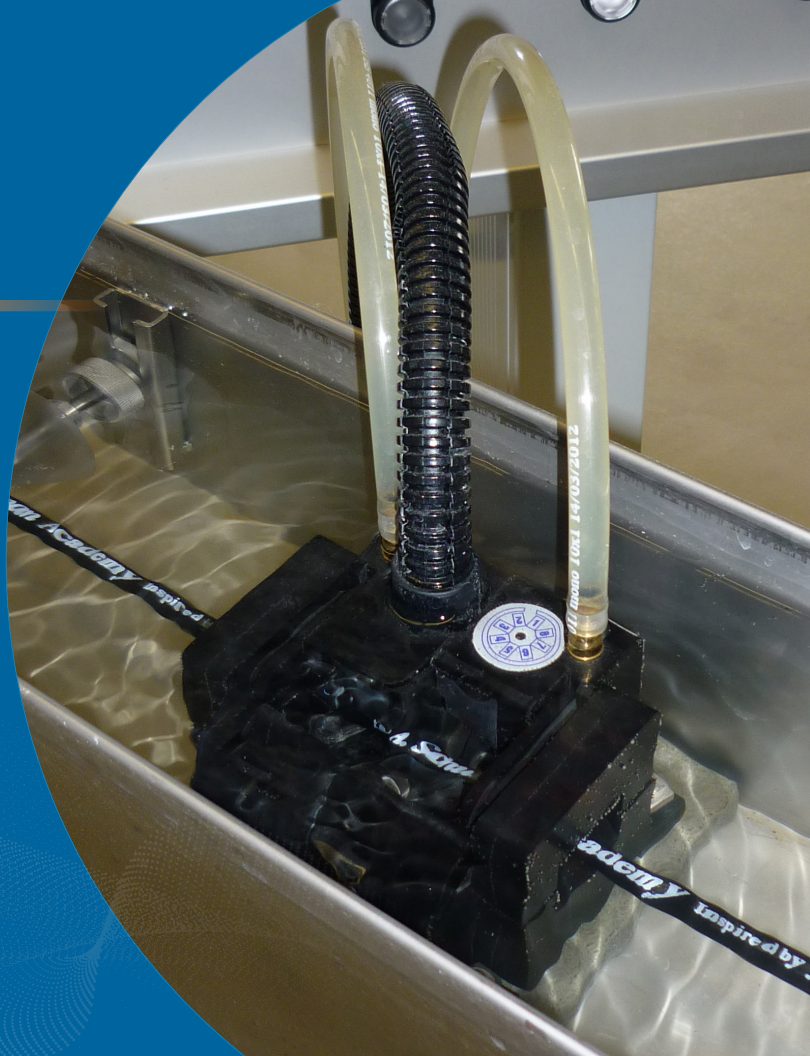
TUBING EXTRUSION SENSORS

HIGHEST STANDARD IN ULTRASONIC WALL THICKNESS & CONCENTRICITY MEASUREMENT



Nordson

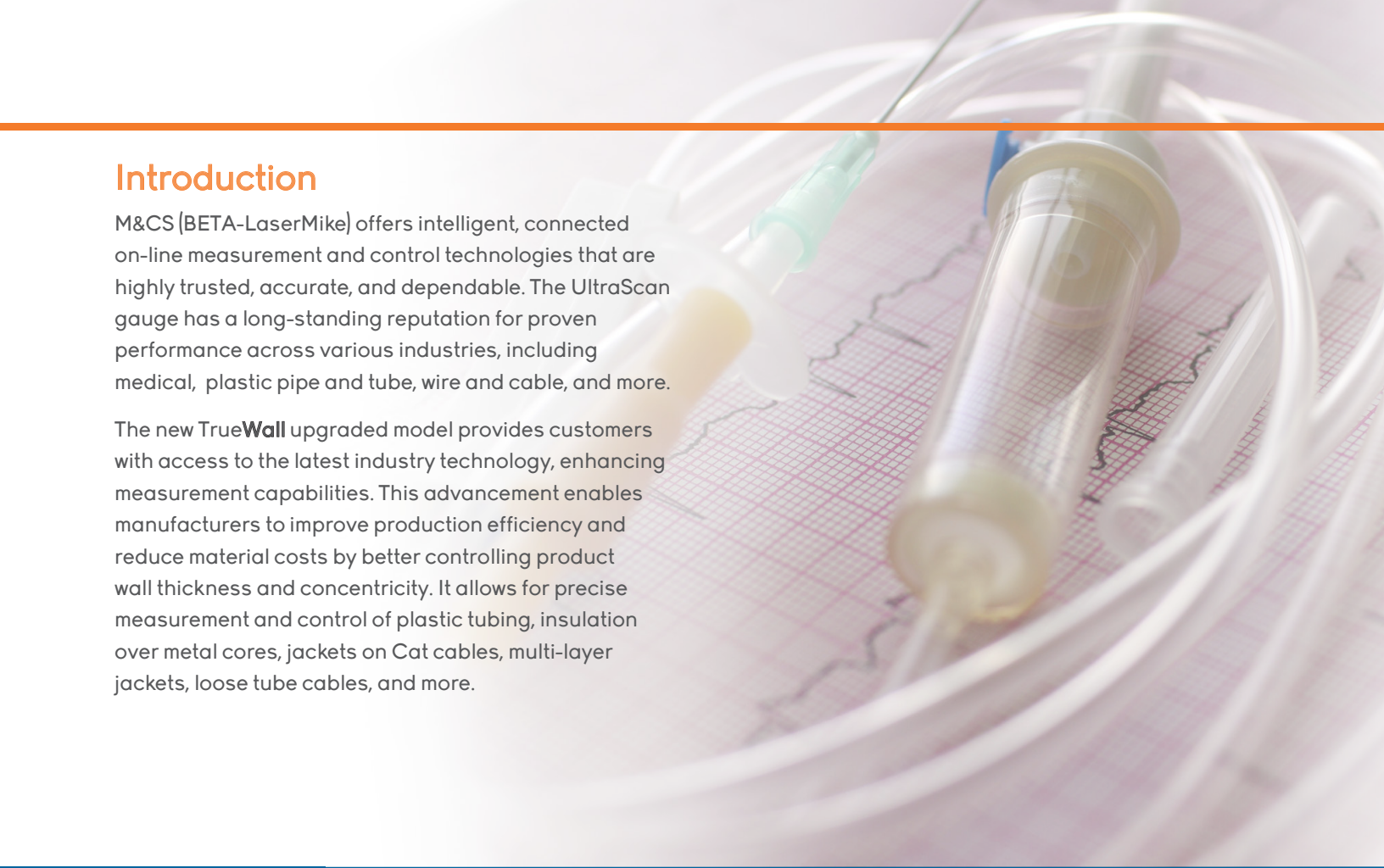
Measurement & Control

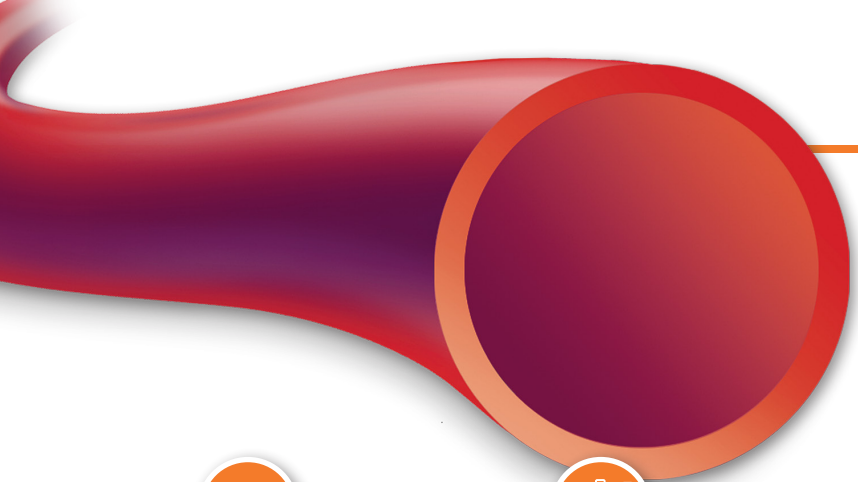
CONTENTS

Introduction

M&CS (BETA-LaserMike) offers intelligent, connected on-line measurement and control technologies that are highly trusted, accurate, and dependable. The UltraScan gauge has a long-standing reputation for proven performance across various industries, including medical, plastic pipe and tube, wire and cable, and more.

The new True**Wall** upgraded model provides customers with access to the latest industry technology, enhancing measurement capabilities. This advancement enables manufacturers to improve production efficiency and reduce material costs by better controlling product wall thickness and concentricity. It allows for precise measurement and control of plastic tubing, insulation over metal cores, jackets on Cat cables, multi-layer jackets, loose tube cables, and more.





Why On-Line Measurement for Tubing is Important?

