CHOPIN Technologies' solutions for measuring dough tenacity, extensibility, elasticity and baking strength
The Alveograph test measures the visco-elastic properties of a bubble of dough as it is inflated.

The Alveograph test consists of producing a test piece of dough, which, under air pressure, turns into a bubble. This process reproduces the deformation of the dough when subject to carbon dioxide during fermentation.

The test involves 4 main steps:
1. Mixing flour and salted water
2. Preparing five calibrated pieces of dough
3. Putting these pieces of dough to rest
4. Automatically inflating each piece of dough until the resulting bubble bursts

The Alveograph measures the essential rheological characteristics of the dough:
- \( P \) : dough tenacity (aptitude to resist deformation)
- \( L \) : dough extensibility (maximum volume of air that the bubble is able to contain)
- \( P/L \) : configuration of the curve
- \( L.e. \) : elasticity index, \( L.e. = P200/P \) (\( P200 \): pressure at 4cm from the beginning of the curve)
- \( W \) : dough baking strength (surface under the curve)

Why are these results important?
The Alveograph produces results that serve as references for all of the cereal industry. These results allow controlled production processes and ensure quality of the final products.

Use within the cereal industry

For Storage Operators
- Secure the buying and selling of wheat and flour using an international reference
- Monitor wheat quality upon reception
- Select and classify wheats according to their future use
- Detect insect contaminated wheat

For Bakers
- Monitor the conformity of incoming flour
- Test new compositions
- Control additives

For Millers
- Optimize the blends of wheat and flour
- Adapt the flour for its final use by accurately measuring out additives and improvers
- Control the different flour fractions
- Use on durum wheat (Triticum durum): semolina protocol (standard UNI 10453)

For more information: www.chopin.fr/en or info@chopin.fr
The Alveograph is adapted for use in various applications. Some examples:

**Wheat selection**
Compare, select and classify the different batches of wheat available on the market according to their future use.

**Wheat or flour blends**
In milling, wheat or flour is blended to adapt quality according to the future use. With the Alveograph, calculate the right blend for making high quality products.

**Additives**
Optimize their usage by measuring their effects (cysteine, ascorbic acid, yeast, glucose, etc.) on the plastic properties of the dough.

**Durum wheat (Triticum durum)**
The Alveograph evaluates the tensacity of semolina intended for making pasta and determines the bread-making capacities of durum wheat flour (standard protocol UNI10 453).

**Salt**
Salt produces a reinforcement of protein structure. In bread making, this effect is researched to avoid sticking after mixing. The effect of salt on dough rheology can be measured with the Alveograph.

**Gluten**
The effects that gluten has on dough are easily detectable with the Alveograph. For example, excess gluten results in high dough elasticity, and poor extensibility.

**Proteases**
The hydrolysis of peptide bonds leads to a partial destruction of the gluten network. These effects are clearly shown on the Alveograph results.

**Deactivated yeasts**
Deactivated yeast has an effect on the dough plastic qualities, which are detectable with the Alveograph.

**Insect contaminated wheat**
The Alveograph makes it possible to detect flour that has been produced with contaminated wheat.

**And plenty more!**

For more information: www.chopin.fr/en or info@chopin.fr
The new Alveograph instruments benefit from the know-how and unique expertise CHOPIN Technologies has for the analysis of flours.

New range of Alveograph

Alveograph

The AlveoPC determines the parameters \( P, L, P/L, Ie, W \), according to the standard protocol. The instrument is associated with a simple, modern and intuitive software. It allows you to:

- Measure the plastic qualities of wheat and flour at constant hydration (50% b15)
- Benefit from an approved analysis (AACC 54-30.02, ICC 121, NF EN ISO 27971, and more) for commercial transactions (standard protocol)
- Optimize wheat and / or flour blends
- Predict correct additive dosages

Alveolab

The Alveolab has very important innovations making the Alveograph test more accurate and easier to achieve. At the forefront of technology, this instrument allows you to:

- Measure the plastic qualities of wheat and flour at constant or adapted hydration
- Evaluate the behavior of the dough during mixing
- Benefit from an approved analysis (AACC 54-30.02, ICC 121, NF EN ISO 27971, and more) for commercial transactions (standard protocol)
- Change test parameters to create custom protocols
- Work in a totally controlled environment (temperature and humidity)

For more information: www.chopin.fr/en or info@chopin.fr
Key functions and innovations – Alveolab & AlveoPC

Instruments linked to PC software
- Test data is displayed live after test
- A standard analysis certificate is automatically generated. Your company name and logo can easily be added.
- All data is backed up to assure perfect traceability.

Extrusion and cutting of dough pieces
- Resting plates have a high-resistance anti-adhesive coating to facilitate the preparation of dough pieces.
- Dough cutter is semi-automatic and very easy to use.

Key functions and innovations – Alveolab

Protocols
- New parameters, stress/strain and first derivative, are now calculated automatically.
- “Degradation”, “relaxation” and “hybrid” protocols (a combination of different protocols, for example: alveo + relaxation) are pre-loaded in the software.
- Custom protocols can be created, for example, by varying the intensity and duration of the mixing. Consequently, the Alveograph test has even more predictive analysis of flour performances.

Cooling
- Cooling is assured by an integrated system (Peltier effect). Therefore, there is no need to connect the equipment to a cooling water system.

