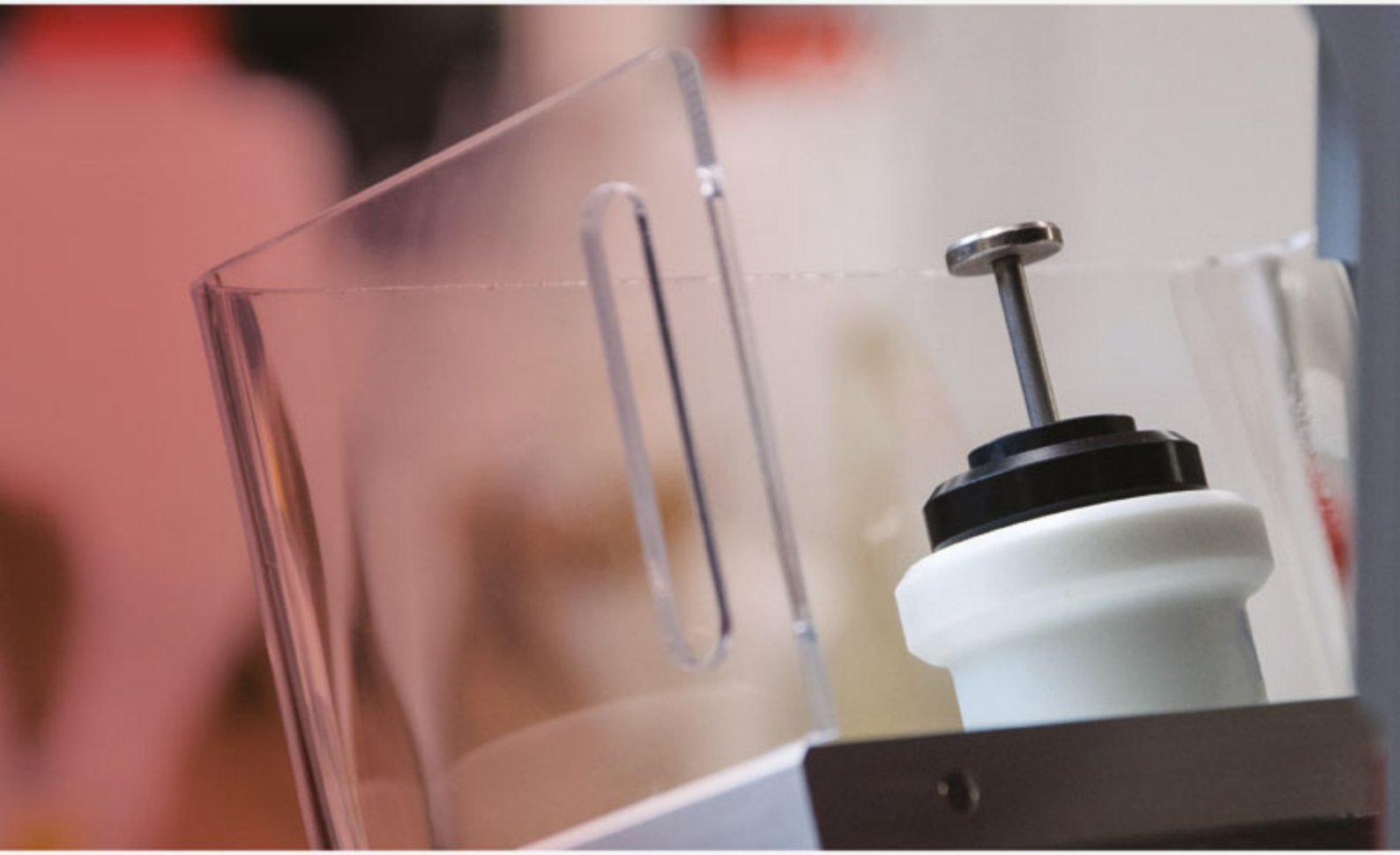


CHOPIN
TECHNOLOGIES



For almost a century, **CHOPIN Technologies** has been offering stakeholders in cereal processing improved methods and tools for quality control.

By investing more than 10% of its turnover in the research and the development of new solutions, CHOPIN Technologies continues to be at the cutting edge of innovation. This commitment has resulted in the regular creation of unique tools recognized by many international standards and organizations. These tools are adaptable to the needs of the different participants in the cereal processing chain.

CHOPIN Technologies' TEAMS help you make the most of your devices:

The **Applications Laboratory** offers assistance tailoring CHOPIN Technologies' solutions to your specific needs.
Our experts will help you to develop custom calibrations, including infrared, and test protocols. They will train you on the proper use of the devices so that you get the most from your analysis. CHOPIN Technologies will put its fully equipped laboratory at your disposal for your studies and research.

The **Serdia** Team is on hand to assist with the design of customized silo thermometry solutions. They will carry out the assessment of your facilities and needs, propose custom solutions, and ensure the installation of a complete facility tailored to your site.

The **After-Sales Team** is here to offer guidance and guarantee optimum use of your equipment: we offer hands-on operator training and equipment maintenance (preventive maintenance agreements, on-site maintenance inspections, routine maintenance of standards-approved moisture meters*), either on-site or at our facilities.

The training provided by our **CT Center** gives you the opportunity to increase your knowledge on the potential of your equipment and to exchange information with experts recognized for their mastery of quality control and development of analytical methods.

*CHOPIN Technologies is ISO9001: 2008 certified for the manufacture, distribution and routine inspection of moisture meters.

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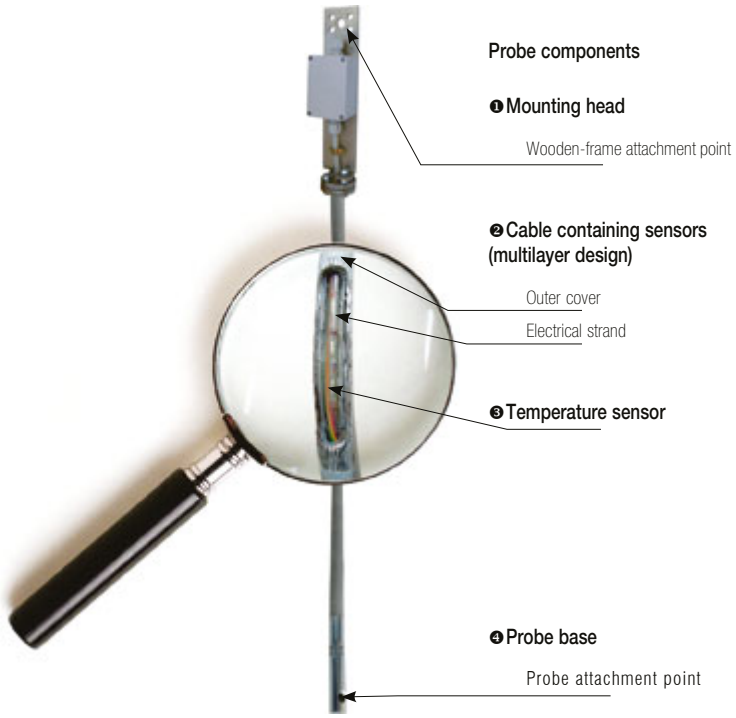
GRAINS

STORAGE MONITORING

SAMPLING

GRAIN ANALYSIS

AUTOMATIC GRAIN CONTROL UPON DELIVERY





Anchoring systems

Type A: for wooden-framed silos

Type D: for concrete and metal silos

All CHOPIN integrated silo thermometry can integrate Industrial Portable Probes (see Page 8) for particular needs.

SERDIA Probes

- **Continuous temperature monitoring of grain within the silo**

- **Distributed measurements:** Identify critical zones where the temperature must be monitored, which then determines **how probes are distributed.**
- **High-resistance cables:**
  - Coaxial technology for increased service life.
  - UL 94V2 compliant fire resistance.
- **Low tensile stress:**
  - Small diameter cables suitable for a wide variety of infrastructures.
  - Suitable for mounting to any type of structure.
- **High accuracy and reliability:** High-resistance thermistors, more accurate and reliable than thermocouples or low-resistance sensors.
- **Easy maintenance:** Electrical components slide freely into the cable, allowing sensors to be changed without dismounting the probe, even if the compartment is full of grain.

Readout systems

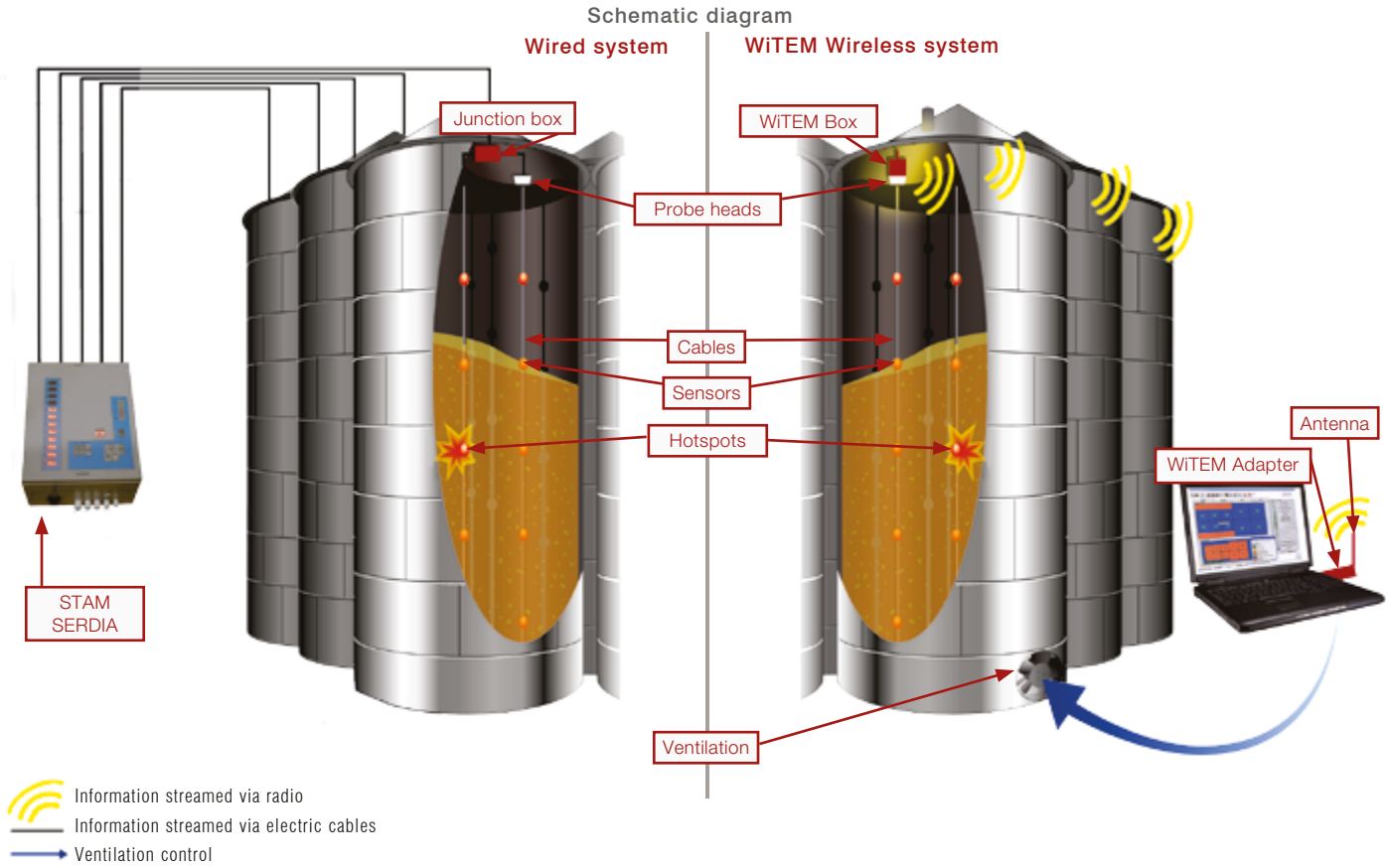
STAM and Silostar are two Serdia systems allowing the user to monitor the temperatures measured by the sensors.

