

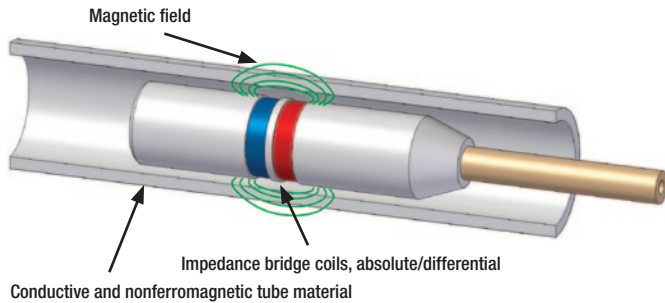


- **Condensers**
- **Feedwater Heaters**
- **Heat Exchangers**
- **Air Conditioners**
- **Boilers**
- **Air Coolers**

MultiScan MS5800E™

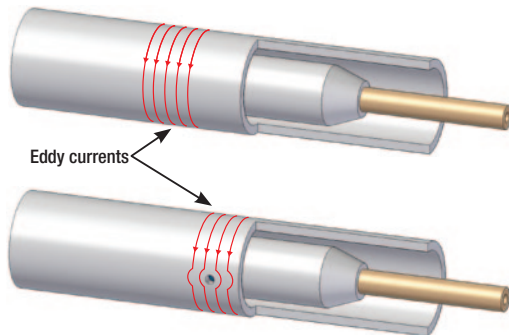
Tube Inspection with Eddy Current Testing (ECT)

- Condensers
- Feedwater heaters
- Heat exchangers
- Air conditioners

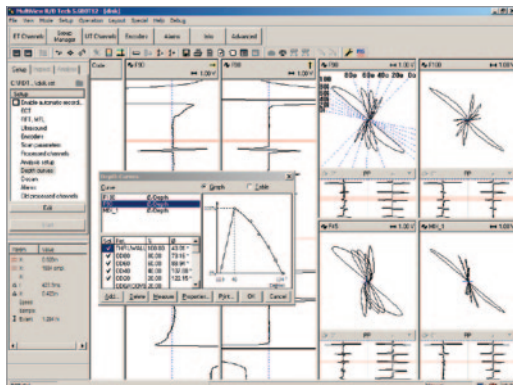


ECT APPLICATIONS

Eddy current testing is a noncontact method used to inspect nonferromagnetic tubing. This technique is suitable for detecting and sizing metal discontinuities such as corrosion, erosion, wear, pitting, baffle cuts, wall loss, and cracks in nonferrous materials.



- Two coils are excited with an electrical current, producing a magnetic field around them. The magnetic fields penetrate the tube material and generate opposing alternating currents in the material. These currents are called eddy currents.
- Any defects that change the eddy current flow also change the impedance of the coils in the probe.
- These changes in the impedance of the coils are measured and used to detect defects in the tube.



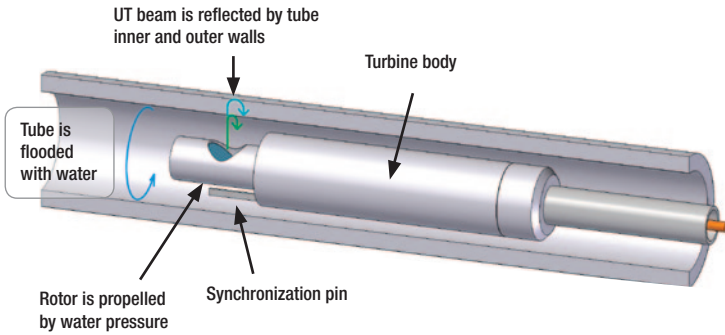
MULTISCAN MS5800E KEY FEATURES

- **4 simultaneous frequencies per input.**
This feature allows inspection speeds up to 2 m/s with 4 frequencies on absolute and differential channels, without signal distortion.
- **Electronic probe balancing.**
No separate external reference probe is required for absolute channel operation.
- **4 ECT inputs and up to 64 multiplexed channels.**
The MultiScan™ MS5800E can support a large number of ECT channels to perform array probe inspections. Compared to single-channel inspection, the array probe technology allows faster and easier surface coverage.

