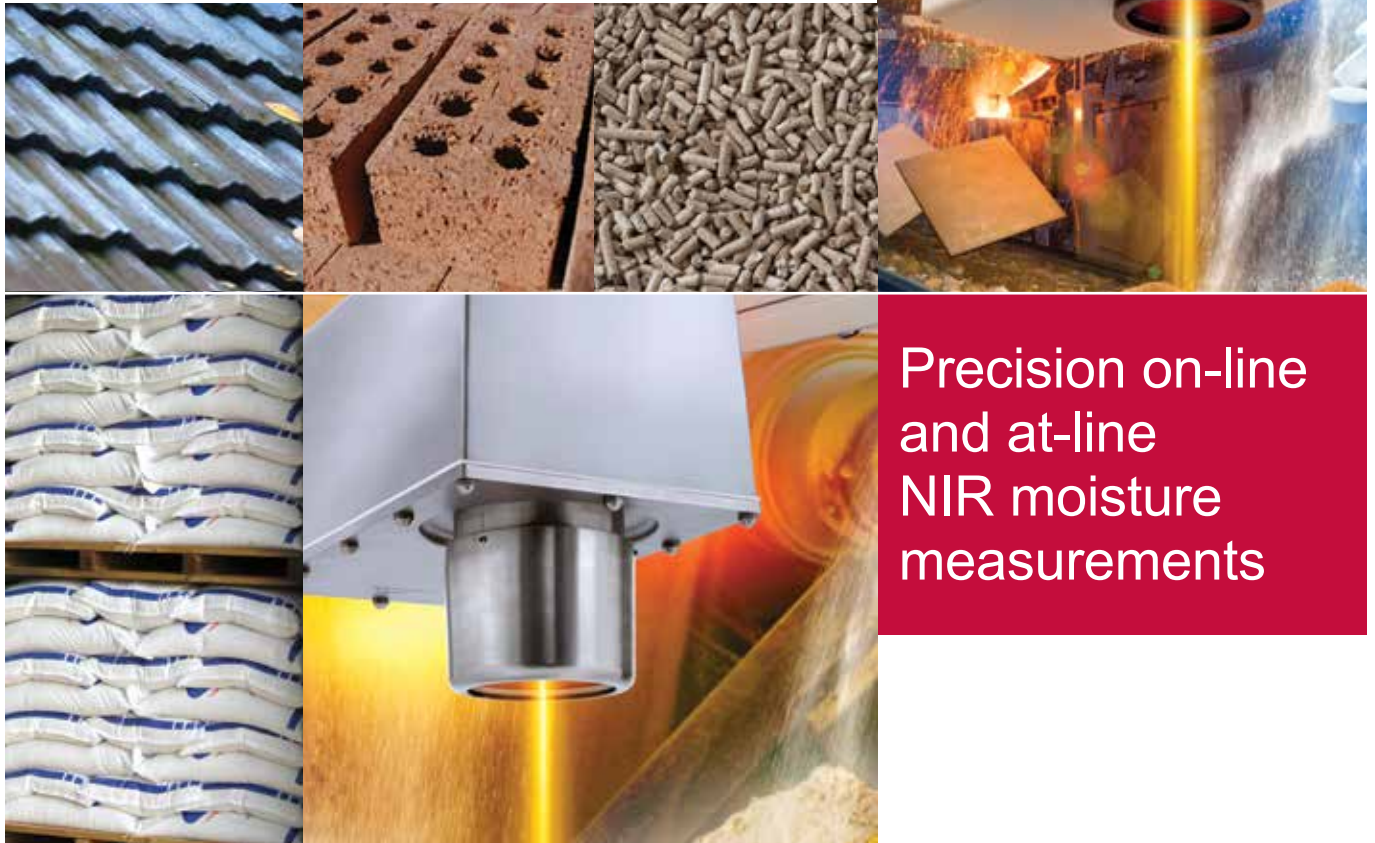


MINERALS AND BULK MATERIALS APPLICATIONS



Precision on-line
and at-line
NIR moisture
measurements

- ▶ Enhance Product Quality
- ▶ Improve Production Efficiency
- ▶ Reduce Fossil Fuel Consumption
- ▶ Automate Drying Processes

NDC & the Minerals, Mining & Bulk Materials Industries

As fuel and power become more costly, the need to accurately and reliably measure, monitor and ultimately control the moisture content in energy-intensive industrial and mining processes has become a critical endeavor.

NDC has worked closely with industry over the last 40 years to develop the accurate, stable and robust measurements that these processes require for quality and process control.

