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TECHNOLOGIES
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EMPOWERING TRUE PROCESS AND QUALITY CONTROL TODAY AND BEYOND

Series 9

A NEW ERA IN GAUGING FOR FOOD INDUSTRY APPLICATIONS

NDC – Maximizing Process Performance and KPIs

Through the Measurement of Moisture, Fat/Oil, Protein, Browning, Bed Depth and More

For more than 50 years, NDC has designed and built measurement solutions specifically developed to meet the manufacturing challenges faced by the food industry.

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 MM710e on-line food gauge 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 the food industry and forging successful relationships with the leading manufacturers.

Today, tens of thousands of NDC 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.

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Stay Ahead with the Series 9 On-Line Gauge

Process demands keep changing, but our Series 9 on-line food gauge is your **next-generation process optimization solution** for measuring moisture, fat/oil, protein and other key constituents. It is specially engineered for 24/7 duty, helping you to meet product quality demands and efficiency goals.

With **25 times more processing power** than its predecessor, the Series 9 delivers unparalleled measurement performance while maintaining simplicity and versatility in design and operation.

The **flexible, future-proof platform** harnesses the full power of infrared spectroscopy. The user-friendly format requires no special operator skills or expert knowledge, yet it allows expert users to access the enhanced interaction capabilities as desired.

The Series 9 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

Driven by our industry-leading expertise and unrivalled applications knowledge, the Series 9 delivers the performance and productivity you need – now, and for the challenges yet to come.

Leverage the Power of At-Line Analysis

The InfraLab e-Series – there is simply no better at-line analysis solution on the market today. This powerful, at-line analyzer is designed to be used anywhere in the process as part of your quality assurance system. Benefit from rapid, accurate measurements for a wide variety of food applications. Learn more about this powerful analyzer inside.

Advance Your Process.
Realize Immediate and Long-Term Value.

We understand your process challenges

Consistent product quality

The food industry faces many challenges as it strives to ensure consistent product quality, strong customer loyalty and maximum production efficiency.

In-process measurement and close control of critical process parameters – such as moisture, fat and protein – present a significant opportunity for food manufacturers to achieve their production and quality goals. However, the complexity and diversity of food products and production methods mean that taking a generic approach to process measurement cannot work.

Specifically engineered out-of-the-box solution

Requirements differ at various stages of the process, such as in the preparation of ingredients, mixing, forming, wetting, drying, baking/frying, flavoring, sorting and weighing. That's why applications engineering is at the heart of every NDC solution

At each stage in the process, the product may appear in a different form – e.g., powder, slurry, dough, flake, granule or final product – and the product may be transported on an open conveyor belt or enclosed duct at the point of measurement. Product flow may be either continuous or discontinuous, while ambient process conditions such as temperature and humidity may vary. In addition, the product itself may be prone to seasonal changes, crop differences and variations in raw material supply.

Decades of applications expertise

NDC understands these critical factors. That's why we've engineered robustness into our measurement solutions. This ensures that any changes in the measurement output are due solely to varying levels of the measured parameter, without influence from other product or process variables. With immediate access to data, our gauges take you one step further towards maximizing the performance potential of your process. As a result, you'll realize the following benefits:

- ▶ Enhanced product quality and consistency
- ▶ Reduced waste
- ▶ Development of best practices and safety
- ▶ Increased process productivity
- ▶ Continued brand loyalty

Operate your process at peak performance with single- or multi-component measurements in applications, such as:

▶ **Coffee processing** – moisture, degree of roast

▶ **Confectionery** – fat and moisture

▶ **Cookies and biscuits** – fat, moisture, degree of bake

▶ **Dairy powders** – moisture, fat, protein

▶ **Meat processing** – moisture, fat, protein

▶ **Savoury snacks** – moisture, fat, degree of bake

▶ **Starch and wet milling** – moisture, fat, protein

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

Meeting Your Application Needs Today and Tomorrow to Fully Leverage Your Investment

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 NDC 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