MultiScan MS 5800U™

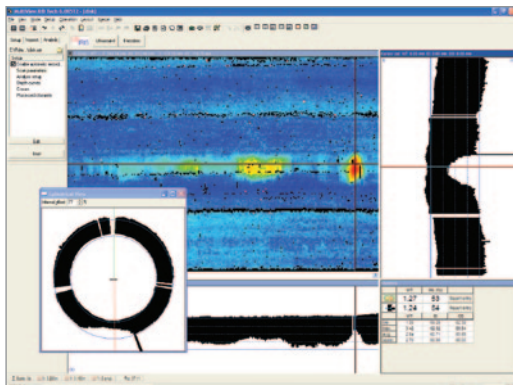
Tube Inspection with Internal Rotating Inspection System (IRIS) for Ferrous and Nonferrous Materials

- Boilers
- Feedwater heaters
- Air coolers
- Heat exchangers



IRIS APPLICATIONS

The ultrasonic IRIS option is used to inspect a wide range of materials including ferrous, nonferrous, and nonmetallic tubing. This technique detects and sizes wall loss resulting from corrosion, erosion, wear, pitting, cracking, and baffle cuts. Olympus digital IRIS inspection technology is used extensively as a prove-up technique for remote field testing, magnetic flux leakage, and eddy current inspections.



MULTISCAN MS 5800U (IRIS) KEY FEATURES

- **Setup wizard**
Simplifies equipment calibration for different tube diameters and materials. The wizard also generates the reporting code for the inspection.
- **Real-time gain and gate controls**
UT settings can be modified during the C-scan acquisition to quickly optimize signal detection.
- **Real-time and continuous color C-scans**
Reduces missed flaws with C-scan displays. Enhance the quality and appearance of your reports by including color maps and cross-section views of defects.
- **Full tube-length recording**
Used to analyze data offline and assess results with the customer.

MultiScan MS5800R™

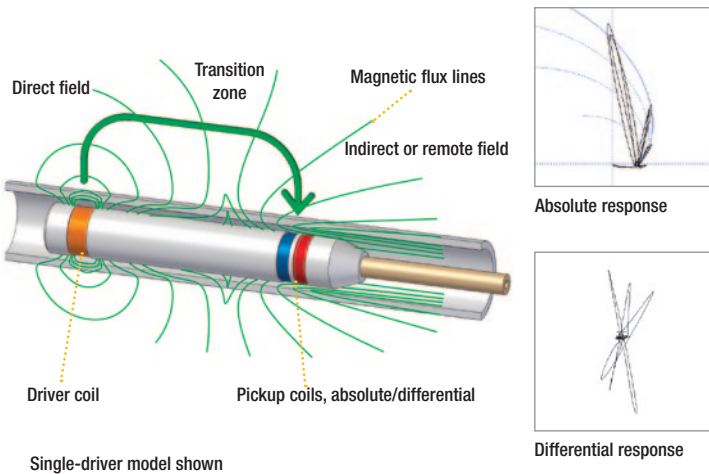
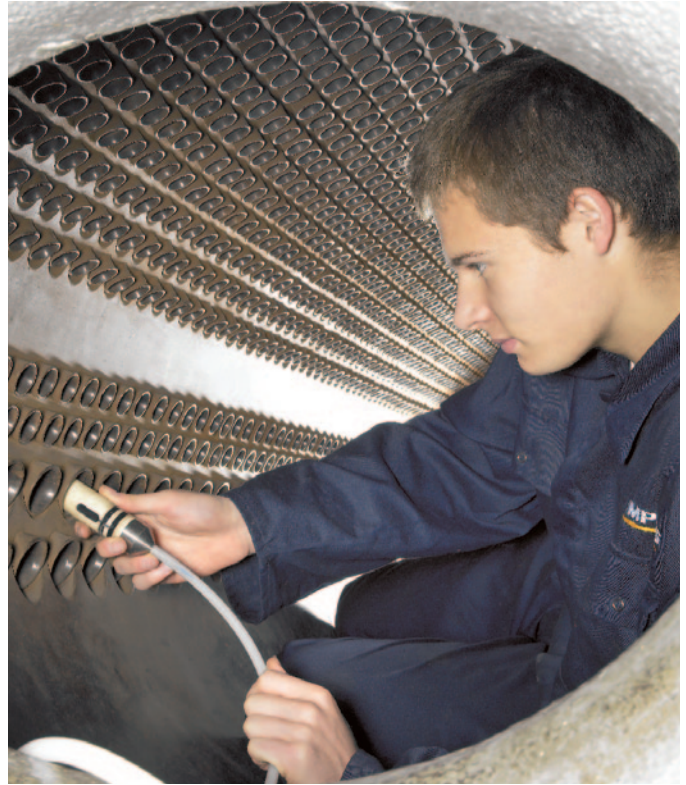
Tube Inspection with Remote Field Testing (RFT)