Each one offers different services depending on the customer needs.





		STAM SERDIA Semi-automatic monitoring	SILOSTAR® SERDIA PC-based control and monitoring
Temperature monitoring	Probe scanning	Automatic	Automatic
	Temperature display	Per probe	Per silo, per compartment, per probe
	External temperature probe	-	Yes
Specifications	Measurement range	0 to 60°C	-15 to +110°C
	Number of sensors supported	Max 96 x 12-sensor probes	Max 255 x 16-sensor probes
	Display	On cabinet	On PC LCD screen
	Remote maintenance	-	Optional
Probe-specific alert configuration		-	Yes
Compatible with SERDIA WiTEM radio probes		-	Yes
Security		-	- Alert - Temperature logging



Communication systems

- **Communication systems handle the data exchange between temperature probes and monitoring systems**

CHOPIN Technologies products and installations are ATEX compliant. INERIS 02ATEX0091 X and INERIS 08ATEX0020 X certified.

SERDIA wired system

This comprises the following components:

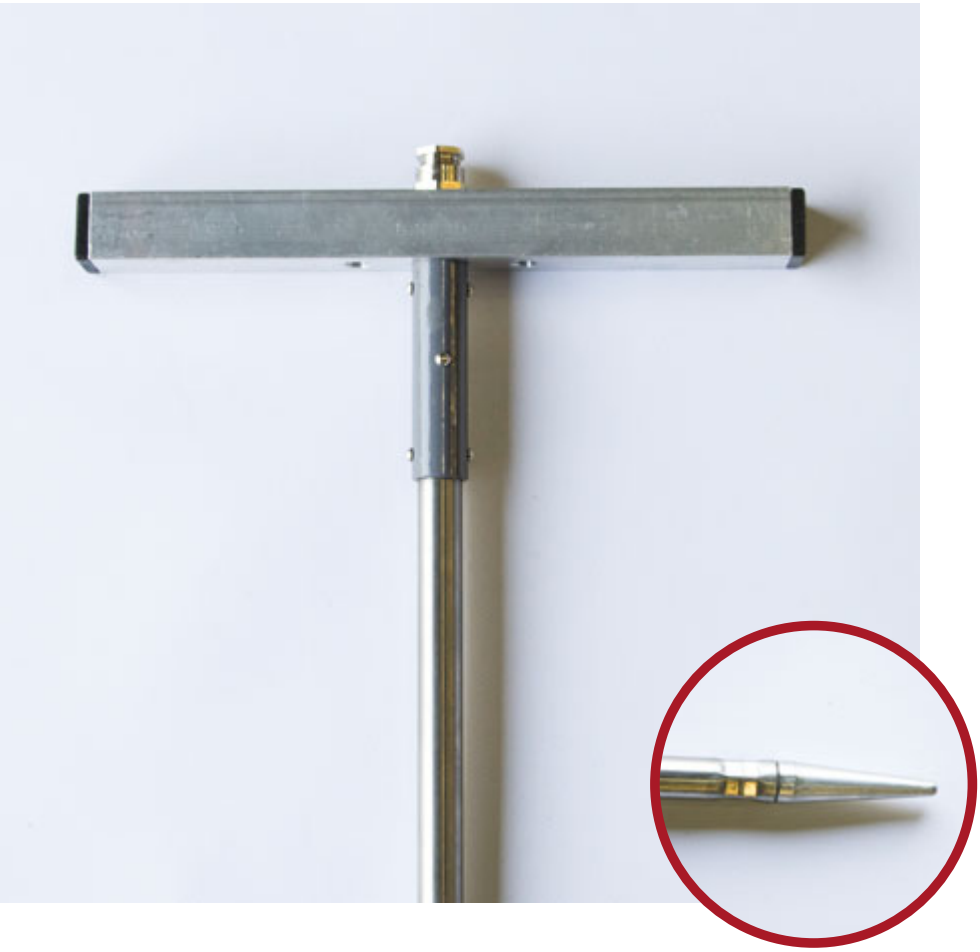
- junction box,
- STAM cabinet
- electric cables for interconnection of components.

Wireless system: SERDIA WiTEM®

The WiTEM (Wireless Intelligence Temperature Monitoring) system consists solely of radio transmitters/receivers on each probe and on the reader.

Benefits of SERDIA WiTEM®

- **Adaptability**: Whatever your silo setup (concrete, steel, flat, etc.), complete reliability of communication is guaranteed.
- **Reliability:** The lack of cables and junction box removes 100% of failures due to short circuits, rodents and lightning strikes.
- **Maximum security:** If one probe fails, it does not prevent other probes from working.
- **Easy-to-use, modular design:** Installation within existing facilities is extremely easy and can be completed in stages (to match available budget).



Industrial Portable Probe

- **Avoid deterioration of stored grain**
- **Avoid risk of fire**

Temperature reading: from 0 to +60°C via fixed or portable temperature reader

Material: type 316 stainless steel (or PVC depending on intensity of use and standing height)

Length: 2-6m

Diameter: 14mm

Measurement points: 1-3 (improved repeatability)

Benefits

- **Ergonomically designed** for easy grain penetration

AG 8200 Portable Reader

- **Check the temperature of stored grain at a glance**
- **Display up to 7 measurement points per probe**

Power supply: 2 x 9V batteries

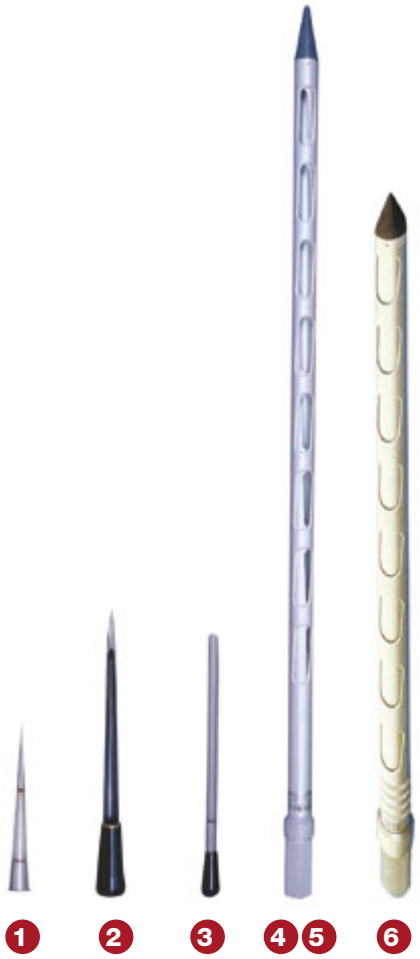
Weight: 580g

Benefits

- **Easy to use:** Digital display.
- **Robust:** ABS anti-shock housing.
- **Versatile:** Suited to a range of environments thanks to its wide measurement range (0-60°C +/- 0.2°C).



Produit sélectionné par : CHOPIN TECHNOLOGIES



Manual Probes

- **Specific probes depending on sample type**

	Code	Item	Length / Description	Use
1	130174	Conical Grain Probe	250mm (stainless steel)	Bag
2	130171	Cocoa and Coffee Probe	360mm (steel)	Bag
3	130179	Probe for use with pulverulent materials	30mm – Ø14mm (stainless steel)	Bag
4	130180	RKS Probe	1.5m – Ø30mm (aluminum)	Bulk / Truck
5	609205	RKS Probe	2m – Ø30mm (aluminum)	Bulk / Truck
6	03700741	RKS Probe	1.3m – Ø50mm (aluminum)	Bulk / Truck

Alpha sampling probe

- **Quick, representative sampling of raw foodstuffs (grains and pulverulent foodstuffs) for reliable analysis.**
- **Automatic collection of grain and powder samples via vertical conduits for quality control of raw foodstuffs and end products.**

Benefits

- **Quick and easy**:
  - Ease of installation and use thanks to automatic sampling.
  - Minimal maintenance.
- **Robust:** Type 316 stainless steel construction.
- **Representative:** Random sample collection.
- **Flexible:** Programmable sample duration and frequency.





Nilemalitre

- **Measure grains specific weight**
- **Determine the mass per unit volume, called hectoliter weight**
- **Estimate the flour extraction yield thanks to the standardized reference method**

Benefits

- Single-bowl system can be adapted to any type of grain and fine-grained product
- Fitted with a filling hopper allowing grain to be evenly packed into the container

Compliant with AFNOR NF V03-719 and ISO 7971-3 standards governing specific weight determination.

