

Ferrous Tubing Probes RFT, NFT, MFL, IRIS

✓	The test method has proven results for the specific application
Limited	The test results obtained from the test method can be interpreted reasonably.
	Test method is either not suitable for the sought application or non-reliable in terms of repeatability

Tube material	Tube type	IRIS	RFT	NFT	MFL	RFTA
Non-Ferromagnetic	Tube	✓				
	Integral finned tube	✓				
Low Ferromagnetic	Tube	✓	✓	✓	✓	✓
	Integral finned tube	✓	✓	✓	✓	✓
Ferromagnetic	Tube	✓	✓	✓	✓	✓
	Integral finned tube	Limited	✓	✓	✓	✓
	Aluminum finned tube	✓		✓	✓	

Selection of NDT test method based on detection sensitivity

Discontinuity Sought	Sensitivity Criteria	ECT	ECA	IRIS	RFT	NFT	MFL
ID Pitting	Probability of Detection						
	Sizing capability						
OD Pitting	Probability of Detection						
	Sizing capability						
Axial cracking	Probability of Detection						
	Sizing capability						
Circumferential crack	Probability of Detection						
	Sizing capability						
ID Corrosion	Probability of Detection						
	Sizing capability						
OD Corrosion	Probability of Detection						
	Sizing capability						
At tubesheet	Probability of Detection						
	Sizing capability						

Remote Field Testing (RFT) Probes

The Remote Field Testing (RFT) technique is a variation of the eddy current send/receive probe technique. The exciter coils are separated from the receiver coils by a distance equivalent to two or three times the tube OD. The receiver coils sense the flux lines that cross the tube wall twice. Remote field has an equal sensitivity to ID and OD indications, while the phase shift is directly proportional to wall loss. The remote field testing technique is used for the inspection of ferromagnetic tubing; such as carbon steel and ferritic stainless, as well as for the detection and sizing of wall thinning resulting from corrosion, erosion, wear, pitting, and baffle cuts.



Frequency Selection for all RFT Probes

20 Hz to 200 Hz used for carbon steel thicker than 6mm

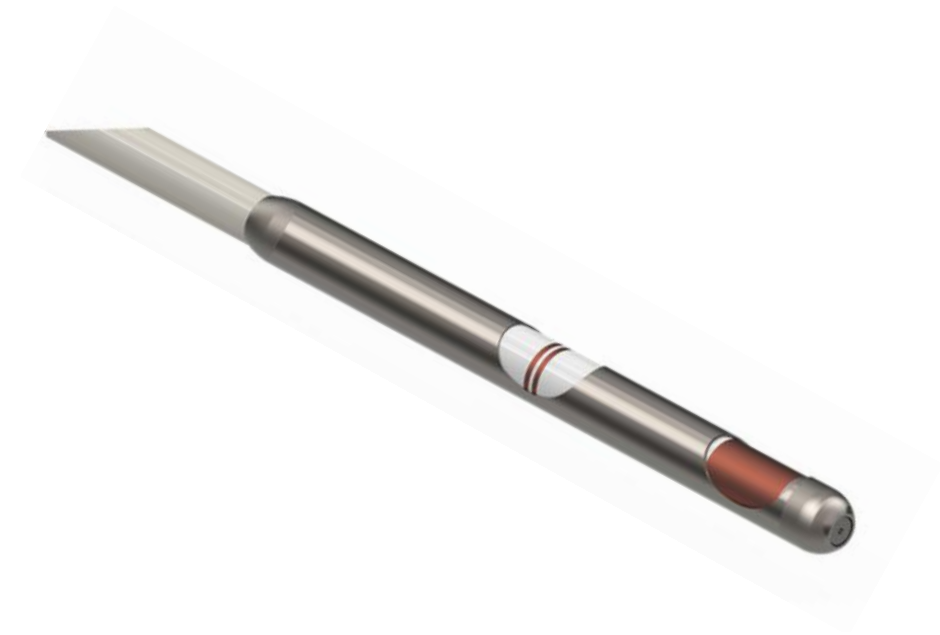
100 Hz to 1000 Hz used for carbon steel applications like SA214 or SA179 (most popular)