- Boilers
- Feedwater heaters
- Carbon steel heat exchangers

REMOTE FIELD TESTING APPLICATIONS

Remote field testing (RFT) is being used to successfully inspect ferromagnetic tubing such as carbon steel or ferritic stainless steel. This technology offers good sensitivity when detecting and measuring volumetric defects resulting from erosion, corrosion, wear, and baffle cuts.

Olympus remote field probes and the MultiScan™ MS5800 are used to successfully inspect heat exchangers, feedwater heaters, and boiler tubes, around the world.



TRC Series Flexible Boiler



Large diameter TRX Series Dual Driver



TRS Series Single Exciter



TRT Series Dual Pickup



TRX Series Dual Exciter

MULTISCAN MS5800R KEY FEATURES (RFT)

- RFT with up to four different frequencies and real-time mixes. This feature allows more flexibility for mixing and defect validation. The detection and sizing of flaws at the support plate becomes easier with multifrequency inspections and dual-driver operations.
- RFT with frequencies ranging from 20 Hz to 250 kHz. The high frequency available with the MultiScan MS5800R™ extends the RFT inspection to thin materials with low permeability, such as the stainless steel 400 series and other ferromagnetic alloys.

RFT probes come in different sizes and configurations to suit most applications.



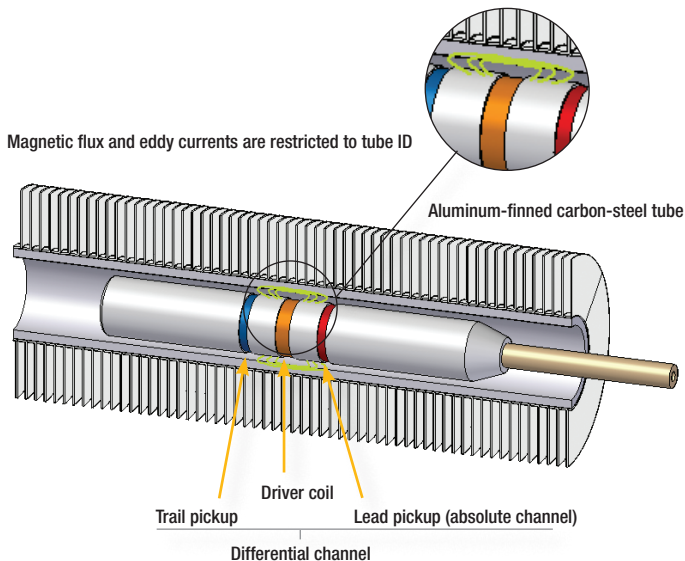
Tube Inspection with Near Field Testing (NFT)

- Air coolers
- Carbon steel heat exchangers

NEAR FIELD TESTING APPLICATIONS

The near field testing (NFT) technology is a rapid and inexpensive solution intended specifically for fin-fan carbon-steel tubing inspection. This new technology relies on a simple driver-pickup eddy current probe design providing very simple signal analysis.

NFT is specifically suited for the detection of internal corrosion, erosion, or pitting on the inside of carbon steel tubing. The NFT probes measure lift-off or "fill factor" and convert it to amplitude-based signals (no phase analysis). Because the eddy current penetration is limited to the inner surface of the tube, NFT probes are not affected by the fin geometry on the outside of the tubes.