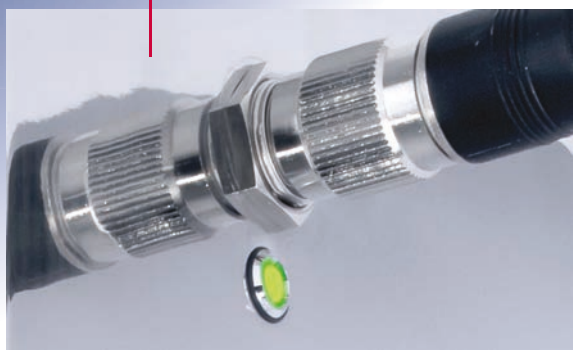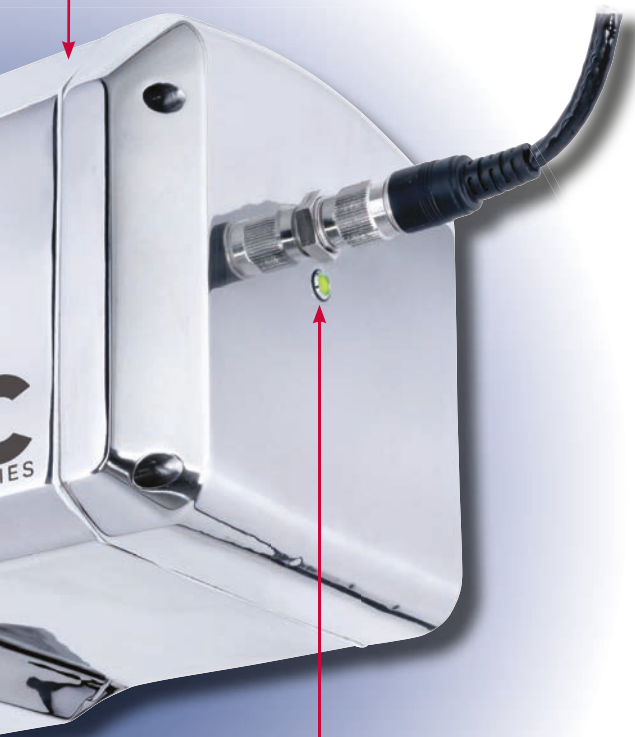► Advanced window contamination monitoring with an optional air flow monitor

Simple slide-on sensor mounting

Integrated Air Purge Window

Removable service backplate

Status indicator light

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

Wireless communication option to remotely connect to mobile devices

► Remotely view gauge, process and sampling information

Advanced diagnostics for maximum uptime

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

EASY TO INSTALL, INTEGRATE AND OPERATE

Connectivity and Interfacing to Enhance Process Insight and Control
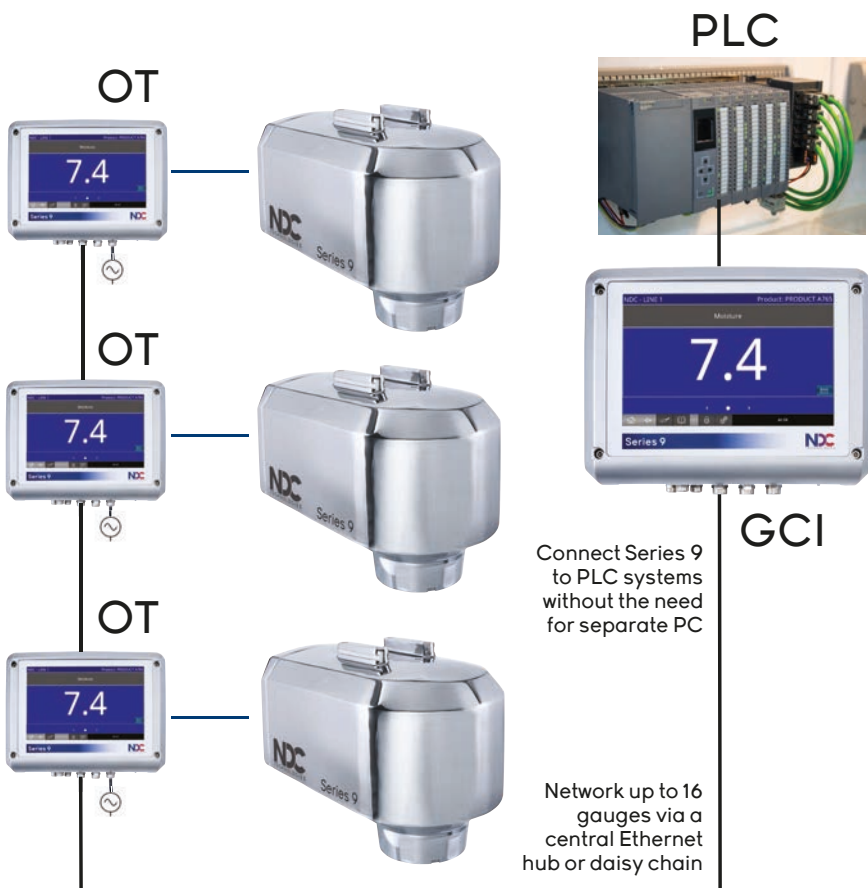
A flexible and scalable in-process gauging system for the food industry

