Anton Paar

Dough Processing and Baking Behavior Analyzer

Brabender ExtensoGraph

Brabender®
A brand of **Anton Paar**

Dough Extensibility and Real-Life Reliability

With its latest generation, Brabender ExtensoGraph has never been more powerful, featuring top technology for unmatched dough analysis precision. It is unique for meeting national and international standards for stretching, extensibility, and processing in the globally established language of dough analysis: Brabender and ExtensoGraph units.

Make reliable statements about processing properties in production and behavior in the oven. The humidity and temperature management system allows you to precisely control temperature and humidity conditions in the fermentation chamber to match your specific test requirements.

FIND OUT MORE

www.anton-paar.com/apb-extensograph

Unique dough evaluation capabilities

- → We ensure testing under genuine production conditions, making biochemical processes visible and empowering users to get full control over their product testing.
- → The Brabender ExtensoGraph measures any type of dough, from exceptionally strong (up to 2,000 EU/BU force) or remarkably elastic (approx. 68 cm).

Compliance assured

- → Globally recognized standard method, compliant with e.g. ICC 114/1, ISO 5530-2 and AACCI 54-10.01, and key national standards, e.g. GB/T 14615, AFNOR NF V03-717-2, ASGA 06-01.
- → Simplifies communication between stakeholders across the entire flour and dough value chain.

Testing beyond standards

- → Complete flexibility: Customize predefined methods and evaluations.
- → Rapid method: Reduce fermentation duration for more than 30 % time savings.
- → Small sample size: Get down to just 20 g of dough by using the Brabender Micro-ExtensoGraph tool.

Seamless lab workflows with MetaBridge

- → Ensure smooth work processes in the laboratory with our guided workflows.
- → Easy access to measurement results data via any web browser.
- → Support of third-party systems (e.g. LIMS, ERP) and OPC UA.

Holistic baking process simulation

- → The Brabender ExtensoGraph is the second phase of the renowned 3-Phase-System, which depicts the production of bakery or pasta products on a laboratory scale.
- → Can be perfectly combined with the Brabender FarinoGraph (phase 1) and Amylograph-E (phase 3)

The Extensogram

To measure with the Brabender ExtensoGraph, a dough consisting of 300 g flour, 6 g salt and distilled water is kneaded in the Brabender FarinoGraph until a specified consistency is reached. This ensures objectivity and reproducibility during sample preparation and a constant initial consistency. The Extensogram shows the exerted force as a function of the stretching length (time).

1

A – Energy
Area under the curve in [cm²]. Describes the work applied for stretching the dough. The energy gives an indication of the dough stability during fermentation.

2

R_{50} – Resistance to extension
Height of the curve at 50 mm, measured in Extensograph Units (EU). The result after 50 mm is the standard for evaluating the upward phase, as it is independent of the extensibility.

3

E – Extensibility
Length of the curve in [mm]. Shows the stretching properties of the gluten and is measured from the moment when the hook touches the dough until it breaks.

4

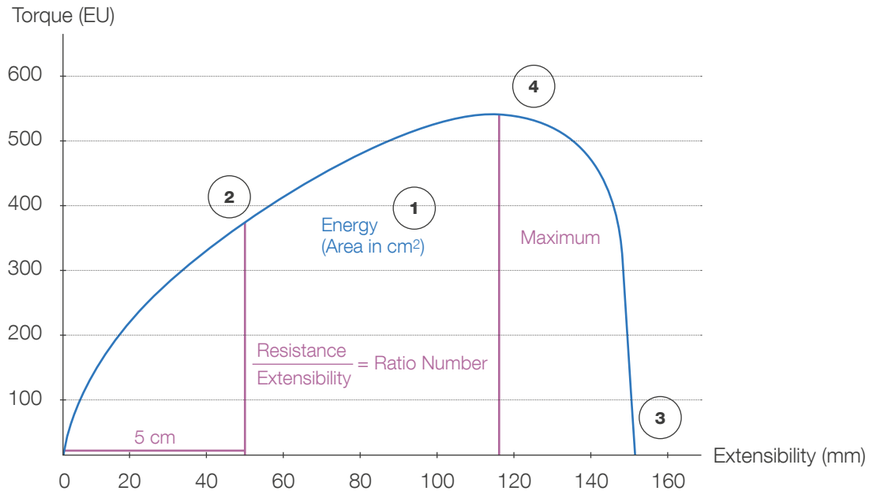
R_m – Maximum resistance to extension
Highest point of the curve in Extensograph Units (EU). This is the peak of the curve shortly before the breaking point of the dough.