Reduced Scrap Rates

Measuring off-line often fails to identify process deviations in time. By implementing on-line measurement, you can detect these variations in real-time and take decisive action to minimize scrap.

Increased Automation

Our systems can be integrated into existing production lines, automating the measurement process and reducing the need for manual labor.

Improved Quality Control

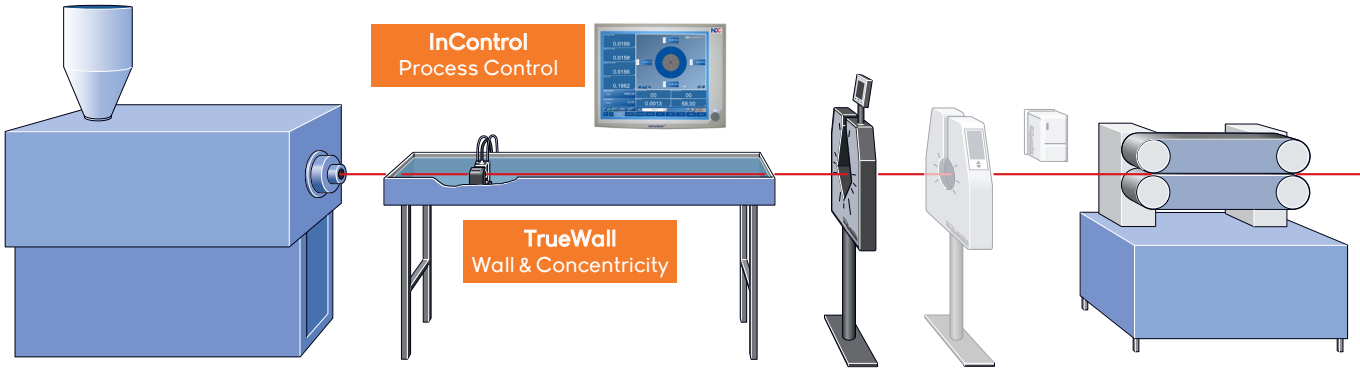
Real-time data analysis enables proactive analytics, identifying potential issues before they become problems.

Compliance with Industry Standards

Our systems are designed to meet or exceed industry standards for medical tubing measurement, ensuring regulatory compliance.

Extrusion Line Measurement for Tubing

On-Line Measurement for Quality Assurance



Off-Line Measurement for Quality Control

BenchMike Pro
ID/OD/Wall

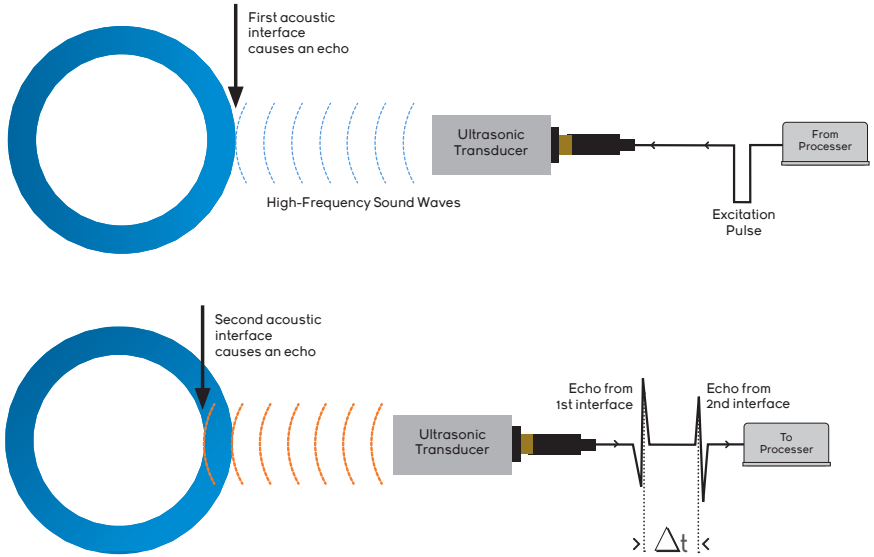
UP NEXT: ULTRASONIC GAUGES

ULTRASONIC GAUGES

How Ultrasonic Measurement Works

Ultrasonic measurement leverages the measurement power of ultrasound echoes.