1 kHz to 10 kHz used for thin or lower permeability carbon steel like A-556

5 kHz to 30 kHz used for ferromagnetic stainless steel like SS439 (A-268) or SEA-Cure

Tube diameter (mm)	Tube OD diameter (inches)	Recommended Rigid probe clearance (overall)	Recommended Flexible probe clearance (overall)
12.7	1/2"	1.5mm(0.060")	
15.9	5/8"	1.5mm(0.060")	
19.05	3/4"	2.0mm(0.075")	
25.4	1	2.0mm(0.075")	
31.75	1.25	2.5mm(0.100")	5.0mm(0.200") U-bend
38.1	1.5	3.0mm(0.125")	5.0mm(0.200") U-bend
44.45	1.75	4.0mm(0.150")	6.35mm(0.250") Boilers
50.8	2	4.0mm(0.150")	7.6mm(0.300") Boilers
63.5	2.5	4.0mm(0.150")	7.6mm(0.300") Boilers
76.2	3	4.4mm(0.175")	8.26mm(0.325") Boilers
88.9	3.5	4.4mm(0.175")	8.26mm(0.325") Boilers
101.6	4	4.4mm(0.175")	8.26mm(0.325") Boilers

RFTLS Remote Field Testing Low Voltage Single Exciter



Standard Features

- Absolute and differential signal
- Single Exciter
- Includes a 30-dB preamplifier
- Wear resistant design

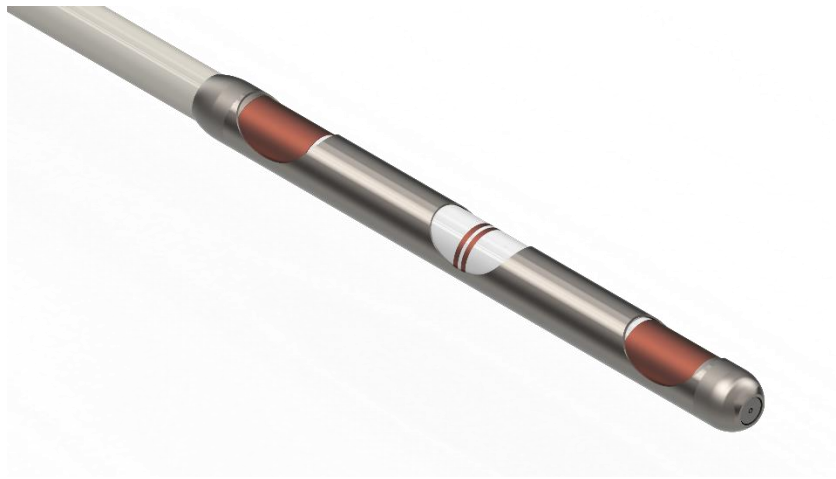
Probe Diameter 1mm Increments	Poly Length	Push Poly Black Polypropylene	Frequencies	Connector
0.320" to 3.000" (8 mm to 76mm)	65' (20m) 98' (30m)	Poly size Probe diam. 5/16" (8-10mm) 21/64" (11-12mm) 3/8" (13-25mm) 1/2" (26-76mm)	20-200Hz 100-1000Hz 1-10kHz 5-30kHz	19 Pin Amphenol
Custom options are available for all items				

Supporting Instruments and Software

MIZ-200 with Eddyner or Velocity

MIZ-28 with must have adaptor 043A800-00 ZEC-ADP-MIZ-28-LV-RFT (allows for exciter coils to be individually excited)

RFTLD Remote Field Testing Low Voltage Dual Exciter



Standard Features

- Absolute and differential signal
- Single or dual driver operation selectable from the software interface (Adapter required for MIZ-28)
- Includes a 30-dB preamplifier
- Better detection of signal at tube support plate than single exciter
- Wear resistant design