5

R_{50}/E – Ratio
Quotient of resistance R_{50} and extensibility. The ratio is an additional factor in the review of the dough behavior and describes two properties with one number.

6

R_m/E – Ratio (max)
Quotient of resistance R_m and extensibility.



*Extensograph Units (EU) = Brabender Units (BU)

What's New?

Advantages over the previous Brabender ExtensoGraph generation

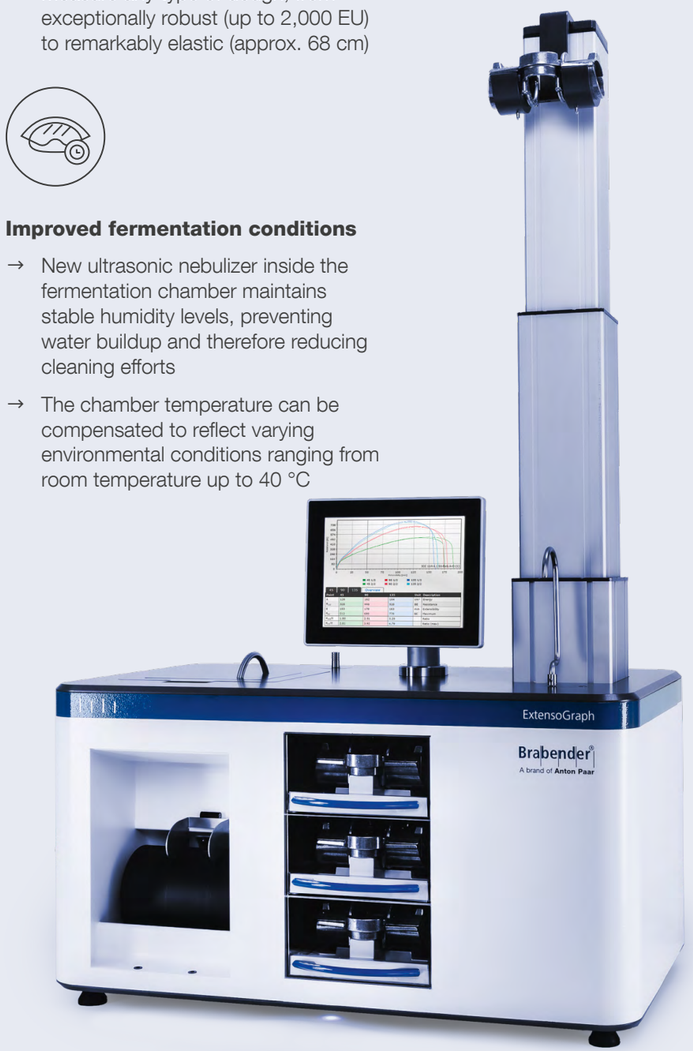
Compact design
- → Stand-alone unit: PC, touchscreen and MetaBridge software are integrated and ready to use
- → Built-in heating system, no need for external thermostat: Heat the device up in less than an hour, minimizing setup time
- → Optimized, space-saving stretch unit that lifts upwards, preventing blockage of laboratory storage spaces

Modular system for each working step
- → ExtensoPrep: For rounding and long moulding of the dough
- → ExtensoFerm: For the fermentation of the dough
- → ExtensoBase: Hook module with PC, touchscreen and software to measure the extensibility

Automation
- → Parameters from the preparation on the Brabender FarinoGraph are transferred automatically
- → Built-in software timer to monitor the fermentation duration
- → Built-in light barriers that recognize individual process steps and make operation simpler and quicker

Better specifications
- → Extended torque and stretch length. Measure any type of dough, from exceptionally robust (up to 2,000 EU) to remarkably elastic (approx. 68 cm)

Improved fermentation conditions
- → New ultrasonic nebulizer inside the fermentation chamber maintains stable humidity levels, preventing water buildup and therefore reducing cleaning efforts
- → The chamber temperature can be compensated to reflect varying environmental conditions ranging from room temperature up to 40 °C



MetaBridge

The MetaBridge operating software enables measurements according to your preferred standard with just a click. Access your measurements from any device and location.