1. Echoes are generated by the changes in the speed of sound waves when they meet materials with different densities. When the speed of sound changes, some of the energy is reflected as an echo, while the rest continues on.
2. Our ultrasonic gauges are equipped with a set of 4 or 8 transducers, depending on the product diameter and concentricity requirements, to generate ultrasound around the product. The return echoes are analyzed and processed by the gauge to provide concentricity and wall thickness measurements.
3. The transducers can output different frequencies depending on the product thickness. Generally, low frequencies are used to penetrate thick walls, while high frequencies are better for thin walls.



$$\text{Thickness} = \frac{\Delta t}{2} \times s$$

Δt = time between 1st and 2nd echos

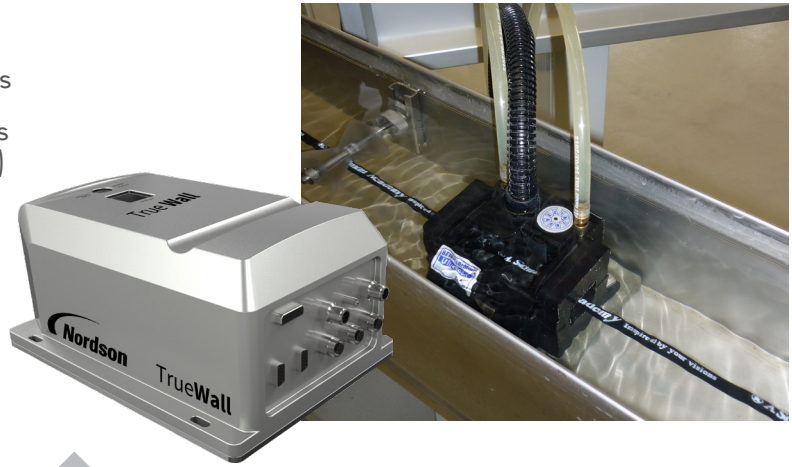
s = speed of sound trought material

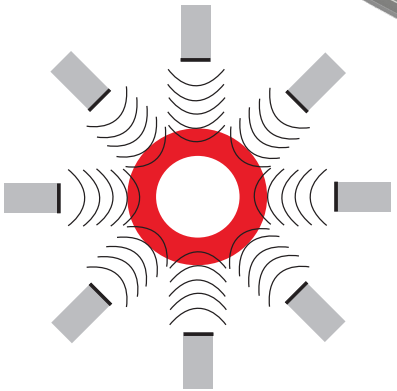
Standard Transducers:

- 10 MHz Transducers = 0.254mm Minimum Wall Thickness
- 20 MHz Transducers = 0.127mm Minimum Wall Thickness (Can activate Thin Wall mode - 25µm min wall thickness)

Standard Gauge Heads (4 or 8 Transducers):

- 12 mm Ultrasonic Gauge - Majority of Medical
- 25 mm Ultrasonic Gauge
- 40 mm Ultrasonic Gauge
- 63 mm Ultrasonic Gauge
- Potential for larger sizes





Multi-Point Wall & Concentricity

TrueWall surrounds the product with four to eight transducers. This enables TrueWall to fully evaluate the product at all critical locations for fast, accurate measurement of wall thickness and concentricity.

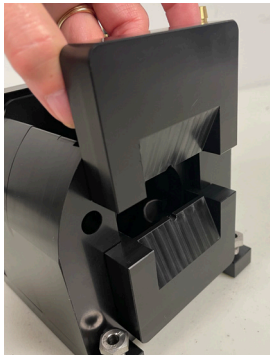
SPECIFICATIONS & ACCESSORIES

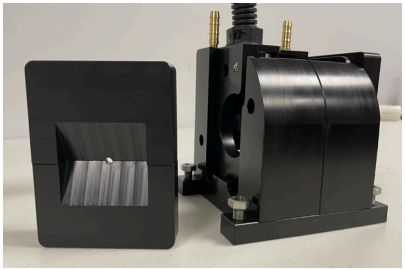
Note: more sizes available

	1012	1025	1040	1063
OD Range	0.25-12mm (0.01-0.5 in.)	2.5-25mm (0.1-1.0 in.)	4.0-40 mm (0.16-1.57 in.)	7.5-63 mm (0.30-2.5 in.)
Minimum Wall Thickness	Without Thin Wall: 10 MHz: 0.254 mm (0.010 in.) 20 MHz: 0.127 mm (0.005 in.) With Thin Wall: 20 MHz: 0.025 mm (0.001 in.)	Without Thin Wall: 10 MHz: 0.254 mm (0.010 in.) 20 MHz: 0.127 mm (0.005 in.) With Thin Wall: 20 MHz: 0.025 mm (0.001 in.)	10 MHz: 0.254 mm (0.010 in.)	5 MHz: 0.508 mm (0.020 in.) 10 MHz: 0.254 mm (0.010 in.)
Transducers	4, 8	4, 8	4, 8	4, 8
Transducer	5 MHz, 10 MHz, 20 MHz	5 MHz, 10 MHz, 20 MHz	5 MHz, 10 MHz	5 MHz, 10 MHz
Thin Wall Algorithm	To 25 µm (0.001 in.) on products as small as 250 µm (0.010 in.)			

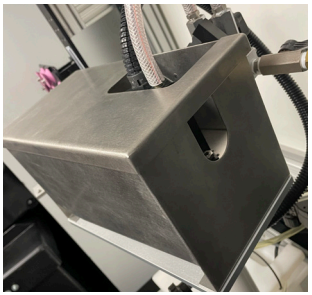
Accessories

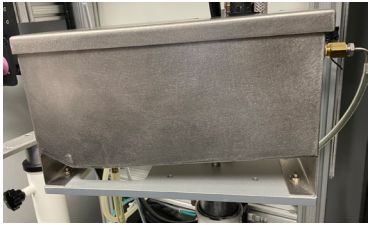
Guide Blocks





Catcher Tank





MATERIALS

Common Materials That Can Be Measured

Very Tight Tolerances Required

Perfluoroalkoxy (PFA)
High purity that's suitable for pharmaceutical, laboratory, and sampling applications

Fluorinated Ethylene Propylene (FEP)
A highly lubricious material with a low coefficient of friction that's biocompatible

Pebax
Block copolymers made up of rigid polyamide blocks and soft polyether blocks

Nylon
A lightweight, corrosion-resistant, and abrasion-resistant synthetic polymer often used for catheters

Polyethylene
A flexible and biocompatible plastic that's often used for medical tubing, needle sheaths, and sampling tubes

Polyurethane
A highly biocompatible material that softens at body temperature, making it a good choice for catheter material

Polyester
Lightweight thermoplastic polymer resin that offers excellent dielectric strength and wear resistance

PEEK: Biocompatible and very chemically compatible material widely described as the highest performance thermoplastic material currently available because of its remarkable chemical resistance

Polyimide
Does not melt when fused with other thermoplastic materials commonly used in catheter manufacturing

