

Flour Milling Analysis

Instrumentation and Analyzers



Laboratory and Process Instrumentation and Support



Perten Instruments has provided analysis instruments to flour millers for more than 50 years. We know that flour must meet compositional and functional specifications. Our understanding of flour milling and our expertise in analysis technologies puts Perten Instruments in a unique position to work with you to produce better flour more profitably. We supply instruments to test both functional and compositional properties so you know what wheat to buy, how to best mill it, and how the flour will perform at the bakery.



Whole Grain

1. Purchase the right wheat

When you know the properties of the wheat you are buying, you can produce the flour your customers need. We provide grain analyzers to measure both functional and compositional properties of wheat.

Falling Number – Sprout damage detection

Glutomatic – Gluten quantity and quality

IM 9500 – Moisture, Protein and Test Weight

DA 7250, DA 7300 In-line and IM 8800 – Moisture and Protein

AM 5200 – Moisture and Test Weight

SKCS – Wheat uniformity



In the Mill

2. Optimize milling

Our NIR instruments track key parameters for process optimization. Moisture, ash, and protein are some of the characteristics they determine.

DA 7250 and DA 7300 In-line – Moisture in tempered wheat; Ash, Protein, and estimates of Starch Damage and Water absorption in flour

IM 9500 – Moisture in tempered wheat; Ash and Protein in flour

AM 5200 – Moisture in tempered wheat

Falling Number – Determine fungal amylase, alpha-amylase, or malt addition

Compo



DA 7250

Most accurate,
feature rich & versatile
NIR analyzer



DA 7300

In-line process
NIR whole grain &
flour analyzer



Inframa

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NIR anal
flour ca

Our NIR and Grain Moisture Meters

provide multiple analysis capabilities for millers. These instruments are accurate, rugged, and designed for use in the challenging flour mill environment. With them, you will be able to:

- purchase the right wheat
- optimize milling
- verify flour quality

Flour millers save money and improve quality every day by measuring with our compositional analyzers.

Moisture in Wheat: Accurate moisture analysis ensures correct payment and storage. Rapid, accurate moisture helps millers optimize tempering. Moisture is also important in ground wheat for correct Falling Number measurements.

Protein in Wheat: Using average wheat bin protein content is insufficient for calculating blend ratios as wheat varies significantly within a bin. Blend ratios can be dynamically controlled by measuring the incoming grist. This ensures blended wheat meets protein requirements leading to more consistent end-product and improved milling yield.

Protein in Flour: Accurately calculate gluten dosing. Realize savings by using lower cost/lower protein wheat and adding gluten to reach the required flour protein level.

Ash: Continuous ash monitoring allows millers to optimize mill yield and rapidly detect any problems.

Starch Damage Estimates: Adjust roll stands to control the amount of damaged starch.

Speck Count: Increases in speck count may indicate a screen breakage requiring immediate attention. Avoid rejects and customer complaints by continuously monitoring speck counts.

For millers requiring maximum accuracy and versatility the **DA 7250** is the natural choice. It analyzes grain, flour, bran, bakery mixes and many other products. In addition to moisture, protein and ash it also offers extended parameters such as estimation of water absorption and starch damage.

Modern diode array technology, factory normalization and automated self-tests make the DA7250 extremely accurate. Temperature stabilization, solid-state optics and an IP65 enclosure provides robustness – place in almost any environment, including production areas.

Its touch screen with intuitive user interface ensures rapid operator confidence. Windows connectivity makes it easy to connect accessories such as printers, barcode readers and even wireless modems.

The **DA 7300** is used by flour millers worldwide for in-line process and quality control. Substantial

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Inframatic 9500
Rapid grain
analyzer with
capabilities



IM 8800
Portable Grain
NIR Analyzer



AM 5200
Grain Moisture
Meter

savings are realized by simultaneously increasing yield, reducing rejects, and increasing end-product quality and consistency. In-line monitoring using the DA 7300 provides many benefits:

Measurement results are integrated into the mill process control systems allowing for manual or automated mill adjustment.

Continuous measurement identifies issues as they occur as opposed to detection at load-out.

The integrated camera provides a real-time “window” into the process using video capabilities and speck counts and color analysis with still images.

The **Inframatic 9500** is the most accurate NIR wholegrain analyzer available. It measures moisture, protein, wet gluten, and more in less than 30 seconds. When equipped with the optional Flour Module, it can also determine moisture, protein, color, and ash in wheat flour and moisture in ground wheat for Falling Number analyses.

With a large touch screen and simple sample handling, it is easy to use. Single block optics and advanced instrument standardization make the IM 9500 more accurate than other grain analyzers. It is approved in a number of countries for official testing of moisture and protein in wheat. The Test Weight Module provides even greater functionality and value in one instrument.

With superior performance and an attractive price, the IM 9500 is a good investment for all mill sizes.

The **Inframatic 8800** is a battery powered, NIR grain analyzer which determines protein and moisture in wheat and other grains. Using the optional Falling Number Moisture Module it provides accurate moisture measurement of ground wheat and flour, which is important for correct Falling Number measurements. Samples are analyzed in less than 2 minutes, and it has up to 2 hours of battery life.