NDC moisture gauges are used around the world to control the quality of construction materials and engineered wood products; to optimize the sinter process in steel making; to help biofuel consumers maximize combustion; and to insure the quality of materials as diverse as ceramics, synthetics and explosives.



The Need for Quality & Process Control

Using accurate moisture control to improve product quality & reduce energy consumption

Measurements:

- ▶ **Moisture content of:**
 - Powders & Aggregates
 - Flakes & Granules
 - Slurries & Pastes

Applications:

- ▶ **Ceramics and Clay Products**
- ▶ **Fibers and Polymers**
- ▶ **Nitrocellulose**
- ▶ **Mineral Powders and Ores**
- ▶ **Sand, Cement Meal and Aggregates**
- ▶ **Gypsum**
- ▶ **Industrial Textiles**
- ▶ **Wood and Cellulose Products**
- ▶ **Biofuels, Organic Waste and Biomass**

The challenge is to introduce into the process a measurement that will be robust and stable enough to withstand the environmental conditions, yet accurate and reliable enough to be trusted for process control.

Instrument design must further ensure that changes in the measurement output are due solely to varying levels of the moisture and not because of product or process variables.

Once installed in the process, the instrument must transmit its output values in the required format, digital or analog, to the process PLC or SCADA for closed loop control.

NDC industrial moisture gauges have been installed and are in daily use around the world in heavy industrial processes, helping users to optimize quality and process performance.



InfraLab Moisture Analyzer



CM710e Moisture Gauge



The CM710e Moisture Gauges

Rugged and robust CM710e is built for the processing environment...

CM710e with Standard IP65 Cast Alloy Housing ▼



CM710e with IP65 Stainless Steel Housing with optional Vortec air cooling ▼



CM710e: Key Features

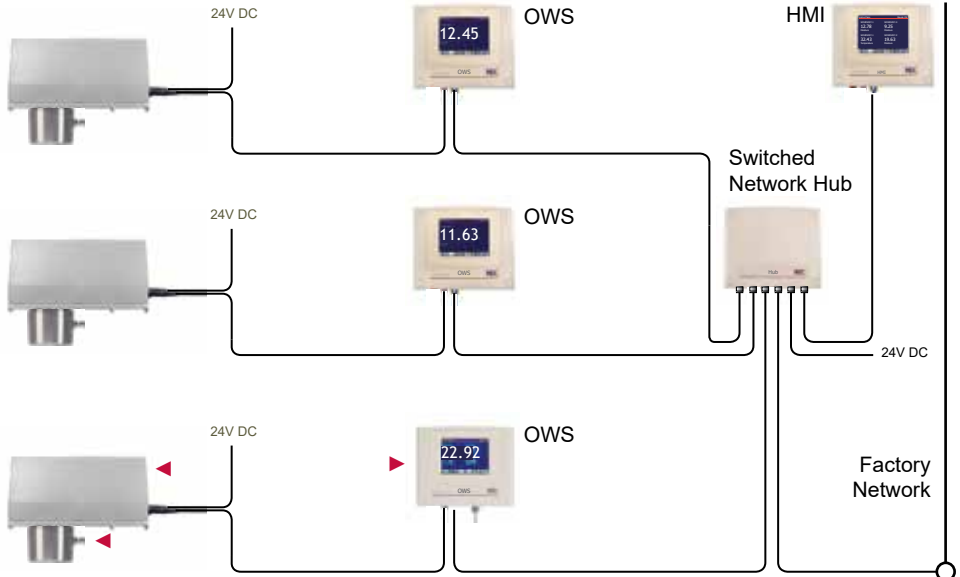
The CM710e is available with a choice of housings and accessories designed to withstand the process environment while enhancing performance, including:

- ▶ **Series 710e devices**
for interfacing, connectivity and networking
- ▶ **Ethernet, Fieldbus and analog connectivity**
options for networking and integration
- ▶ **Auto reference standard**
for routine stability checks and standardization after source change
- ▶ **IP65 & IP67 housings**
cast alloy or stainless steel
- ▶ **Air and water cooling**
options for > 50° C ambient temperatures
- ▶ **PowderVision sampler**
for products in enclosed ducts
- ▶ **Air Purge Window Shield**
for dusty or steamy atmospheres
- ▶ **ATEX certified system**
or dusty or steamy atmospheres
- ▶ **316 Stainless Steel Housing**
ATEX 3D Zone 22 rated

710e Devices and Networks

Easy to install, integrate and operate, the CM710e is the most flexible in-process gauging system available...