Standard Options

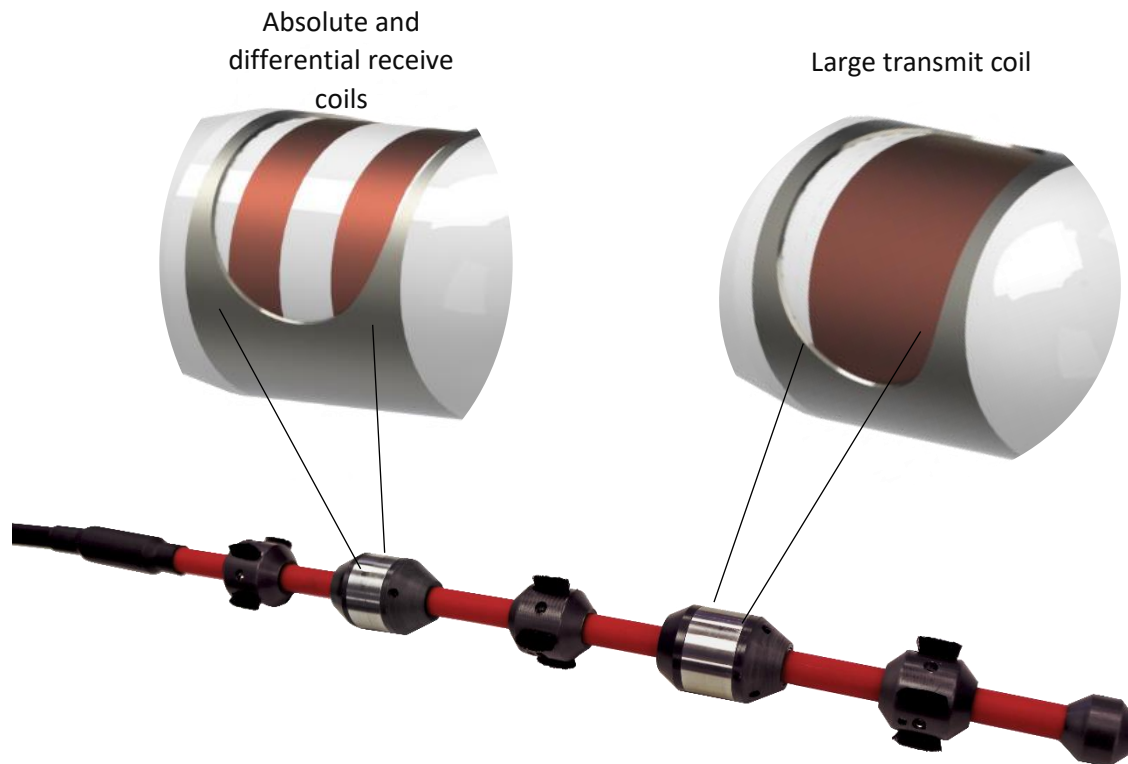
Probe Diameter 1mm Increments	Poly Length	Push Poly Black Polypropylene	Frequencies	Connector
0.320" to 3.000" (8 mm to 76mm)	65' (20m) 98' (30m)	5/16" (8-10mm)	20-200Hz	19 Pin Amphenol
		21/64" (11-12mm)	100-1000Hz	
		3/8" (13-25mm)	1-10kHz	
		1/2" (26-76mm)	5-30kHz	
Custom options are available for all items				

Supporting Instruments and Software

MIZ-200 with EddyNet or Velocity

MIZ-28 with must have adaptor 043A800-00 ZEC-ADP-MIZ-28-LV-RFT (allows for exciter coils to be individually excited)

RFTLSF Remote Field Probe Single Exciter Flexible Boiler, Low Voltage



Standard Features

- Absolute and differential signal
- Stainless steel sheathed coils
- Single operation
- Includes a 30-dB preamplifier
- Wear resistant design

Probe Diameter 1mm Increments	Poly Length	Push Poly Black Polypropylene	Frequencies	Connector
0.410" to 3.000" (10.4mm to 76mm)	65' (20m) 98' (30m)	21/64" (11-12mm) 3/8" (13-25mm) 1/2" (26-76mm)	20-200Hz 100-1000Hz 1-10kHz 5-30kHz	19 Pin Amphenol
Custom options are available for all items				

