CHOPIN TECHNOLOGIES

Spectralab

High performance NIR analyzer
designed for process control in flour mills

Accuracy on ash: 0.017%

Accurate

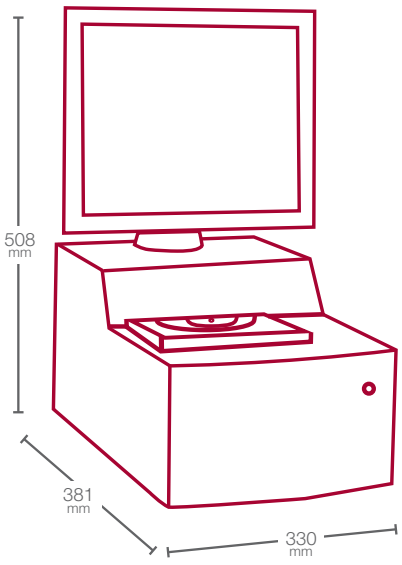
- Analyzer with TRUE Alignment™ spectroscopy (TAS) technology
- Wavelength precision < 0.005 nm
- Wavelength accuracy < 0.02 nm
- Wavelength range: 1100 - 2600 nm
- Photometric noise full range < 20 µAu
- Absorbance range up to 3 AU

Quick

- Results in less than 30 seconds

Easy to use

- Suitable for industrial use (Sealed case for at-line use)
- High resolution touch screen LED display



22 kg

100/240 V
50/60 Hz

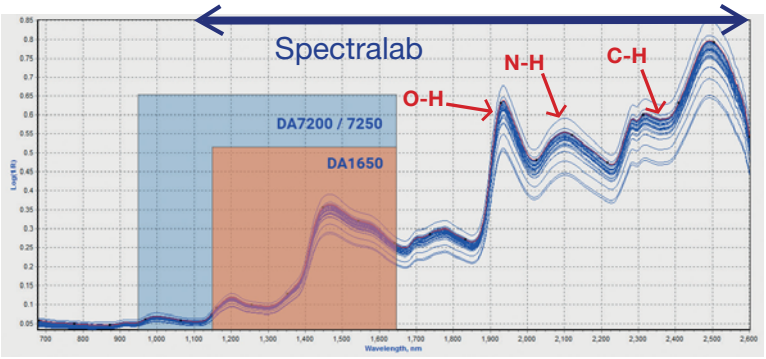
Compliant with standard ISO 12099

Test time: **30 seconds**
Operator time: **10 seconds**

High performance NIR analyzer

The Spectralab is based on the True Alignment™ Spectroscopy, that precisely calibrates it to first principle standards and then monitors and maintains the alignment for reliable, trouble free analysis.

The Spectralab uses the near-infrared (NIR) wavelength range from 1100 nm to 2600 nm. This range offers optimal coverage and enables direct and complete transfer of calibrations from competing NIR systems.



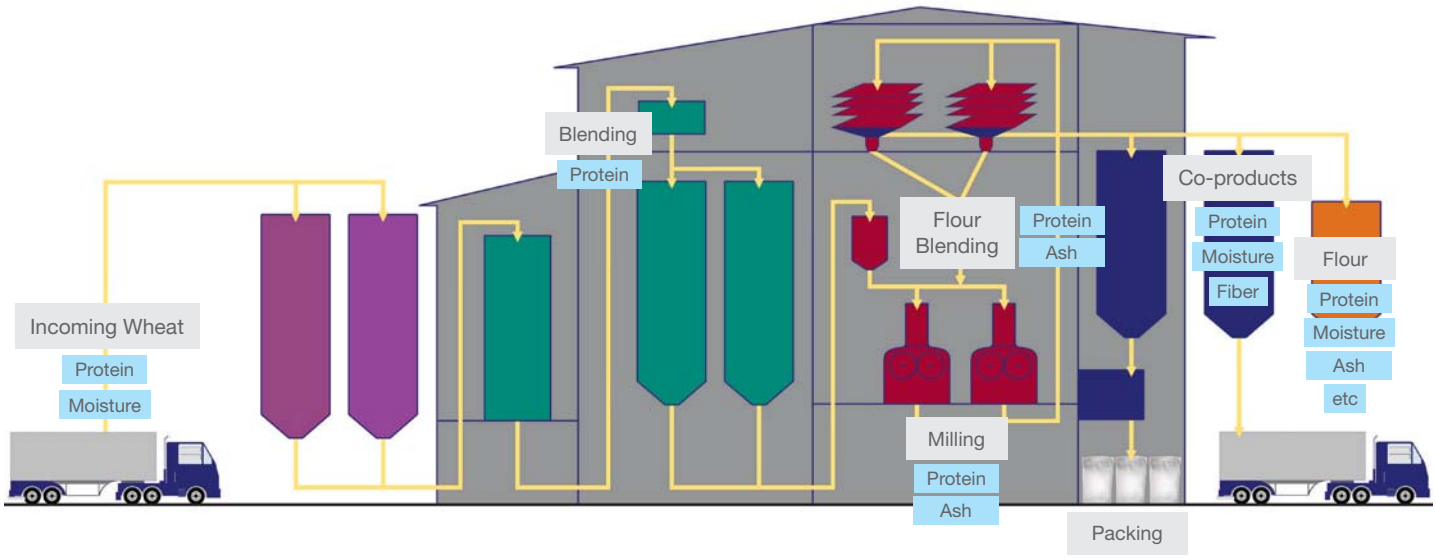
- High Resolution Touch screen LED display
- Integrated Windows®7 Computer with Intel® Celeron™ Quad Core Processor and 160 GB Solid State Drive
- High resolution encoder for extremely accurate and precise wavelength registration
- Custom electronics including low noise detector boards, self-diagnosing and upgradeable controller board, and ultra-stable power supplies
- 4 USB ports, 2 Ethernet ports, 1 VGA and 1 Serial port
- Multi-cup adapter for easy analysis of powders, coarse granular materials, pellets, liquids and slurries
- High throughput monochromator with scanning range from 1100 to 2600 nm
- Sealed case with no fans, filters or water cooling for reliable operation in dusty environments
- High quality optics with over 99% transmission through 3400 nm for artifact free collection of light
- Custom dual-cooled InGaAs detectors for high sensitivity, low noise and long life
- 5 watt lamp with high efficiency optical bench provides high signal / noise without the need for additional cooling

