Flour Milling Analysis

Instrumentation and Analyzers

Moisture

Sprout damage detection

Protein

Ash

Gluten

Speck count

Water absorption

Test Weight

Falling Number

Starch damage

Protein

Texture

Malt addition

Color

Volume

Laboratory and Process Instruments and Support

Perten
INSTRUMENTS
a PerkinElmer company

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.

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

Whole Grain

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
IM 9520 – Ash and Protein in flour
AM 5200 – Moisture in tempered wheat
Falling Number – Determine fungal amylase, alpha-amylase, or malt addition

In the Mill

DA 7250
Most accurate,
feature rich & versatile
NIR analyzer

DA 7300
In-line process
NIR whole grain
& flour analyzer

Inframatic 9500
Approved grain
NIR analyzer with
flour capabilities

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 DA 7250 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 savings are realized by simultaneously increasing yield, reducing rejects, and increasing end-product quality

Inframatic 9520
Dedicated
NIR Flour Analyzer

IM 8800
Portable Grain
NIR Analyzer

AM 5200
Grain Moisture
Meter

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 9520** is a dedicated NIR instrument for flour millers and professional bakers. It provides simple, rapid, routine bench-top analysis. In less than 30 seconds, measure ash, moisture, protein and other key components accurately and reproducibly. Sample handling is simple and straight forward.

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.

doughLAB
Water absorption
& mixing
characteristics

Falling Number®
Sprout damage
detection & malt
addition

Glutomatic®
Gluten quantity
& quality

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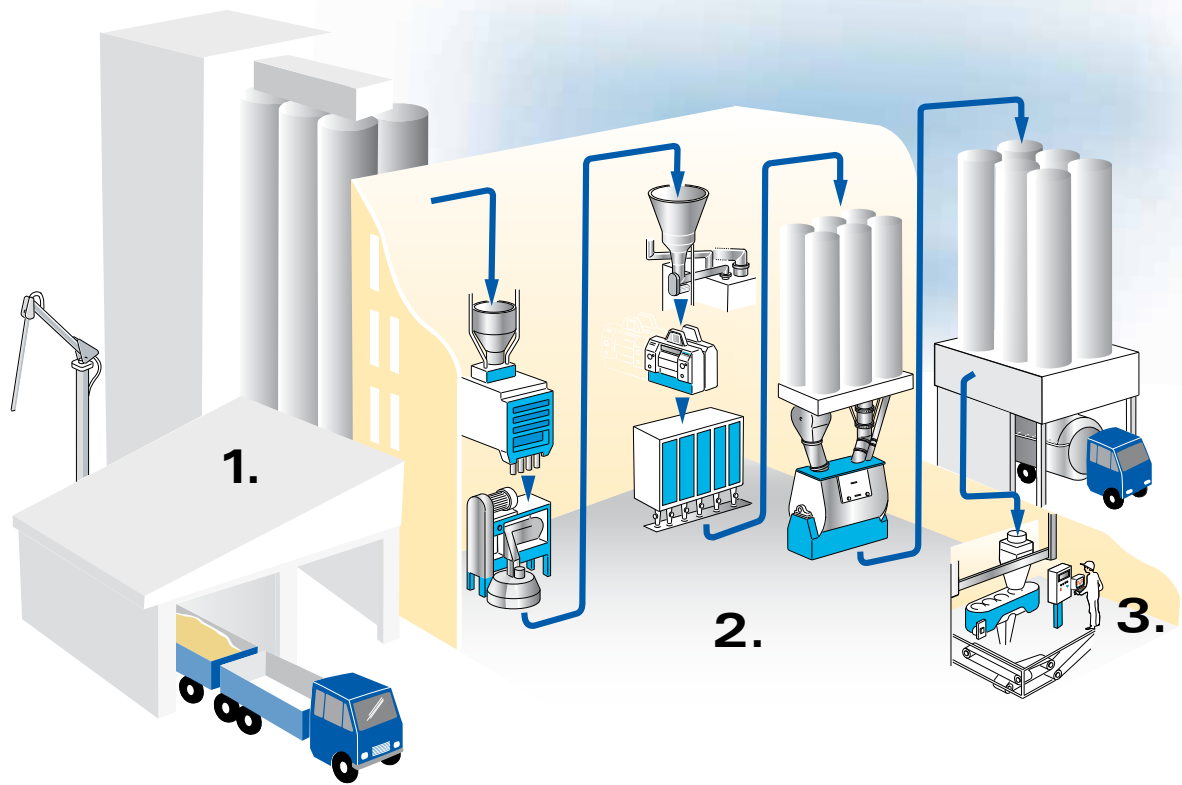
Methods include aspects of staling such as firmness, springiness, hardness, fracturability and crispness of various baked and extruded products. Measure stretchability and extensibility of pancakes, tortillas, firmness of pasta and noodles, and properties of dough. Custom methods can also be created.