Polypropylene
Offers high chemical resistance and dimensional stability, while being cost-effective at the same time

C-Flex
Designed to meet the critical demands of the pharmaceutical, research, biopharmaceutical, and diagnostics industries can tolerate ETO and autoclave sterilizations

Polyvinyl Chloride (PVC)
Third most produced plastic in the world. Used for water/sewage pipes, power & telecom ducts, amongst other uses

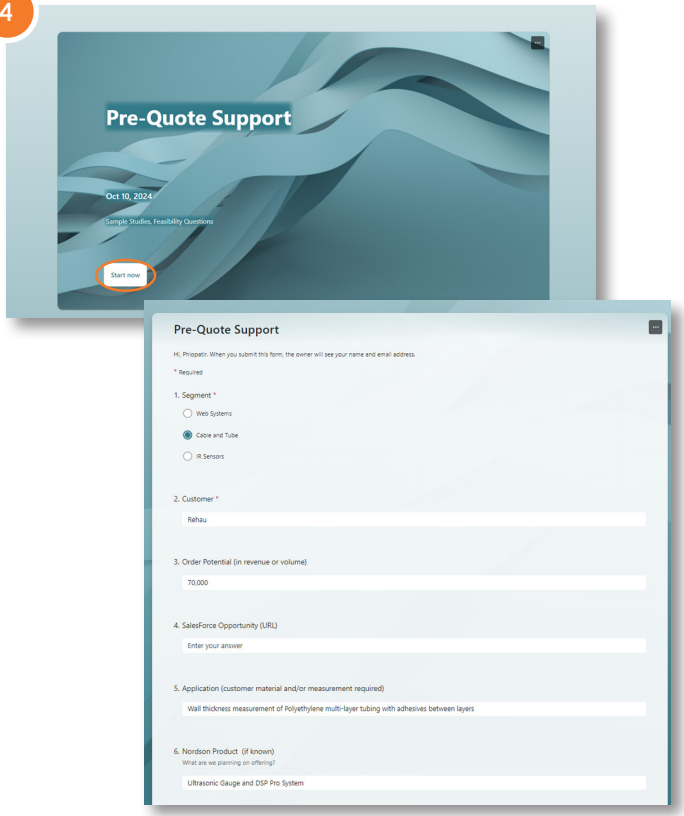
SAMPLE TESTING (for Uncommon Materials/Applications)

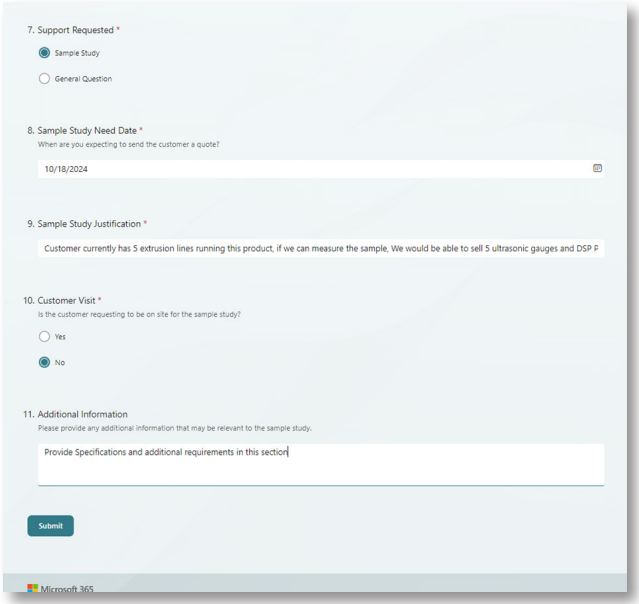
Instructions

1. Open the Nordnet website and go to the Sharepoint Application.
2. Go to the search bar under the Sharepoint Application and type in Apps Engineering and Project Management Support
3. Click on the Pre-Quote Support button
4. Go through the Pre-quote support process and answer all questions for the sample including material, specifications, variables with the extrusion line (temperature, pressure, etc.) and business opportunity with customer.

Once you submit, a project manager will be assigned to your project.

4


Pre-Quote Support
Oct 10, 2024
Sample Studies, Feasibility Questions
Start now
Pre-Quote Support
Hi, Priopatir. When you submit this form, the owner will see your name and email address.
* Required
1. Segment *
Web Systems
Cable and Tube
IR Sensors
2. Customer *
Rehau
3. Order Potential (in revenue or volume)
70,000
4. SalesForce Opportunity (URL)
Enter your answer
5. Application (customer material and/or measurement required)
Wall thickness measurement of Polyethylene multi-layer tubing with adhesives between layers
6. Nordson Product (if known)
What are we planning on offering?
Ultrasonic Gauge and DSP Pro System


7. Support Requested *
Sample Study
General Question
8. Sample Study Need Date *
When are you expecting to send the customer a quote?
10/18/2024
9. Sample Study Justification *
Customer currently has 5 extrusion lines running this product, if we can measure the sample, We would be able to sell 5 ultrasonic gauges and DSP P
10. Customer Visit *
Is the customer requesting to be on site for the sample study?
Yes
No
11. Additional Information
Please provide any additional information that may be relevant to the sample study.
Provide Specifications and additional requirements in this section
Submit
Microsoft 365

INTRODUCING TRUEWALL

The UltraScan DSP Pro has become even more powerful. We've integrated a range of AI-optimized technologies into the leading ultrasonic gauge on the market, which has inspired us to give it a new, equally powerful name: the True**Wall** system.

True**Wall** offers unprecedented new levels of connectivity, communication, and control in a single enclosure with a sleek design. Its powerful capabilities enable the True**Wall** system to integrate seamlessly into production network environments to promote better data exchange, tighten manufacturing operations, increase process efficiency, and improve product quality.

Faster Change-Overs

Eliminates the need for manual product alignment (up to an hour for alignment with competition).

Precise Measurements

(even for the smallest of tubing)

Thin wall mode measures down to .025 mm wall thickness.

Boost Productivity

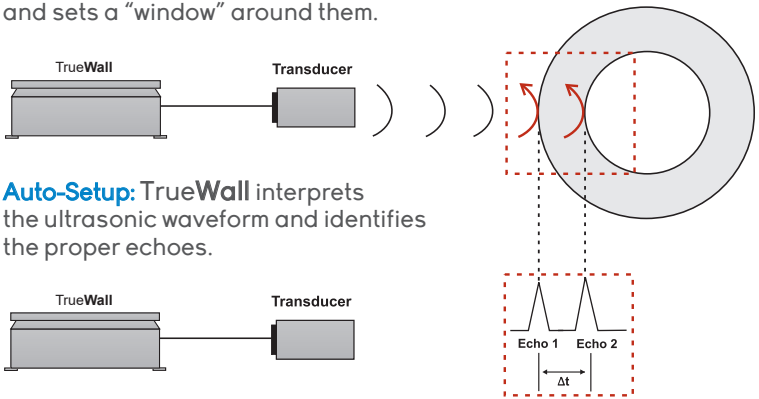
with fast & accurate data

More than double the measurement rate/per second for all thickness measurements than competition.