Convenient interfacing: what you need, where you need it



► The NDC CM710e recommended gauge configuration comprises: **Stainless Steel Sensor Housing, Air Purge Window Shield & Operator Workstation**

710e HMI



- ¼ VGA color touchscreen
- Analog and Ethernet connections
- Controls up to 16 gauges
- Multi-lingual interface

710e Devices

Series 710e Peripheral Devices available include:

- **OWS: Operator Workstation**
- **HMI: Human Machine Interface**
- **User Port**
- **Switched 7-Way Switched Hub**

The OWS provides operator-level interaction with an individual gauge with access to sampling and diagnostic functions.

The HMI provides supervisory access to up to 16 networked CM710e gauges to enable gauge set-up, calibration adjustment, and product management, with analog and digital connectivity as well as network access. Both HMI and OWS feature high definition multi-lingual colour touch screen displays.

The User Port provides additional analog outputs and digital I/O for any connected gauge. The Switched Network Hub enables convenient networked arrangements of multiple 710e gauges and devices, with its 7 network connections.

For simplicity and convenience, all CM710e gauges and devices run on 24V DC, either from an on-site supply or from an NDC in-line 24V universal power supply.

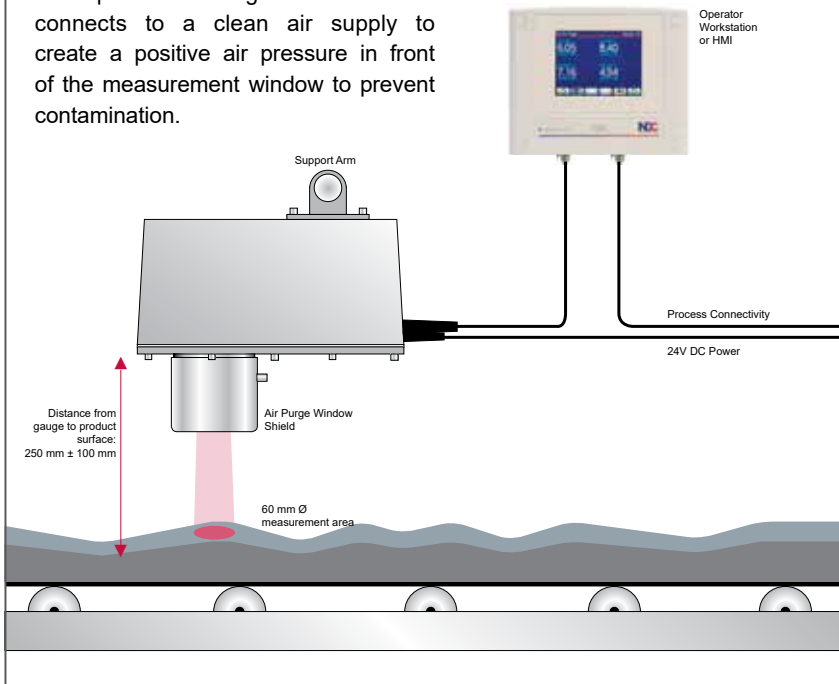
Long term stability combined with industry-best performance, low installation costs and no routine maintenance requirements guarantee the **lowest cost of ownership** over the CM710e's many years of service.

The CM710e in the process

Fully engineered for continuous or discontinuous product flows & products in enclosed ducts

CM710e Recommended Configuration

The optional Air Purge Window Shield connects to a clean air supply to create a positive air pressure in front of the measurement window to prevent contamination.



Installation

The CM710e measures over a 60 mm diameter area and is suspended over the process line at a distance of 250 mm from the mean product height to the CM710e measurement window.

The gauge tolerates and the measurement is not affected by product height fluctuations of ± 100 mm.

Measuring powders in ducts

For powders transported by gravity in enclosed ducts, the pneumatic PowderVision sampler is used. The device comprises a tube fitting with window and sample collection cup. The cup fills with the falling product and after a sample has been collected and measured, a jet of air ejects it and the cycle recommences.