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

OT

OT

OT

PLC

GCI

Connect Series 9 to PLC systems without the need for separate PC

Network up to 16 gauges via a central Ethernet hub or daisy chain

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
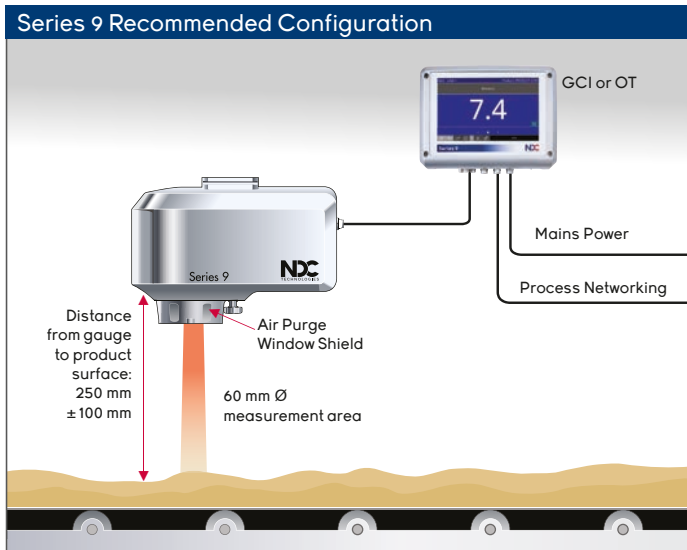
Scalable solution to meet your plant configuration

Series 9's flexible building-block architecture enables you to scale NDC'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 for the Process to Deliver Accurate, Reliable Measurements

In continuous product flows...

Series 9 Recommended Configuration

GCI or OT

7.4

Mains Power

Process Networking

Distance from gauge to product surface: 250 mm ±100 mm
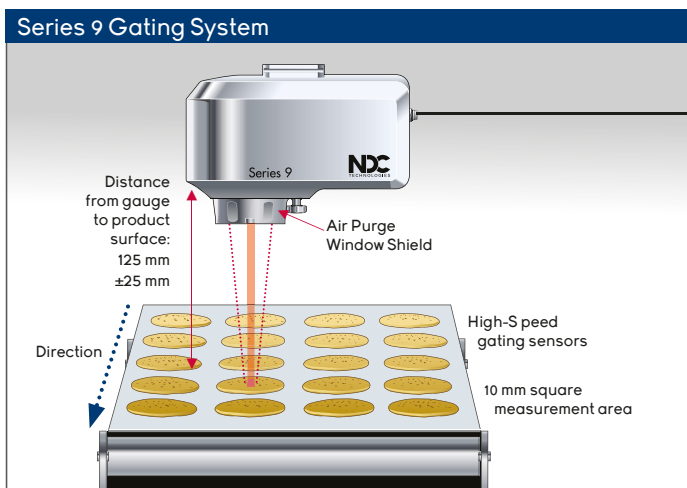
Series 9

Air Purge Window Shield

60 mm Ø measurement area

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.