AI-Optimized Wall Thickness Measurement Technology

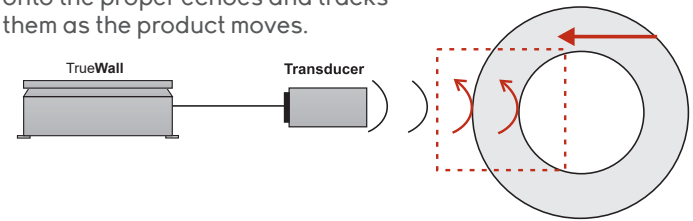
All ultrasonic measurement systems require setup of the ultrasonic waveform. While other systems require extensive user involvement during this process, TrueWall's patented technology, with its Auto-Search, Auto-Setup, and Auto-Tracking functions, makes waveform setup instantaneous and completely automatic.

Auto-Search: TrueWall finds the echoes and sets a "window" around them.



Auto-Setup: TrueWall interprets the ultrasonic waveform and identifies the proper echoes.

Auto-Tracking: TrueWall locks onto the proper echoes and tracks them as the product moves.

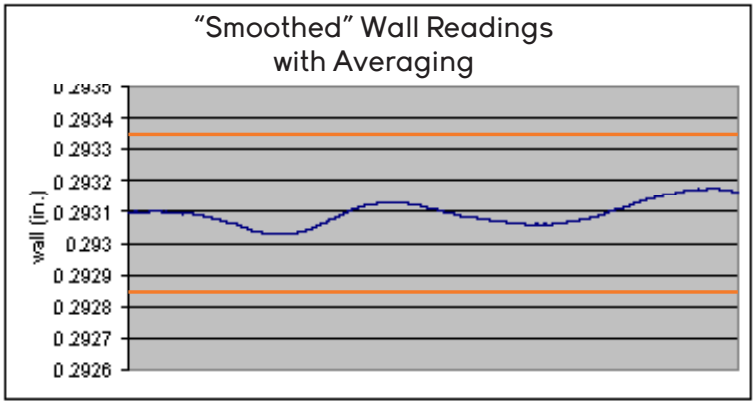


ADDITIONAL SOFTWARE

Usually for Tube & Pipe

Diameter Measurement

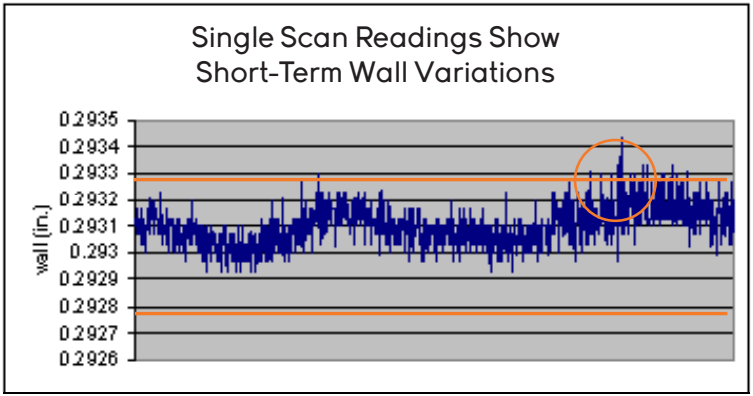
- Capability to measure OD – no need for AccuScan
- Not typically used in Medical - accuracy not high enough (±0.050 mm/± 0.002 in.)



Standard tolerance checking compares averaged wall values against tolerance limits.

Wall Thickness Tolerance Verification:

- Capability for flaw detection similar to lump and neck
- Samples/length dependant upon gauge site and speed of lines



High-speed tolerance checking compares individual scans against tolerance limits.

ULTRASCAN vs TRUEWALL

BLM UltraScan (OLD)	SO WHAT?	TrueWall (NEW)
Standard Ultrasonic Technology	Improved Usability By Increasing Output Rates	AI-Optimized Wall Measurement Technology Automated Measurement
Required Separate Controller for Monitoring		Integrated In-Process Monitoring Capabilities
2,000 Wall Measurements Per Second	Ensure Quality, Every Time.	10,000 Wall Measurements Per Second Faster & More Precise Measurement
Signal Gain of 40db		Signal Gain of 50db Detecting thinner walls
12 Bit Analog		Digital Converter System 2X Higher Resolution

BLM UltraScan (OLD)	SO WHAT?	TrueWall (NEW)
Manual Time Setting		Real Time Clock and NTP
Requires Controller to View Status	Improved Usability	Integrated LED Display Easily check various gauge statuses and setting
Requires Controller for Diameter Gauge Connection	Increased Output	Direct Integration with Diameter Gauge
Manual Gauge to Processor Set Up	Enhanced Confidence	UDP Discovery Application Fast gauge discovery
Connectivity RS-232, DeviceNet, CANopen, and Profibus		Connectivity ModBus TCP, EtherNet/IP, Profinet IO – plus fieldbus for Profibus, DeviceNet, and RS232.

KEY TALKING POINTS

What is different with the Truewall System compared to the old Ultrascan DSP?

- Old system is a box that took the data from the gauge and sent it to a controller for monitoring. New system has completely integrated the capabilities of monitoring ID/OD & Wall thickness, concentricity and ovality all directly from one gauge.
- For higher accuracy diameter requirements, diameter gauges can connect directly to gauge to provide 100% ovality and ID of product.
- Capability of transducer mapping (shut off certain transducers) to always continue production even if a transducer is down.
- Additional differences are in the So What table comparison.

What are the Truewall Systems key differentiating technologies?

- Our algorithms utilize an AI Optimized measurement technology for automatic waveform & echo tracking process, reducing product set up time.
- Custom-designed transducers and algorithms to be able to read 1 thou (25µm) and above wall thicknesses
- Wall measurement expertise and capability to measure variety of products such as multi-layer tubing, thin-walled tubing, clear tubing, etc.
- TrueWall system has a built-in diameter feature option for tubing applications that don't require a diameter gauge.
- TrueWall system has a built-in wall thickness verification feature to monitor tolerances range set.

What have customers said about the TrueWall system?

- The most powerful measurement processing system in the market, second to none.
- The Product set-up process required a specialized extrusion tech and would take a half-hour. Using the TrueWall System and the AI Optimized measurement technology, the set-up time is now 3-minutes and any operator can do it.
- The Truewall system can consistently measure the 1 thou wall thickness consistently which the competitive products cannot do.