Dough hydration
- At the beginning of the test, water is added automatically and very precisely.
- The temperature of the water tank is regulated.

Inflation of the dough pieces
- The positioning and the inflation of the dough pieces are automated, and carried out in a temperature and humidity controlled compartment.
- The inverted bubble is more spherical and closer to the ideal conditions of the test.

Improver guide
- Helps you to quickly choose the most suitable additive to obtain target Alveograph values.

Virtual store
- Virtually attribute a product to a silo or a cell and enter its price.

Blends
- Select up to 5 products and automatically find the most affordable blend that corresponds to your target Alveograph values.

Analysis traceability
- Monitor over time the quality of a specific product in relation to a given supplier or customer.
### Protocol

<table>
<thead>
<tr>
<th>Compliant with standards AACC 54-30.02, ICC 121 and NF EN ISO 27971</th>
<th>Alveolab</th>
<th>Alveo PC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alveographic Analysis □ standard protocol at constant hydration (50% b15)</td>
<td>Value P determination</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Value L determination</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Value P/L determination</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Value W determination</td>
<td>●</td>
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<tr>
<td></td>
<td>Value I.e. determination</td>
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<table>
<thead>
<tr>
<th>Alveographic Analysis □ calculation of new parameters</th>
<th>Stress/strain</th>
<th>●</th>
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<tbody>
<tr>
<td>1st derivative</td>
<td>●</td>
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<table>
<thead>
<tr>
<th>Alveographic Analysis</th>
<th>Degradation protocol</th>
<th>●</th>
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<tbody>
<tr>
<td>Relaxation protocol</td>
<td>●</td>
<td>-</td>
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</tr>
<tr>
<td>Hybrid protocol</td>
<td>●</td>
<td>-</td>
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</tr>
</tbody>
</table>

| Measure of consistency during mixing | ● | - |
| Consistograph Analysis | ● | - |

### Test

| Creation of new specialized protocols (mixing speed, duration, etc.) | ● | - |

<table>
<thead>
<tr>
<th>Cooling</th>
<th>Integrated Peltier effect</th>
<th>Water (cryostat or tap)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric maximum consumption</td>
<td>2200W/h</td>
<td>1250W/h</td>
</tr>
<tr>
<td>Calibration of the pump (92/60)</td>
<td>Automatic</td>
<td>Manual</td>
</tr>
</tbody>
</table>

| Mixing | New generation Aluminium/Stainless steel dough trough | ● | ● |
| Adding of water | Automatic | Manual |
| Regulated water temperature | ● | - |

| Shaping of test dough pieces | Semi-automatic cutter | ● | ● |
| Anti-adhesive resting plates | ● | ● |

| Resting of test dough pieces | Resting chambers | 3 | 2 |
| Positioning and squashing of test dough pieces | Automatic | Manual |

| Blowing of test dough pieces | Analysis zone with regulated temperature and humidity | ● | - |
| Bubble | Inverted | Upright |

| Optimum conditions of use | Temperature | 15-28 °C | 18-22 °C |
| Relative humidity | 15-90% | 50-80% |
| Average number of tests in 8 hours (1 operator) | 20 | 12 |

### Software

| Software □ “Test” | Multilingual | ● | ● |
| Control of the test | ● | - |
| Data acquisition in real time | ● | ● |
| Automatic save and archive | ● | ● |
| Comparison | ● | ● |
| Automatic creation of certificate of analysis | ● | ● |

| Software □ “Tools” | Improver guide | ● | - |
| Help in managing blends | ● | - |
| Virtual store | ● | - |
| Histogram (record of past performance) | ● | - |
| Control card for the equipment | ● | - |

For more information: www.chopin.fr/en or info@chopin.fr
Standardization

Our new Alveograph instruments keep the existing standards:
Results from the AlveoPC and Alveolab conform to standards AACC 54-30, AACC 54-50, ICC 121, ICC 171, NF-EN-ISO 27971, GOST 51415-99, GB/T 14614, 4-2005.

Available services

After Sales Service
service@chopin.fr
Our service technicians guide you to guarantee optimal and durable use of your Alveograph.

CT Center
ctcenter@chopin.fr
The CT Center offers you specific training, to improve your knowledge and get the most out of your Alveograph.

Applications Laboratory
labo.applications@chopin.fr
Our experts are here to help you in developing new protocols, or in developing specific tests.

Technical Characteristics

<table>
<thead>
<tr>
<th>Power supply</th>
<th>220/240V 50/60Hz</th>
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</thead>
<tbody>
<tr>
<td>Power</td>
<td>2300 W</td>
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<tr>
<td>Net weight</td>
<td>80 kg</td>
</tr>
<tr>
<td>Dimensions (mm)</td>
<td>L1000 x H850 x P550</td>
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<tr>
<td>Product code</td>
<td>ALVEOLAB</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Power supply</th>
<th>220/240V 50/60Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>1300 W</td>
</tr>
<tr>
<td>Net weight</td>
<td>70 kg</td>
</tr>
<tr>
<td>Dimensions (mm)</td>
<td>L900 x H500 x P500</td>
</tr>
<tr>
<td>Product code</td>
<td>ALVEOPC</td>
</tr>
</tbody>
</table>

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