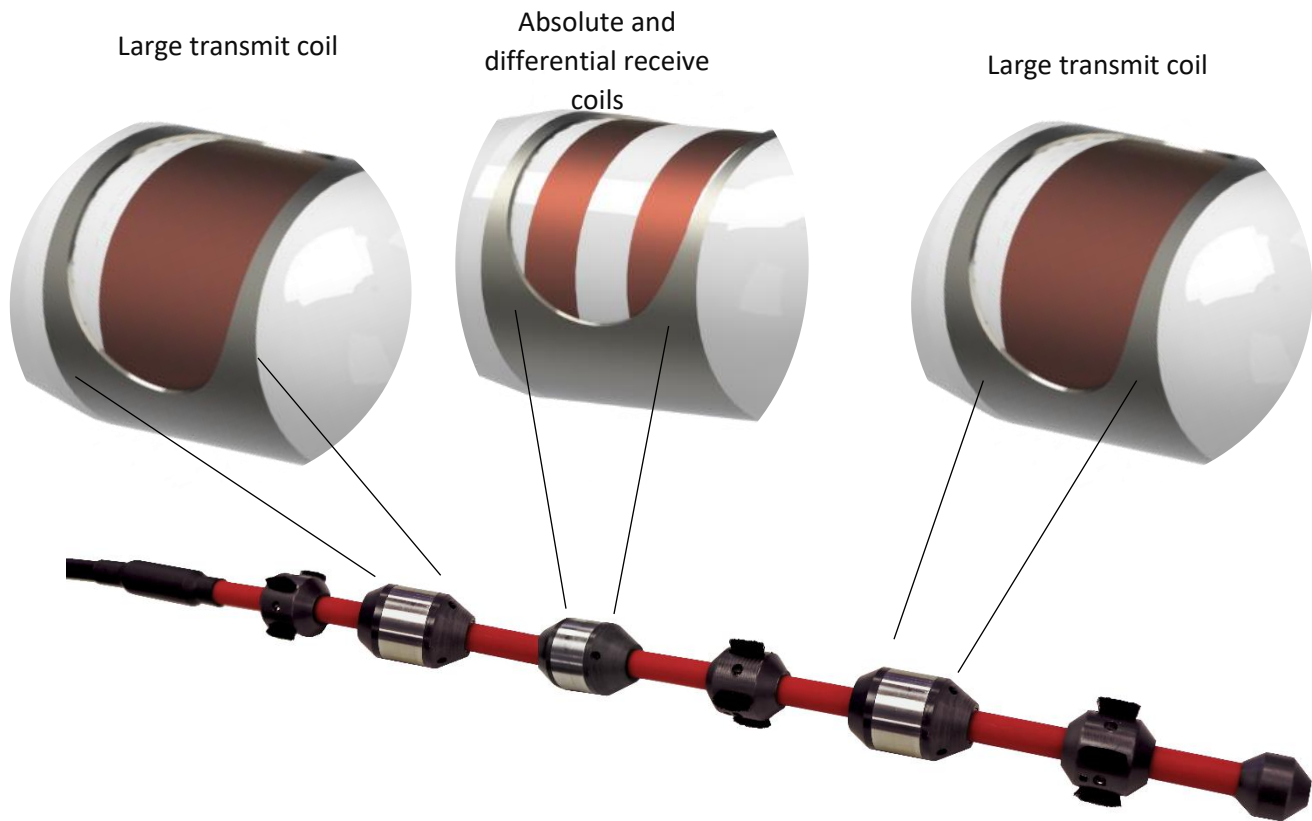
Note: For flexible RFT probes smaller than 0.925 (23.5mm) it is recommended to use a dual exciter flexible RFT probe, model RFTLDF to receive a better signal to noise.

Supporting Instruments and Software

MIZ-200 with EddyNet or Velocity

MIZ-28 with ... Adaptor xxx allows for exciter coils to be individually excited.

RFTLDF Remote Field Probe Dual Exciter Flexible Boiler, Low Voltage



Standard Features

- Absolute and differential signal
- Stainless steel sheathed coils
- Single operation
- Includes a 30-dB preamplifier
- Wear resistant design

Probe Diameter 1mm Increments	Poly Length	Push Poly Black Polypropylene	Frequencies	Connector
0.410" to 3.000" (10.4mm to 76mm)	65' (20m) 98' (30m)	21/64" (11-12mm) 3/8" (13-25mm) 1/2" (26-76mm)	20-200Hz 100-1000Hz 1-10kHz 5-30kHz	19 Pin Amphenol
Custom options are available for all items				

Supporting Instruments and Software

MIZ-200 with EddyNet or Velocity

MIZ-28 with ... Adaptor xxx allows for exciter coils to be individually excited.