Options : • *Certified electronic scale*

Numigral

- **Measure the weight of 1,000 grains in less than one minute**
- **Classify seed**
- **Estimate the number of grains needed to be sown to achieve desired seed density**
- **Evaluate agronomic yield, flour and middling extraction and brewing yield**

Benefits

- Counts any constituent type measuring 1-15mm using the universal bowl and adjustment screw.
- Pre-selection of number of items to count with bowl vibration automatically cutting out when this number is reached.

Compliant with AFNOR NF V03-702 and ISO 720 standards for determining the mass of 1,000 grains.





NSP Grain Cleaner

- **Clean, weigh and calculate the level of impurities in your samples**

This tool performs horizontal sifting on an inclined plan. It requires a weighing machine (not included) to calculate impurity content.

Benefits

- **Versatile:**
  - Works on any type of grain.
  - Large choice of sieves.
- **Speed of operation:** Separates 1L of grain in around 45 seconds.
- **Robust:** Designed for intensive (silo) use.

Sieves

- **Check impurity content upon delivery**
- **Detect insects**
- **Avoid returned merchandise by checking cereal, oil and protein crops prior to dispatch**

Stainless steel sieve (Ø 200mm)

Each sieve is delivered with an approval certificate, and identified with a number according to the NF ISO 5223 standards (dated 2000/10/05).

Wooden sieve for insect detection (Ø300mm)

Fitted with a collector tray, this sieve has a stainless steel mesh (1.80 mm aperture).



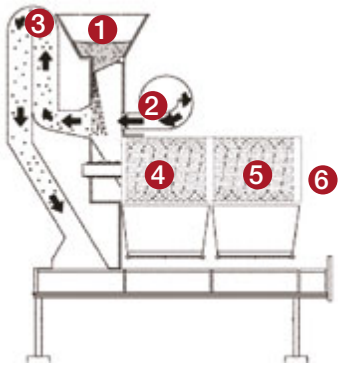


Quatuor II *

- **Assess the real value of grain by calculating impurity levels**
- **Clean grain before any subsequent quality control**
- **Determine the ideal storage conditions depending on the cleanness of the grain**
- **Detect the presence of a specific contaminant**

The Quatuor II is a screening machine fitted with a rotary sieve that automatically performs 3 operations:

- Cleaning/separation of impurities from good grain;
- Sorting/classification of seed into one or more categories depending on size;
- Weighing, calculation and printout of the percentage of light, coarse and broken-grain impurities.



Benefits

- **Large choice of sieves tailored to the specific type of grain** (wheat, barley, rapeseed/canola, sunflower, corn, etc.).
- Thanks to **automatic calculation,** results are operator-independent and there is no risk of error.
- **Speed** (1 min 20 sec) and simplicity of use: select the grain, fill the hopper and start the test. The results can be retrieved directly via **a PC and printer.**
- The machine i**s robust, quiet and clean** (no dust emitted).

Principle of operation

1 The sample of grain is weighed in the hopper, which gradually empties.

2 3 Finer particles (unfilled grains, dust, barbs, etc.) are evacuated into the light impurities container through ventilation. The remaining grain is screened via the rotary sieves.

4 Broken grains and small impurities go through the first sieve and are weighed.

5 Good grains go through the second sieve and are weighed.

6 Large impurities come through both sieving passes.

The results are automatically displayed at the end of the cycle (results comparable to benchmark methods: NF EN ISO 658/ NF ISO 5223).

** Device compatible with Gestar automatic control station (see page 16)*

Options : • *Data entry keypad* • *Printer* • *PC software for retrieval of results*



Infraneo*

- **Measure humidity, protein, ash, starch and other content for whole grains, or flour or other powders**
- **Efficiently control all steps of the milling process and secure commercial transactions…**
- **Develop PLS calibrations independently or with the assistance of CHOPIN Technologies' support team**

The Infraneo is an analyzer based on **near infrared transmission technology**. The device is fitted **with a latest-generation grating monochromator** which is able to work across wavelength ranges between 750 nm and 1100 nm.

Benefits

- **Analyze key parameters for any type of whole grain** (wheat, barley, colza, maize, rye) and powdered products (flours). The amount of grain needed ranges from 50ml to 1 liter without crushing or weighing.
- **Results obtained in 60 seconds** regardless of the number of parameters to be measured. Measurement possible in 45 seconds as 10 subsamples of wheat.
- **Export and use results in Excel** via Ethernet, Wi-Fi and USB connections.
- **Wide choice of calibrations:** NEW calibrations may be developed with extreme ease, either independently or with the support of CHOPIN Technologies' Application Laboratory.
- **Robust hardware and stable long-term performance** via the automatic monochromator self-adjustment system. The accuracy of the monochromator and the use of transmittance measurements allows for highly accurate results (annual checks and updates).
- **Modular system** for use in conjunction with a weight density module or Aqua-TR moisture meter. In-series measurements of: approved moisture, weight density and protein content or content of other grain constituents.
- **Easy maintenance, with operator-replaceable lamp.** Remote maintenance service available, allowing technicians to service the device remotely.

** Device compatible with Gestar automatic control station (see page 16)*

Options :
- *Grain boat*
- *Aqua-TR Module*
- *External keyboard and mouse*
- *PS module*
- *Printer*
- *Flour kit (2 Neocup flour, 1 Neocup bran, Neofix, 1 scoop, 1 spatula, 1 brush)*



Flour kit





Aqua-TR* Agri-TR

Compliant with NF EN ISO 7971-2 Specific weight

- **Determine the water content, specific weight and temperature of cereals, oilseed and protein crops**
- **Identify the ideal conditions for harvesting, delivering, drying, storing and ventilating grains**
- **Secure commercial transactions**

Principle

The Aqua-TR and Agri-TR use **volume measurement technology** to determine the water content.

They measure weight density, incorporating a patented auto-levelling system.

Advantages

- **Accuracy of calibrations** is verified annually via a monitoring device.
- **Quick and easy to use** (press the test button once product detected in the hopper) **with a representative sample volume** (650ml)**.**
- **Portable,** allowing on-site measurement, optionally powered via 12V adapter.

	Agri-TR	Aqua-TR
Length of complete cycle	35 secs	20 secs
No. calibrations	8	64
Auto-start	-	Yes
GESTAR-compatible	-	Yes
Option to couple with NIR analyzer	-	Yes
Logging (Aqua-Pro software)	Optional	Store 1000 results and retrieve data in Excel format
Connection	Printer	Printer, PC or modem
Mobility	May be powered via 12V adapter (Optional)	

** Device compatible with Gestar automatic control station (see page 16)*

Options :
- *Kit to connect Aqua-TR to a near infrared (NIR) analyzer*
- *Printer*
- *Aqua-Pro software for the Agri-TR*
- *12V adapter*

Wile 26



Wile 55



Wile 65



Wile 200



Wile

- **Determine when to harvest, deliver, dry or ventilate your grain**
- **Evaluate future fodder quality**
- **Prevent fire hazards**

Benefits

- **Simplicity**: Fast, direct digital screen readout. Easy to transport.
- **Security**: Can be calibrated against a benchmark method or approved moisture meter.

	Wile 26	Wile 55	Wile 65	Wile 200
Products analyzed	Straw and fodder in bales or windrows	Cereal, oilseed and protein crops*		Cereal, oilseed and protein crops**
Benefits	Bale density setting between 80 and 250 kg/m^3	- Automatic temperature compensation - Withstands vibrations, no moving mechanical parts - 16 pre-set grain calibrations		- Automatic temperature compensation - Compatible with USB
			- Grain and menu display	
Moisture	13-83 % +/- 0,5%	5-40% +/- 0,5%	5-40% +/- 0,5%	6-45% +/- 0,3 %
Temperature	0 - 80°C +/- 0.2%	Not measured	0 - 80°C +/- 0.2% (via external probe)	5 - 45°C +/- 0.1%
Accessory	Temperature sensor (optional)		Temperature sensor	

** wheat, barley, winter barley, rapeseed/colza, sunflower, maize, moist maize, durum wheat, oats, rye, peas, soya, flax, rice, sorghum, ray-grass.*

*** wheat, barley, rapeseed/colza, sunflower, maize, durum wheat, oats, rye, peas, soya, rice, sorghum.*



Gestar
Automatic Control Station

A fully automated system, allowing key quality control parameters to be determined in real time.

- **Obtain protein and moisture content, weight density, content of gluten, zeleny, impurities, etc. in a single pass using a single sample, without human intervention**
- **Incorporate results into customer databases**
- **Amalgamate all of this information within a single delivery record, along with the quantity delivered**



Automatic sampling probes may be integrated into the system

CHOPIN Technologies analysis devices included in the Gestar system



Quatuor II
Cleaning and impurity content measurement
Page 12

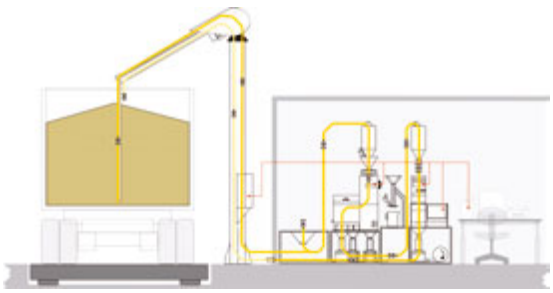
Aqua-TR
Certified moisture meter
Page 14

Infraneo
Measurement of proteins, water content, starch, ash and other constituents
Page 13

PC
Gestar PC control system interface

Benefits

- **Traceability** :
  - All analysis logged
  - Production of control sample
- **Security of results:** No manual input thanks to computer-controlled transfer
- **Measurement reliability**
  - Automatically homogenized sampling
  - Identical analysis across all samples
- **Minimal operator intervention:**
  - No handling of samples or devices
  - Evacuation of sample surplus





Grinder-CHOPIN

- **Grind all types of grains: wheat, barley, rye, etc.**
- **Sample preparation for the Hagberg falling number test with the Amylab FN, and for the Mixolab testing of ground wheat**
- **Get fine and homogeneous samples quickly**

Principle of operation

The Grinder-CHOPIN features a sealed grinding chamber in which metal hammers rotate at high speed to ensure rapid and even grinding.

