

IN-PROCESS / AT-LINE ANALYSIS

Nordson
MEASUREMENT & CONTROL



A NEW ERA IN
GAUGING FOR
INDUSTRIAL BULK
APPLICATIONS



Empowering True Process
and Quality Control

NDC Products

Intelligence that transforms the world.

Maximizing Process Performance and KPIs

Through Moisture Measurement

For more than 50 years, we have designed and built measurement solutions specifically developed to meet the manufacturing challenges faced by the bulk material, mineral, chemical and pharmaceutical industries.

Our leading position in process measurement has been achieved by working closely with our customers and developing solutions that meet their needs – for better process insight and quality control. We set the bar in the industry for best-in-class performance with our CM710e and PH710e on-line industrial gauges and InfraLab e-Series at-line analyzer. Our legacy of innovation continues with the Series 9 gauge.

By solving process-specific application challenges, we play a dominant role in supporting industry and forging successful relationships with the leading manufacturers.

Today, tens of thousands of Nordson gauges are in service around the globe. That's because we are trusted not just to meet process needs, but to uncover new efficiencies, ensure quality and add value wherever our products are installed.



Stay Ahead with the Series 9 On-Line Gauge

The Only On-Line Sensor on the Market that can Simultaneously Measure Color, Moisture, Fat/Oil, and Protein...Out of the Box

The Series 9 gauge is a best-seller in the food industry. It is specially engineered for 24/7 duty, helping manufacturers to meet product quality demands and efficiency goals.

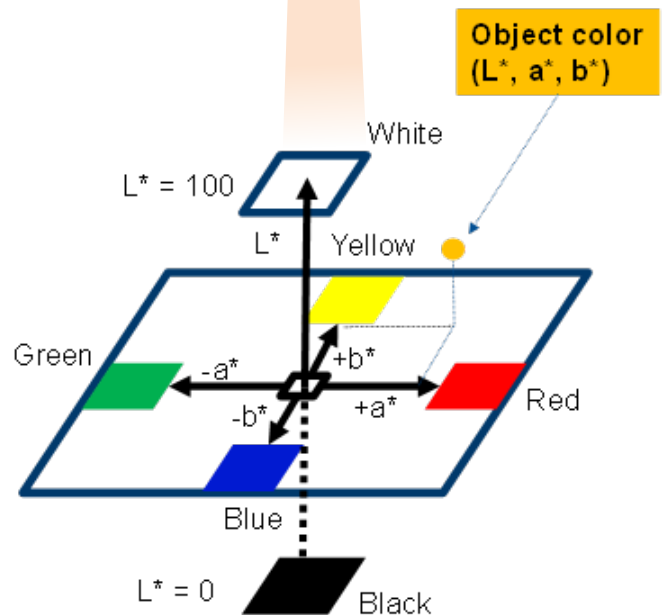
Installed directly on-line, it delivers unparalleled measurement performance while maintaining simplicity and versatility in design and operation. It doesn't require special operator skills or expert knowledge.

The Series 9 can simultaneously measure key constituents such as Moisture, Oil/Fat, Protein and Color in Food or solid products. Color can be measured across a wide range of standard scales, including CIELAB (L^* , a^* , b^*), Tristimulus (X, Y Z), RGB, CIELCh (L^* , C^* , h) ΔE^* & ΔE_{cmc} , Degree of Roast (DOR).

Application tests in leading companies have proven that repeatable numeric color readings, combined with other critical measurements such as moisture, fat/oil, and protein, can be confidently used as part of a process control strategy to deliver consistent product quality every time.

The Series 9 Color Gauge keeps you ahead with:

- Evolutionary technology that is flexible, adaptable and scalable to meet your changing needs
- Enterprise-level intelligence compatible with Industry 4.0
- Easier operation and maintenance
- Lower cost of ownership over a long lifetime of operation



Leverage the Power of At-Line Analysis

The **NEW** InfraLab® Series 9 – benchtop analyzer to the Series 9 on-line gauge – is the latest leading at-line analysis solution on the market. Designed to be used anywhere in the process, the InfraLab Series 9 offers an expanded range of features and capabilities that will help you elevate your quality assurance process. Benefit from rapid, accurate and consistent measurements for a wide variety of tobacco applications. Learn more about this powerful analyzer on page 12.



Improve your Process with Immediate and Long-Term Advantages

We understand your process challenges



Automated process control

Automated process control using real-time, on-line moisture measurement is a primary objective for many processes in order to achieve consistently optimal product quality, meet required product flow or compression characteristics or ensure the product can be correctly stored or transported prior to end use.