Optional Software Available:

- UCal™ Chemometric software for custom calibration development, monitoring and validation of results.

The Spectralab, a process control tool for Flour Mills

The analyses carried out during the different stages of the production of flour make it possible to control the process and to improve the yield. The graph below shows the parameters most commonly measured at each stage of the production process.



ASH CONTENT: a quick and accurate alternative to the reference method

The aim of the miller is to produce, from the batches of wheat, the greatest quantity of flour possible, while respecting a certain number of qualitative criteria, including the ash content.

The ash content of a flour is defined as the proportion of mineral remaining after incineration at 900° C. Most of the minerals in wheat are found in the bran layer. The extraction rate represents the amount of flour extracted from the grain of wheat.

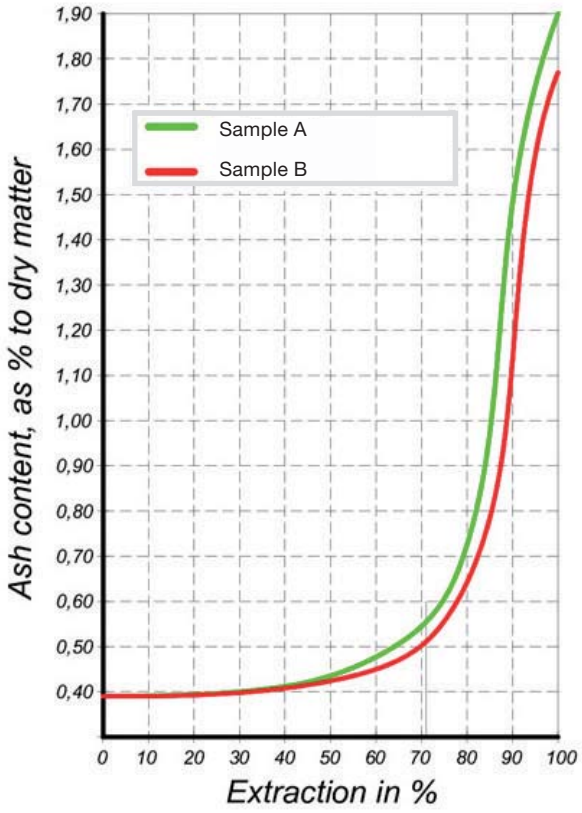
The higher the extraction rate, the higher the ash content of the flour. This is represented by the curve opposite.

The more the miller is able to get closer to the maximum value of ash required by his client's specifications, the more he maximizes his income.

To get closer to the limit without exceeding it, the tool used to measure the ash content must provide an extremely fast, reliable and accurate result.

The reference method (NF ISO 2171), using the ash furnace, allows this accuracy, but requires 3 hours to provide a result.

The Spectralab provides a result of a precision very close to the method in the ash furnace, in only 30 seconds!