The ground product is automatically sifted using a standard 0.8mm screen (other screens can be used to vary the size and distribution of particles).

The resulting grist is recovered in a nylon bag placed under the grinding chamber.

Benefits

- **Very safe grinding system,** equipped with two sensors – one on the door and the other on the screen.
- Sample preparation for:
  - the Hagberg falling number test (AACC 56-81.03, ICC 107/1, ISO/DIS 3093).
  - the Mixolab testing of ground wheat (AACC 54-60.01, ICC 173/1).
- **High grinding capacity:** 300 g in one minute, with a maximum capacity of 800 g (hopper capacity: 1.2L).
- **Low emission of dust,** thanks to the sealed chamber and the use of the nylon bag.



Amylab FN

- **Detects sprout damaged loads of grain and measures the alpha-amylase activity of flours**
- **According to the Hagberg falling number method.**
- **According to the new faster Testogram method.**

Measurement principle

Poor climatic conditions can cause grains to sprout. Flour made from germinated grains has strong alpha-amylase activity. This can cause significant defects such as sticky dough, bread that doesn't rise, and a reddish crust in baked products.

Hagberg falling number

Measures the amount of time it takes for a stirrer to pass through a starch sample, formed by the gelatinization of a liquid flour suspension, under the effect of its own weight.

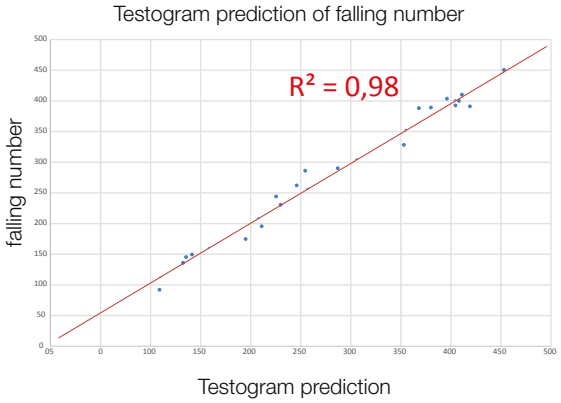
The Amylab FN applies the principles of the Hagberg method while using innovative technologies. This ensures that users will obtain the **same results as with traditional instruments.**

Testogram rapid testing method

Measures the viscosity of a gel made of flour and water that **is agitated for 90 seconds** at a constant temperature of 100°C.

After obtaining this measurement, the Amylab FN accurately predicts the Hagberg falling number.

It is, on average, 66% faster than the Hagberg method.





The Amylab FN is the safest, fastest, and simplest solution for detecting batches of sprouted grains.





Benefits

- Safety
  - Induction heating system replaces the hot water bath eliminating boiling water and evaporation.
  - No glass tubes: reduces risks of **injuries and contamination**
- Time savings
  - Reusable aluminum test tubes with removable bottoms, which allows very easy **cleaning** that is **twice as fast as** with glass tubes.
  - **Analysis time is 66% faster** on average using the new Testogram method (results are obtained in 90 seconds).
- Ease of use
  - **No need to connect the Amylab FN to a cooling system.**
  - Plugs into a regular **110 or 220V outlet.**
  - Ergonomic user interface on a 7-inch touchscreen provides **clear and readable results.**
- Precise results
  - **No variation in the results** because of the hot water bath (variation in temperature and water level).
- Economic benefits
  - **Cost savings** because the aluminum tubes are reusable.





FLOURS AND DOUGHS

TEST MILLING

FLOUR ANALYSIS

DOUGH ANALYSIS



LabMill

- **Measure wheat milling performance**
- **Analyze the behavior of wheat during milling (resistance to crushing and yield at every stage)**
- **Get flour of an industrial quality (ash, damaged starch, rheology)**

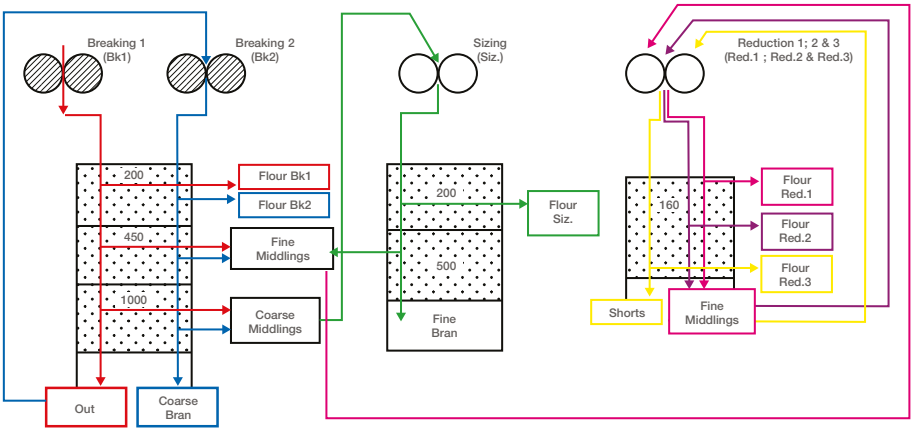
Wheat milling performance and behavior of grains during milling

Milling Quality is associated with the extraction rate, in other words, with the maximum amount of flour of a certain quality obtained, often defined by ash content. It is important as even a low yield gap has significant economic consequences.

It is also useful to know precisely the behavior of wheat during milling. Actually, depending on the characteristics of the grain, most flour is made during the breaking or reduction stage. The industrial mill diagram should therefore be perfectly suited to the type of grain used.

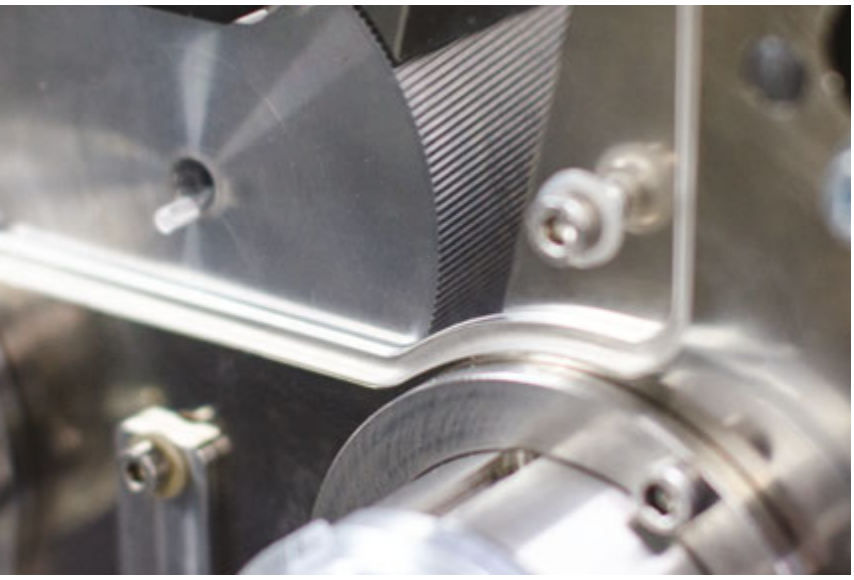
The patented, innovative milling procedure of the LabMill consists of five successive phases:

- 2 breaking steps to make flour, fine middlings, coarse middlings, and bran.
- 1 sizing step to reduce coarse middlings to flour, fine middlings, and fine bran.
- 2 or 3 reduction steps to reduce fine middlings to flour.



LabMill was developed within the Milling Value Consortium (AFSA, Arvalis-Institut du Végétal, ANMF, Danone Vitapole, INRA, IRTAC, Ulice, CHOPIN Technologies).

French Patent Number: 0905572 | US Patent Number: 9 067 210



Breaking Cylinder

The LabMill CHOPIN Technologies includes patented innovations which combine performance, precision, repeatability, sturdiness and ease of use.

Advantages

- **Flour quality of an industrial mill**
- **Automatic control** of the feed rate
- **Simple** control via a touch screen
- Access to **the different milling fractions**
- Capacity: from 50 to 3,500 grams
- Adjustable settings (feed rate, cylinders gap, sifting time)
- **Low maintenance cost**

Applications

For Wheat Breeders

- Use with as little as 50g samples of wheat

For Millers

- Choice of wheat, making blends, optimization of tempering, adaptation of settings…

For Ingredient Specialists

- Milling up to 3.5kg in one pass, for bread-making tests

For Control Labs and Research Institutes

- Carrying out of repeatable and reproducible milling representative of the quality of wheat used

For Universities, Schools…

- Wheat milling education with a tool representative of industrial practices (grooved cylinders, smooth cylinders, sifting…)

Results

- **High extraction rate:** from **66 to 82%,** average of 77% for hard wheat and 75% for soft wheat
- Controlled **ash** (0.50 to 0.63% /db) and **starch damage** contents (6 to 20 UCD)
- Milling time: 20 minutes for 500g



CD1 Mill

- **Produce a flour representative of the industrial wheat milling process**
- **Select soft wheats, evaluate blends, assess milling quality and characterize resulting flours**
- **Simulate the key stages of an industrial mill: breaking, sifting and reduction**

Principle

The CD1 Mill is a laboratory tool that simulates the stages of an industrial mill:

1. Two-step **breaking** between 3 fixed grooved rollers
2. **Sifting** via centrifugal sifter
3. One- or two-step **reduction** by pressing through 2 adjustable smooth rollers
4. **Sifting** via centrifugal sifter

Benefits

- **Obtain flours of a representative nature** to industrial flour (level of damaged starch controlled).
- **Fixed configuration** resulting in a flour of consistent quality, identical across all CD1 mills.
- **Sturdy build** with rollers that are virtually non-wearing during normal use, resulting in minimal maintenance.
- **Complies with the AACC 26-70.01 and NF EN ISO 27971 standards** defining a methodology for determining alveograph properties of test flours.