Tighter control of moisture

In addition to great quality, moisture content greatly impacts process efficiency and yield. Whether you're achieving the correct end-point moisture prior to forming a product, monitoring moisture in a slurry before the spray dryer or using feedback control at the dryer exit to optimize moisture levels, these and many other processes can benefit from tighter control of moisture levels within your product.



Accurate, robust measurements

Measurements must be robust enough for the process environment and accurate and reliable enough to be trusted for control. The process may also demand specifically-engineered solutions to gain access to the product to make an effective measurement.

While many products are transported on conveyors that provide convenient measurement access, pneumatic transport systems require automatic samplers, discontinuous product flows require product presence/absence detection and a measurement may also be required through a sight glass.



We offer a range of well-engineered solutions

We offer a wide range of well-engineered solutions to ensure that the measurement can be made where and when you need it. Nordson industrial moisture gauges have been installed and are in daily use around the world in demanding industrial processes, helping manufacturers to optimize quality and process performance. Our gauges will also help you to:

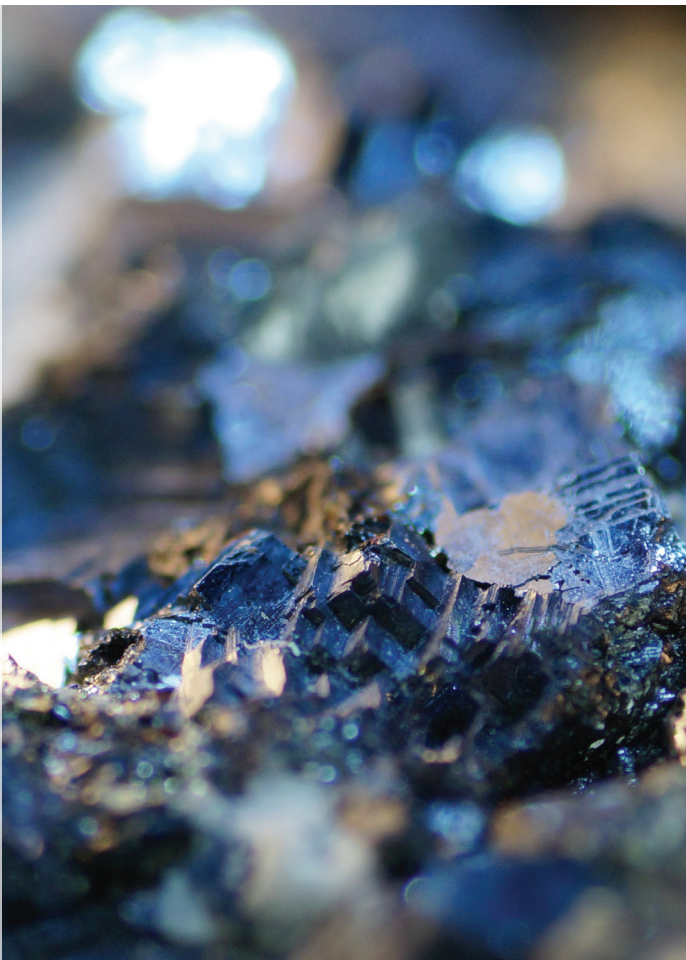
- Improve production efficiency
- Reduce fossil fuel consumption
- Achieve right-first-time batch drying



Operate your process at peak performance with moisture measurements in applications, such as:

- Powders and Aggregates
- Flakes and Granules
- Slurries and Paste

Refer to the list of applications later in this brochure to see how the Series 9 delivers value to your process.



Engineered with your process in mind

Greater processing power to perform more advanced measurements and gauge operations

- Powerful, dual-core processor with large on-board storage

Unparalleled process vision

- 12 hours of measurement trending and embedded product calibration adjustment tools

Expansive measurement database to meet your needs

- Every Nordson application is fully documented

Hygienic, seamless stainless-steel enclosure with sapphire window

- 316L stainless steel, sealed to IP67

Integrated Air Purge Window shield to keep window clean from process environment

- Advanced window contamination monitoring with an optional air flow monitor



Simple slide-on sensor mounting



Integrated Air Purge Window



Removable service backplate

Innovative removable backplate for easy service and maintenance

- Remove gauge internals while leaving enclosure in place

ATEX certification for safe use in dust hazardous environments

- DUST: II 1 D Ex Ta IIIC T288°C Da Ta
-20°C to 50°C and II 2D Ex Tb III C T80°C Db