SPECIFICATIONS

TrueWall

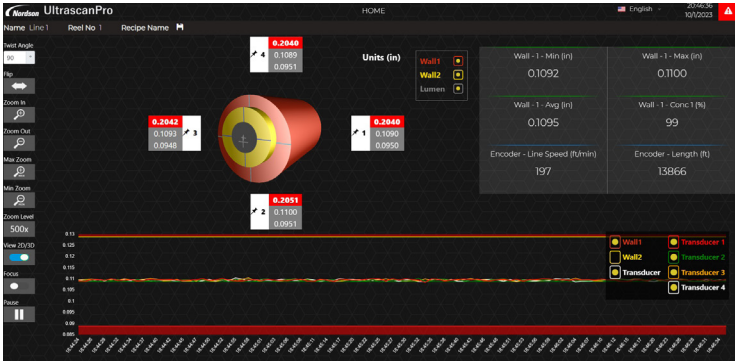
Wall Measurement Performance	
Concentricity Accuracy	±0.05%
Repeatability	±0.001 mm (0.000040 in) using 20 MHz transducer
Resolution	0.00004 mm (0.000015 in)
Measurement Rate	At least 4000 measurements/sec internal (standard processing mode) At least 1500 measurements/sec internal (thin wall mode)
Measurement Update Rate	At least 10 ms (via Ethernet TCP/UDP BB protocol)

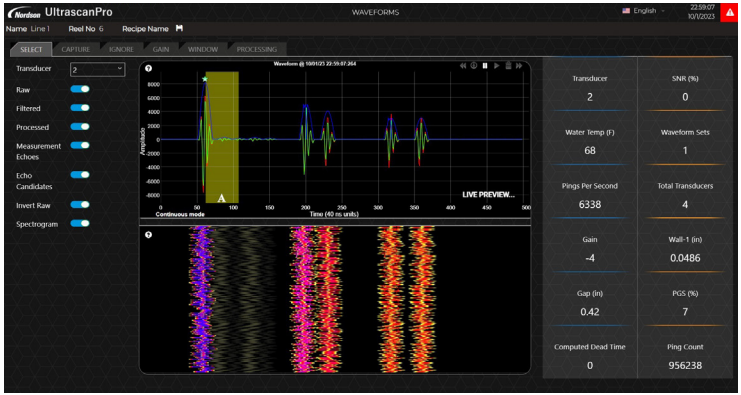
OD Measurement Performance	
Accuracy	±0.050 mm (±0.002 in)
Resolution	0.00008 mm (0.0000030 in)
Measurement Rate	At least 2000 measurements/sec internal
Measurement Update Rate	At least 10 ms (via Ethernet TCP/UDP BB protocol)

UP NEXT: INTEGRATED MONITORING

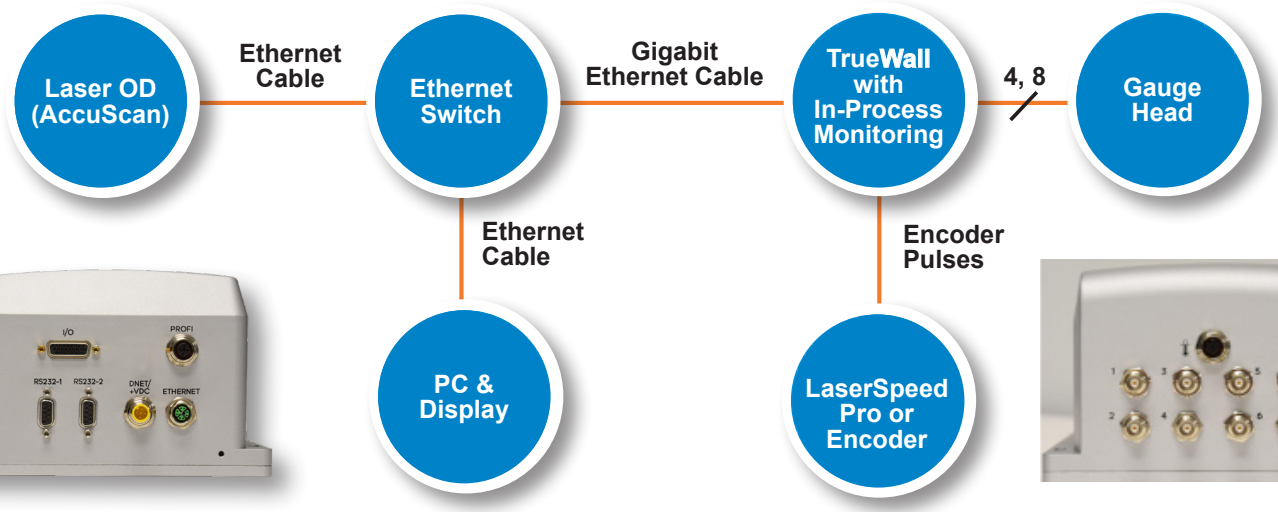
INTEGRATED IN-PROCESS MONITORING

- **Get Going Quickly:** No need for complex software training – easy to use
- **Simplified Setup:** Reduced the time and resources needed to get your equipment up and running
- **Lower Costs:** Less operational expenses by eliminating the need for additional hardware
- **Seamless Integration:** Works seamlessly with your existing equipment
- **Real-Time Quality Control:** Monitor critical measurements (centering, wall thickness, etc.) to reduce the risk of defects





Interconnection Diagram



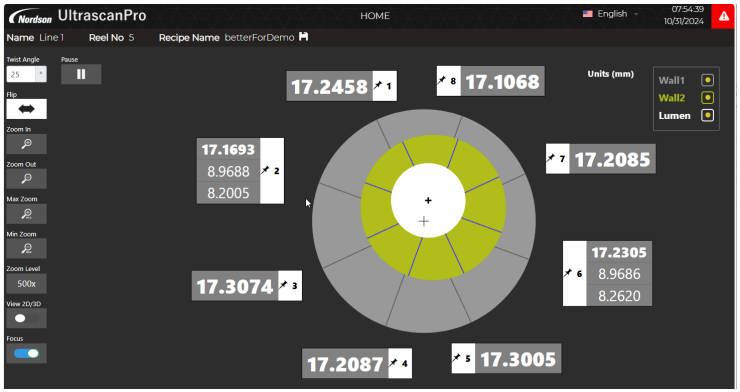
FRONT PANEL VIEW

REAR PANEL VIEW

HOME SCREENS

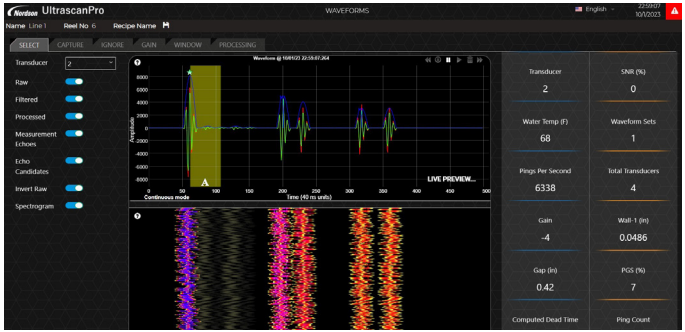
WALL

Examines the product in a 3D view as it travels through the trough. This screen provides valuable information to the operator including Wall Thickness, Measurement Tiles, Trend Graph.