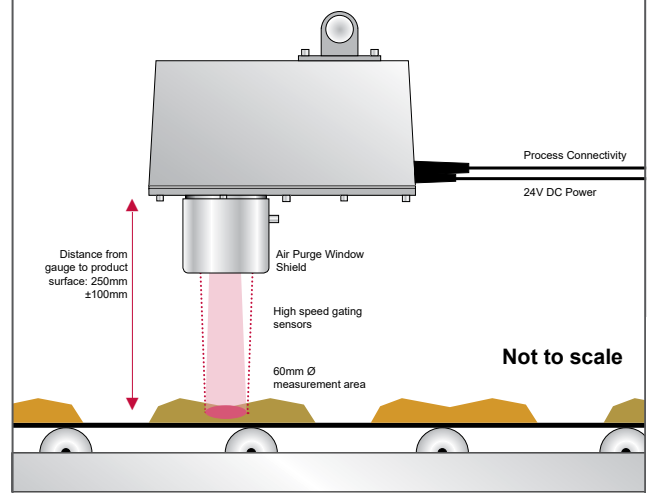
Process Conditions



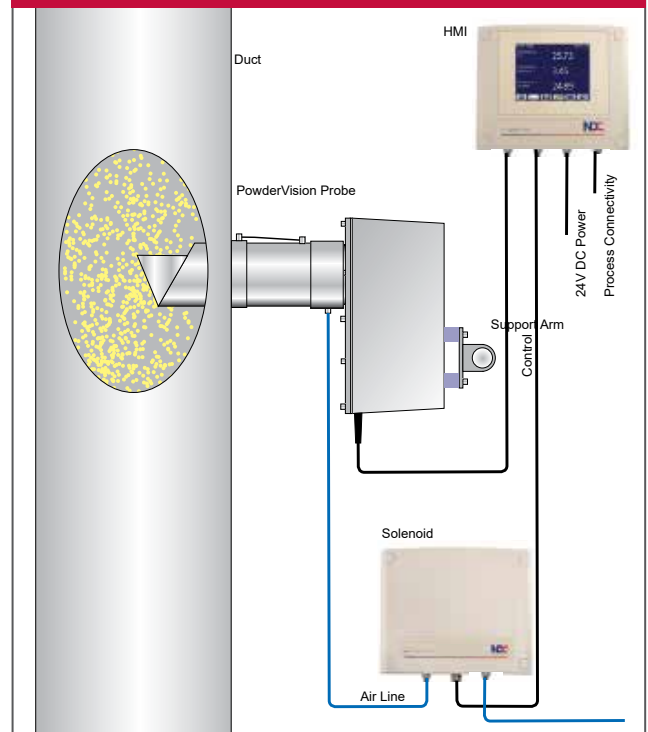
Ambient lighting, temperature or relative humidity changes do not affect the CM710e measurement. The alloy & optional stainless steel housings are sealed to IP65 and can operate in ambient temperatures from 0° to 50° C. The stainless steel housing is also available in IP67 and ATEX certified versions. A vortex cooler or insulated air-cooled housing are available for ambient temperatures exceeding 50° C.

CM710e Gating System for 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.



CM710e PowderVision Sampling System



The InfraLab Moisture Analyzer

Fast, accurate and easy to operate, the InfraLab makes short work of sample testing

Key Features

- ▶ **Color VGA display** touchscreen user interface
- ▶ **InfraLab Manager software** for data management via PC
- ▶ **Ethernet and LIMS** connectivity
- ▶ **On-board data storage** of up to 10,000 sample measurement files
- ▶ **Up to 200 users** each with identifying pass code
- ▶ **Product database** for up to 200 products with unique 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)

The InfraLab e-Series moisture analyzer is designed for at-line or laboratory use and measures samples taken from the process in less than 10 seconds.

InfraLab is designed as a routine replacement for loss-on-drying, Karl Fischer titration or gravimetric moisture testing.

Once calibrated to the 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.

Once set up, InfraLab is accessed via its intuitive interface and requires no special user skills in routine use.

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 on site without intervention from NDC.

Ethernet connectivity 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 provides user access to all measurement and calibration data and enables set-up and remote access to data and key functions. It enables up to 16 networked analyzers to be controlled and viewed centrally from a PC.



▶ **Standard large bowl**

At-Line in the Process Area or in the Laboratory

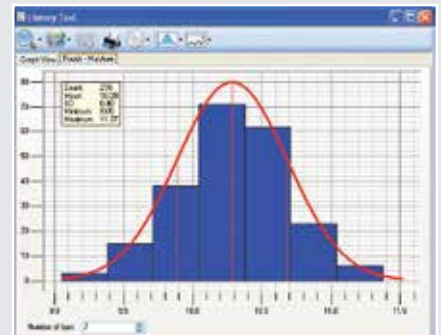
Access data quickly and easily via Ethernet or the USB download function



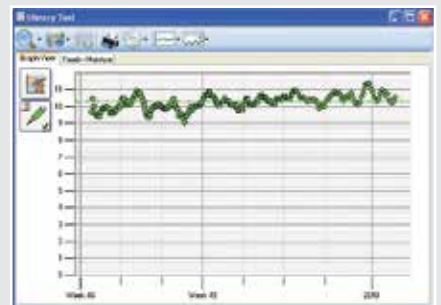
► InfraLab shown with optional petri-dish adapter

InfraLab delivers substantial savings through increased speed and reduced costs of routine sample testing...