Versatile connectivity for flexible integration into production networks

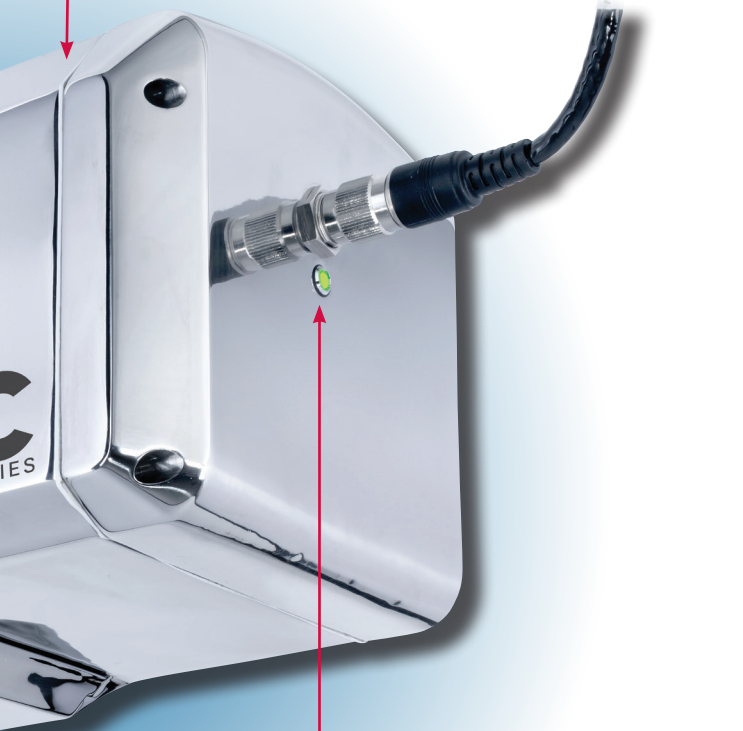
- Ethernet and fieldbus networking with digital and analog connectivity

Easily connect to Series 9 via hand held tablet

- Connect from any location wirelessly or via internet for sampling and configuration

Advanced diagnostics for maximum uptime

- Includes Status indicator light for at-a-glance confirmation with integrated Auto-Check feature for total piece of mind



Status indicator light

Easy to Install,
Integrate and Operate

Connectivity and Interfacing to Enhance Process Insight and Control

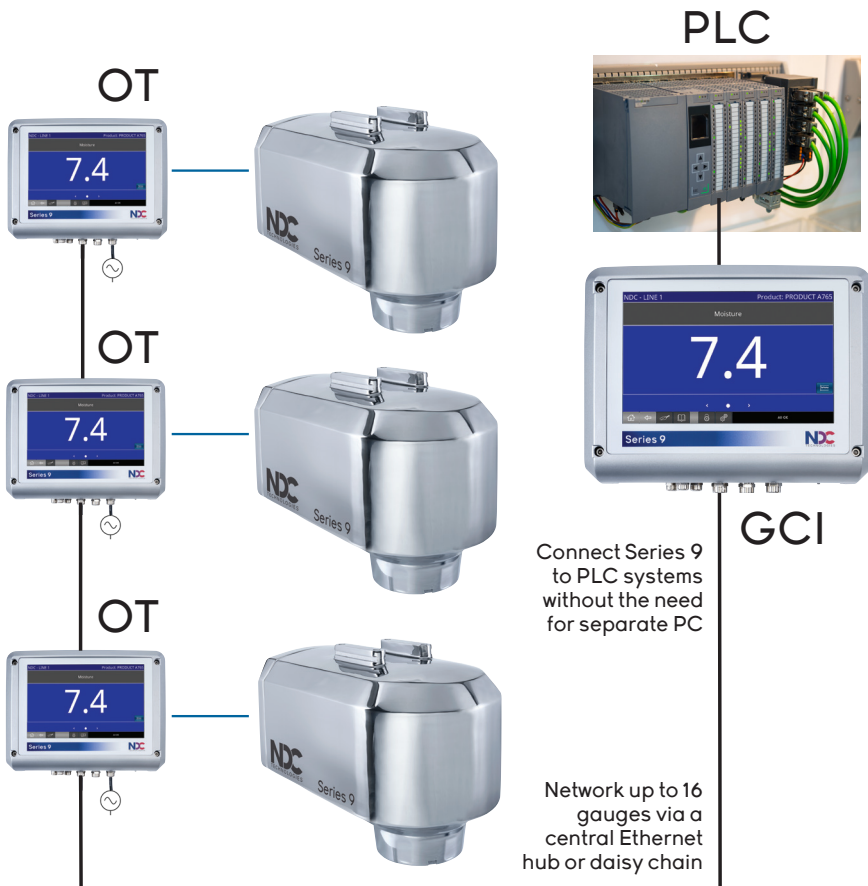
A flexible and scalable in-process gauging system for industrial applications



Gauge Control Interface (GCI)

Series 9 gauge control interface

- 10-inch, touch-screen GCI
- Three Ethernet ports and RJ45 external port
- Interfaces up to 16 gauges
- Multi-lingual interface



Portable interface

Accessing your Series 9 gauge is even easier with our portable operator terminal. It can be docked in the control room or operated near the gauge (wirelessly or via Ethernet cable) for sampling and configuration.