FOCUS

Displays the product in a donut view of the walls only for Largest Viewing by Operator. This screen presents further information on the product that gives precise information on thickness.



WAVEFORM

Echoes, Spectrometer, Measurement Tiles

CENTERING

Gap, Gain%, SNR, PGS%, for each transducer

SPECIFICATIONS

General Specifications	
Connectivity	Ethernet (ModBus TCP, EtherNet/IP, Profinet IO); fieldbus (Profibus, DeviceNet)
Simultaneous Host Connections	Multiple TCP sockets
Baud Rates	4.8 kbaud to 230 kbaud
Enclosure	IP65 protection-rated enclosure, milled aluminum (for efficient heat dissipation), metallic silver finish
Display	Organic Light Emitting Diode (OLED)
Product Warranty	2 years
Options	Diameter and ovality measurement; high-speed tolerancing; self-flooding gauge configuration; trough height stand; small trough (for mounting outside existing cooling troughs)

UP NEXT: PRODUCT OFFERING

ACCUSCAN 6000 SERIES

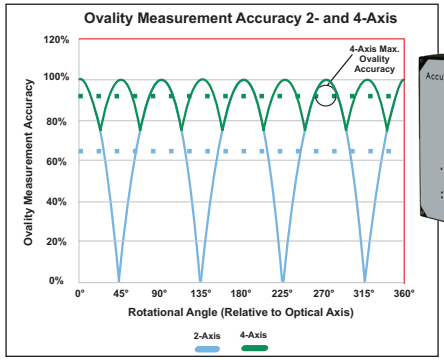
The Industry's Only Four-Axis Diameter & Ovality Gauges

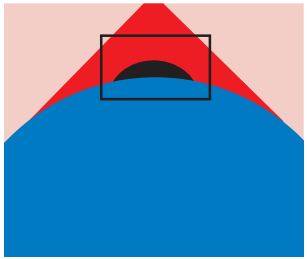
1. **Provides up to 100% Ovality Accuracy**
   The AccuScan 6000 Series delivers a higher average ovality accuracy than can be reached with two-axis and delivers 100% accuracy when the product is aligned with the measurement axes. (see right).

2. **Better Measurement Coverage for More Accurate Diameter**
   Ultra-fast diameter and ovality measurements at 2400 scans per second per axis, totaling 9600 measurements per second. Highest single-scan accuracy in the industry with single-scan repeatability down to 1 micron.

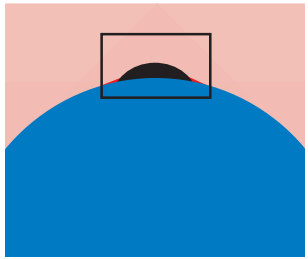
3. **Offer the Highest Flaw Detection Accuracy (OPTIONAL)**
   In the illustration to the right, a lump with a given height in the "blind area" (highlighted in red) will not be detected. As you can see, the blind area in the two-axis gauge is significantly larger than the four-axis gauge. With 4-axis, you significantly increase the probability of detecting lumps and neckdowns.

4. **Delivers the Highest Product Quality Yield for Significant Manufacturing Savings**
   Instantly detect changes in the product diameter so you can produce more quality product faster for maximum quality results. This level of measurement accuracy and quality coverage helps you reduce scrap and significantly lower manufacturing costs.





Coverage with 2-Axis



Coverage with 4-Axis

Specifications

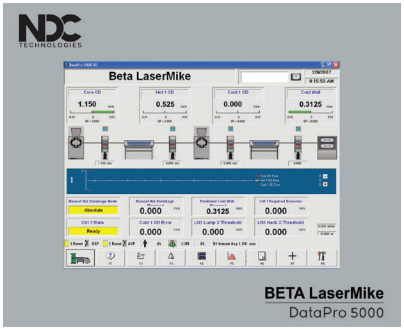
Performance	
Number of Axes	4
OD Range	0.1 - 12 mm (0.004 – 0.47 in)
Gate Size	16 mm (0.63 in)
Accuracy	±0.0005 mm (±0.000020 in)[1]
Repeatability (Single-Scan)	±1µ±0.025%
Resolution	0.00001 mm (0.0000004 in)
Scan Rate	2400 scans/sec/axis (total 9600 scans/sec)
Communications	
Standard	RS-232, DeviceNet, Profinet, Ethernet, EtherNet/IP, TCP/IP, quad Analog-Digital output, and relay contacts
Optional	Profibus
Environmental & Physical Data	
Power	24 VDC, 21.6 W, 0.9 A
Temperature	5-45° C (41-113° F)
Weight	4.5 kg (10 lbs)
Dimensions	360 x 240 x 40 mm (14.1 x 9.4 x 1.5 in)

[1] *±0.02% of product size.*

DATAPRO 5000

Process Control & Data Management Systems

Our control and data management systems, when coupled with BETA LaserMike gauges and a versatile set of I/O capabilities, enable you to produce superior quality products by providing all the information and control capability you need to keep your production process running smoothly. BETA LaserMike control systems aid and improve the manufacturing process at every step, from the start-up period to the production period to the final quality checks.