Series 9 Gating System

Series 9

Distance from gauge to product surface: 125 mm ±25 mm

Air Purge Window Shield

Direction

High-S peed gating sensors

10 mm square measurement area
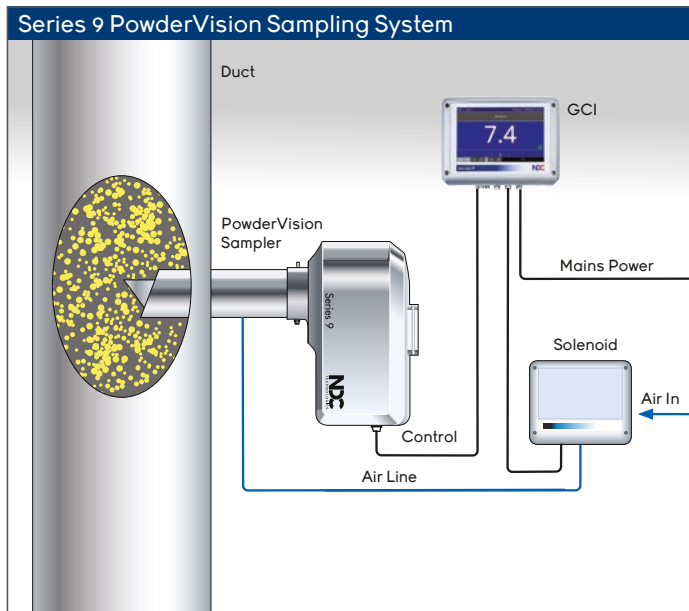
Discontinuous product flows

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 products, such as cookies, biscuits or crackers as shown here, or for processes which simply do not flow continuously.

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

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Used with a PowderVision sampler in gravity-fed product flows

Series 9 PowderVision Sampling System

Duct

GCI

7.4

PowderVision Sampler

Series 9

NDC

Mains Power

Control

Solenoid

Air In

Air Line

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 food industry 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

The InfraLab Food Analyzer

Fast, accurate and easy to operate, InfraLab is the viable alternative to laboratory methods
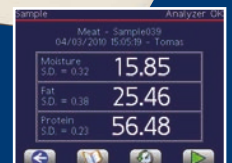
The InfraLab e-Series food analyzer, designed for both at-line and laboratory use, measures samples taken from the process in less than 10 seconds. Available in single- or multi-component formats, InfraLab is able to simultaneously analyze:

- ► Moisture
- ► Degree of Brownness
- ► Fat and Oil
- ► Degree of Roast
- ► Protein

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 calibrated to your preferred reference methods, a process facilitated by the InfraLab Manager software, its key advantages are: speed, minimal sample preparation and the fact that it measures a larger, more representative sample than other techniques.

InfraLab is accessed via its intuitive, touch-screen interface and requires no special user skills in routine use.

Touch-screen display

Data download to USB memory stick

Reference standard (option)

Barcode reader (option)

Key features

- ► **Color VGA touch-screen** interface

- ► **InfraLab Manager software** for data management via PC

- ► **Ethernet and LIMS** connectivity for factory or laboratory network integration

- ► **On-board data storage** of up to 10,000 sample measurement files

- ► **Up to 200 users** with individual pass code and specific access permissions

- ► **Product database** for up to 200 products with specific settings for each

- ► **USB data port** for data download to spreadsheet programs

- ► **Barcode reader option** making log-in and product selection even easier

- ► **Reference standard** for routine stability checks and standardization after servicing

- ► **Choice of sample bowl size**: deep, shallow (rotating) or petri-dish (static)

- ► **Measurement speed** 5 seconds or 10 seconds (application dependent)

- ► **History Audit Log** of calibration records and Reference Standard values

InfraLab Manager Software

At-line in the process area or in the laboratory

Secure data storage

In addition to its speed and precision, InfraLab benefits from substantial data storage and security features.

The time and date of every measurement are recorded along with the name of the operator who is logged in at the time.

5-year consumables warranty

The source lamp and motor are guaranteed for 5 years and can be exchanged quickly and easily onsite without intervention from NDC.

Ethernet connectivity

This capability enables InfraLab to be used either as a stand-alone analyzer or integrated into LIMS or factory networks, or simply connected to a PC when required to take advantage of the features offered by the InfraLab Manager software.

InfraLab Manager software

This tool provides user access to all measurement and calibration data and enables setup and remote access to data and key functions. It enables up to 16 networked analyzers to be controlled and viewed centrally from a PC.