Series 9 devices

Series 9 peripheral devices all run on 24V DC power and include:

- Operator Terminal
- Gauge Control Interface
- Gauge Control Port
- Power Hub



OT

Operator Terminal

The OT provides 24V DC to a single gauge and operator-level interaction access to its measurement, data trending, sampling and diagnostic functions. Three (3) Ethernet ports are available for convenient networking configurations.

GCI

Gauge Control Interface

The GCI provides 24V DC power to a single gauge. It enables you to perform multi-gauge setup (up to 16 gauges), calibration adjustments and product management. Both the GCI and OT feature high-definition, multi-lingual, color touch-screen displays.

GCP

Gauge Control Port

The GCP provides three (3) Ethernet ports, allowing multiple gauges to be networked (daisy chained). It also has additional options for analog outputs and digital I/O for any connected gauge.

PH

Power Hub

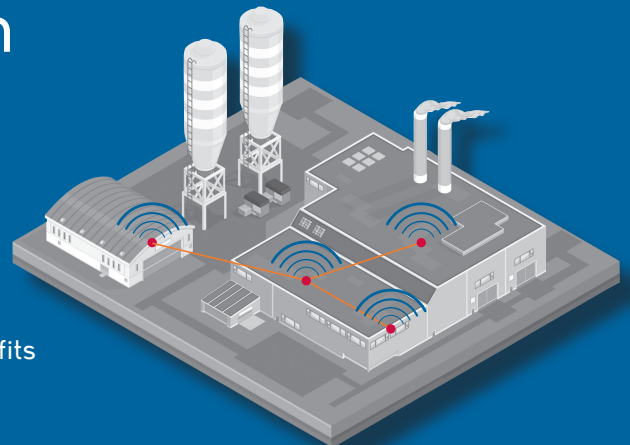
The PH provides 24V DC power to a single gauge. It also enables convenient networked arrangements of multiple Series 9 gauges and devices via three (3) Ethernet ports.

Industry
4.0

Scalable solution to meet your plant configuration

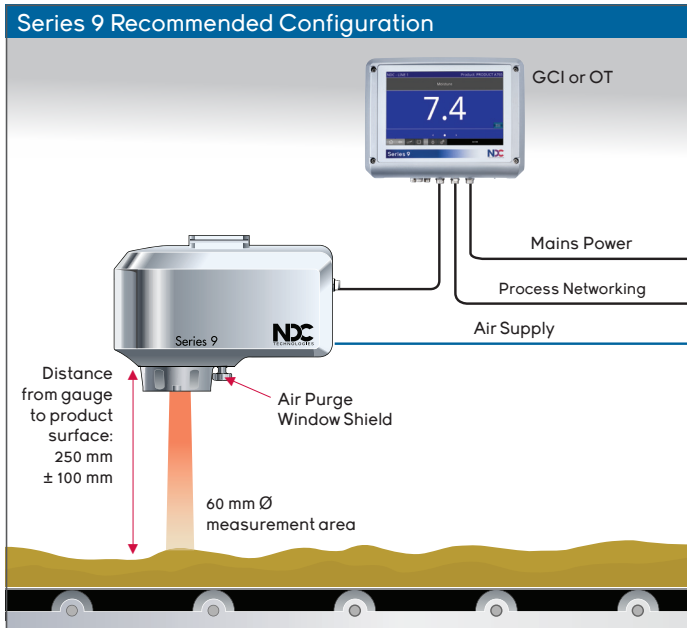
Series 9's flexible building-block architecture enables you to scale Nordson's gauging system to meet current and future site requirements.

- Keep pace with changing demands
- Meet the needs of your plant
- Protect current investment while realizing additional benefits
- Maintain a competitive edge



Fully Engineered to Deliver Accurate, Reliable Measurements

In continuous product flows...

