

IN-PROCESS / AT-LINE ANALYSIS



EMPOWERING  
TRUE PROCESS AND  
QUALITY CONTROL  
TODAY AND BEYOND



A NEW ERA IN GAUGING  
FOR TOBACCO  
INDUSTRY APPLICATIONS



# NDC – Maximizing Process Performance and KPIs

## Through the Measurement of Moisture, Nicotine, Total Sugars and More

For more than 50 years, NDC has designed and built measurement solutions specifically developed to meet the manufacturing challenges faced by the tobacco 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 TM710e on-line tobacco gauge and InfraLab e-Series at-line analyzer. Our legacy of innovation continues with the TM9000 gauge.

By solving process-specific application challenges, we play a dominant role in supporting the tobacco 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.



# Stay Ahead with the TM9000 On-Line Gauge

Process demands keep changing, but our TM9000 on-line tobacco gauge is your **next-generation process optimization solution** for measuring moisture, nicotine, total sugars 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 TM9000 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 TM9000 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 TM9000 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 tobacco applications. Learn more about this powerful analyzer inside.



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

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## We understand your process challenges



### Continuous control in primary and leaf processing

Primary processing departments are required to deliver a consistent tobacco blend to the secondary department. To achieve this, parameters such as moisture content, fill value and particle size must be controlled.

The TM9000 on-line gauge meets the industry challenge by providing reliable moisture measurements that are not affected by process, environmental and product variables.

The TM9000 gauge is engineered for the very best long-term stability without the need for systematic re-calibration, making it the most reliable gauge available for tobacco process control.



### Recon tobacco sheet

We also provide a system specifically designed for manufacturers of reconstituted sheet tobacco that accurately measures moisture, nicotine, sugars, sheet basis weight or grammage, and thickness. Our TM9000 solutions include fixed-point and scanning systems to measure across the product sheet.



### Reduced risk and other solutions

As the tobacco industry innovates to produce next-generation products, such as non-combustibles, reduced-risk and other tobacco solutions, NDC has been working closely with manufacturers to deliver application-specific measurement solutions.

Our TM9000 and InfraLab e-Series tobacco gauges accurately and reliably measure not only moisture, nicotine and sugars, but also glycerol (humectants) – key components that need to be measured in reduced-risk products.

Other capabilities include measurements for product thickness, mass per unit area and length and speed. 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
- ▶ Controlled in-pack moisture
- ▶ Optimized making speeds
- ▶ Reduced waste
- ▶ Continued brand loyalty



## Operate your process at peak performance with single- or multi-component measurements of:

- ▶ Moisture
- ▶ Total volatiles
- ▶ Product temperature
- ▶ Nicotine
- ▶ Total sugars
- ▶ Glycerol
- ▶ Propylene glycol
- ▶ Eugenol oil (Kretek tobacco)
- ▶ Menthol

*Refer to the list of applications later in this brochure to see where the TM9000 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

### 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



Status indicator light

**EASY TO INSTALL,  
INTEGRATE AND OPERATE**

# Connectivity and Interfacing to Enhance Process Insight and Control

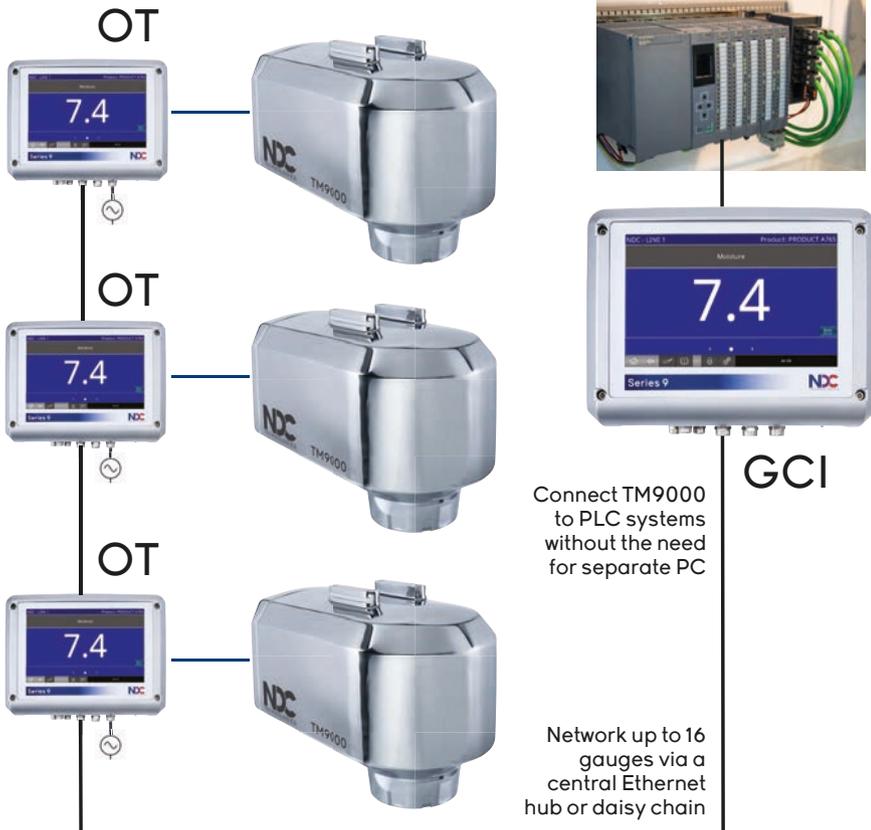
A flexible and scalable in-process gauging system for the tobacco industry