Connection of multiple instruments, including transitioning data from Brabender FarinoGraph to Brabender ExtensoGraph, reduces throughput times and minimizes errors. You can also export and share data with colleagues and third-party systems such as LIMS, ERP, or via email.

Optimized workflows

- → Brabender shapes standards; many of the well-known ISO, ICC and AACCI standards are directly usable
- → Guided workflows avoid common errors in advance
- → Customize predefined methods; reduce fermentation duration to save 30 % time

MetaBridge Connect

- → Easy access to your measurement data via a web browser within the company network
- → MetaBridge devices exchange information to optimize your work in the laboratory; this enables, for example, the automatic exchange of sample names and other parameters

Data sharing

- → Standard data exports in typical formats such as Excel, CSV, PDF
- → Built-in mailing function for a quick exchange with colleagues and customers
- → Support of third-party systems (e.g. LIMS, ERP) via Brabender WebAPI, shared network folders or OPC UA

Correlation

- → Compare a multitude of measurements with the correlations add-on feature to obtain an optimal understanding of your materials
- → MetaBridge automatically creates smart correlations in the background and sends monthly e-mail reports for quality control

Modular Brabender ExtensoGraph

Besides the all-in-one instrument, the Brabender ExtensoGraph is also available in a modular setup. This allows you to configure the instrument's work steps (balling and long molding, fermentation, stretching) according to your needs.

- → Increase your sample preparation throughput by adding another ball homogenizer and roller, fermentation cabinets or hooks
- → Optimize the reproducibility with duplicate, simultaneous measurements with a second stretching hook

Brabender ExtensoGraph

⊕ **ExtensoPrep**

⊕ **ExtensoFerm**

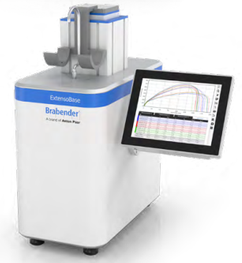
⊕ **ExtensoBase**

ExtensoPrep
For rounding and long molding of the dough

- → Integrated heating to prevent sample cool-down
- → Automatic start of the rounding process upon lid closing
- → Automatic process handling when preparing the dough

ExtensoFerm
Cabinet for the dough fermentation

- → Integrated heating, no need for an external thermostat
- → Adjustable temperature (room temperature to 40 °C)
- → Controlled humidity for consistent, reproducible results



ExtensoBase
Unit with hook, PC, touchscreen and software to measure dough extensibility

- → Pre-installed MetaBridge software
- → Interchangeable hook and holding device for Brabender Micro-Extensograph tool
- → Automatic start of the measurement when the sample is placed in position

Brabender ExtensoGraph Measurements: **Working Principle**

The Brabender ExtensoGraph simulates realistic production conditions and records all of the complex biochemical processes, so you can fully trust your results.

	Bakery production ↓	**Brabender ExtensoGraph** ↓
Step 1	After preparation of dough, the dough remains in the mixer bowl or on the worktable for the first relaxation	After preparation of the dough with the Brabender FarinoGraph, 45 min rest time in the fermentation cabinet
Step 2	Weighing of small dough pieces and folding of the dough	Simulation of production work through first measurement after 45 min
Step 3	Resting and relaxing of the dough	Another 45 min resting time in the fermentation cabinet
Step 4	Making up (shaping) of the dough pieces (e.g. bread loaves)	Second measurement after 90 min (2 x 45) and recording of the characteristics
Step 5	Resting of the shaped dough pieces in the proving cabinet until they are placed in the oven	Another 45 min resting time in the fermentation cabinet to record all biochemical processes
Step 6	Setting of the dough pieces in the oven	Third measurement after 135 min in total (3 x 45) and recording of a quality curve

1. Rounding

The dough produced in the Brabender FarinoGraph is weighed out into two dough pieces of 150 g each for the double determination. These are placed in the homogenising balling unit and shaped into a ball.

2. Long molding

The round piece of dough is then placed in the moulder and shaped into a cylinder.

