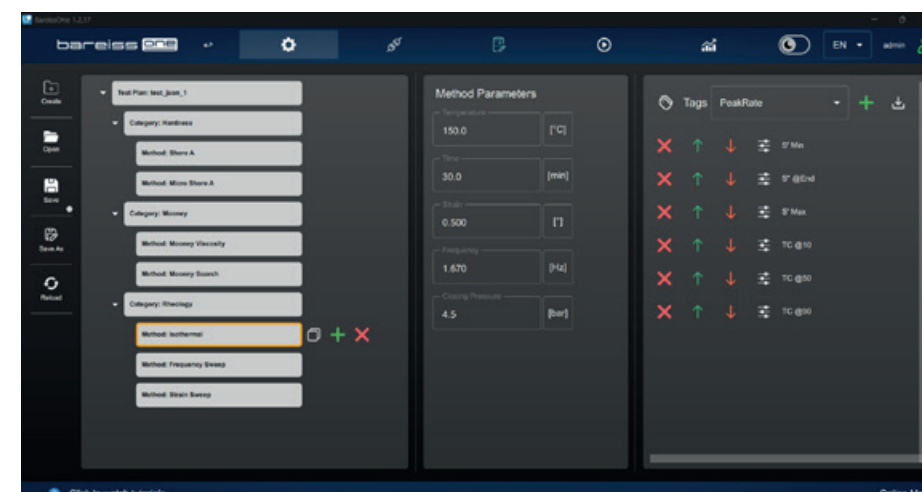
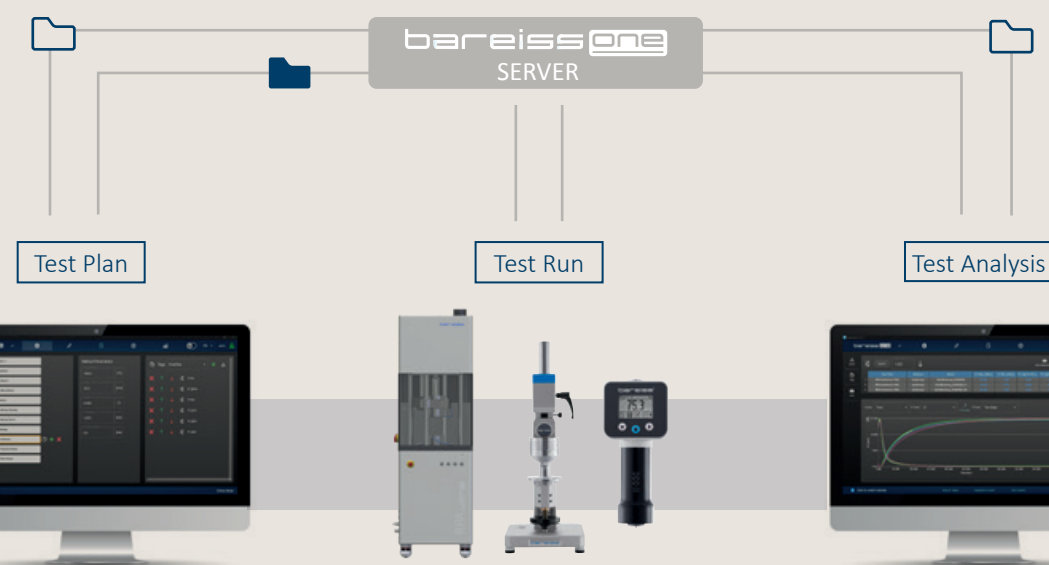
**bareissone**

BareissOne is the central software platform for all Bareiss test devices/ instruments, unifying test categories in a single modular environment. It supports everything from simple single measurements to complex multi-step test sequences, ensuring flexibility across laboratory needs.

With its modern, intuitive interface, BareissOne enables fast setup, execution, and analysis with minimal training effort. Clear icons and a structured workflow provide a full overview of the workspace, making it easy to navigate test categories and access relevant functions for new and experienced users.

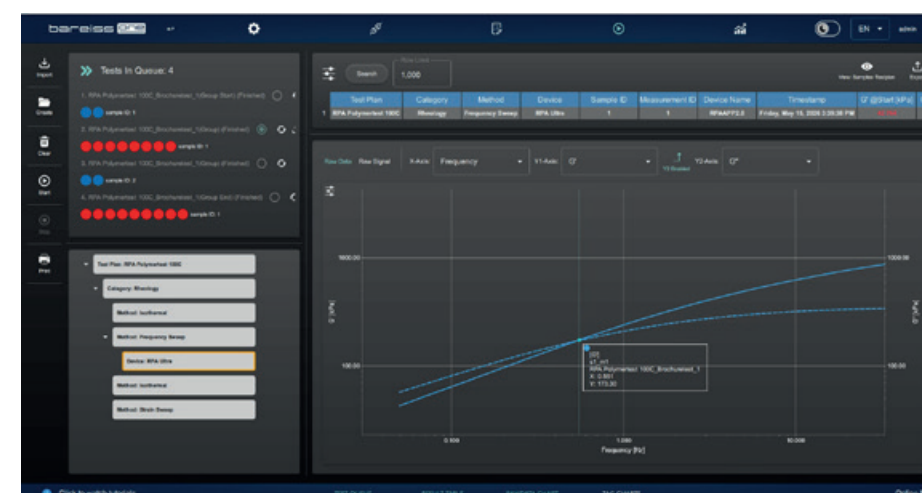
Beyond test execution, BareissOne offers powerful data management and analysis tools, including statistical evaluation via calculated tags and advanced export options. User authorization, system logging, user-defined fields, and customizable reporting ensure full traceability and efficient workflow control.

The BareissOne Server-Client solution enables networked operation and integration of selected third-party instruments, supporting centralized control, data transfer, and seamless connection to LIMS or internal analysis systems.



## STRUCTURED TEST PLANNING WITH VERSION CONTROL

The Test Plan Editor enables users to create, save, and reuse test plans. Categories (e.g. hardness, rheology, density), methods, and all relevant parameters are clearly defined. Tags and tolerances can be customized individually — ensuring reproducible testing procedures.



## GUIDED MEASUREMENT EXECUTION WITH LIVE MONITORING

In the Test Run module, measurements are carried out through a guided workflow including test plan selection, device assignment, and batch definition. During testing, live curves, raw data, result values, and automatic pass/fail evaluations based on predefined tolerances are available in real time.



## COMPREHENSIVE DATA ANALYSIS AND BATCH COMPARISON

The Test Analysis module enables the evaluation and comparison of multiple batches. Key result metrics, live curves, tag charts, and raw data can be flexibly combined and visualized. Trends, process stability, and specification limits become immediately visible.

# TRUSTED WORLDWIDE.



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## Bareiss Prüfgerätebau GmbH DAkkS accredited laboratory

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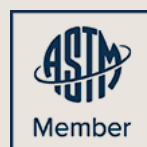
The accreditation is valid for the scope listed in certificate  
D-K-15206-01-00 (mechanical measurands in the range of hardness).

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Federal Ministry  
for Economic Affairs  
and Climate Action

on the basis of a decision  
by the German Bundestag



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