The **Aquamatic 5200** is a rapid grain moisture meter for analysis at in-take and to monitor the tempering process. Officially approved for moisture testing of grain in many markets, it employs the newest technology - 150MHz and the UGMA.

These two developments improve grain moisture measurement accuracy by as much as 75% and provides accurate analysis on wheat during tempering thus allowing the miller to predict final moisture content as soon as 30 minutes after water addition.

Function



doughLAB
Water absorption
& mixing
characteristics



Falling Number®
Sprout damage
detection & malt
addition



Glutomatic®
Gluten quantity
& quality



BV
Volume
measurement

The **doughLAB** determines water absorption of flour, dough development time and other dough mixing parameters. The instrument uses the traditional 20 minute test and AACCI 54-70.01 approved high-speed mixing 10 minute test. The 10 minute test increases lab throughput and efficiency. It improves analysis results by making it easier to interpret samples with long development times, indistinct development peaks and multiple peaks. In addition, the high speed method more closely resembles today's bread making processes.

Millers can quickly calculate flour blends to meet target water absorption specifications using the software. Perform complex "what if" analyses without having to run lots of tests. These blend models can be used to manage crop changeover issues and design flour blends to maintain specifications for specific purposes and products while reducing costs.

Bake labs can create specific tests to study flour performance using variable temperature and high speed/energy mixing. High torque tests are used for crumbly doughs such as pastry, cookie, cracker, pasta, noodle and other low water absorption dough formulations. Defined energy input tests – which cease mixing the sample once the specified amount of mechanical energy has been applied – can be used to produce repeatable samples for further testing such as texture analysis and test baking.

The **Falling Number** The Falling Number Method is the world industry standard and accepted method for detecting sprout damage in flour, wheat and other grains. Perten Falling Number models are the only validated instruments for the approved methods.

At grain intake a Falling Number instrument is essential to detect sprouted shipments. One truckload of sprouted wheat can lower the grade of the entire content in a silo. You cannot afford to take the risk and not test.

Use the Falling Number Method in the mill to ensure end product quality, calculate blends of flours to achieve a specific Falling Number, or calculate malt addition.

Protein content does not guarantee flour performance. The **Glutomatic** System is the world standard method to measure gluten quantity and quality in flour, wheat, durum and semolina. Gluten quality is critical to the bread making quality of wheat, and different types of end products require flour with different characteristics. The Glutomatic System is a simple, rapid and reproducible method and can be performed at the grain reception, providing functional information of gluten without extracting the flour.

Flour millers use the Glutomatic to test flour streams for gluten formation quantity and quality. The results of the Glutomatic tests are used to calculate blends of flours and vital wheat gluten addition.

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BVM
Bread
volume
measurements



TVT
Texture
analysis



RVA
Starch pasting
characteristics



SKCS
Single kernel
testing for wheat
uniformity

The **BVM** uses laser topography to rapidly measure accurate dimensions (length, width, depth), weight and volume of bread and baked products. The software generates a 3-D rotatable diagram of the product and stores all results – including the 3-D model. Performance is nearly 5 times more accurate and 10 times faster than seed displacement tests and the method is standardized in the AACCI 10-14.01 method. Millers and bake labs use the BVM to measure pup loaf volume. Results are archived for claims and audits. The BVM has accessories to measure many products such as pan and hearth breads, small rolls, hamburger buns, cookies, pizza, flat bread, pastries, muffins, and cakes. The BVM is an essential tool for test bakeries and test kitchens to prove the performance of flour, wholemeal, bread improvers and ingredients.

The **TVT** texture analyzer performs fast, easy-to-use, objective texture analysis. Force, distance and time measurements are analyzed to define physical properties, compare products and raw materials, evaluate the effects of processing and formulation, assess changes during storage and imitate handling and consumption.