Histogram

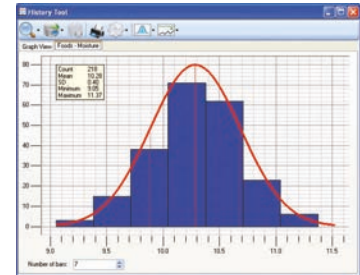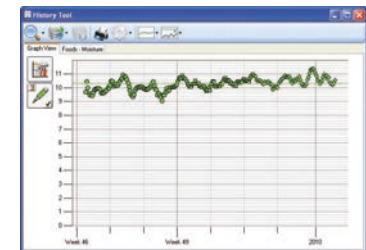Data display

Calibration

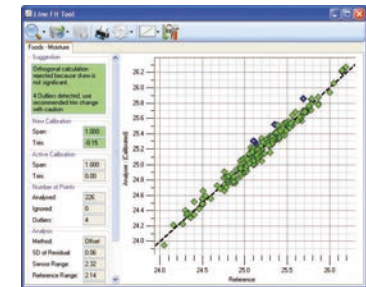## Network connectivity

Ethernet

PC running "InfraLab Manager" software

InfraLab's rapid analysis capability delivers substantial savings through reduction in costs of routine sample testing

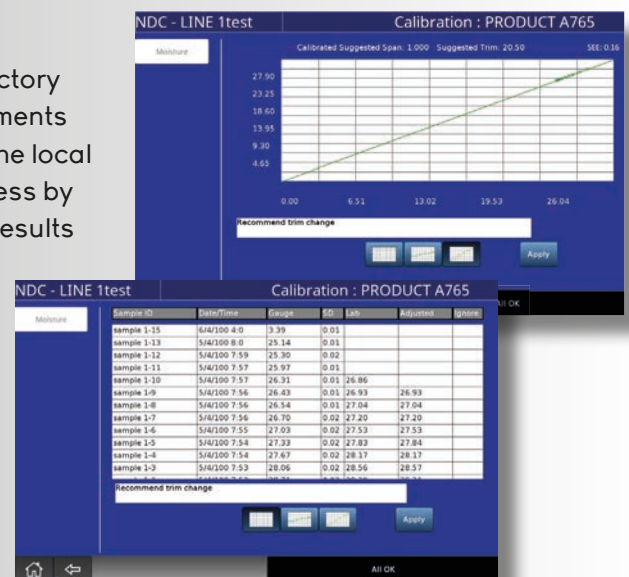# Get Unparalleled Performance in the Following Food Applications

Applications	On-Line	At-Line	Moisture	Fat/Oil	Protein	DOB	Application areas
Breakfast Cereals	▶	▶	✓				breakfast cereal - corn, wheat or rice based
Cheese Processing		▶	✓	✓	✓		cottage cheese, cream cheese, mozzarella, hard and semi-hard cheeses
Chocolate Making	▶	▶	✓	✓			cocoa beans, cocoa liquor, cocoa powder, drinking chocolate, molten chocolate, crumb
Coffee and Tea Processing*	▶	▶	✓				green beans, ground roast coffee, instant coffee, instant tea, finished tea leaf
Confectionery	▶	▶	✓				sugar coatings, molding starch, fondant cream
Cookies and Biscuits	▶	▶	✓			✓	cookies - wire cut, biscuits
Corn and Maize Wet Milling	▶	▶	✓	✓	✓	✓	starch, modified starch, sweetners, gluten, germ, maize fiber
Crackers and Crispbreads	▶	▶	✓				sweet or savory crackers, Scandinavian crispbreads
Dairy Powders	▶	▶	✓	✓	✓		casein, lactose, milk powder, infant formulae, non-dairy creamer
Flour and Grains	▶	▶	✓	✓	✓		rice, wheat flour (white or wholemeal), soya flour, oat flakes, whole wheat or barley, wheat gluten
Ingredients, Seeds, Nuts and Spices	▶	▶	✓	✓			sunflower seeds or meal, shea nuts, sesame seeds, spices, yeast, nuts palm fiber
Meat Further Processing		▶	✓	✓	✓		ground beef, pork, lamb, poultry, meat cuts, mechanically reclaimed meat products
Olive Oil Extraction	▶	▶	✓	✓			olive pomace or "orujo" during virgin oil and standard oil extraction processes
Pet Foods and Animal Feeds	▶	▶	✓				pellets, dry feeds, dog biscuits, alfalfa, lucerne, distiller's grains, spent grains, bagasse, brewery waste, coffee waste
Potato Chips and Crisps	▶	▶	✓	✓		✓	fried potato chips or crisps, baked potato chips or crisps, hand-cooked chips
Snack Products, Baked or Fried	▶	▶	✓	✓		✓	corn chips, tortilla chips, corn dough, puffed corn snacks, popcorn, pretzels
Starch	▶	▶	✓				corn starch, potato starch, wheat starch
Sugar Processing and Refining	▶	▶	✓				granulated sugar, caster sugar, brown sugar, sugar cubes