Near Field Testing (NFT) Probes

The Near Field Testing (NFT) technique is a variation of the eddy current send/receive probe technique. The exciter coils are closer to the receiver coils than RFT probes. Typical applications are for internal corrosion, erosion and axial cracking on fin-fan carbon steel tubing.

Frequency Selection for all NFT Probes

- 20 Hz to 200 Hz used for carbon steel thicker than 6mm
- 100 Hz to 1000 Hz used for carbon steel applications like SA214 or SA179 (most popular)
- 1 kHz to 10 kHz used for thin or lower permeability carbon steel like A-556
- 5 kHz to 30 kHz used for ferromagnetic stainless steel like SS439 (A-268) or SEA-Cure

NFTLS Near Field Testing Low Voltage Single Exciter

Standard Features

- Absolute and differential signal
- Single Exciter
- Includes a 30-dB preamplifier
- Wear resistant design

Probe Diameter 1mm Increments	Poly Length	Push Poly Black Polypropylene	Frequencies	Connector
0.320" to 3.000" (8 mm to 76mm)	65' (20m) 98' (30m)	5/16" (8-10mm)	20-200Hz	19 Pin Amphenol
		21/64" (11-12mm)	100-1000Hz	
		3/8" (13-25mm)	1-10kHz	
		1/2" (26-76mm)	5-30kHz	
Custom options are available for all items				

Supporting Instruments and Software

MIZ-200 with EddyNet or Veocity

MIZ-28 with ... Adpator xxx allows for exciter coils to be individually excited.

NFTLD Near Field Testing Low Voltage Dual Exciter

Standard Features

- Absolute and differential signal
- Single or dual driver operation selectable from the software interface (Adapter required for MIZ-28)
- Includes a 30-dB preamplifier
- Better detection of signal at tube support plate than single exciter
- Wear resistant design

Probe Diameter 1mm Increments	Poly Length	Push Poly Black Polypropylene	Frequencies	Connector
0.320" to 3.000" (8 mm to 76mm)	65' (20m) 98' (30m)	5/16" (8-10mm)	20-200Hz	19 Pin Amphenol
		21/64" (11-12mm)	100-1000Hz	
		3/8" (13-25mm)	1-10kHz	
		1/2" (26-76mm)	5-30kHz	
Custom options are available for all items				

Supporting Instruments and Software

MIZ-200 with EddyNet or Veocity

MIZ-28 with ... Adpator xxx allows for exciter coils to be individually excited.

Magnetic Flux Leakage (MFL) Probes

Magnetic Flux Leakage (MFL) is based on the magnetization of the material to inspect using strong magnets located inside the probe. As the probe encounters a wall reduction or sharp discontinuity, the flux distribution varies around that area and is detected with an inductive pick-up coil. Typical applications are corrosion, steam erosion and circumferential cracking on air cooler tubing with aluminum fins or ferromagnetic stainless steel. The recommended diameter is 1.5-2mm smaller than tube ID.

Frequency Selection for all MFL Probes

20 Hz to 200 Hz used for carbon steel thicker than 6mm

100 Hz to 1000 Hz used for carbon steel applications like SA214 or SA179 (most popular)

1 kHz to 10 kHz used for thin or lower permeability carbon steel like A-556

5 kHz to 30 kHz used for ferromagnetic stainless steel like SS439 (A-268) or SEA-Cure

MFL Magnetic Flux Leakage High Saturation Probe

Standard Features

- Absolute and differential signal
- Single Exciter
- Includes a 30-dB preamplifier
- Wear resistant design

Probe Diameter 1mm Increments	Poly Length	Push Poly Nylon 6/6	Frequencies	Connector
0.470" to 1.180" (12mm to 30mm)	65' (20m) 98' (30m)	21/64" (11-12mm) 3/8" (13-25mm) 1/2" (26-76mm)	20-200Hz 100-1000Hz 1-10kHz 5-30kHz	19 Pin Amphenol
Custom options are available for all items				

Supporting Instruments and Software

MIZ-200 with EddyNet or Veocity

MIZ-28 with ... Adpator xxx allows for exciter coils to be individually excited.