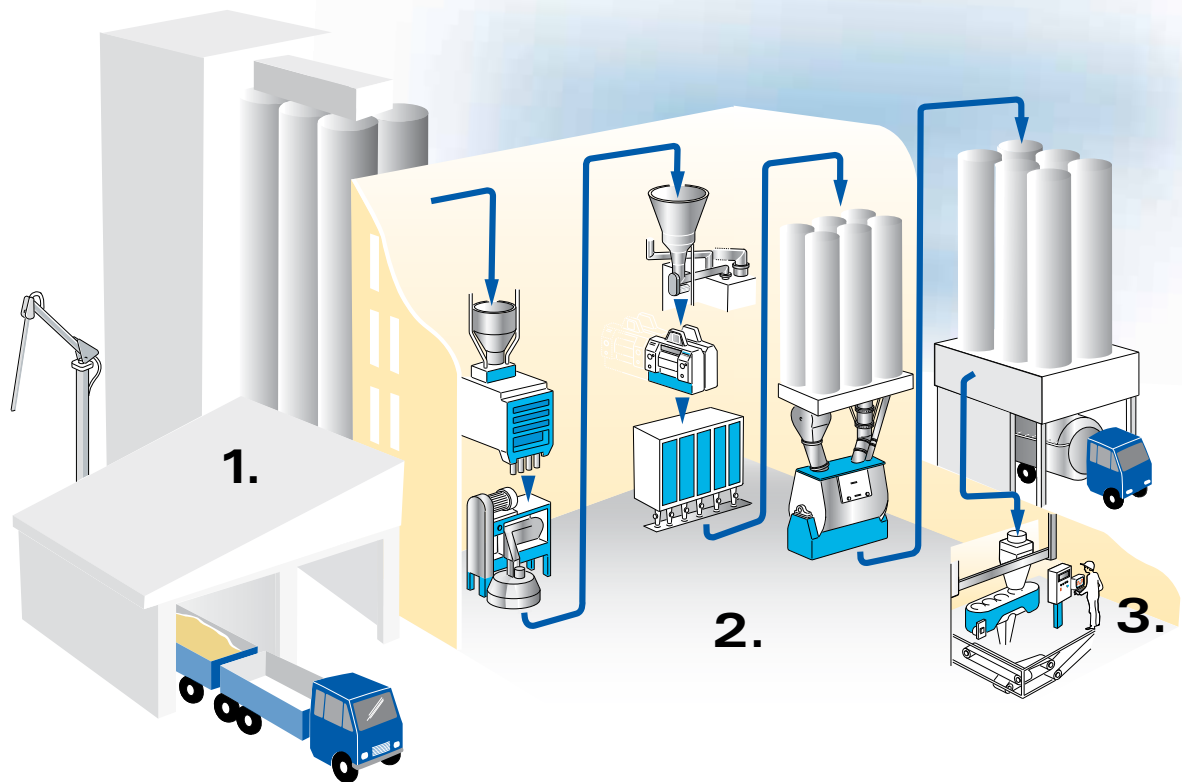
Methods include aspects of staling such as firmness, springiness, hardness, fracturability and crispness of various baked and extruded products. Measure stretchability and extensibility of pancakes, tortillas, firmness of pasta and noodles, and properties of dough. Custom methods can also be created.

The **RVA** can evaluate the suitability of a flour or wholemeal for baked products, noodles/pasta, batters and extruded products – whether flour is the main ingredient or is being used as a thickener or binder. Test methods include AACCI, ICC and other standards and user-created custom analyses.

The RVA is a rotational viscometer with programmable temperature and shear to determine flour functional characteristic such as rapid starch pasting profile, solvent retention capacity (SRC), enzyme activity from fungus, sprout or insect damage, degree of cook from heat treatment and diastatic activity from added malt flour or fungal amylase. The RVA is also an excellent tool to monitor the performance of ingredients used in e.g. bake mixes and may even replace test baking in certain cases.

The **SKCS** is a unique instrument that singulates kernels of wheat and measures weight, diameter, moisture and hardness for each individual kernel.

Mills use the kernel diameter to help adjust roll-stands to optimize mill yield. By viewing the histograms of the individual kernel analysis, blended shipments are easily identified. Blended wheat shipments can have deleterious impacts on both mill yield and quality.



Flour Performance

3. Verify flour quality & performance

There are many definitions of flour quality and many ways to determine it. Whether you need to perform a few specific tests on the flours you sell, or you have to test bake to observe end-product quality, we have the instruments you need.

At load-out:

Falling Number – Falling Number value of flour

Glutomatic – Gluten quantity and quality

DA 7250 – Moisture, Ash, Protein, and estimates of Starch Damage and Water Absorption in flour and bake mixes

IM 9500 – Moisture, Ash and Protein in flour

DA 7300 – Moisture, Ash, Protein of flour for in-line blending

In the test bake lab:

doughLAB – Water Absorption, Stability, Mixing Time, Mixing Energy of flour and dough

BVM – Volume, Size, Density, Specific Volume of baked goods

TVT – Characterizes texture of baked goods such as Firmness, Springiness, Hardness, Crispness, Fracturability and more

RVA – Starch pasting characteristics and more in flours

DA 7250 – Moisture, Protein, Fat and Sugars in baked goods

Wheat & Flour Analysis Experts for 50 years



We have been experts in wheat and flour analysis since 1962 when Mr. Harald Perten and Mr. Sven Hagberg developed the Falling Number method – now the world standard for determination of sprout damage in grain. A cereal chemist by training, Mr. Perten was determined to supply millers and bakers with simple and accurate tests for flour quality.

The Falling Number method was the start of a partnership with the flour milling industry, a partnership strengthened with the introduction of the Inframatic NIR instrument in 1981. NIR instruments are still fundamental to flour millers, and we have continuously invested in research and development of new NIR technologies to bring even more accurate and flexible analyzers to the industry.

From the beginning our goal has been to develop easy-to-use, improved analyzers, applications, and methods to meet your needs. We continue to strive to accomplish this goal, employing experts in multiple engineering fields, cereal chemistry, and food technology. We attend industry and trade meetings worldwide. We spend significant time at mills listening to millers, quality managers and chemists so we understand your challenges and how we can help you be better at what you do.



- Perten Office
- Perten Distributor