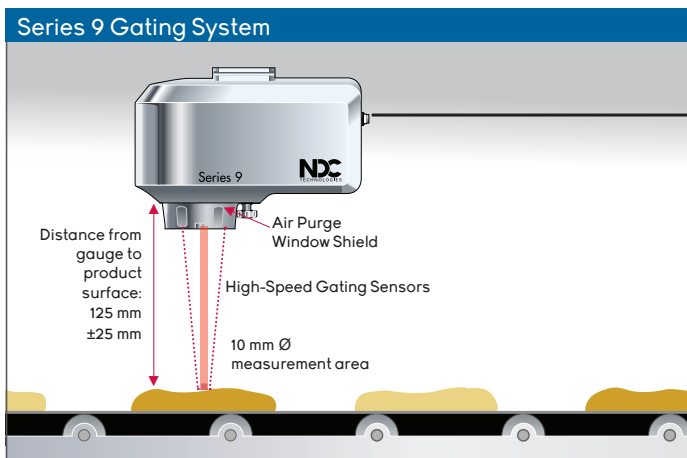


Installation

The Series 9 measures over a 60 mm diameter area (optionally 25 mm or 10 mm) and is suspended over the process line at a distance of 250 mm from the mean product height to the Series 9 measurement window.

The gauge tolerates product height fluctuations of ± 100 mm without the measurement being affected.

Ambient lighting, temperature or relative humidity changes do not affect the Series 9 measurement.

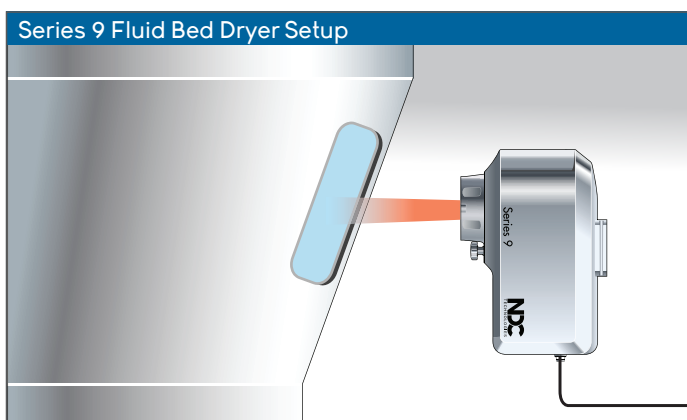


Discontinuous product flows

The optional integrated "high-speed gating" system detects the product's presence or absence in discontinuous flows and avoids recording of data when nothing is passing across the measurement area.

High-speed gating can be used for processes which simply do not flow continuously.

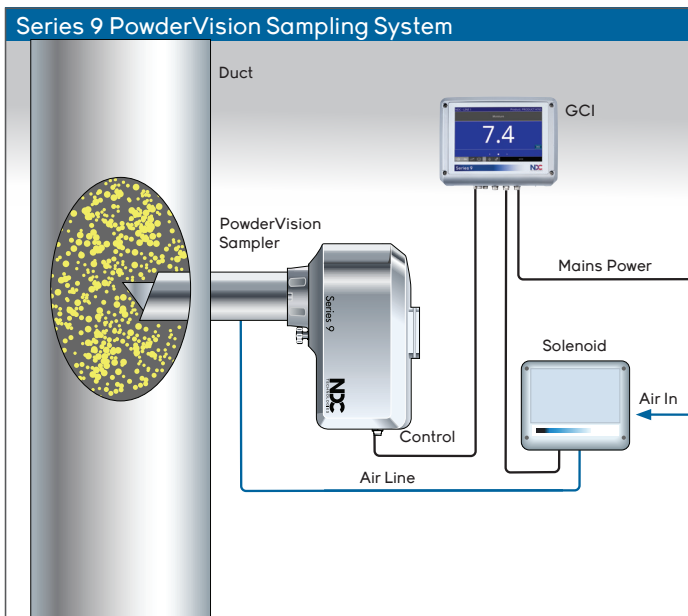
Beam patch sizes of 60 mm or 10 mm are available.



Powders in fluid bed dryers

The Series 9 moisture gauge can be installed to measure moisture in powders in a fluid bed dryer through a sight glass, while ensuring that the measurement area is below the powder line. For powders that adhere to the sight glass, ask about Nordson's unique cleanable fiber probe solution.

Used with a PowderVision sampler in gravity-fed product flows



Measuring powders in gravity-fed ducts

The pneumatic PowderVision sampler can be used with the Series 9 gauge for powders transported in enclosed ducts.

This device comprises of a tube fitting with window and a sample collection cup which fills with the falling product. Once a sample has been collected and measured, a jet of air ejects it and the cycle repeats.

Additional technical information sources

For additional technical information about installation, calibration, networking and process connectivity, and to learn more about the Series 9 gauge generally, please consult the product manuals.

Ready for any process condition

The Series 9's stainless-steel hygienic housing is sealed to IP67 requirements and optionally ATEX certified. Its seamless hygienic design is a must for industrial applications and allows operation in ambient temperatures from 0-50°C without cooling.