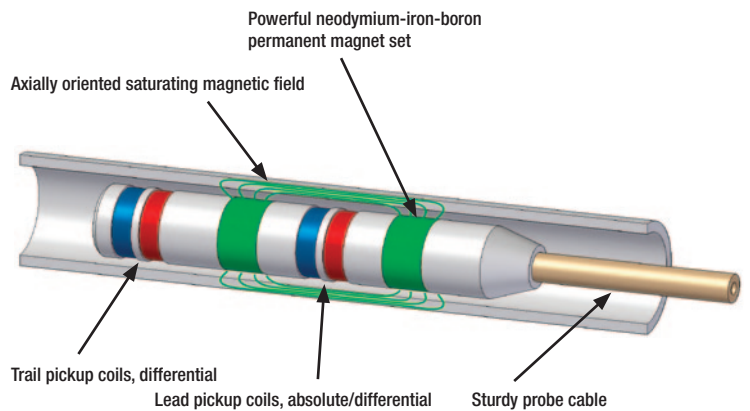
MultiScan MS 5800R™

Tube Inspection with Magnetic Flux Leakage (MFL)

- Feedwater heaters
- Air coolers
- Carbon steel heat exchangers

MAGNETIC FLUX LEAKAGE APPLICATIONS

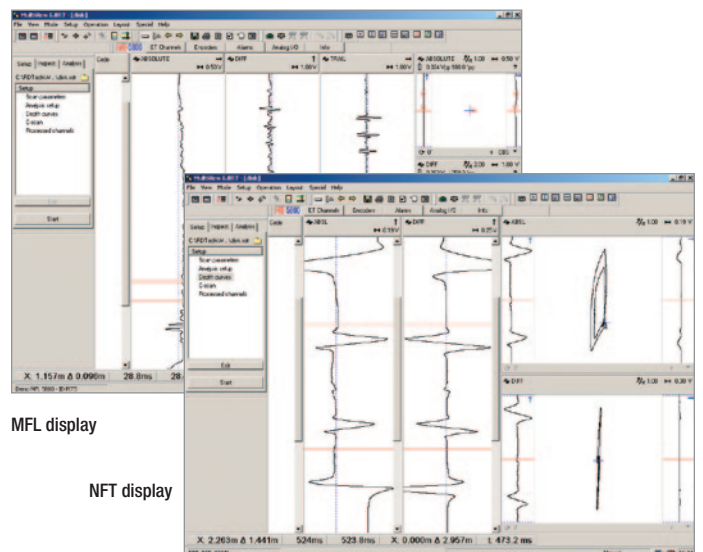
Magnetic flux leakage (MFL) is a fast inspection technique, suitable for measuring wall loss and detecting sharp defects such as pitting, grooving, and circumferential cracks. MFL is effective for aluminum-finned carbon steel tubes because the magnetic field is almost completely unaffected by the presence of such fins.



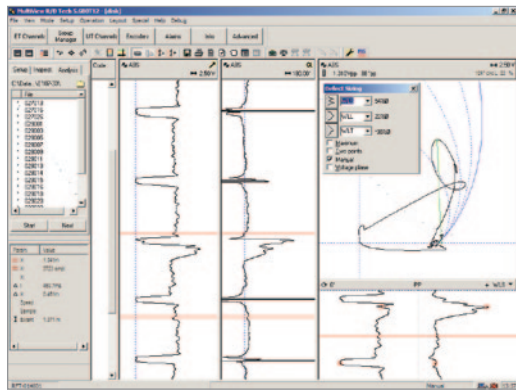
TFB Series high-saturation MFL probe



TRD Series NFT probe

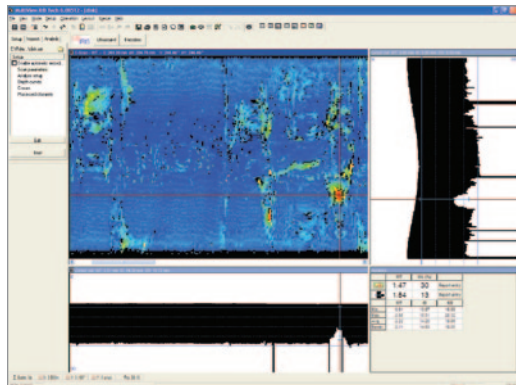


MultiView™



VOLTAGE PLANE ANALYSIS FEATURES

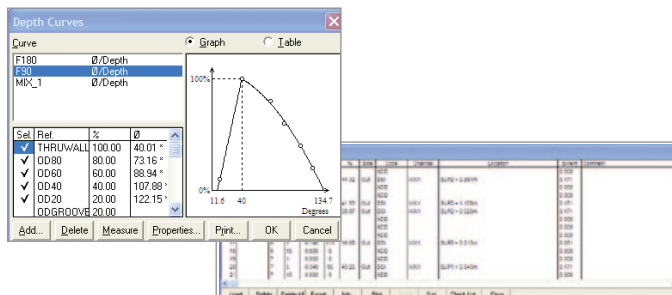
- Voltage plane theoretical curve
- Circumferential sizing overlay
- Calibration of three depth curves with only one reference point
- Voltage plane calibration without a support-plate signal
- Dual-driver software control



