

# SOLUTIONS FOR GRAIN ANALYSIS



**Technology You Can Trust. Expertise You Can Count On.**

A Complete Portfolio of Testing Capabilities

Cereal Grains · Oilseeds · Pulses · By-products · Plant-based Ingredients





# GRAINS – THE FOUNDATION OF FOOD

Researchers, breeders, growers, traders, millers, processors, ingredient users – today's grain industry demands more when it comes to quality, safety, and uniformity. They also seek diverse products with unique characteristics. Whether consumed whole or processed, grains have nutritional and functional requirements and must be safe for consumption. And the only way to ensure grain quality is through rigorous testing.

That's where we come in. Our easy-to-operate, integrated testing and analysis solutions encompass the three primary areas required for complete knowledge of grains and their derivatives – nutrition, functionality, and safety. Our testing solutions help grain traders, processors, and labs test for quality at each stage, including:

- Establishing grain value
- Determining quality, nutrition, and safety
- Optimizing product yield and reducing waste
- Developing innovative, sustainable plant-based food products

With more than 60 years in the grain business, we're proud to be an ally in helping feed the world – safely, nutritiously, and economically.

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# CRITICAL QUALITY, NUTRITIONAL, AND SAFETY ANALYSES

Whether your focus is moisture, proteins, oils, fibers, vitamins, or minerals, we have the right analytical solutions to meet your needs.

**Grain traders** use our systems to optimize the drying process and establish product value. **Elevators** use our instruments for grading purposes, which helps to avoid subquality grain, obtain optimum value, and verify load-out. And **processors** use our solutions to verify incoming grain quality, blend and segregate in-process monitoring, and verify quality at load-out.

Additionally, our mycotoxin, pesticide, and heavy metal testing solutions are used at all stages of the grain process to help keep dangerous materials out and ensure the highest quality grain products.



## Testing at a Glance

### ► PROXIMATES

#### **Moisture, protein, fat, fiber, starch, and ash**

Many grains are priced and traded based on specific components. Fast, accurate measurement of these components is crucial to the grain trade.

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### ► FUNCTIONALITY

#### **Falling number, starch pasting, ingredient performance, and gluten properties**

Functionality is often not solely dependent upon composition, but also upon energy input and the resulting interactions of substances.

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### ► NUTRITION

#### **Amino acids, vitamins, minerals, and proteins**

Grains represent a significant portion of human and animal consumption. Ensuring proper nutritional content and digestibility are important grain aspects.

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### ► SAFETY

#### **Mycotoxins, pesticides, heavy metals, and pathogens**

While generally a safe food source, grains can become compromised naturally, unintentionally, and intentionally. It's critical that companies ensure the safety of grain products.

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# END-TO-END GRAIN ANALYSIS

From ingredient intake to process monitoring to load-out – each step in the grain supply chain relies on thorough, dependable testing, and our customers rely on us for solutions that positively impact their efficiency and profitability. They can trust in our technologies and capabilities – instruments, consumables, software, and support – to cover all their grain analysis needs.

## Analysis at Every Stage: Grain Trade, Grain Receiving, Processing, and Finished Grain Products



### Ingredient Intake

Wheat, rice, corn, barley, soybeans, soy meal, pulses

- Ingredients are screened and binned, stored, or rejected
- They are tested for composition, functionality, and safety
- Testing is performed at receipt area and in the in-house lab



### Process Areas

Milling, mixing, fermenting, distilling, extracting, pressing, fractionating, drying

- Processes are monitored and the results are used to adjust processing conditions
- Early detection reduces waste, eliminates rework, improves efficiency, and decreases energy use
- Testing happens with process instruments, at-line instruments, and with in-house lab tests



### Load-Out

Finished goods, byproducts, coproducts

- Finished goods are tested for safety, composition, and quality
- Higher-risk products are stored until safety or quality measurements are performed
- Testing happens at-line or with process instruments, generally pre-packaging

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# DETERMINING THE VALUE OF GRAIN

Both buyers and sellers need to know the quality of grain, as that determines its commercial value and intended use. Through our fast, accurate, and fit-for-purpose analytical solutions, we're helping the grain trade make smart business decisions.



