Anton Paar

For determining the flour quality, the stretch properties of the dough and the baking behaviour in the oven

Brabender: Extensograph-E

Brabender®

A brand of **Anton Paar**

Brabender® Extensograph®-E

Use the Brabender Extensograph-E for measuring the stretching properties of your dough, in particular the resistance to extension and the extensibility, to make reliable statements about the processing properties in production and the subsequent baking behaviour in the oven.

The procedure

For the test in the Extensograph-E, prepare your sample dough from flour, distilled water, and salt in the Farinograph. This ensures objectivity and reproducibility during dough preparation and a constant starting consistency.

After a certain proving time, the dough is stretched until rupture in the Extensograph-E. The force exerted is measured and recorded.
This procedure is repeated three times.

Technical Data

- Sample weight: 300 g of flour + 6 g of salt + dist. water
- Speed of balling unit: 83 ± 3 min^{-1}
- Speed of dough roll: 15 ± 1 min^{-1}
- Speed of stretching hook: 14.5 ± 0.5 mm/s
- Force measurement: electronical
- PC port: USB
- Mains connection: 1 x 230 V; 50/60 Hz + N + PE; 3.2 A;
  115 V; 50/60 Hz + PE; 6.3 A
- Dimensions (W x H x D): instrument with tray holder arms, without rack: 850 x 450 x 630 mm
  space required (at table edge): 850 x 1000 x 630 mm
- Weight: approx. 75 kg net

Highlights

Proven method

- Applied in research and industry for more than 80 years
- Recognized by international standards for flour and dough quality*
- Works best in combination with Farinograph and Amylograph (Brabender 3-Phase System)

Practical results

- Realistic simulation of dough preparation
- Mapping of the usual work steps and time intervals in bakery production (unlike rapid methods)
- Estimation of gluten strength, gas holding capacity and bakery product volumes
- Visibility of the effect of additives on the dough properties

Optional accessories

- External proving cabinet for increased capacity
- Micro-Extensograph for small dough quantities

* Apart from the standard methods, there are accepted short methods which allow to save time with reduced proving times that are similar to those in production - the results correlate very well with those from the standard methods.

Standard and short method

1. The dough produced in the 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. The round piece of dough is then placed in the moulder and shaped into a cylinder. The entire shaping simulates the processing of dough in production.

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

4. The basin with the piece of dough is clamped in the holding device. The hook stretches the dough downward while the Extensograph records the values. This process is repeated three times after each 45 min. fermentation time. The last measurement describes the stretching behavior of the dough during the baking process.

There are several standards describing in detail the Extensograph test procedure:

- ICC-Standard no. 114/1
- AACC Method no. 54-10.01
- ISO 5530-2
- RACI, GB/T, GOST R, IRAM, FTWG, and others...

Automatic test evaluation

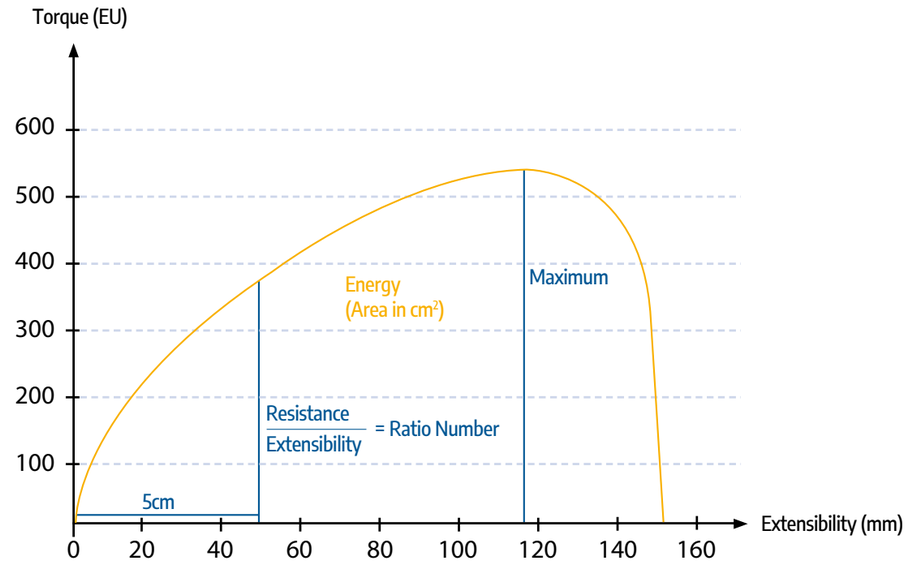
The Extensogram, recorded online and represented as a color diagram on the monitor, shows the exerted force as a function of the stretching length (time).

The quality of flour and additives is made evident by following parameters:
- Shape of the measuring curve
- Area below the curve
- Numerical values of the evaluation points

The Extensogram includes:
- Resistance to extension (5 cm)
- Resistance to extension (Max.)
- Extensibility
- Area below the curve (energy)
- Ratio number (Resistance 5 cm / extensibility)
- Ratio number (Max.) (Resistance max. / extensibility)

From these values, the rheological properties of the respective flour and the influence of flour additives (ascorbic acid, enzymes, emulsifiers) on the dough quality can be clearly recognized. Furthermore, the “rheological optimum” for the respective application of the flour can be determined and adjusted on the basis of the evaluated data.

The Extensogram



Scheme Extensogram

The Brabender 3-Phase-System

The Extensograph is the second phase of the reknown 3-Phase-System, which depicts the production of bakery or pasta products on a laboratory scale in a holistic and practical manner.