ULTRASOUND ANALYSIS FEATURES

- Offline cylindrical view
- Pit-depth measurement cursors
- Display of wall loss (%) and remaining wall
- Real-time C-scan acquisition

MultiView™/T

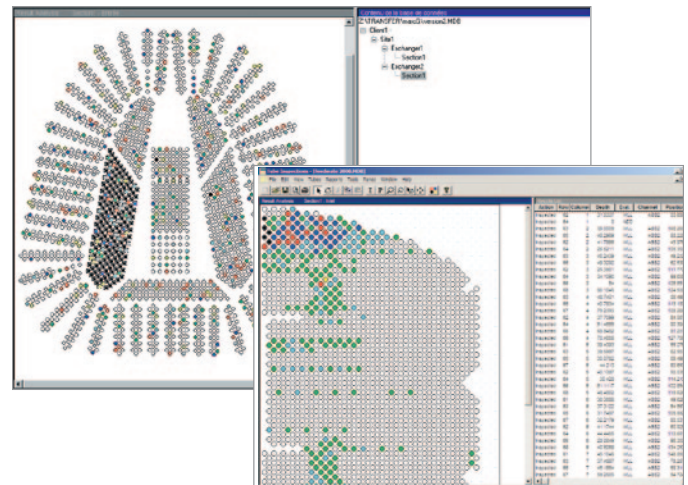


TUBE ANALYSIS SOFTWARE OPTION

- Phase-to-depth and voltage-to-depth sizing curves
- Computer-assisted analysis
- Tabular report entries and report generation

CARTO™

INSPECTION PLANNING AND TUBESHEET MAPPING



- Database management of exchangers, reports, and tubesheet maps
- Graphical tools for the creation of tubesheet maps and inspection lists
- Storage of all reports and tubesheet maps in database
- Display of results from single or multiple reports

Software features (ECT/RFT/MFL/UT)

Setup wizard	Easy configuration for tube inspection with conventional probes
Automatic calibration	Simultaneous calibration of all channels and depth curves
Data file storage	Any PC-compatible media
Printing	Screen dump, acquisition, and setup reports to any Microsoft® Windows XP®-compatible printer

Software features (UT)

Measurement mode	Wall thickness: IRIS (immersion)
Setup display	A-scan
Profilometry display	Wall thickness, ID and OD color C-scans, B-scan for tube circumferential cross section and axial section
Cursors	Cross-section cursors and manual pit-sizing cursors
Measurement	Wall loss (%), remaining wall, and statistics on tube geometry (minimum, maximum, average)

Software requirements

Operating system	Microsoft Windows XP Pro
Hardware requirements	2 GHz Pentium® with 2 GB RAM, 1 GB of free space on a hard disk, 1024 × 768 display resolution

Accessories

MS5800 Backpack

The MultiScan™ MS5800 Backpack has been designed and manufactured with the comfort and safety of your operational staff in mind. It improves safety when the operator needs to carry inspection equipment on steps or in awkward places ensuring constant 3-point contact.

This backpack has been developed and tested in the field with the help of several service companies whose input has been used to precisely define the requirements for this unique product.

In an industry where safety and security is paramount, the MS5800 Backpack protects both your equipment and your staff.

- Designed with the operator in mind
- Improves compliance with safety regulations by enabling 3-point contact
- Offers improved protection to the instrument
- Multiple pockets for carrying calibration tubes, documents, and accessories.
- Velcro® loop for attaching coiled probes
- Steel D-rings for hoisting
- Robust Cordura construction
- Padded shoulder straps
- Side-carry molded handle
- Rigid rubberized bottom for better load distribution and water resistance
- Nonrusting hardware



MS5800 Footswitch

The MultiScan MS 5800 Footswitch (P/N: TA-FSW-001) is designed with the operator in mind. It allows the remote control and one-man operation of the Olympus MS5800 inspection system. The footswitch functionality, integrated with MultiView™ 6.0 R7 software, is available to help the operator in many ways.