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. It may even replace test baking in certain cases and can run tests up to 140°C in model RVA 4800.

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 and IM 9520 – 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

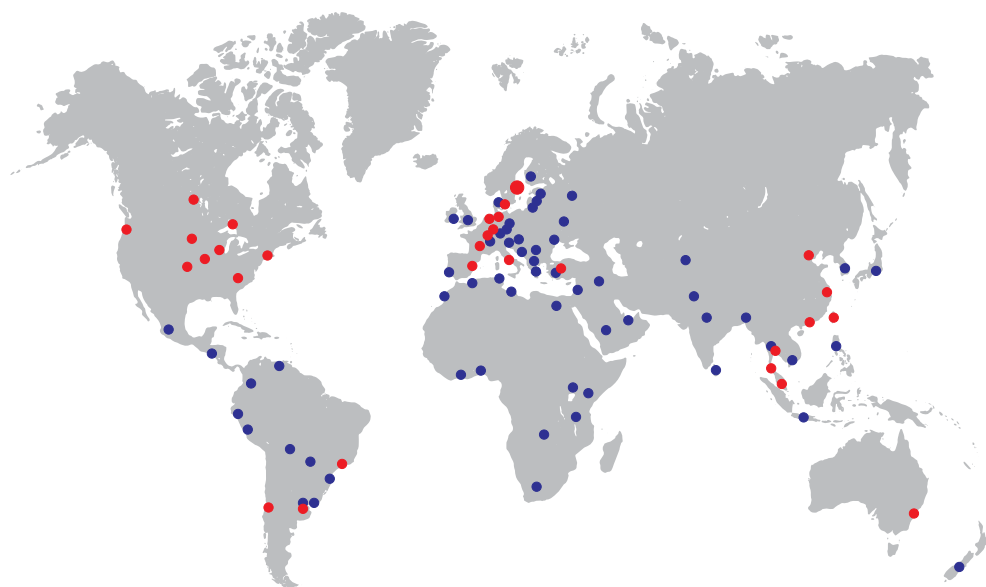**DA 7250** – Moisture, Protein, Fat and Sugars in baked goods

Food Analysis Experts for over 50 years

Founded in 1962, Perten Instruments, today part of PerkinElmer Inc., is a leading supplier of advanced analytical instruments to the food and agricultural industries. We serve some of the largest companies, smaller specialized operations, and the research institutes that support them.

We develop innovative methods and instruments which help the food industry feed the world more efficiently. Perten solutions measure composition, test functionality, and monitor safety. They are used for ingredient screening, formulation, process monitoring, and final product quality control. They are placed in the field, at R&D facilities, in labs, at-line, and integrated into process systems. Most importantly for our customers, our tools help reduce waste and improve efficiencies.

As a key business of PerkinElmer, Perten is based in Stockholm, Sweden and serves customers in over 100 countries. PerkinElmer is a global leader focused on innovating for a healthier world, with a dedicated team of 9,000 employees worldwide. Together, we are passionate about providing customers with an unmatched experience as they help solve critical issues. PerkinElmer's innovative detection, imaging, informatics and service capabilities, combined with deep market knowledge and expertise, help customers gain earlier and more accurate insights to improve lives and the world around us.

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