Phase 1 (Farinograph)

Water absorption and kneading characteristics of dough

Phase 2 (Extensograph)*

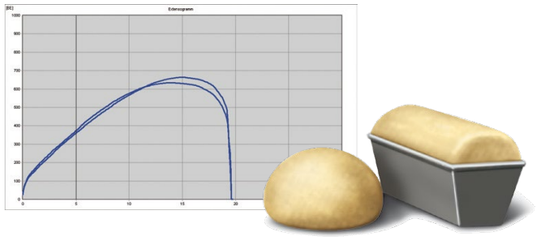
Stretching properties of dough, prediction of the baking volume

Phase 3 (Amylograph)

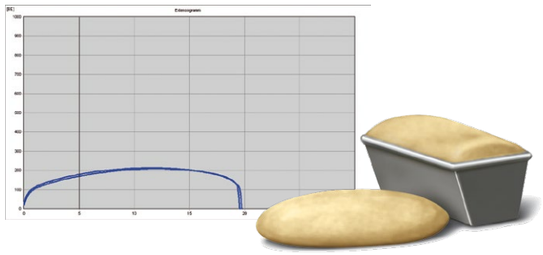
Gelatinization properties of starch, enzyme activity and bakeability of flour

* For the performance of an Extensograph test, the Farinograph is used to prepare the dough sample

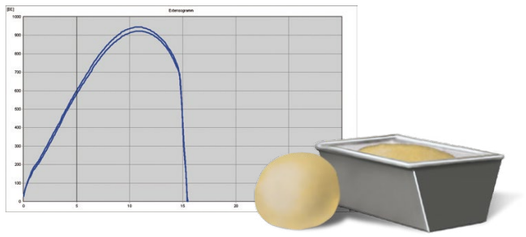
Extensogram profiles of different flour qualities



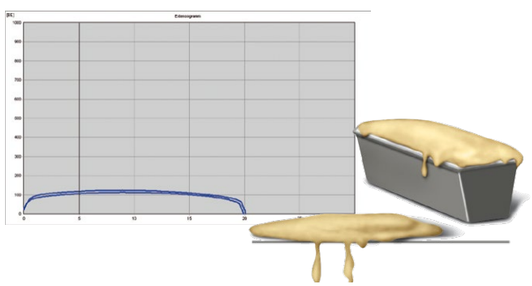
- Strong flour
- Extensible, elastic dough
- Suited for long fermentation processes, large proving tolerance
- Light, voluminous baking products with a good volume



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



- Rigid, tough dough structure
- Poor extensibility
- Dough hardly rises during proving
- Results in a small baking volume with little poor spring

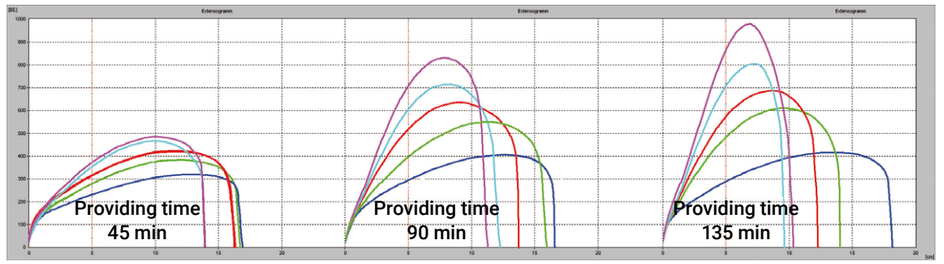


- Flour not suitable for normal baking products

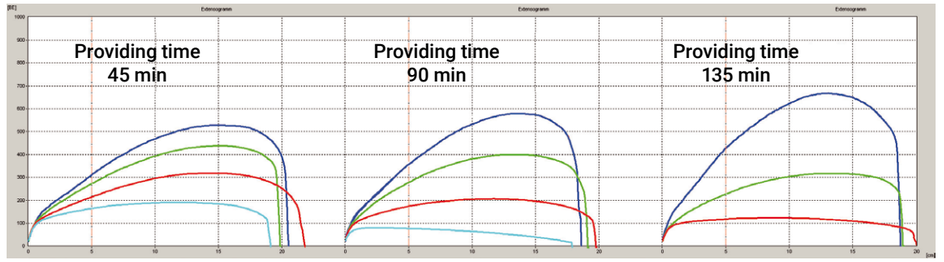
Rheological optimum

Different products require different flour qualities and dough properties.
The “rheological optimum“ characterizes the physical condition of a dough which, under the given processing conditions, supplies an optimum baking result.
The diagrams show the effect of various amounts of flour additives on the flour quality.

Influence of additives



Increasing addition of ascorbic acid



Increasing addition of proteinase

Like no other instrument, the Extensograph-E shows the influence of flour additives like ascorbic acid, enzymes (e.g. proteinases), and emulsifiers and thus permits to determine the rheological properties of each flour and to adjust the “rheological optimum“ for the respective purpose.

Capacity increase for the Extensograph

Additional external proving cabinet for using with an already existing Brabender Extensograph or Extensograph-E. Tempering to 30°C takes place by connection to a thermostat.

The system consists of a tempered proving cabinet with 3 fermentation chambers, as well as the appropriate tray supports, dough trays and clamps.

Proving cabinet for Extensograph-E

- Mains connection: not necessary
- Dimensions (W x H x D): 740 x 205 x 420 mm
- Weight: approx. 30 kg

The Extensograph

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