



ICC-Standard no. 114/1
AACC Method no. 54-10
ISO 5530-2

Extensograph®-E

For measuring the flour quality
and stretching behaviour
of dough



... where quality is measured.



The application of constant flour qualities is of decisive importance for the milling and baking industries. Different baking products require different demands regarding the flour quality.

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 baking behaviour of the dough.

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

Testing flour quality:

- Stretching behaviour of the dough
- Baking characteristics
- Influence of flour additives
- Rheological optimum

Test procedure

Before starting 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.

Standard and short method

There are several standards describing in detail the **Extensograph®-E** test procedure:

- ICC-Standard no. 114/1
- AACC Method no. 54-10
- ISO 5530-2
- RACI, GB/T, GOST R, IRAM, FTWG, and others...

Apart from these 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.

Menu-guided test procedure

The program guides you through the entire test. Clear on-line diagrams show the test progress.

The evaluation is not limited to the standard methods - you can, just as well, run tests without duplication and with any proving times.

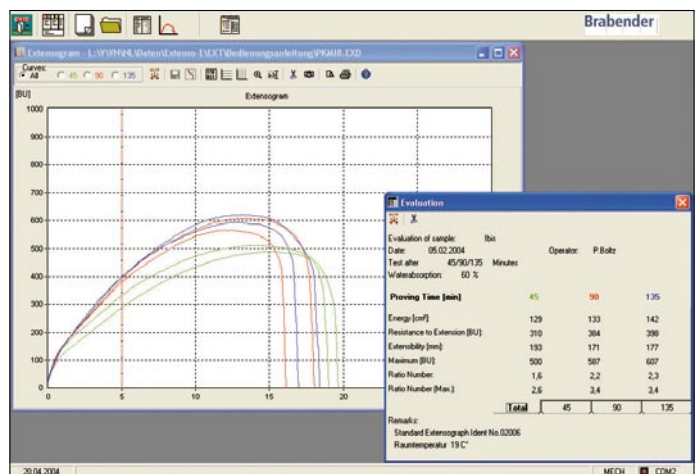
The software manages the tests of a day and shows, for each sample, which proving times have already been completed.

The Extensogram

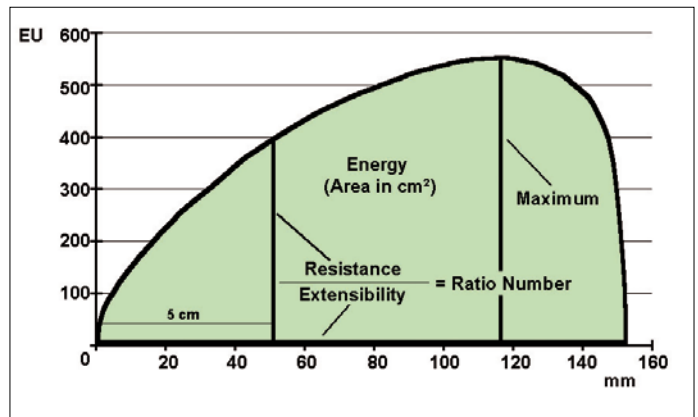
The Extensogram, recorded online and represented as a color diagram on the monitor, shows the exerted force as a function of the stretching length (time).

The shape of the measuring curve and its variation during the individual proving times, the area below the curve as well as the numerical

values of the different evaluation points permit to make reliable and reproducible statements as to the flour quality and the suitability of the flour for a certain task. Furthermore, the influence of flour additives on the flour characteristics can be made evident.

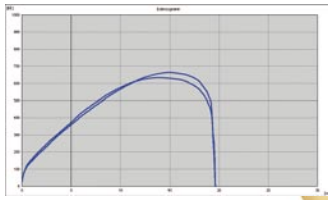


Extensogram

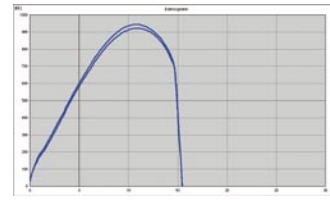


Scheme Extensogram

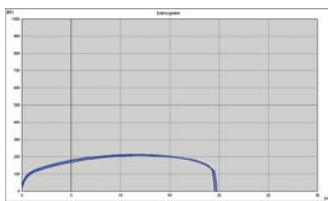
Extensogram profiles of different flour qualities



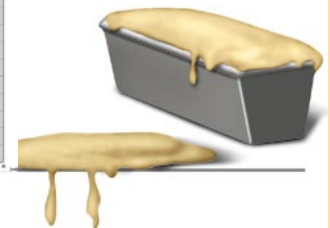
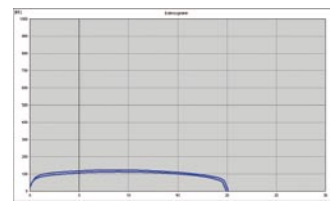
- Strong flour
- Extensible, elastic dough
- Suited for long fermentation processes, large proving tolerance
- Light, voluminous baking products with a good volume



- Rigid, tough dough structure
- Poor extensibility
- Dough hardly rises during proving
- Results in small pieces of dough with poor spring



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



- Flour not suitable for normal baking products

Automatic test evaluation

The Extensogram includes

- Resistance to extension (5 cm)
- Extensibility
- Maximum (Resistance to extension)
- Area below the curve (energy)
- Ratio number (extensibility/resistance)
- Ratio number (extensibility/maximum resistance)

From these values, the rheological properties of the respective flour and the influence of flour additives (ascorbic acid, enzymes, emulsifiers) on the flour 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 evaluation data.