Options :
- *Crushing sieve*
- *Crushing beater*
- *4kg milling kit*
- *Conversion sieve*
- *Conversion beater*



CD2 Mill

- **Produce durum semolinas representative of an industrial mill**
- **Select durum wheats, evaluate blends, estimate semolina yield and characterize semolina obtained**
- **Simulate the main stages of an industrial mill: breaking, sifting and reduction**

Principle

The CD2 test mill produces representative grist by simulating the stages of an industrial mill:

1. Two-step **breaking** between 3 fixed grooved rollers
2. **Sifting** via centrifugal sifter
3. **Reduction** via two steps through 3 fixed smooth rollers
4. **Sifting** via centrifugal sifter

Benefits

- The machine's **high endurance** allows up to 30 milling tests per day without overheating
- **Fixed setup** resulting in products of consistent quality, identical across all CD2 mills.
- **Sturdy build** with rollers that are virtually non-wearing during normal use, resulting in minimal maintenance.

Options :
- *Crushing sieve*
- *Crushing beater*
- *4kg milling kit*
- *Conversion sieve*
- *Conversion beater*

MR2L
MRIOL

- **Optimal pre-tempering of wheat prior to milling**
- **Efficiently mix flours and other powders (additives, etc.)**

Mixers are supplied with 2 mixing screws: one suitable for grain mixtures, the other for mixes of other powders.

Mixers have a built-in timer





Muffle Furnace MLI 1100

- **Grade flours and semolinas in accordance with regulations**
- **Determine calibration settings for NIR analyzers**

Determine the ash content of cereals and milled products by incinerating in an oxidizing atmosphere at 900°C until organic matter has completely combusted.

The result is determined by weight differential.

Options : • *Quartz furnace boats*



Oven EMIO

- **Determine the moisture content of any type of product, whether grain or powder, using the reference method, compliant with international standards**
- **Calibrate or check the accuracy of quick-method analyzers (moisture meters, NIR)**

The operating principle is very simple: a natural air current is created inside the chamber, air is drawn in through the inlets in the doors and escapes through the chimneys. No ventilator is therefore necessary.

Benefits

- Each of the 10 compartments is equivalent to an individual chamber, with optimized airflow.
- This oven allows precise, automatic temperature regulation to within +/- 0.1°C.

Options : • *Aluminium cups*

Grinding

- **Quickly grind cereals, legumes and pellets in order to measure the water, ash and protein content**



MLI 204



IKA10-50ML

	MLI 204	IKA10 - 50ML
Benefits	- Quick grinding: partial crushing via a pre-crushing arm, before the product is sent through 2 hardened steel grooved wheels (1 fixed) - Granulation can be changed via a graduated adjustment ring	- Speed control in 500 RPM increments up to 25,000 RPM - Liquid cooling prevents over heating of ground material - Digital display for crushing time and error codes - 50 ml capacity - Grinds up to 6mm material
Safety	- Interlocked motor and grinding chamber - Closed loading hopper with pre-crusher and dust-tight collecting bin	- Lid with bayonet lock - completely secure and quick sealing - Secure activation: the mill does not start until the lid is closed and cannot be opened until the machine stops
Maintenance	- Easy cleaning and disassembly via 2 side screws	- AISI Type 304 Stainless steel chamber - Brushless motor: increased durability and low noise level
Rotation speed	930 rpm	25,000 rpm
Power supply	220/380 V - 50Hz	230 V - 50/60 Hz
Power rating	350/480/830 W	300 W
Net weight	15 kg	2.9 kg
Dimensions (L x D x H)	40 x 40 x 33 cm	13 x 14.5 x 25 cm



SDmatic

- **Measure the level of damaged starch in less than 10 minutes**
- **Check that roller-mills are tuned (parallelism, wear) to reduce power consumption**
- **Monitor consistency of flours (water absorption, fermentation, manufacturing behavior) and quality of finished products (outer appearance and taste characteristics)**
- **Improve dough yields by adjusting the water absorption of flours**

Principle

The measurement principle is based on the amperometric method (Medcalf & Gilles). The device measures the capacity and speed of iodine absorption of a flour suspension in an acidic medium. This works because iodine has the particular property of quickly attaching to damaged starch granules.

Benefits

- The SDmatic offers exceptional accuracy thanks to its system of self-calibration and the quantity of iodine, which is automatically, generated depending on the mass of flour to be analyzed.
- Fully automated analysis, without the need for complex enzymes.
- As testimony to the suitability and quality of its measurements, the SDmatic is certified to AFNOR V03-731 - AACC 76-33.01, ICC 172 and ISO 17715:2013 standards.

Why measure damaged starch contents?

During the grinding process, starch granules are damaged to some degree depending on the hardness of the grain, wheat preparation and mill configuration.

Once damaged, the water absorption capacity of starch increases tenfold. It is a critical constituent in determining the mixing properties of dough. Damaged starch therefore has a direct effect on the behavior of dough during fermentation. Its action will have an influence not only on the volume of the finished product, but also on its color.

Failure to control the levels of damaged starch may cause a number of issues at the stage of transforming flour into cooked products. For example:

- Sticky doughs that are difficult to handle for either humans or machines.
- Failure to rise, meaning a lack of volume and shorter shelf life for the finished product.
- Visual blemishes in the product after baking (color, cracking).

Options : • *Control flour* • *Reaction bowl*



Infraneo

- **Measure humidity, protein, ash, starch and other content for whole grains, or flour or other powders**
- **Efficiently control all steps of the milling process and secure commercial transactions…**
- **Develop PLS calibrations independently or with the assistance of CHOPIN Technologies' support team**

The Infraneo is an analyzer based on **near infrared transmission technology**. The device is fitted **with a latest-generation grating monochromator** which is able to work across wavelength ranges between 750 nm and 1100 nm.

Benefits

- **Analyze key parameters for any type of whole grain** (wheat, barley, rapeseed/canola, maize, rye) and powdered products (flours). The amount of grain needed ranges from 50ml to 1 liter without crushing or weighing.
- **Results obtained in 60 seconds** regardless of the number of parameters to be measured. Measurement possible in 45 seconds as 10 subsamples of wheat.
- **Export and use results in Excel** via Ethernet, Wi-Fi and USB connections.
- **Wide choice of calibrations:** NEW calibrations may be developed with extreme ease, either independently or with the support of CHOPIN Technologies' Application Laboratory.
- **Robust hardware and stable long-term performance** via the automatic monochromator self-adjustment system. The accuracy of the monochromator and the use of transmittance measurements allows for highly accurate results (annual checks and updates).
- **Modular system** for use in conjunction with a weight density module or Aqua-TR moisture meter. In-series measurements of: approved moisture, weight density and protein content or content of other grain constituents.
- **Easy maintenance, with operator-replaceable lamp.** Remote maintenance service available, allowing technicians to service the device remotely.

Options :
- *Grain boat*
- *Aqua-TR Module*
- *External keyboard and mouse*
- *PS module*
- *Printer*
- *Flour kit (2 Neocup flour, 1 Neocup bran, Neofix, 1 scoop, 1 spatula, 1 brush)*



Flour kit



SRC-CHOPIN

- **Automatically measure the solvent retention capacity of flours**
- **In a single test, analyze the main functional compounds that directly influence the quality of the final product: damaged starch, glutenins and pentosans**
- **Use a single test for the entire supply chain, from breeding to baking**
- **Gain all the advantages of a method that has been internationally recognized and standardized (AACC 56-11) since the 1990s**
- **Take advantage of an automated, repeatable and reproducible method that removes operator bias**

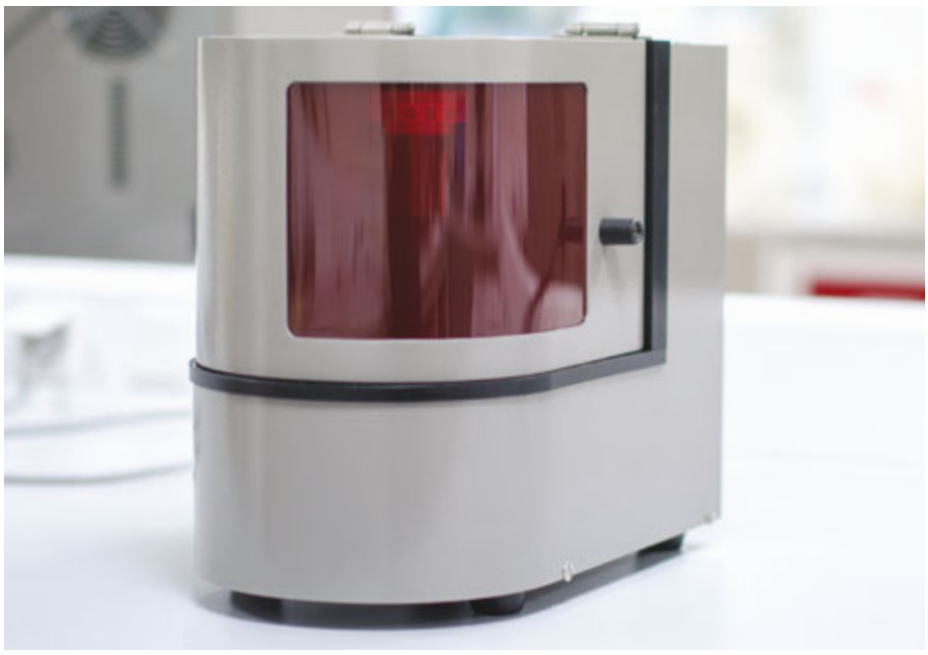
Methodological principle

The SRC (Solvent Retention Capacity) method is a flour water absorption test based on the increased swelling capacity observed in various different polymers (glutenins, damaged starch and pentosans) when they come into contact with specific solvents (lactic acid, sodium carbonate and sucrose respectively, as well as distilled water for the absorption value). These solvents are used to measure and predict the functional contribution of each of these polymers to the quality of finished products. *[Kweon, Slade & Levine, 2011]*

The different stages of the method are: sample preparation, preparation of solution, shaking, resting, centrifugation, removal of supernatant liquid, weighing and presentation of results.

Benefits

- By removing all sources of variation caused by manual operations, the SRC-CHOPIN gives results that are **4-5 times more accurate.**
- The SRC-CHOPIN **simplifies** testing by performing all stages of the method **automatically**, from recording the weight of the flour to calculating and displaying the results.
- By automating the test, the SRC-CHOPIN **frees up the operator** for almost the entire duration of the protocol (45 minutes of operator time for the manual method versus 10 min. for the automatic method).
- The SRC-CHOPIN enables **simultaneous analysis of 8 samples,** i.e. a choice of possible combinations of 1-8 flours and 1-4 solvents.
- The SRC-CHOPIN is **a complete system.** It incorporates a weighing scale, agitator, centrifuge, supernatant draining system and touchscreen controller.