For higher ambient temperatures, cooling options using a novel heat exchanger arrangement are available:

- **Vortec air cooling:** with an optional air control solenoid to optimize air consumption and reduce operating cost
- **Water cooling**



TEMPERATURE



DUST



AMBIENT LIGHT



HUMIDITY

InfraLab® Family of Analyzers

Fast, Accurate & Easy to Operate – Viable Alternative to Laboratory Methods

InfraLab® Series 9

Proven. Cost Effective. Accurate.

The InfraLab® Series 9 food analyzer, designed for both at-line and lab use, measures samples taken from the process in less than 5 seconds. Available in single- or multi-component formats, InfraLab is able to simultaneously analyze:

- Moisture
- Oil
- Protein

InfraLab is ideal for bulk products such as pharmaceutical powders.

InfraLab is designed as a routine replacement for loss-on-drying, Karl Fischer or gravimetric moisture testing and to replace chemical methods for fat or protein analysis, such as Soxhlet, Weibull-Stoldt or Kjeldahl. Once adjusted to your preferred reference methods using the built-in calibration tools, its key advantages are: speed, minimal sample preparation and the fact that it measures a larger, more representative sample than other techniques.



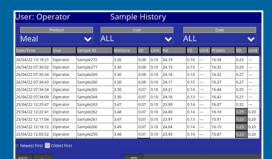
10-inch, high-resolution capacitive touchscreen display



Use encrypted USB sticks (BitLocker) for data download to spreadsheet programs



Reference standard for routine stability checks and standardization after servicing



History Audit Log and on-board data storage (up to 10,000 sample measurements)

InfraLab Family Advantages:

- Advanced high-accuracy, at-line industrial analyzer designed for rapid analyses in process environments
- Direct replacement for time-consuming laboratory analyses or at-line instruments such as loss-on-drying or gravimetric moisture or testing which has inherent operator-dependent repeatability and reproducibility performance issues
- Intuitive user interface that is consistent across the entire product range including integrated calibration adjustment tools to ensure continuity of performance with no loss of data
- Reduces the burden on over-stretched QA Laboratory resources
- Enables cross-checking of on-line measurements
- Enables greater processing and measurement capability for deeper process insight, creating new and exciting opportunities for application development
- Significantly reduces your operational expenditure and delivers a strong return on investment over the lifetime of operation

NEW InfraLab® Series 9 Top-Loader

Repeatable & Reproducible Results Every Time.

The InfraLab® Series 9 Top-Loader analyzer, is ideal for powders or ground products.

Measurement time in less than 5 seconds including simultaneous color (CIELAB) measurements.

Available in single- or multi-component formats, InfraLab is able to simultaneously analyze:

- Moisture
- Color (CIELAB, XYZ)



Fast ROI with Lowest OPEX

Example Applications:

- Ceramics & clay
- Fibers & polymers
- Nitrocellulose
- Minerals - mining
- Mining - industrial
- Mining - building & construction materials
- Industrial textiles
- Wood & cellulose products
- Organic waste & biofeed
- Chemicals
- Detergents
- Fertilizers
- Pharmaceuticals & nutraceuticals

User: Supervisor

Audit Trail

| Event | User | Date | |
|-------------------|------------|---------------|--|
| Recipe | ALL | 24 Hours | |
| Date/Time | User | Event | Details |
| 23/03/22 10:37:05 | Supervisor | Calibration | Rolled Oats - channel3.trim '0.00' => '-48.254' |
| 23/03/22 10:36:37 | Supervisor | Calibration | Rolled Oats - channel2.trim '45.00' => '51.232' |
| 23/03/22 10:35:13 | Supervisor | Calibration | Rolled Oats - channel1.trim '43.00' => '50.765' |
| 23/03/22 10:17:30 | Engineer | Recipe Update | Corn - productname 'Corn' => 'Rolled Oats' |
| 23/03/22 10:17:08 | Engineer | Recipe Update | Corn - channel1:appcodefull '16009083' => '16009100' |
| 23/03/22 10:17:08 | Engineer | Recipe Update | Corn - channel2:appcodefull '0' => '16009101' |
| 23/03/22 10:17:08 | Engineer | Recipe Update | Corn - channel3:appcodefull '0' => '16009102' |
| 23/03/22 10:16:02 | Engineer | Recipe Copy | biscuit crumb => Corn |
| 23/03/22 09:36:31 | Supervisor | Recipe Update | biscuit crumb - channel1.trim '37.000' => '43.000' |
| 23/03/22 09:35:31 | Supervisor | Recipe Update | biscuit crumb - channel1.trim '5.000' => '37.000' |