An exceptional accuracy

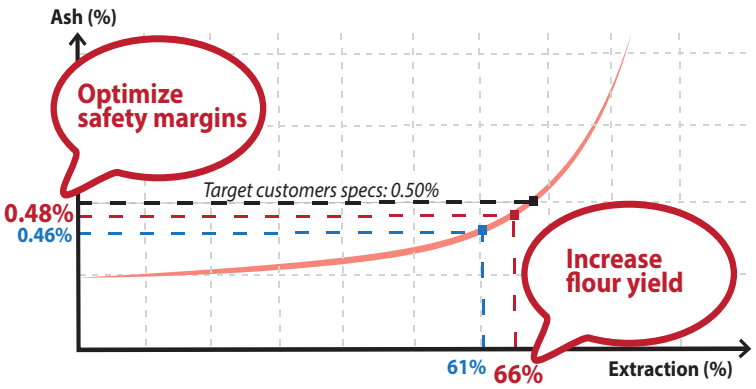
Accurate ash measurement

The more the miller is able to get closer to the maximum value of ash content required by the specifications of his customer, the more he maximizes his income.

With an average error (SEP*) on ash measurement of only 0.017%, the Spectralab makes it possible to minimize this margin of safety. As a result, the flour yield can be increased.

For example, opposite: for a 0.50% target, a classic NIR tool, by its precision, allows the limit to be set at 0.46%. The Spectralab makes it possible to put this limit closer to the target, at 0.48%. This results in this example in a gain of 5% extraction.

Based on yield alone, the typical payback time for a Spectralab in a medium sized flour mill is less than 6 months.



Calibration performance

The upper wavelength region generated by the Spectralab contains vital spectral information for protein, fats, sugar, starch, fibers, amino acids and other constituents.

Protein SEP	Moisture SEP	Ash SEP
0.200	0.129	0.017

**SEP : Standard Error of Prediction*

High Performance Scanning Monochromator

The increased number of data points and increased resolution of the Spectralab make it possible to obtain NIR spectra with a very low noise, which ensures a more precise and detailed measurement of the sample.

	Resolution (nm)	Wavelength range (nm)	Data points
Spectralab	1.0	1100 - 2600	1500

Easy Operation with UScan Routine Analysis Software

The Spectralab is designed for routine at-line use. It is a stand-alone system operated on a large 17” touch screen.

Versatile results display with warning and action displays for outlier and product limits

Configurable SPC view displays control charts for three constituents enabling immediate process control

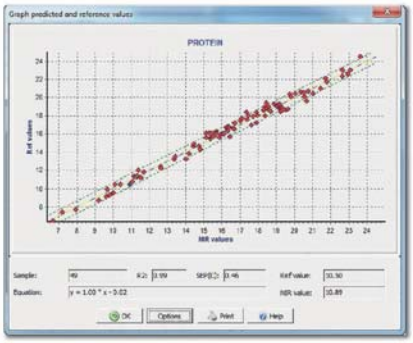
Efficient calibration development and maintenance

- **Single File Format**

The single equation file format is easy for importing and implementing calibrations and eliminates the possibility of mismatching constituent and outlier prediction files.

- **Optimized PLS**

The optimized PLS algorithm based on Neighborhood distances offers the most efficient means to create and maintain NIR databases.



Installation and Training

The Spectralab is designed for easy setup and configuration. Upon delivery, a specialist will perform TAS diagnostics to verify instrument performance and then install calibrations and set up products according to your requirements.

An automatic export to a LIMS or other external data system can also be easily configured.

As part of the installation, a specialist will train the operator and managers in all aspects of routine operation, configuration, diagnostics and data management.

Hassle-Free Maintenance

The Spectralab is designed to be easily maintained by the customer, thereby decreasing downtime and maintenance costs. The lamp has a 10,000 hour life and can be easily monitored in the main program and changed by the user.

TAS aligns the instruments back to factory specifications for interruption-free operation.

The instrument itself is designed for long life and reliability with quality components and no fans, lasers, desiccators or cooling systems to fail.

CHOPIN TECHNOLOGIES

Specifications Table

Light Source	Tungsten halogen lamp with MTBF rating of 10,000 hours, User changeable via pre-aligned assembly
Measurement mode	Reflectance or transflectance
Detector	High Performance ultra-cooled InGaAs extended range detector(s), dual stage temperature stabilized
Optical Bandwidth	10.0 ± 0.3 nm Actual FWHM
Spectra Resolution	Spectral Resolution is an actual 1.0 nm without interpolation, up to 0.5 nm available.
Absorbance range	Up to 3 AU
Analysis time	10 – 60 sec. (20 scans / sample = 40 s)
Wavelength accuracy	< 0.02 nm to traceable standard reference material
Wavelength precision	< 0.005 nm
Wavelength temperature stability	No effect = 0 nm/°C
Wavelength range	1100 - 2600 nm
Number of data points	1500
Photometric noise full range	< 20 µAu
Number of detectors	2
User Interface	
Operating System	Windows 7 Embedded
Display	17” touch screen, high resolution
Networking	LIMS compatible
	OPC compliant
	HDMI Port
	4 USB ports

Your CHOPIN Technologies representative:

☎ +33 1 41 47 50 48 - info@chopin.fr - www.chopin.fr
20 avenue Marcellin Berthelot - 92396 Villeneuve-la-Garenne CEDEX, France