*Includes Degree of Roast measurements.

Calibration software

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

- ▶ Instrument setup and calibration
- ▶ Product management (product settings)
- ▶ Displays of measurement and other key parameters
- ▶ Data logging, data trending and export
- ▶ Diagnostic functions
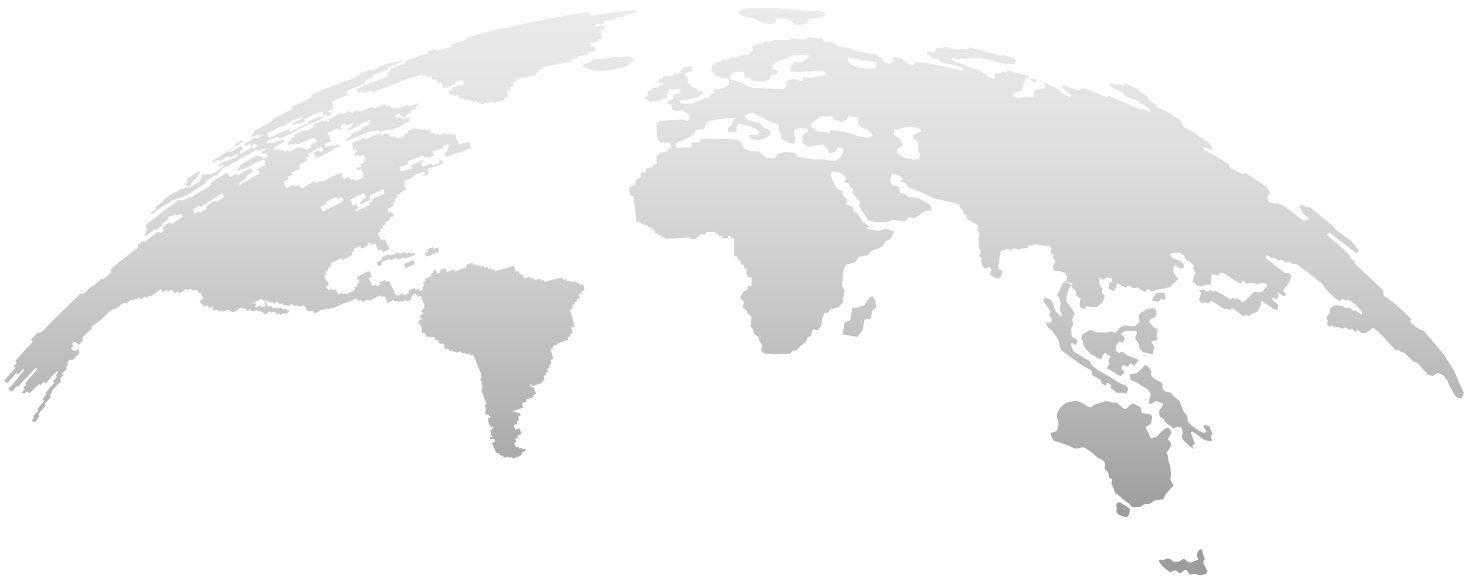- ▶ OPC server (optional)

Notes

Optimizing Your Investment with World-Class Service and Support

NDC'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 NDC product.

Visit myNDC service cloud at myndc.com.

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