SRC-CHOPIN automatic scale

The SRC-CHOPIN allows the solvent retention capacity of flours to be measured simply, automatically and to a high level of accuracy

Applications

Breeding

- Carry out the test on whole grain (just 20g of ground material), which is predictive of the SRC values on white flour.
- Complement the results of other existing methods (mixograph, zeleny test, farinograph, etc.).

Milling

- Optimize wheat tempering and flour quality.
- Determine the blends required to meet required specifications: SRC values conform to blending law.
- Assess the effects of the chlorination process on flour quality.

Baking

- Draw up simple specifications. For example, for cookies and crackers: water-SRC < 51%, lactic acid-SRC > 87%, sodium carbonate-SRC < 64%, and sucrose-SRC < 89%.
- Predict the volume of finished products. For example, the greater the lactic acid-SRC value, the higher the volume of bread.
- Predict crumb texture. High values for lactic acid-SRC, sucrose-SRC and sodium carbonate-SRC lead to a hard crumb with low pliability.

The perfect complement to rheological analyses

Rheological analysis devices such as the Alveograph* measure the combined effects of the different functional polymers in the flour. The SRC method allows you to analyze and therefore better understand the individual contribution of each of the primary polymers (damaged starch, glutenins and pentosans) towards the final properties of the dough.

Example: In biscuit-making, the manufacturer seeks minimal water absorption, and specifically the lowest possible contribution attributable to damaged starch or pentosans.

SRC and rheological analysis go hand in hand to give you an understanding of the behavioral properties of flours and doughs.

Options :
- *Pack of 8 tube assemblies*
- *Single SRC syringe*
- *Spring-loaded syringe*
- *Single SRC tube*
- *Pack of 8 complete lids (without tubes)*

** see pages 34-35*

CHOPIN Technologies Alveographs

			Alveo PC graph	Alveo lab graph
PROTOCOL	Compliant with AACC 54-30.02, ICC 121 and NF EN ISO 27971 standards		●	●
	Alveographic Analysis – standard protocol at constant hydration (50% b15)	P value determination	●	●
		L value determination	●	●
		P/L value determination	●	●
		W value determination	●	●
		Ie value determination	●	●
	Alveographic analysis – new parameter calculations	Stress/strain	-	●
		1st derivative	-	●
	Alveographic analysis	Degradation protocol	-	●
		Stress relaxation protocol	-	●
		Hybrid protocol	-	●
	Measurement of consistency during mixing		-	●
	Consistographic analysis		-	●
	Alveographic analysis – customized hydration protocol		-	●
	Option to create new specialized protocols (mixing speed, duration, etc.)		-	●
TEST	Cooling		Water (chiller or mains)	Integrated thermoelectric cooling
	Max power consumption		1,250 W/h	2,200 W/h
	Pump calibration (92/160)		Manual	Automatic
	Mixing	New-generation aluminium/ stainless steel	●	●
		Water addition	Manual	Automatic
		Water temperature regulation	-	●
	Dough sample formation	Semi-automatic cutter	●	●
		Anti-adhesive resting plates	●	●
	Resting of test dough pieces	Resting chambers	2	3
	Positioning and squashing of test dough pieces		Manual	Automatic
	Blowing of test dough pieces	Type	Manual	Automatic
		Analysis zone with regulated temperature and humidity	-	●
		Bubble	Upright	Inverted
	Optimum conditions of use	Temperature	18-22°C	15-28°C
		Relative humidity	50-80%	15-90%
	Average number of tests in 8 hours (1 operator)		12	20
SOFTWARE	Software	Multilingual	●	●
	Software – "Test"	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 chart for the equipment	-	●



Alveo PC graph

- **Get all the benefits of 90 years of improvement and innovation behind CHOPIN Technologies Alveograph**
- **Measure the resistance, extensibility, elasticity and baking strength of flours using the Alveograph, an internationally recognized benchmark**
- **Get standardized analysis (AACC 54-30.02, ICC 121, NF EN ISO 27971, GOST 51415-99) for commercial transactions**

Principle

The Alveograph allows you to measure the viscoelastic properties of wheat flours. The test consists of producing a test sample of dough, which, under the action of air pressure, is deformed into a **bubble**. This mode of expansion reproduces the deformation of dough that occurs under the influence of the carbonic gas released during **fermentation**.

The test allows 4 key values to be obtained:

- The **P** value represents the **dough's resistance** to deformation.
- The **L** value represents the maximum volume of air that the bubble can contain and indicates the dough's **extensibility.**
- The **I.e.** value represents the index of **elasticity.**
- The **W** value indicates **the baking strength** of the dough.

Applications

The new AlveoPC is accompanied by a simple modern, user-friendly **software** interface. It allows the viscoelastic properties of flours to be measured with constant water absorption (50% b15). It is tailored to the following applications:

- Selecting, characterizing and **classifying** wheats and flours depending on their intended use.
- Detecting **insect-damaged wheat**.
- Specifying and optimizing wheat and flour **blends**.
- Selecting the most appropriate **additives** to improve the quality of finished products.
- Checking product specification **compliance**.
- Analyzing the effects of adding **gluten**, **proteases**, **deactivated yeast**, or of salt content, on the viscoelastic properties of the dough.

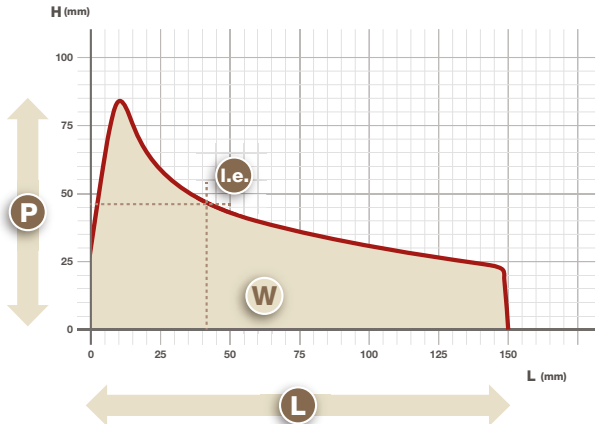


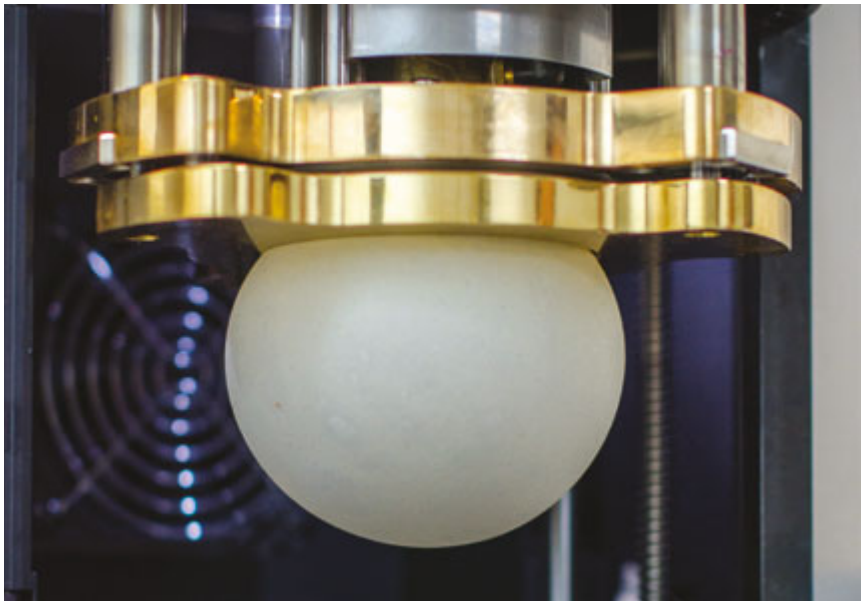
Alveolab graph

- **Enjoy a wider range of applications with the Alveolab: simpler, more accurate and more easily customized to meet a range of industry needs**
- **Measure water absorption as well as the resistance, extensibility, elasticity and baking strength of flours using the internationally recognized benchmark device**
- **Measure the plastic qualities of wheats and flours at constant or custom water absorption levels**
- **Assess the mixing properties of dough**
- **Standardized analysis (AACC 54-30.02, ICC 121, NF EN ISO 27971, GOST 51415-99) for commercial transactions (standard protocol)**
- **Modify test parameters to create custom protocols**
- **Fully controlled test conditions and environment (temperature and humidity)**

Benefits

- Use **universally recognized values** (P, L, W, l.e.)
- By **automating** various **stages from testing** and **controlling** the device using a user-friendly software interface, results are operator-independent, and the test is more **reliable** and **simpler** to perform.
- Through **automatic regulation of temperature and humidity** in the testing compartment, results are independent of ambient conditions and therefore more **accurate**.
- With the Alveolab, it is now possible to increase the number of tests carried out on a daily basis and thereby **optimize return on investment**.
- Using dedicated protocols, the device analyzes all **types of wheat** (soft, hard, durum) under optimum, industry-typical conditions.





Alveolab dough bubble

Measure the viscoelastic properties of wheat flours using the internationally recognized benchmark device.

The very latest in the Alveograph range

CHOPIN Alveolab now boasts a number of major innovations, making alveograph testing more accurate and simpler to perform.

- **Automatic pump calibration** saves the operator time while ensuring accuracy at all times.
- During the mixing stage, **water is now added automatically** and more precisely.
- The use of **brand new accessories,** such as anti-adhesive resting plates and the semi-automatic cutter, allow for finer control of dough pieces.
- **Positioning** and **swelling** of dough pieces is now automated and performed in a temperature and humidity-controlled compartment.
- The **inverted bubble** is more spherical and closer to ideal test conditions.