► **Perten Falling Number® – World-Standard Method for Sprout Damage**

Detect sprout-damaged wheat, barley, and rye to segregate, blend, and price outgoing and incoming grain, helping to obtain its optimal value.

[LEARN MORE](#)



► **Inframatic™ 9500 Whole Grain NIR – Reliable, Robust, and Meets Grain-Handling Operation Requirements**

Analyze a wide range of grains, oilseeds, pulses for moisture, protein, oil, and more in less than 30 seconds. Approved for official trade use in multiple countries.

[LEARN MORE](#)



► **Aquamatic™ 5200 Grain Moisture Meter – Results in 10 Seconds**

Employs 149 MHz and the UGMA to measure moisture, temperature, and TW/HLW in 10 seconds, while optimizing grain drying to reduce cost and mitigate mycotoxin growth. Approved for official grain trade in many countries.

[LEARN MORE](#)



► **Inframatic™ 8800 NIR Grain Analyzer – Portable Instrument Determines Protein, Moisture, and Oil**

Test early in the grain-trade process to detect and segregate the highest quality product for maximum value.

[LEARN MORE](#)



► **AuroFlow™ AQ Afla Strip Test – Simple-to-Use Mycotoxin Test Strips**

High-powered portable reader facilitates mycotoxin testing anywhere, anytime. Additionally, the water-based extraction methods create an easy, environmentally friendly method.

[LEARN MORE](#)



► **SPD 4200 Sequential Precision Divider – Split Samples into Sub-Samples for Testing**

Provides a small, representative sub-sample from a larger quantity in less than 15 seconds.

[LEARN MORE](#)

Check out our NetPlus Networking Solution for grain networks and remote administration ►

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# PROCESSING QUALITY GRAIN

Whether milling, fractionating, extracting, or fermenting, our robust grain testing instruments and methods help in improving efficiency and yields, while also increasing throughput and reducing waste in all forms – energy, labor, and materials. Screen ingredients, monitor processes, and verify outgoing materials for quality, function, and safety to get the most value from your grain.



► **Perten Falling Number –  
World-Standard Method for  
Sprout Damage**

Keep unknown sprouted grains from entering processes or facilities with the Falling Number Blend and optimize your grain to meet specific end-product needs.

[LEARN MORE](#)



► **Inframatic 9500 Whole Grain NIR –  
Reliable, Robust, and Meets Grain-  
Handling Operation Requirements**

Analyzes a wide range of grains and oilseeds for moisture, protein, oil and many other parameters in less than 30 seconds.

[LEARN MORE](#)



► **Aquamatic 5200 Grain Moisture  
Meter – Results in 10 Seconds**

Ensure you receive the quality you pay for with rapid, accurate moisture analysis of all of your incoming grains, oilseeds, and pulses.

[LEARN MORE](#)



► **Lab Mill 3100 – Grinding for Falling  
Number, Glutomatic, Kjeldahl, and  
NIR Analysis**

Built-in insulated metal construction lowers noise level, and cyclone sample outlet allows for convenient sample collection, making the mill virtually self-cleaning between grindings.

[LEARN MORE](#)



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PROCESSING PORTFOLIO CONTINUES



# PROCESSING QUALITY GRAIN

There are many different grain processes including milling, fractionation, extraction, and fermentation. Our robust instruments and methods help processors screen incoming grain to make certain it will process as intended, monitor the process in real time to optimize production yield and reduce waste, and verify final product quality and safety.



## ► RVA Ingredient Performance Analyzer – For Product Development, QA, and QC

Can test as little as two or three grams of sample using international standard methods or tailor-made test routines of mixing, measuring, heating and cooling the grain trade.

[LEARN MORE](#)



## ► doughLAB™ – Measures Flour Rheological Characteristics

Determines levels of water absorption, stability, elasticity, viscosity, extensibility and more.

[LEARN MORE](#)



## ► FT 9700™ Bench-top FT-NIR Instrument – Accurate Results In Less Than 30 Seconds

Offers a simple, modern, intuitive, and productive agri & food testing experience. Capable of using calibrations based on transferred data from other brand NIR systems.