The MS 5800 Footswitch helps to maximize the efficiency of tube bundle inspections by reducing the overall inspection time and therefore, the equipment service downtime.

- Designed for one-man operation
- Offers much easier and more flexible control of the inspection system
- Offers a significantly reduced inspection and analysis time
- Heavy-duty design that is suitable for harsh environments
- Four switches that are mounted onto two boards to allow maximum flexibility: two switches to be used individually or all four switches to be used simultaneously.



Tube Inspection Probe Catalog

The *Tube Inspection Probe Catalog* features eddy current, magnetic flux leakage, remote field and near field, IRIS ultrasonic probes and accessories, and related ordering information. This document can be downloaded from the Olympus NDT Web site.



MultiScan MS 5800 Specifications

GENERAL

Power: 120 VAC or 220 VAC $\pm 10\%$, auto-automatic selection, 48 Hz to 63 Hz

Size (excluding handle): 45 cm x 30 cm x 22 cm

Weight: Maximum weight with all modules installed: 12.8 kg

Environment: -20°C to 45°C operating ambient, -20°C to 70°C storage; 95% relative humidity, noncondensing

Computer interface: 100Base-T Fast Ethernet

EDDY CURRENT TESTING

Probe inputs: 4 independent differential inputs and up to 64 multiplexed inputs (16 time slots)

ECT channels: 16 simultaneously (4 inputs x 4 frequencies)
256 in super-multiplexed mode (with 16 time slots)

Number of frequencies: Up to 8 frequencies

Frequency range: Adjustable from 20 Hz to 6 MHz

Acquisition rate: 40 kHz per channel (in conventional mode)
14 kHz divided by the number of time slots (in multiplexed mode or MFL)

Supported probes: Universal connector supports all standard differential and absolute bobbin, impedance, transmit-receive, and rotating probes
(Adaptor cable might be required.)

Probe balancing: True electronic probe balancing. No separate external reference probe is required for absolute channels.

Output voltage: 20 Vp-p per generator (2 outputs)

Output current: 1 A (peak)

Real-time alarms: 8 independent alarms

Encoders: 2 quadrature encoders and digital inputs

REMOTE FIELD TESTING, NEAR FIELD, AND MAGNETIC FLUX LEAKAGE

Probe inputs: 4 independent inputs for RFT/NFT
4 independent inputs for MFL

RFT/NFT channels: 16 simultaneously (4 inputs x 4 frequencies)

MFL channels: 4 simultaneously
64 in multiplexed mode (4 inputs x 16 time slots)

Number of frequencies: Up to 4 frequencies

Frequency range: Adjustable from 20 Hz to 250 kHz

Acquisition rate: 40 kHz per channel (in conventional mode)
14 kHz divided by the number of time slots (in multiplexed mode)

Supported probes: Supports any differential and absolute probes with single exciter, dual exciters, dual pickup, near field, and magnetic flux leakage (Adaptor cable might be required.)

Probe balancing: True electronic probe balancing

Output voltage : 20 Vp-p per generator (2 outputs)

Output current: 1 A (peak)

Analog output: X and Y components of the first input

Real-time alarms: 8 independent alarms

Encoders: 2 quadrature encoders or digital inputs

ULTRASONIC IRIS TESTING

Number of pulsers/receivers: 1 channel in pulse-echo mode

System bandwidth: 0.5 MHz to 25 MHz

Sampling rate: 8 bit 100 MHz

Transducer frequencies: 1 MHz to 20 MHz

Pulse repetition rate: Up to 20 kHz

Dynamic gain (linear amplifier): 70 dB, 1 dB steps

A-scan length: 32 to 8,092 points

Pulse voltage: 50 V to 300 V, 1 V steps

High-pass filter: None, 2, 5, 10 (MHz)

Data-acquisition synchronization: Time, continuous, position, or external

Encoders: 2 quadrature encoders and digital inputs (requires MultiView 6.1 or higher)



MS 5800 ER1U fully loaded for tube inspection duty. Factory-installed hardware options for the MS 5800 can be independently purchased.

Hardware options (factory configurable)

5800-E	Eddy current capability
5800-R	Remote field, near field, and magnetic flux leakage capability
5800-1U	1 UT channel (IRIS)

OLYMPUS NDT INC. is ISO 9001 certified.

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