OLYMPUS®

Your Vision, Our Future

TUBE INSPECTION SYSTEM

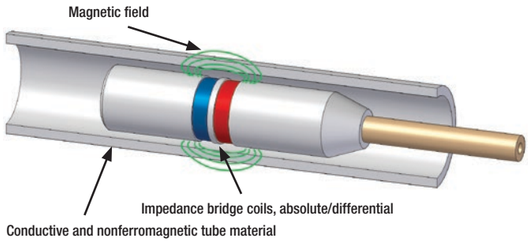
MultiScan MS 5800 Series

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

MultiScan MS 5800E™ System

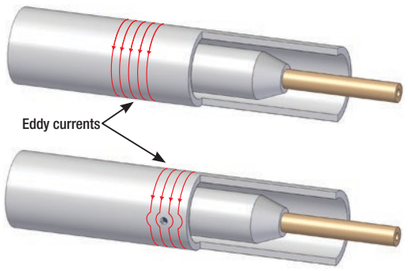
Tube Inspection with Eddy Current Testing (ECT)

- Condensers
- Feedwater heaters
- Heat exchangers
- Air conditioners

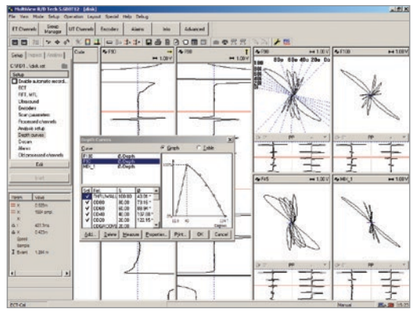


ECT Applications

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 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.



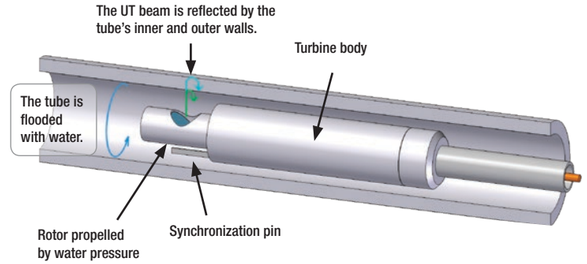
MultiScan MS 5800E Key Features

- **Four simultaneous frequencies per input.**
  Inspection speeds up to 2 m/s with four 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 MS 5800E system can support a large number of ECT channels to perform array probe inspections. Compared to single-channel inspection, the array probe technology enables faster and easier surface coverage.

MultiScan MS 5800U™ System

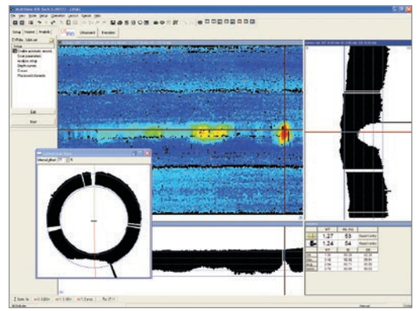
Tube Inspection with an Internal Rotating Inspection System (IRIS) for Ferrous and Nonferrous Materials

- 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 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 for quick optimization of signal detection.
- **Real-time and continuous color C-scans**
  Reduces missed flaws with C-scan displays. To enhance the quality and appearance of your reports, include color maps and cross-section views of defects.
- **Full tube-length recording**
  Used to analyze data off-line and to assess results with customers.

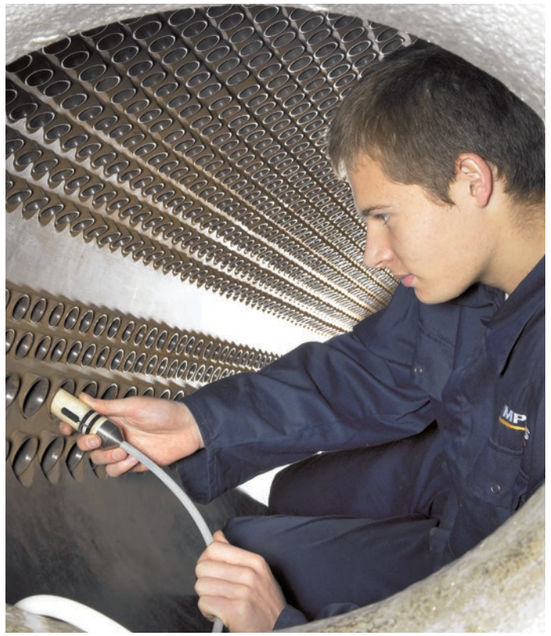
MultiScan MS 5800R™ System
Tube Inspection with Remote Field Testing (RFT)