Newest First
 Oldest First

All OK

Full Audit Trail for GMP and Audits Reviews

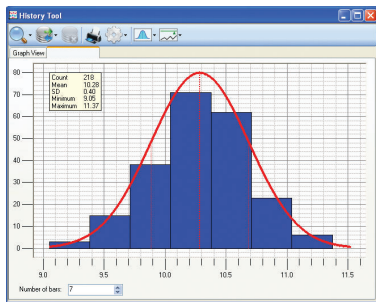
Infralab Manager & Calibration Software

Network connectivity

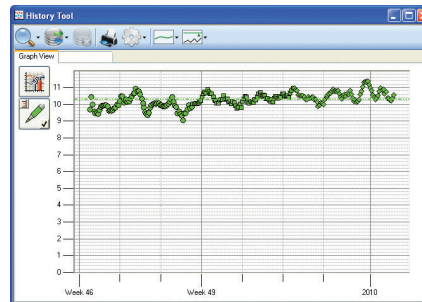
Optional communications interface for sending measurement data over Ethernet for capture and storage in a centralized database.



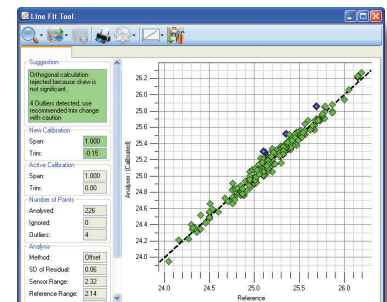
Advanced Data Analysis for Deeper Process Insight



Histogram



Data display



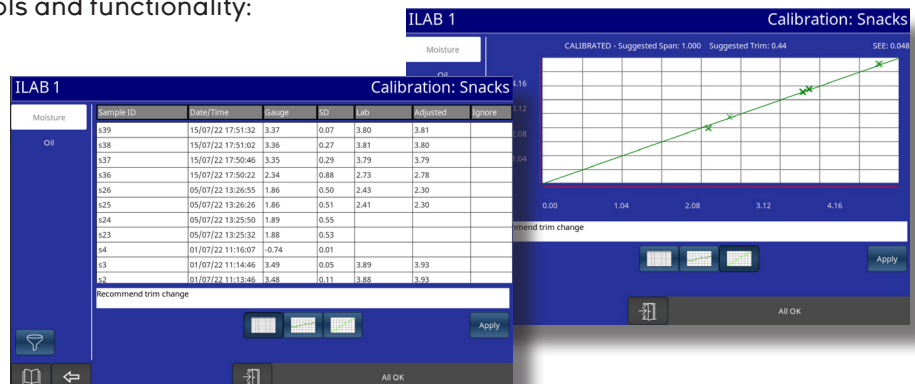
Calibration

With InfraLab Series 9, you realize a greater return on investment by reducing routine sample testing costs.

Integrated Calibration Tools

The Series 9 and InfraLab are delivered with our unique factory calibrations that are ready for use for the specified measurements and ranges. On installation, they are adjusted to agree with your reference method. The software simplifies this process by enabling a comparison of instrument values with laboratory results and features the following tools and functionality:

- Instrument setup and calibration
- Product management (product settings)
- Displays of measurement and other key parameters
- Data logging and export
- Diagnostic functions



Intelligence that transforms the world.