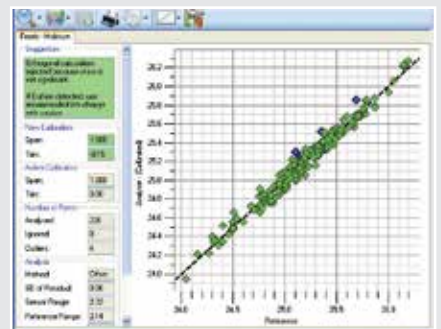
InfraLab Manager Software



► Histogram



► Data display



► Calibration

Applications

Comprehensive applications engineering for high performance process measurements

NDC Minerals and Bulk Materials Applications		
Industry Sector	Moisture	Application Areas
Ceramics & Clay	✓	ball clay, refractory clay, china clay (kaolin), spray dried ceramic powders, red clay 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 – prebalancing – pre-ginning, neoprene rope, rayon fiber, textile fibers, wool
Wood & 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 & Biofeed	✓	sewage sludge
Other	✓	lead acid battery paste

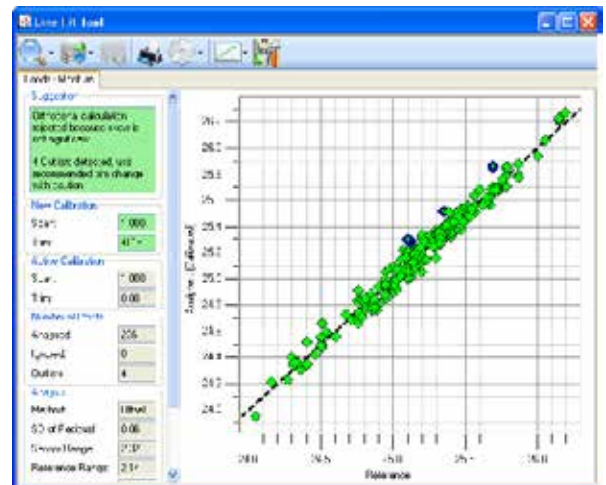
Measurement Ranges and Calibration

Recognizing that there can be no such instrument as a "generic" moisture, the CM710e is supplied with a factory pre-calibration which covers the required moisture range. The pre-calibrations are based on our extensive applications engineering history and are designed to require the minimum of adjustment to achieve agreement with your laboratory primary reference technique.

The GaugeToolsXL software provided simplifies this process by enabling comparison of instrument values with laboratory results and features the following tools or functionality:

- ▶ Instrument Set-up and Calibration
- ▶ Product Management (Product Settings)
- ▶ Displays of Measurement and other Key Parameters
- ▶ Data Logging and Data Trending & Export
- ▶ Diagnostic Functions
- ▶ OPC Server (optional)

Thanks to their Ethernet connectivity, in many instances, the instruments can be interrogated and communicated with via the internet to provide diagnostics, updates and other support functionality.



For applications in chemicals and pharmaceuticals, consult the Chemicals and Pharmaceuticals brochure.

Notes and Diagrams

Notes and Diagrams

Company overview

Combining industry-best performance and reliability with a global support structure

NDC Technologies, headquartered in Irwindale, California, designs, develops and produces a wide range of process measurement and control instrumentation for a broad scope of manufacturing industries.

NDC has manufacturing facilities in California, Dayton, Ohio and Maldon, UK, with centers of excellence at each of these locations including Loncin, Belgium. In addition, there are direct sales and support facilities in China, Japan, France, Germany and Italy. There is also a highly trained network of Sales and Service distribution channels in more than 60 countries around the world.

NDC Technologies is structured to serve its key industry segments with two distinct business units:

► Food, Bulk and Packaging

In packaging, NDC provides basis weight, thickness, coat weight and moisture measurement and control systems for a diverse array of applications in the converting and film extrusion industries and also provides solutions for customers in nonwovens and calendering.

For the food and bulk industries, NDC delivers both on-line and at-process analyzers for the measurement of key constituents such as moisture, fat, oil and protein. NDC's broad spectrum of measurement solutions are used in the food, chemicals, minerals building materials, pharmaceutical and tobacco industries.

► Cable, Metals and Tubing

In the steel and aluminium industries, NDC offers advanced solutions for the measurement of thickness, width, flatness, edge shape, coatings, and length and speed of sheet and long casted products.

NDC serves the wire, cable, fiber optic, pipe and tube industries with a broad portfolio of on-line and off-line measurement and control solutions for the dimensional monitoring of diameter, ovality, wall thickness, eccentricity, length and speed, and other parameters.



NDC Technologies is represented in over 60 countries worldwide. www.ndc.com

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