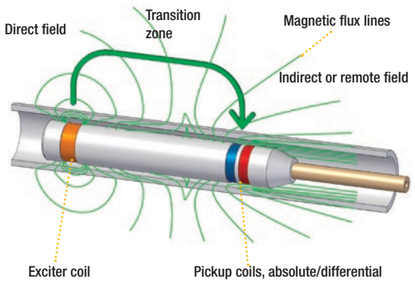
- Boilers
- Feedwater heaters
- Carbon steel heat exchangers

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 MS 5800 are used all around the world to successfully inspect heat exchangers, feedwater heaters, and boiler tubes.





Single-exciter model shown

Absolute response

Differential response

MultiScan MS 5800R Key Features (RFT)

- RFT with up to four different frequencies and real-time mixes. This feature provides more flexibility for mixing and defect validation. The detection and sizing of flaws at the support plate is made 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 MS 5800R™ extends RFT inspection to thin materials with low permeability, such as 400-series stainless steel, and other ferromagnetic alloys.

RFT probes come in different sizes and configurations for compatibility with most applications.

TRC-series Flexible Boiler

Large diameter TRX-series Dual Exciter

TRS-series Single Exciter

TRT-series Dual Pickup

TRX-series Dual Exciter

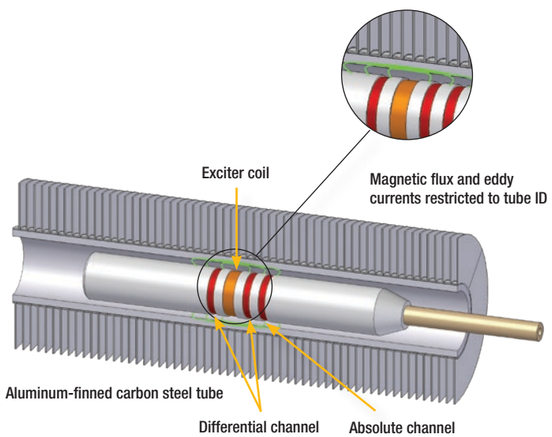
Tube Inspection with Near-Field Testing (NFT)

- Air coolers
- Carbon steel heat exchangers

Near-Field Testing Applications

Near-field testing (NFT) technology is a fast, cost-effective 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 to 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.

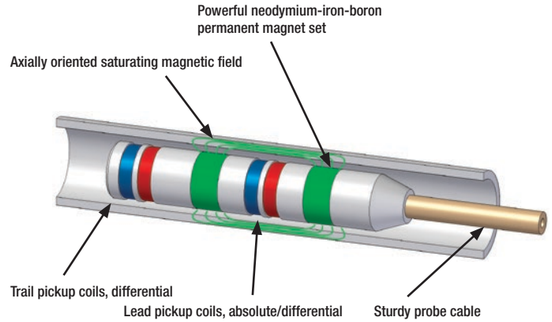


MultiScan MS 5800R™ System
Tube Inspection with Magnetic Flux Leakage (MFL)

- Feedwater heaters
- Air coolers
- Carbon steel heat exchangers

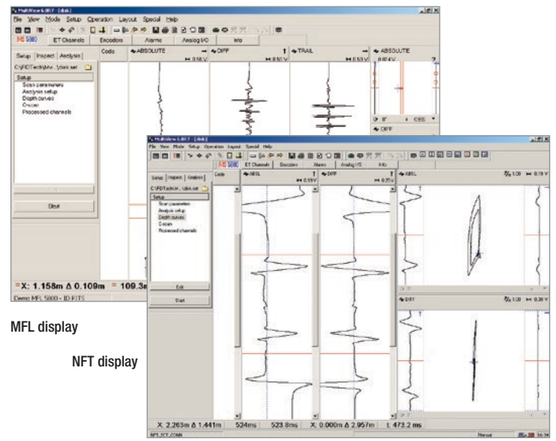
Magnetic Flux Leakage Applications

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 the fins.