Gauge Control Interface (GCI)

## TM9000 gauge control interface

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



Connect TM9000 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 TM9000 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.

## TM9000 devices

TM9000 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

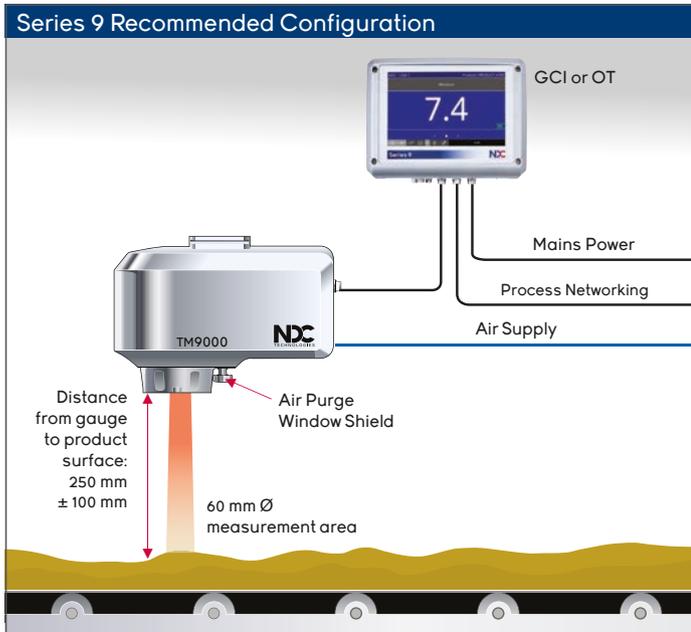
# Scalable solution to meet your plant configuration

TM9000'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



## Installation

The TM9000 gauge measures over a 60 mm diameter standard beam patch size and is suspended over the process line with the measurement window at a distance of 250 mm from the mean product height.

The gauge tolerates product height fluctuations of  $\pm$ 100 mm without affecting the measurement.

Ambient lighting, temperature or relative humidity changes do not affect the TM9000 measurement.

### Additional technical information sources

For additional technical information about installation, calibration, networking and process connectivity, and to learn more about the TM9000 gauge generally, please consult the product manuals.

## Ready for any process condition

The TM9000's stainless-steel hygienic housing is sealed to IP67 requirements and optionally ATEX certified. Its seamless hygienic design is a must for tobacco 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



## Why our tobacco measurements are better

The NIR measurements used in the TM9000 and InfraLab tobacco analyzer have been generated over many years using thousands of tobacco samples to create robust linear calibrations to the compendial methods or primary reference techniques.

Such techniques are well established in the industry and each producer has its preferred methods and specifications.

The TM9000 and InfraLab have been designed specifically to be calibrated to the preferred method. They feature NDC's unique factory calibrations that have been developed through rigorous comparisons of gauge and lab values making them linear over the entire measurement range.

In most cases, the SPAN value of the calibration will not require adjustment. Only the TRIM value may require adjustment to agree with the local methodology.

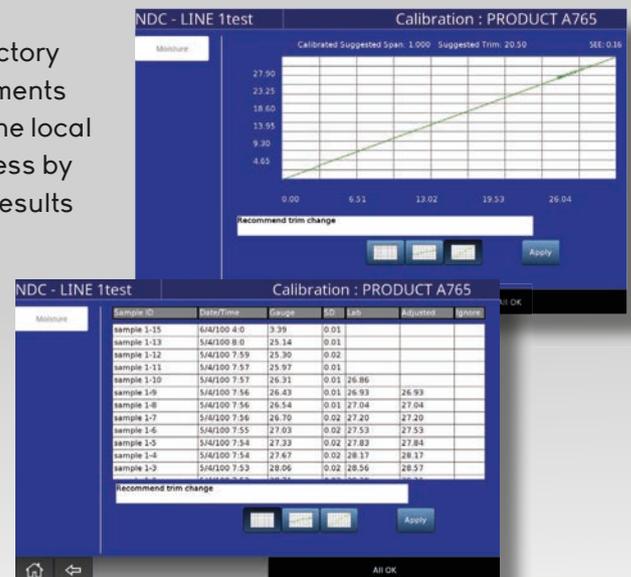
NDC tobacco gauges provide a repeatability of  $\pm 0.1\%$  and deliver high levels of accuracy when calibrated and compared to a primary method: moisture 0.1%, nicotine 0.2% and sugars 1.0%.