- Perform fast, simple changeovers of product settings
- Reduce start-up time with precise monitoring of die center
- Decrease material usage, giveaway, and rework with closed-loop control
- Drive product quality with process analysis and statistics
- Improve data management with real-time charts, printed reports, data logging, alarming, and networking capabilities

Specifications

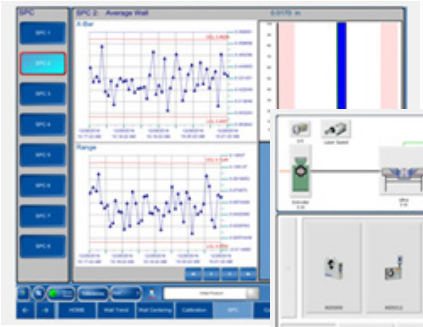
Feature	
Display	38.1 (15 in.) Touch-Screen
Gauge Support	AS 5000/6000, TrueWall, CenterScan, LN 3000, LS Pro, and Preheater
Max Gauges	Not-Limited
Applications	Inner/Outer Diameter, Wall & Concentricity, Lump Neck, Fault Detection, Length & Speed
Cross-Section Display	Yes (Multi-Layer Possible)
Control Loops	2
Auto Setpoint Control	Yes
SPC	8 Graphical Channels
Trend Charts	5 Channels

Feature	
Printed Reports	Yes (Custom)
Data logging	20 Channels
Serial Ports	RS-232 & USB
Ethernet Port	Yes (10/100 Base T)
Alarming	Yes
Product Recipes	Yes (Unlimited)
Security	10 Levels (Custom)
I/O	Digital, Analog, Relay Contacts, Serial, USB/Network Printer, Ethernet, VGA
Interfaces w/ PC	Yes

INCONTROL

The Latest in Advanced Process Visualization & Control

- **Increase Productivity** - intuitive GUI lets you work smarter, not harder, and perform fast and simple product changeovers, reduce start-up time with precise monitoring of die center
- **Realize Production Savings** - decrease material usage, give away & rework with closed-loop control
- **Drive Product Quality** - get process analysis, statistics reporting, tolerance checking and other powerful features
- **Get Powerful Connectivity** - easily integrate with other system through I/O flexibility and optional OPC UA Server module



SPC Data Analysis

Configuration Editor

SPC Data Analysis: Collects and displays process data on 8 individual channels. View real-time charts, statistics and generate reports to improve your production process and ensure repeatable product quality while advancing the effectiveness of your quality documentation.

Configuration Editor: Enables you to easily visualize the current extrusion line configuration. Add or modify product and process parameters. Set up and adjust hardware, communication protocols, production line layout and I/O settings without any special technical knowledge.

The InControl system brings advanced production processes and product insight into complete focus. InControl provides the most intuitive graphical user interface to visualize process and measurement data, such as inner and outer diameter (ID/OD), wall thickness, concentricity and OD ovality, from a variety of Nordson gauges. Easy to set up, simple to configure and effortless to use, InControl enables you to precisely and efficiently control production processes to drive quality manufacturing.

Specifications

Feature		Feature	
Display	48.3 cm (19 in) Touch-Screen	I/O	Digital, Analog, Relay Contacts, Serial, USB/Network Printer, Ethernet, VGA
Gauge Support	AS 5000/6000, True Wall, LN3000, and LS Pro	Interfaces w/ PLC	Yes
Max Gauges	Multiple Gauge Combinations	Auto Setpoint Control	Yes
Applications	Inner/Outer Diameter, Wall & Concentricity, Lump & Neck, Fault Detection, Length & Speed	SPC	8 Graphic Channels
Cross-Section Display	Yes (Multi-Layer Possible)	Trend Charts	8 Tiles and/or Trends of Dimensional Data
Control Loops	4	Printed Reports	Yes (Custom)
Alarming	Yes	Data logging	Yes
Product Recipes	Yes (Unlimited)	Serial Ports	RS-232
Security	10 Levels (Custom)	Ethernet Port	Yes (10/100 Base T)

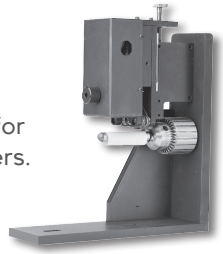
BENCHMIKE PRO

Off-Line ID/OD/Wall Measurement System

BenchMike Pro is the next evolution of the industry's leading off-line ID/OD/Wall Thickness measurement system with thousands of gauges installed worldwide. The foremost manufacturers rely on BenchMike Pro's fast measurements, ±0.9 µm accuracy and ±0.25 µm repeatability to help them deliver the superior-quality products their customers demand.

- Uses auto-compensation to maintain accuracy throughout the measurement range and to adjust for thermal expansion
- Employs tolerance checking for quickly alerting operators to out-of-tolerance conditions
- Improves efficiency with a library of stored recipes that operators can use for quickly switching products
- Accepts a range of part-holding fixtures for consistent presentation of the cable samples to be measured
- Comes with many different communication options for more flexible connection to centralized production networks, PCs, data devices and CUPS-supported USB printers
- Includes a large touchscreen display to improve measurement data viewing

ID/OD/Wall Fixture



Is supplied with a range of Teflon-coated mandrels to provide low friction rotation for a wide range of tube diameters.

High-precision ball-bearing mandrels can also be supplied to make rotating and measuring softer, stickier tubes.

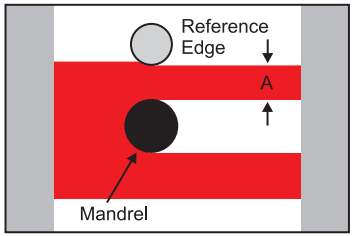
Description	Model 2025	Model 2050
Measurement Range	0.100 to 25.4 mm (0.004 to 1.0 in.)	0.254 to 50 mm (0.10 to 2.0 in.)
Accuracy	±0.9 mm (±0.000036 in.)	±1.5 mm (±0.000060 in.)
Communications	Serial (DB9 and USB), USB printer port, Ethernet, Digital I/O, Fixture port, Scan output BNC	

ID/OD/Wall Measurement for Small Tubing

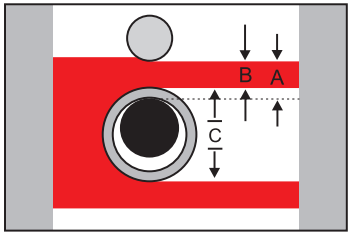
For precision ID, OD, and Wall thickness measurements, simply place a tube sample on the ID/OD/Wall fixture and the BenchMike will calculate all of the dimensions.

The ID/OD/Wall fixture will automatically rotate a sample to a pre-defined number of positions for measurements at multiple points around the product. This rotation also allows for the calculation of concentricity and ovality of the product.

The graphical user interface has options to view the rotational cross-section of the product and a graph that shows deviation or variation at the various rotational degrees of measurement.



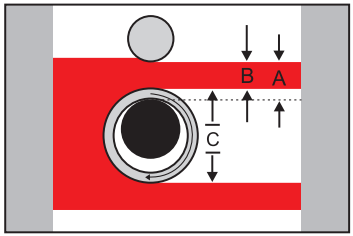
Step 1: Master on reference edge and mandrel



Step 2: Place product on mandrel and take measurements

Wall = A - B OD = C

ID = OD - (2 x Wall)



Step 3: Rotate the product to attain multiple points of measurement as well as concentricity and ovality

Concentricity = Δ(A - B)

Ovality = ΔC

For questions or support go to: https://ndc.custhelp.com/

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Nordson Measurement & Control is represented in over 60 countries worldwide. **www.ndc.com/betalasermike**