TFB-series high-saturation MFL probe

TRD-series NFT probe

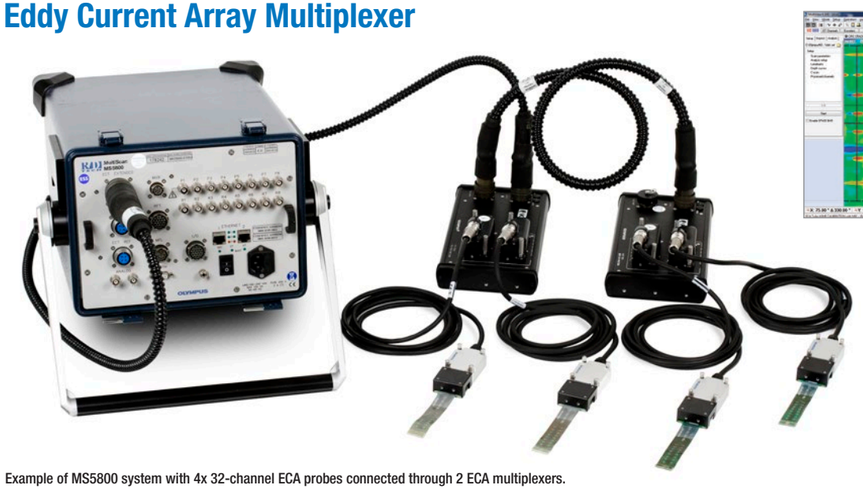


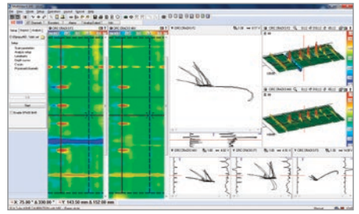
MFL display

NFT display

Accessories

Eddy Current Array Multiplexer





Example of MS5800 system with 4x 32-channel ECA probes connected through 2 ECA multiplexers.

The array technologies are valuable when high resolution or imagery is desired. The MultiView™ acquisition and analysis software features improved C-scan functionality for easy setup and analysis in a virtually unlimited number of layouts.

When used in combination with the MS5800 system and the MultiView “C” option, one or two ECA multiplexer units enable array technology with ECT, RFT, NFT, or MFL technologies. While the majority of OmniScan® ECA probes can be connected to the ECA multiplexer, Olympus provides the option of configuring the Tube Testing Array probes to your needs.

Ordering Information

Part Number	Item Number	Description	Maximum Number of Individual Sensors				
			ECT	RFT	NFT	MFL	IRIS
MUX-PKG-MS	U8780060	Universal ECA Multiplexer, 64 channels (required)	64	8	64	64	Not supported
MUX-PKG-QS-SLV	U8780069	Optional: Slave ECA Multiplexer for 64 additional channels	128	N/A	N/A	N/A	Not supported
MV-OPT-C	U8142018	Option C for MultiView (required)	---	---	---	---	Not required

MS5800 Backpack

Each MS5800 system is currently delivered with a backpack (20ED0074, U8764077), which provides your operational staff with maximum comfort and protection. The backpack, which was developed and tested in the field with the assistance of several service companies, also provides additional space to carry calibration tubes, probes, or adaptors.

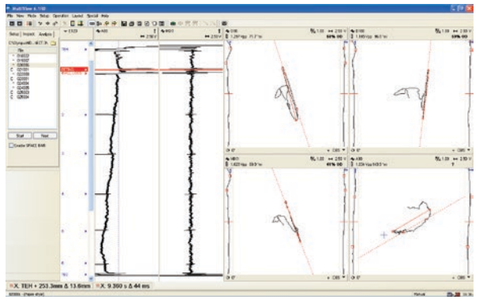
MS5800 Footswitch

The optional MS5800 Footswitch (TA-FSW-001, U8770248) provides productivity gains to individuals or two-person crews when recording data. With its field-proven, rugged design, it enables the operator to remotely perform the majority of common operations by programming several useful and configurable functionalities in the MultiView software, without the need to directly access the computer.