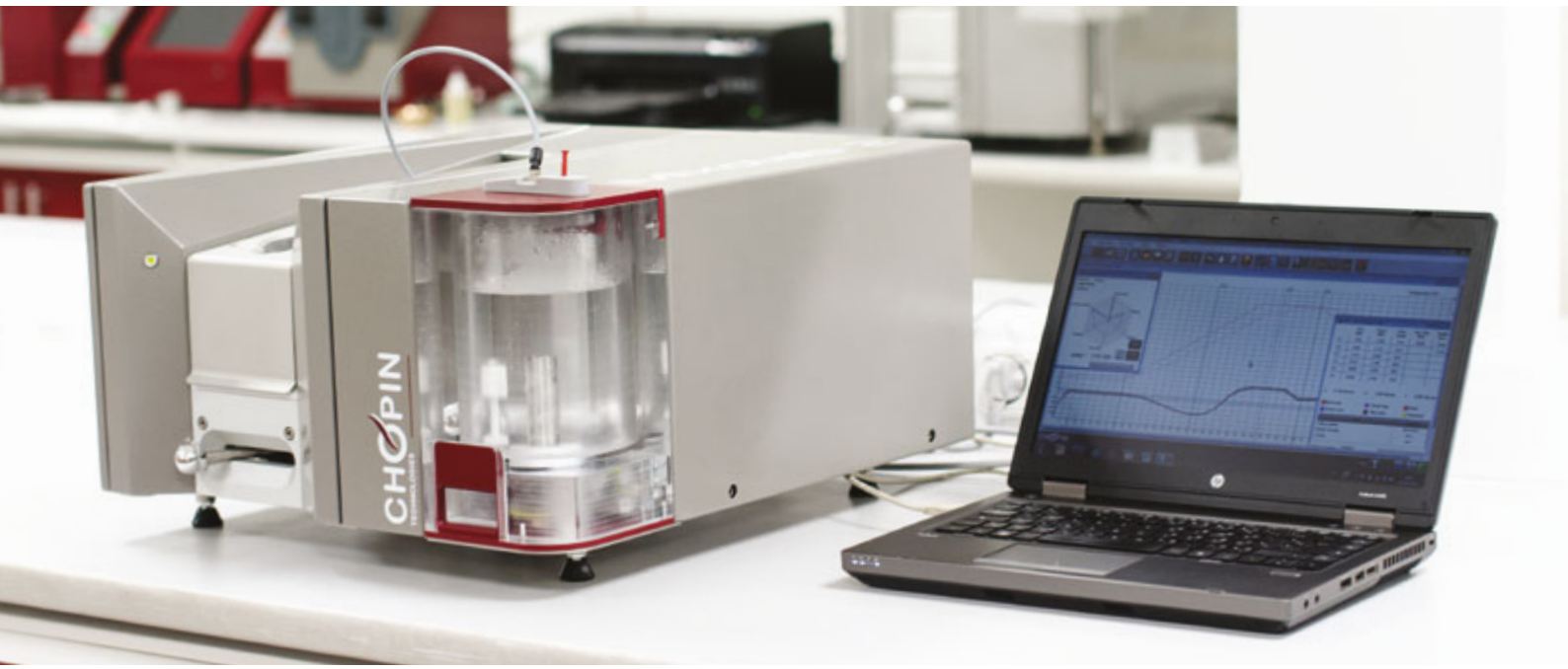
The easy-to-use, full-featured and user-friendly control software, itself a further major innovation, offers new possibilities for analyzing your results.

- **New parameters** such as the 1st derivative, stress/strain parameters, instantaneous consistency of the dough during mixing etc. are now possible.
- An **improver guide** also allows you to choose the most suitable additive for obtaining target alveographic values. And finally, a new module allows you to optimize wheat or flour blends.
- It is also possible to **develop new protocols**, e.g. by varying the intensity and duration of mixing, thereby performing alveographic analysis that is even more predictive of wheat performance.

Applications

The Alveolab is also perfectly suited to the applications listed on page 32.

Options : • *STRONG and WEAK control flours*



Mixolab 2

- **Measure the characteristics of dough during mixing, as well as the quality of the starch and protein**
- **Obtain complete information and characterize flours in one single test**
- **Anticipate the behavior of flours during mixing and baking**
- **Profiler: Develop simple and complete specifications**
- **Simulator: Benefit from all of Mixolab's possibilities while conserving Farinograph's® references**
- **The Mixolab responds to standards ICC 173, AACC 54-60.01, AFNOR V03-764, GOST P 54498-2011 and ISO 17718:2013 in determining rheological characteristics of flour and ground wheat**

The Mixolab measures the consistency of a dough sample when subject to both mixing and a rise in temperature. It analyzes the quality of proteins and starch from a 50g sample of flour.

Applications

The Mixolab can analyze **flour, ground grain or dough directly sampled from the production line**. It also offers extraordinary flexibility and provides relevant information on a wide range of applications: **soft wheat, durum wheat, barley, rye, rice, corn, quinoa, cassava, etc**.

The equipment allows the user to develop formulations by evaluating the effects of additives (gluten, protease emulsifiers, lipases, cysteine, amylases, etc.) and ingredients (salt and substitutes, sugar and fatty substances, etc.). It is also possible to develop bread-making prediction models.

It is also extremely helpful in the development of products that are rich in fiber and/or gluten-free.

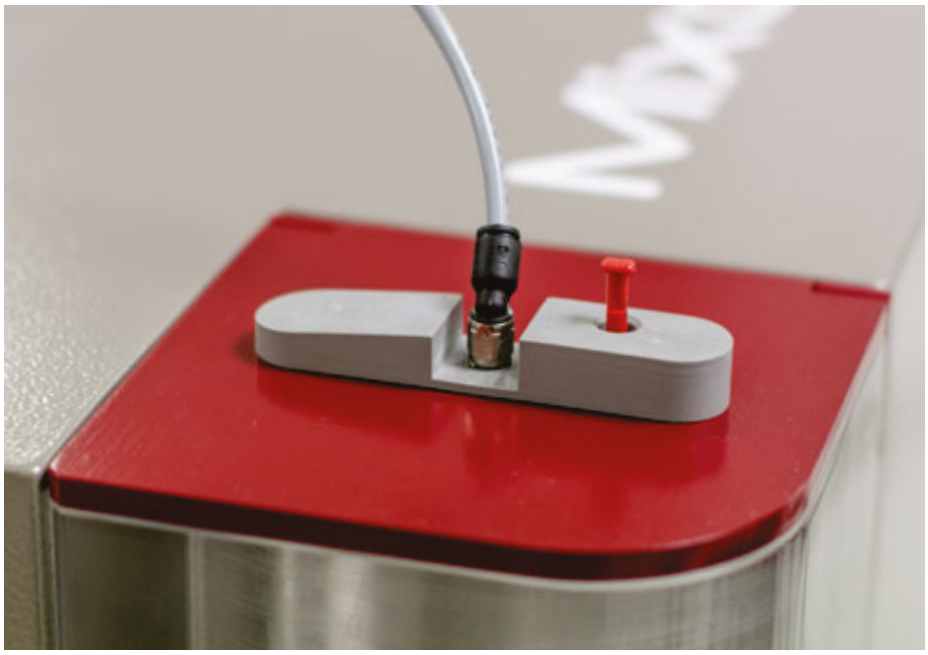
The 2nd Generation of Mixolab

An innovative, reliable and powerful device

- Automatic and highly accurate regulation of the mixer temperature (max: 90°C).
- Dual-material aluminum/stainless steel mixer: robust and easy to clean.
- Easy-to-remove water tank for quick, easy cleaning.
- Water added quickly, automatically and extremely precise (± 0.02ml). Fractionated addition possible (pump capacity: 75ml).
- Electronic calibration at all measurement points of the Chopin+ curve (temperature and torque), for more accurate analysis.

Simple, complete and intuitive software

- Temperature stability index, evaluating the dough's resilience to increases in temperature (in addition to the tradition stability value during mixing).
- Option to create protocols that vary both temperature (max: 90°C) AND mixing speed (max 250rpm), e.g. to reproduce a rest phase.
- "*Blending law*" function to create and save theoretical curves corresponding with researched blends.
- "*Additive effect*" function to directly visualize the optimum amount of additive to use.
- Function creating automatic calculations at the end of the test, displaying the results of "*predicted formulas*" such as bread volume.
- Integrated "*control card*" menu to follow the precision of the equipment.
- Automatic test to determine flour hydration in less than 8 minutes.



Mixolab 2 Water tank

The Mixolab enables you to determine the full qualitative profile of flours (protein structure, starch, enzyme activity), while simulating the conditions of the manufacturing process.

Benefits

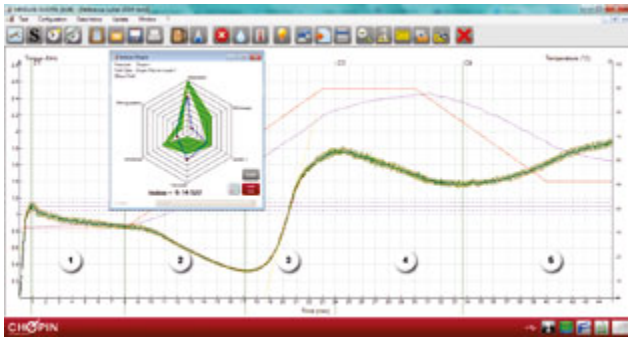
- **All-in-one** - A single standardized device enabling complete analysis of a dough subjected to an increase in temperature
- **Versatile** – Easily create custom protocols to test a variety of cereals, whole flours or doughs with samples directly collected from the production line
- **Straight forward** – the analysis process is fully automated and the Profiler system allows simple characterization of products on the basis of six quality criteria

Mixolab combines 3 main features:

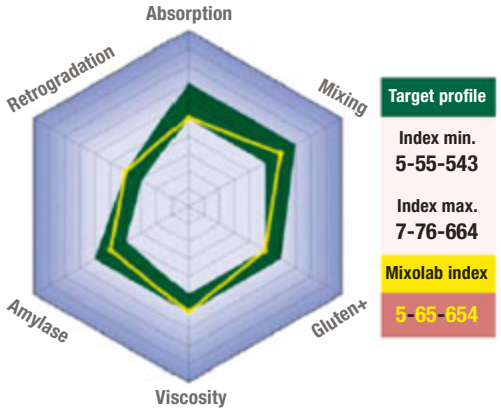
Mixolab Standard: The standard "Chopin +" protocol provides a complete 5-stage analysis of flour in 45 minutes.