Get Unparalleled Performance in the Following Industrial Applications

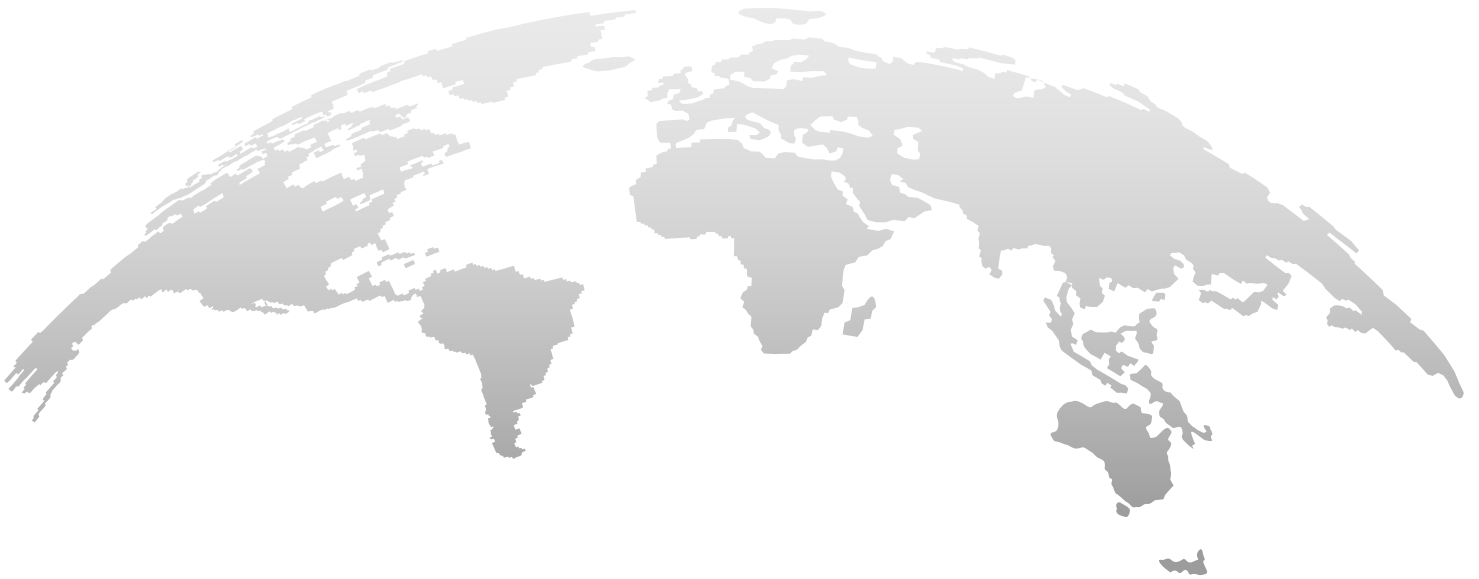
| Minerals and Bulk Applications | | |
|--|----------|--|
| Industry Sector | Moisture | Application Areas |
| Ceramics and Clay | ■ | ball clay, refractory clay, china clay (kaolin), spray dried ceramic powders, clay for roofing tiles |
| Fibers and Polymers | ■ | cellulose acetate tow, yarn or chips, glass fiber chips, nylon granules, rubber crumb, PVC powder |
| Nitrocellulose | ■ | nitrocellulose chips, nitrocellulose with nitroglycerine |
| Minerals – mining | ■ | bauxite (aluminum oxide), calcium fluoride (fluorspar), copper concentrate, copper ore powder or granules, copper tailings, crushed dolomite (calcium magnesium carbonate), gold ore, gypsum (calcium sulphate), ilmenite, kaolin granules, molybdenum sulphide, peat, phosphates, refined potash, potassium fluoride, powdered talc |
| Minerals – industrial | ■ | ash (power station and fly ash), coke breeze (powdered), crushed or powdered coal, milled furnace slag, raw sinter mix, sinter mix (mixture of iron ore + coke breeze + limestone) [not pure iron ore], Laponite, bentonite (Wilkinite) |
| Minerals – building and construction materials | ■ | cement meal, concrete mixes, roofing tile chips, washed sand, sand for roofing tiles |
| Industrial Textiles | ■ | cotton: Input – prebaling – pre-ginning, neoprene rope, rayon fiber, textile fibers, wool |
| Wood and Cellulose Products | ■ | cellulose pulp sheet, cork chips and sheet, paper fiber pulp, particle board, fiber board, OSB, sawdust, wheat straw, wood veneers, woodchips (frozen or unfrozen), wood fiber |
| Organic Waste and Biofeed | ■ | sewage sludge |
| Other | ■ | lead acid battery paste |

| Chemical and Pharmaceutical Applications | | |
|--|----------|---|
| Industry sector | Moisture | Application Areas |
| Chemicals | ■ | aluminum hydroxide, alumina/aluminum oxide, amino acid powder, ammonia oxide, ammonium/potassium chloride, boric acid, bromine, calcium carbonate, ferrite powder, sodium chloride (salt), sodium carbonate/bicarbonate, sodium sequicarbonate, sulphur, titanium dioxide paste/powder, uranium dioxide |
| Detergents | ■ | detergent powders: zeolite, phosphate- or carbonate-based, detergent slurries; phosphate or zeolite based |
| Fertilizers | ■ | ammonium, phosphate or nitrate based |
| Pharmaceuticals and Nutraceuticals | ■ | pharmaceutical and nutraceutical powders, sugar coatings in the pan coater |

Optimizing Your Investment with World-Class Service and Support

Nordson Measurement & Control's technical expertise comes from deep experience supporting thousands of products at the world's leading manufacturers. Our portfolio of support offerings leverages this expertise to assist you through the service lifecycle. We offer a complete range of cost-effective support solutions including commissioning, training, technical assistance and service agreements. Customers rely on our 24-7 availability via myNDC – the industry's most progressive service cloud portal. Whether it's configuring new equipment, training your technical staff or solving a technical problem, you can count on our experienced team to help maintain the health and performance of your Nordson product.

Visit myNDC service cloud at myndc.com.



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In line with its policy of continuous improvement, Nordson reserves the right to revise or replace its products or services without prior notice. The information contained in this document may not represent the latest specification and is for indicative purposes only.

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NDC Products

Intelligence that transforms the world.