The "rheological optimum" characterizes the physical condition of a dough which, under the given processing conditions, optimizes baking results. Should this need to be optimized with additives, the Brabender ExtensoGraph excels with its correlation feature. If offers detailed analysis and comparison of how different additive amounts affect flour quality after various proving times in the Extensogram.

Weak flour quality

- → Flour producing a wet, plastic dough
- → Narrow fermentation tolerance, dough tends to spread
- → Small baking volume

Strong flour quality

- → Extensible, elastic dough
- → Suited for long fermentation processes, high proving tolerance
- → Light, voluminous baking products with a good volume

3. Fermentation

The dough pieces are placed in the dough tray carriers and fixed. They are then stored in the fermentation cabinet and tempered to 30 °C for 45 min each.

4. Stretching

The basin with the piece of dough is clamped in the holding device. The hook stretches the dough downward while the Brabender ExtensoGraph records the values. This process is repeated three times. The last measurement describes the stretching behavior of the dough during the baking process.

Beyond Standards

The typical Brabender ExtensoGraph method has been standardized for more than 60 years. This has led to worldwide adoption and the establishment of a simple tool for exchanging results with colleagues and partners. However, depending on your needs, you can tailor the best solution just for you, outside of standard measurements.

Fast method: Speed up measuring time

→ Shorten the fermentation duration and save more than 30 % of your time. To achieve this, reduce the proving time from 45 to 30 min.

→ Reduce the number of repetitions to just one test after 45 min proving time for time savings of almost 70 %. This method can serve as an indicator and fingerprint.

Brabender Micro-ExtensoGraph

→ Significantly decrease the necessary sample volume with the Brabender Micro-ExtensoGraph conversion kit using only 20 g and saving 260 g of your valuable materials.

→ Especially well-suited for breeders and producers working with high-cost raw materials, such as enzymes.

→ Perfectly combinable with the Brabender FarinoGraph 50 g mixer.

Reliable.
Compliant.
Qualified.

Our well-trained and certified technicians are ready to keep your instrument running smoothly.

FIND OUT MORE

www.anton-paar.com/service

Maximum uptime

Warranty program

Short response times

A global service network

Brabender ExtensoGraph

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SPECIFICATIONS		
Sample weight	300 g of flour + 6 g of salt + distilled water	
Speed of balling unit	83 ±3 min^{-1}	
Speed of dough roll	15 ±1 min^{-1}	
Stretching speed	14.5 ±0.5 mm/s	
Process length of the lifting column	680 mm	
Measuring range	0-2,000 EU/BU	
Temperature control	Integrated	
PC port	USB (4), LAN/Ethernet (2), HDMI (1)	
Mains connection	100…240 V, 50/60 Hz, 0.24 kW, 1.0…2.4 A	
Dimension (W x H x D)	840 mm x 720 mm x 500 mm	
Weight	Approx. 115 kg	
Accessories	Brabender Micro-ExtensoGraph tool	
Standards (exemplary selection)	ICC-Standard 114/1 AACC Method 54-10.01 ISO 5530-2 DIN EN ISO 5530-2 CEN EN ISO 5530-2 NF V03-717-2 NF EN ISO 5530-2 GOST ISO 5530-2 OENORM EN ISO 5530-2 SN EN ISO 5530-2	BS EN ISO 5530-2 UNE-EN ISO 5530-2 CCAT 03 CCAT 16 AGSA 06-01 IRAM 15856 GB/T 14615 GB/T 35994 TCVN 7848-2

	ExtensoPrep	**ExtensoFerm**	**ExtensoBase**
	↓	↓	↓
SPECIFICATIONS BRABENDER EXTENSOGRAPH MODULES			
Interfaces	-	2x USB, 1x Ethernet	4x USB, 2x Ethernet, 1x HDMI
Power supply	100…240 V, 50/60 Hz, 0.24 kW, 1.0…2.4 A	100…240 V, 50/60 Hz, 0.12 kW, 0.5…1.2 A	100…240 V, 50/60 Hz, 0.24 kW, 1.0…2.4 A
Dimensions (W x H x D)	362 mm x 458 mm x 500 mm	324 mm x 458 mm x 500 mm	550 mm x 458 mm x 500 mm (incl. touchscreen) 550 mm x 1,470 mm x 500 mm (fully extended lifting column)
Weight (approx.)	48 kg	40 kg	50 kg

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