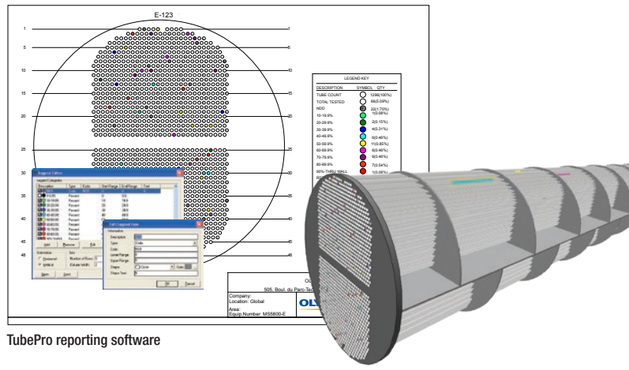
Complete Heat Exchanger Tubing Inspection Solution

MS5800, MultiView, and TubePro Software: The Ultimate Combination.

- Features acquisition, analysis and reporting.
- Multiple technologies: ECT, RFT, NFT, MFL (all with array capabilities), IRIS.
- Offers advanced user-editable reporting featuring 2-D tube maps and impressive 3-D drawings.
- Has an easy-to-use interface with improved controls.



MultiView acquisition and analysis software



TubePro reporting software

MultiView and TubePro

The MultiView and TubePro software brochure details the advances in heat exchanger tubing inspection solutions from Olympus.

This document can be downloaded from the Olympus website.

Tube Inspection Probe Catalog

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

MultiScan MS 5800 Specifications

General

Power: 120 VAC or 220 VAC ±10%, automatic selection, 48 Hz to 63 Hz

Size (excluding handle):
45 cm × 30 cm × 22 cm
(17.7 in. × 11.8 in. × 8.7 in.)

Weight: Maximum weight with all modules installed: 12.8 kg (28.2 lbs)

Environment: –20°C to 45°C (-4 °F–117 °F) for ambient operation; –20°C to 70°C (-4 °F -158 °F) storage; 95% relative humidity, noncondensing

Computer interface:
100Base-T Fast Ethernet

Eddy Current Testing

Probe inputs: Four independent differential inputs, and up to 64 multiplexed inputs (16 time slots) with MUX-PKG-MS (U8780060)

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

Number of frequencies:
Up to eight 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)

Supported probes: The 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. A separate external reference probe is not required for absolute channels.

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

Output current: 1 A (peak)

Real-time alarms: Eight independent alarms (raw channels only)

Encoders:
Two quadrature encoders and digital inputs

Remote Field Testing, Near Field, and Magnetic Flux Leakage

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

RFT/NFT channels:
16 simultaneously
(4 inputs x 4 frequencies);
64 in multiplexed mode for NFT (4 inputs x 16 time slots) and eight for RFT (4 inputs x 2 time slots)

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

Number of frequencies:
Up to four frequencies (RFT only)

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 a 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: Eight independent alarms (raw channels only)

Encoders:
Two quadrature encoders or digital inputs

Ultrasonic IRIS Testing

Number of pulsers/receivers: One 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 MHz, 5 MHz, 10 MHz

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

Encoders:
Two quadrature encoders and digital inputs

(requires MultiView 6.1 or higher)

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

Hardware Options (Factory Configurable)

Part Number	Item Number	Description
MS5800-E	U8090004	Eddy current capability
MS5800-R	U8090010	Remote field, near field, and magnetic flux leakage capability
MS5800-1U	U8090001	1 UT channel (IRIS)
MS5800-ER1U	U8090007	Eddy current, remote field, near field, magnetic flux leakage, and ultrasound (IRIS) capability
MS5800-ER	U8090006	Eddy current and remote field capability
MS5800-E1U	U8090005	Eddy current and ultrasound (IRIS) capability
MS5800-R1U	U8090011	Remote field, near field, magnetic flux leakage, and ultrasound (IRIS) capability

OLYMPUS SCIENTIFIC SOLUTIONS AMERICAS CORP. is certified to ISO 9001, ISO 14001, and OHSAS 18001.

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www.olympus-ims.com/contact-us

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MS_5800_EN_201803 • Printed in the USA • P/N: 920-107-EN Rev. E