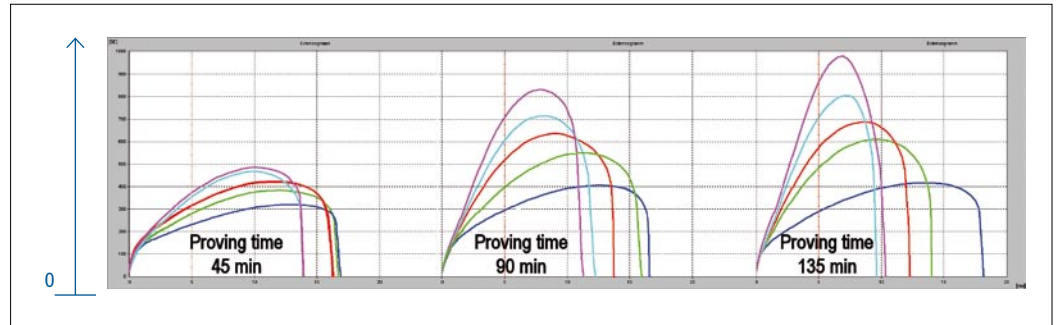
... where quality is measured.

Rheological optimum

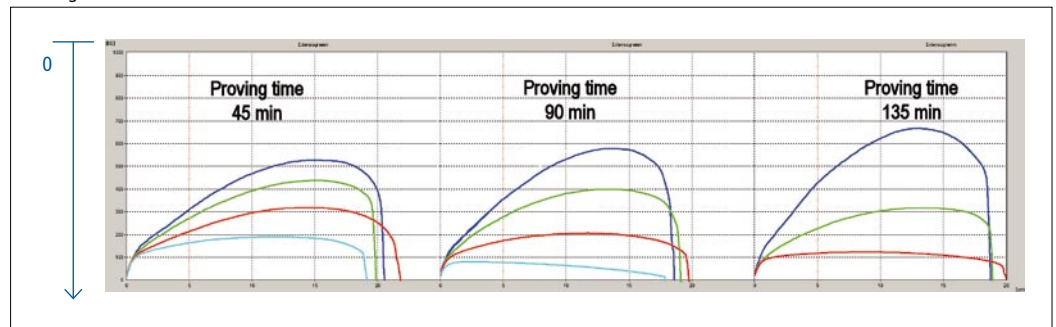
Different products require different flour qualities and dough properties. The "rheological optimum" characterizes the physical condition of a dough which, under the given processing conditions, supplies an optimum baking result.

The diagrams show the effect of various amounts of flour additives on the flour quality.

Influence of additives



Increasing addition of ascorbic acid
 — no addition
 — medium addition
 — highest addition

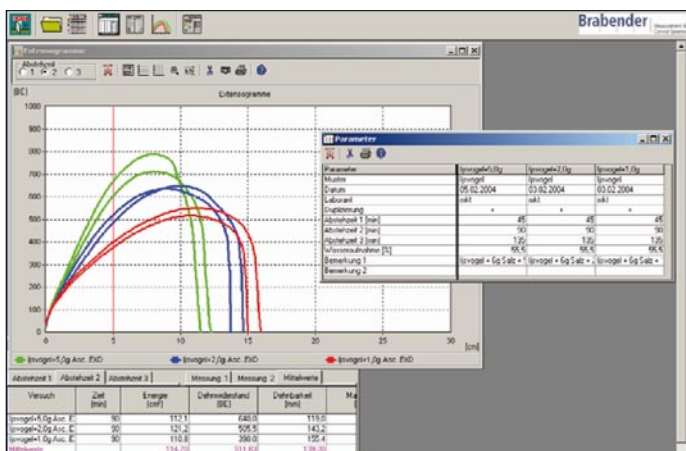


Increasing addition of proteinase
 — no addition
 — highest addition

Data correlation

Use the powerful correlation program to compare diagrams and results of up to 10 tests with each other. Test conditions and results are contrasted in tables and evaluated statistically.

Quick assess trends or irregularities by drawing and printing the Extensograms of a proving time in a single diagram.



Data correlation of three flours

| Extensograph®-E | |
|--|---|
| Sample weight | 300 g of flour + 6 g of salt + dest. 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 | 1x 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) | 850 x 450 x 630 mm |
| <ul style="list-style-type: none"> instrument with tray holder arms, without rack space required (at table edge) | 850 x 1000 x 630 mm |
| Weight | approx. 75 kg net |



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