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## ► DA 7350™ In-Line Process Analyzer with Camera

Performs real-time multiconstituent measurements of products on a processing line, providing information for process control and quality monitoring.

[LEARN MORE](#)



## ► DA 7440™ On-Line Process Analyzer

Performs real-time multiconstituent measurements of products on a processing line or belt, providing information for process control and quality monitoring.

[LEARN MORE](#)



## ► DA 7250™ At-line NIR Instrument – Accurate and Easy-To-Use, results in 6 seconds

Measures moisture, protein, fat, fiber, starch and many other parameters in all types of samples – powders, pellets, grains, pastes, cakes, meal, and slurries.

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# GRAIN TESTING LABS

We provide a full collection of analytical instruments with applications. Our solutions are designed to help you achieve:

- Accuracy and repeatability
- Low cost of ownership and cost per test
- Service through our industry-leading OneSource program

## Grain-Specific Labs

We provide dedicated grain testing instruments for labs servicing the industry – whether their focus is on routine testing or high-volume crop surveys.

## Corporate Labs

Our solutions allow corporate labs to support processing plants by providing R&D services, offering guidance to testing, performing complex, time-consuming analyses that aren't feasible at production facilities, and providing technical services to help solve problems.

## Contract Labs

We offer highly capable equipment and food testing expertise. Uptime, support, and standard methods are critical to offering the required array of testing services.

Our fit-for-purpose instruments are also versatile, enabling multiple tests to be performed following established regulatory protocols and official methods AACCI, ISO, ICC, etc. In addition, our unmatched service and support provide customers with invaluable instrument and method expertise.



## CLICK EACH CATEGORY TO LEARN MORE

- ▶ **Minerals & Metals**
- ▶ **Pesticides, Mycotoxins, Vitamins, Contaminants & More**
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## Minerals & Metals:

Grain is a vital source of dietary trace minerals, but it can easily become contaminated with heavy metals. Rice, for example, uptakes arsenic and cadmium, while other grains can uptake different metals when vulnerable to flood events, soil contamination, and other natural exposures. As the world leaders in atomic spectroscopy technologies, we have the right instrument to meet your specific needs.



### **PinAAcle™ Atomic Absorption Spectrometers (AAS) –**

For trace-elemental analyses, our market-leading PinAAcle flame, graphite furnace, and combined flame/furnace AA spectrometers are the preferred choice in thousands of laboratories globally. They feature simple operation and efficient analysis of up to eight metals/minerals per sample, perfect for routine monitoring.



### **Avio® Max Inductively Coupled Plasma Optical Emission Spectrometers (ICP-OES) –**

Whether you're testing grains, animal feeds, or soils after acid digestion preparation, or testing oils like canola or sunflower after simple dilution, the Avio Max ICP-OES series provides rapid analysis of important trace and essential elements in one run. It's perfect for high-throughput multi-elemental analyses, from high ppm to ppb ranges.



### **NexION® Inductively Coupled Plasma Mass Spectrometers (ICP-MS) –**

For ultimate performance and outstanding detection limits, the multi-award-winning NexION ICP-MS series is the ideal solution for multi-elemental analyses, especially when monitoring trace and toxic metals.

[Check out our award-winning Atomic Spectroscopy portfolio ►](#)

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## Pesticides, Mycotoxins, Vitamins, Contaminants & More



**LC 300™ HPLC & UHPLC Systems** – The innovative LC 300 HPLC/UHPLC portfolio provides unparalleled ease of use for testing vitamins, pesticide residues, mycotoxins, sugars, and more in grain and grain derivatives. Fit-for-purpose workflows and consumables kits simplify instrument operation, while also reducing the risk of costly errors during sample prep and analysis. SimplicityChrom™ Chromatography Data System (CDS) Software supports the complete analytical workflow from instrument control to reporting.