Mixolab Profiler: The built-in software measures all standard curve parameters and transforms these into six quality indices: water absorption, mixing properties, gluten strength, maximum viscosity, amylase activity, and retrogradation.

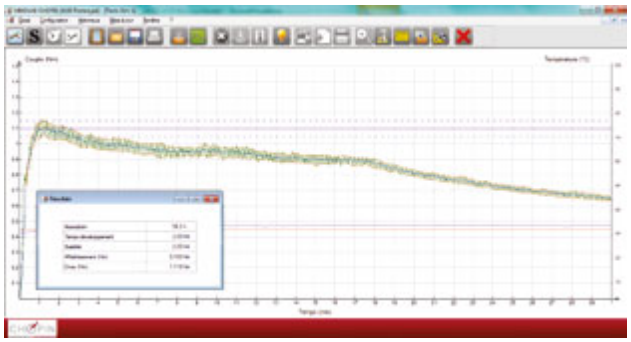
Mixolab Simulator: The Simulator protocol now displays a theoretical Farinograph® curve, displaying results in a form comparable to the Farinograph® at each point: water absorption, dough development time, stability, weakening.



Mixolab Standard

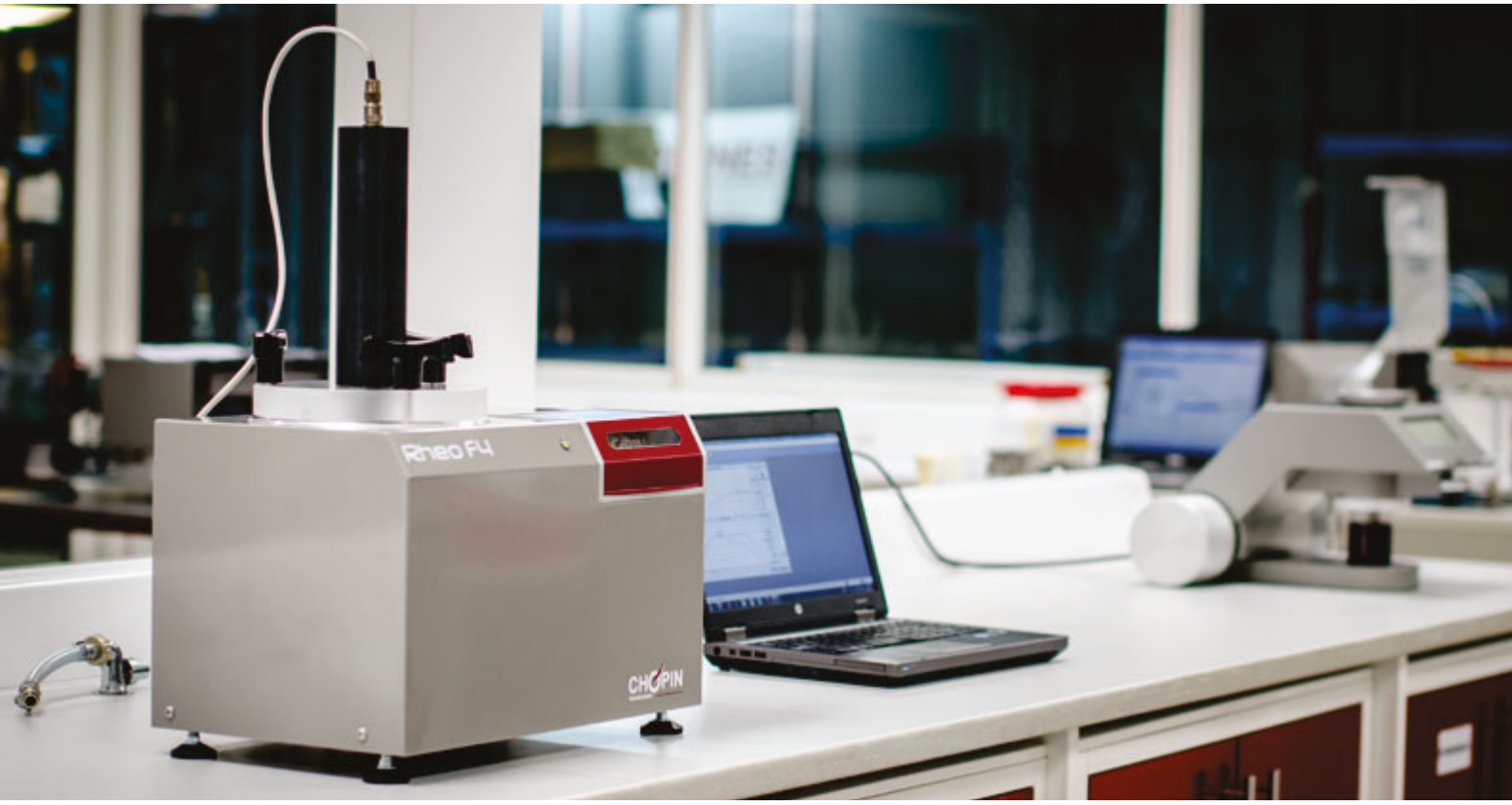


Mixolab Profile



Mixolab Simulator

Options :
- *Second mixer*
- *Dough sample kit*
- *Control flour*
- *Applications guide*



Rheo F4

- **Measure the dough properties during fermentation**
- **Optimize fermentation time and determine the optimum point for loading into the oven**
- **Select and monitor yeast activity (AACC 89-01)**
- **Guarantee a compliant, consistent volume of finished products**
- **Evaluate the effects of additives (amylase, vital gluten etc.) on formulations**
- **Analyze re-activation of fermentation in frozen doughs, and the impacts of salt reduction on fermentation**
- **Analyze the properties of gluten-free formulations**

The **volume of finished products** depends on both the quantity of CO_2 produced by the yeast and the dough's gas-retaining properties.

The Rheo F4 provides a **complete analysis of the proofing properties flours** by measuring the production of CO_2, the volume of dough, as well as its porosity and tolerance during proofing.

Method and results

The Rheo F4 test allows two types of curve to be obtained:

1. A dough development curve showing:

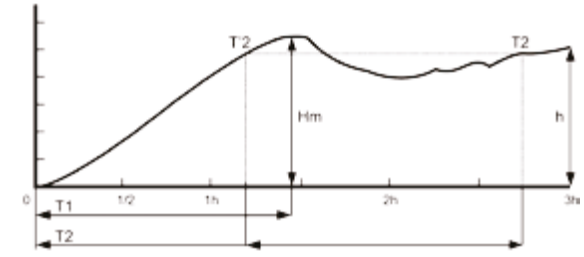
- Maximum development (Hm) reached by the dough, which correlates to bread volume.
- The peak development time (T1) in relation to yeast activity.
- The relative stabilization time at the maximum point (T2- T'2), associated with the tolerance of the dough and optimum time for placing the dough in the oven.

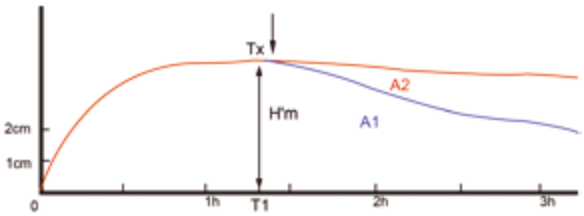
2. A double gas release curve showing:

- Total amount of gas produced (related to yeast activity and quantity of available substrate).
- The amount of CO_2 lost by the dough during proofing, directly related to the porosity of the dough, which may occur more or less early on (Tx) depending on the quality of the protein structure.

Benefits

- The device evaluates any type of proofing (short and long period) through simple customization of the protocol.
- The Rheo F4 is controlled via a simple, user-friendly PC **software** application. Launch a test in just a few clicks. The **analysis** is then completely **automated**.
- Results may be easily compared to a benchmark and printed in the form of a certificate of analysis.





Options : • *Dry yeast* • *Control flour*

	Standards	Power supply (V)	Power supply (Hz)	Power rating (W)	Dimensions in mm (LxDxH)	Net weight (Kg)
AGRI-TR	NF EN ISO 7971-2	110/220	50	35	240 x 330 x 470	9,6
ALVEO PC	AACC 54-30.02 ICC 121 NF EN ISO 27971 GOST 51415-99	220/240	50/60	1800	820 x 550 x 850	70
ALVEOLAB	AACC 54-30.02 ICC 121 NF EN ISO 27971 GOST 51415-99	220/240	50/60	2200	1010 x 640 x 860	80
AMYLAB		110/230	50/60	650	226 x 466 x 561	18
AQUA-TR	NF EN ISO 7971-2	110/220	50/60	35	240 x 330 x 470	9,6
EM10	AACC 44-20.01 AACC 44-15.02 FT WG 0008 NF ISO 712 NF V03 707 NF V03 708 GOST 9404-88 ICC 110/1	220/240	50/60	450	280 x 280 x 580	14
GRINDER-CHOPIN		220/240	50/60	750 W	230 x 520 x 557	37
INFRANEO		110/240	50/60	225	600 x 500 x 385	33
LABMILL		220/240	50/60	2700	900 x 1200 x 1500	200
MIXOLAB 2	ICC 173 AACC 54-60.01 AFNOR V03-764 GOST 54498-2011 AFNOR V03-765 ISO 17718:2013	220/240	50/60	1000	460 x 505 x 270	33
MILL CD1	NF EN ISO 27971 AACC 26-7.01	220/380	50/60	995	1100 x 450 x 900	110
MILL CD2		220/380	50/60	955	1100 x 450 x 900	110
MR10L		220/240	50/60	62	450 x 780 x 400	25
MR2L		220/240	50/60	20	400 x 430 x 250	10
NILEMALITRE	AFNOR NF V03-719 ISO 7971-3	-	-	-	170 x 120 x 450	1,3
NUMIGRAL	AFNOR NF V03-702 ISO 720	230	50/60	50	650 x 420 x 360	22
QUATUOR II		220/240	50/60	210	500 x 730 x 940	50
RHEO F4	AACC 89-01.01	220/240	50/60	150	415 x 265 x 545	12
SDMATIC	AFNOR V03-731 AACC 76-33.01 ICC 172 ISO 17715:2013	110/230	50/60	170	250 x 370 x 390	6
SRC-CHOPIN	AACC 56-11.02	220/240	50/60	1300	865 x 751 x 805	100

- A -	
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