Also, our tobacco gauges lead the industry in reproducibility – thanks to NDC's own manufacture of optical components.

## 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)



# The InfraLab Tobacco Analyzer

Fast, accurate and easy to operate, InfraLab is the viable alternative to laboratory methods

The InfraLab e-Series tobacco 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
- ▶ Glycerol
- ▶ Nicotine
- ▶ Propylene glycol
- ▶ Total sugars
- ▶ Methanol
- ▶ Total volatiles

InfraLab replaces routine loss-on-drying or gravimetric moisture testing, and continuous flow or HPLC analyses for nicotine or total sugars.

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.



## 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



Touch-screen display



Data download to USB memory stick



Reference standard (option)



Barcode reader (option)

# 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

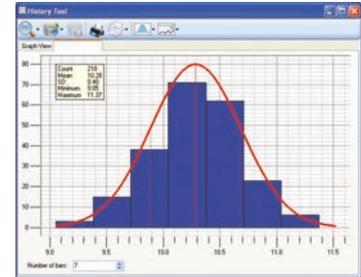
The source lamp and motor are guaranteed for 5 years and can be exchanged quickly and easily onsite without intervention from NDC.

### Ethernet connectivity

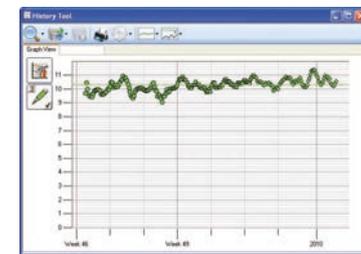
This capability enables InfraLab to be used either as a stand-alone analyzer or integrated into LIMS or factory networks, or simply connected to a PC when required to take advantage of the features offered by the InfraLab Manager software.

### InfraLab Manager software

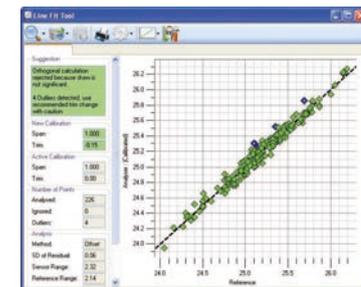
This tool provides user access to all measurement and calibration data and enables setup and remote access to data and key functions. It enables up to 16 networked analyzers to be controlled and viewed centrally from a PC.



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 Tobacco Applications

| Processing Area/Product  | Moisture         | Nicotine   | Sugars   |
|--|------------------|------------|----------|
| Tobacco – General  | 0 - 60%          |            |          |
| Whole Leaf in GLT or Primary or Strips   | 10 - 30%         | 1 - 5.5%   | 0 - 3%   |
| Blended Strips (Lamina)  | 10 - 30%         |            |          |
| Re-dried Cut Lamina  | 10 - 20%         | 1 - 3.5%   | 10 - 20% |
| Final Blend  | 12 - 16%         | 0.5 - 3%   | 10 - 20% |
| WTS Water Treated Stem   | 30 - 50%         |            |          |
| CRS Cut Rolled Stem  | 20 - 30%         |            |          |
| Re-dried Stem  | 0 - 20%          | 0.2 - 1.5% | 8 - 30%  |
| Expanded Tobacco   | 0 - 3% & 7 - 15% | 0.5 - 2.5% | 0 - 16%  |
| Roll-Your-Own Tobacco  | 12 - 20%         |            |          |
| Shorts   | 10 - 15%         |            |          |
| Pipe Tobacco   | 12 - 25%         |            |          |
| Cigar Filler   | 10 - 25%         |            |          |
| Other Measurements   | Range            |            |          |
| Total Volatiles  | 0 - 55%          |            |          |
| Eugenol Oil (in Kretek Tobacco)  | 8 - 15%          |            |          |
| Menthol  | 0 - 2%           |            |          |
| Tobacco Temperature  | 0 - 120°C        |            |          |
| The measurement ranges in this table are indicative of the typical ranges measured with the TM9000. Please consult NDC for your specific measurement needs. Temperature can be measured using the TM9000 only. |                  |            |          |

# 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](http://myndc.com).



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NDC Technologies is represented in over 60 countries worldwide. [www.ndc.com](http://www.ndc.com)

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In line with its policy of continuous improvement, NDC 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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