**GC 2400™ Platform** – For the qualitative and quantitative analysis of grain composition, additives, flavor and aroma components, and contaminants such as pesticides, natural toxins, veterinary drugs, and packaging material, the GC 2400 Platform offers innovative technology that enables access to real-time information on the go, supporting a new user experience. With the detachable touchscreen, the GC 2400 Platform enables remote monitoring of analysis, in and outside of the lab. SimplicityChrom Chromatography Data System (CDS) Software helps maximize productivity while making GC and GC/MS workflow operations efficient.



**QSight® Triple Quad LC/MS/MS** – The QSight LC/MS/MS system offers the sensitivity, selectivity, and specificity needed for the determination of contaminants at trace levels, including pesticides, natural toxins, amino acids, and fatty acid profiles. Leveraging its StayClean™ self-cleaning technology, the QSight LC/MS/MS significantly improves instrument uptime for more sample testing.

[Check out our Chromatography & Mass Spec portfolio ►](#)

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## Automation & Accessories



**QS-Works™ Autosampler** – From analytical sample preparation to final data reporting, the QS-Works 420 workflow offers technology and software that provides customers the confidence to test grain samples accurately and efficiently.



**MaxSignal® HTS Mycotoxin Testing** – Our ELISA-based mycotoxin high-throughput system can perform up to 180 tests in 90 minutes. The system can be programmed for single or multiple mycotoxins, in the same or differing grain matrices, in the same run. Once sample preparation is completed, the samples are inserted, and you can walk away. The flexibility and automation allow grain support labs to address the constantly varying test requirements and throughput needs.



**JANUS® Automation** – To further streamline your workflow, the JANUS systems can be placed in front of analytical instruments to automate sample preparation such as reagent additions, dilutions, and more.



**MPS 320™ Microwave** - The MPS 320 is a reliable and easy-to-operate microwave digestion system for our AAS, ICP-OES, and ICP-MS instruments that accommodates most types of grain samples. It provides the choice of closed-vessel digestion – a requirement for working with volatile elements – or unique, easy-to-use, high-throughput auto-venting vessels. Plus, you can choose between four different rotor configurations, depending on your needs.

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# SUPPORT – HOW AND WHEN YOU NEED IT



Corporate labs, grain- and food-specific contract labs, and large, diversified contract labs all support the grain industry in important ways along the supply chain. While these labs have unique requirements, they also have the goal of serving their specific grain customers. Not only do we have the experience and expertise to provide the methods, techniques, and instruments to best meet their customers’ needs, but we also deliver the workflows, software, and support services that improve efficiency and throughput, while lowering costs-per-test. Our scalable instrument services and customer training ensure you get the most out of your PerkinElmer solution.

OneSource® Laboratory Services offer scalable, flexible options for labs of all sizes, for PerkinElmer and non-PerkinElmer equipment. From service contracts and performance maintenance, compliance qualification and validation, training, descriptive analytics, and interactive dashboards to asset management and comprehensive concierge laboratory services – with OneSource, you can explore what suits you best.

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Capabilities at a Glance	Falling Number	Glutomatic	AM 5200	IM 8800	IM 9500	DA 7250	DA 7350	DA 7440	RVA 4800	doughLAB	AuroFlow AQ LF	MaxSignal ELISA	PinAAcle AAS	Avio Max ICP-OES	NexION ICP-MS	LC 300 (U)HPLC	GC 2400	QSight LC/MS/MS	Pathogen Detection Assays
Amino Acids						x										x		x	
Ash					x	x	x												
<i>E. Coli</i>																			x
Falling Number	x																		
Fatty Acids						x										x	x	x	
Fiber						x	x	x											
Gluten Quality		x																	
Ingredient Performance									x	x									
In-line Monitoring							x	x											
<i>Listeria</i>																			x
Minerals/Heavy Metals													x	x	x				
Moisture			x	x	x	x	x	x											
Mycotoxins											x	x							
Oils				x	x	x	x	x											
Pathogens																			x
Pesticides																x	x	x	
Protein				x	x	x	x	x								x		x	
Rheology	x								x	x									
<i>Salmonella</i>																			x
Starch					x	x	x	x	x										
Sugars/Carbohydrates						x	x	x								x		x	
Vitamins																x	x	x	





[www.perkinelmer.com/grain](http://www.perkinelmer.com/grain)



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