Eddyfi Technologies
Beyond current

Technical Specifications

DEFHI

High-definition multiplexed eddy current array tubing probes

The DefHi® probe is Eddyfi Technologies' groundbreaking high-definition, multiplexed ECA probe. It's designed to inspect the non-ferromagnetic tubing in condensers, feedwater heaters, and heat exchangers.

In our quest to make eddy current array (ECA) a truly universal and easy-to-use tubing inspection method, here is DefHi, an ECA probe engineered to inspect non-ferromagnetic heat exchanger and condenser tubing.

HIGH-DEFINITION MULTIPLEXED ECA

The DefHi probe is a high-definition, multiplexed ECA probe that use electronic channel multiplexing to leverage, via timeslots, the physical inputs of an ECT test instrument and to accommodate up to 128 ECT channels. DefHi is available in variety of configurations and sizes.

DefHi does away with many of the downsides associated with conventional tube inspection techniques. It allows you to detect and size circumferential cracks, a major limitation of bobbin probes. Furthermore, DefHi's multichannel configuration is capable of the high acquisition speed of bobbin probes (much higher than that of rotating (RPC) probes) and can inspect entire lengths of tube.

DefHi offers a uniform, high-definition sensitivity to identify defects in any orientation. Other types of so-called array probes (categorized as non-multiplexed array probes) and air conditioning (A/C) probes are incapable of this level of sensitivity. They are generally limited to a combination of bobbins and coils equal to the number of physical channels of the source ECT tester (usually 4 or 8), which results in suboptimal performance, simply because an insufficient number of coils cannot provide adequate definition.

The patented DefHi probe is therefore the utmost in ECT tubing inspection performance..

FEATURES AND BENEFITS

- One-pass combination bobbin and array probe
- Sizing of circumferential and axial cracks*
- Optimum resolution and uniform sensitivity with oval-coil technology
- Uncompromising durability (highly kink-resistant cable, replaceable centering devices)
- Wider frequency range (HW to HF)
- Convenient analysis with strip chart for bobbin and 2D/3D C-scans for array imaging

*Available with advanced options only.

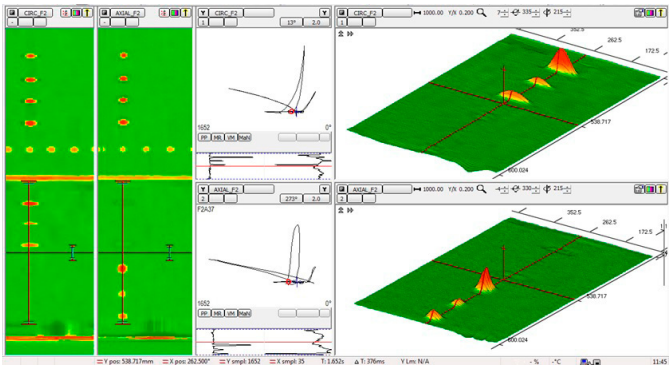

Figure 1: High-resolution C-scan for greater insight on defect morphology.

Figure 3: Heat exchanger inspection using a DefHi ECA probe paired with the Ectane.

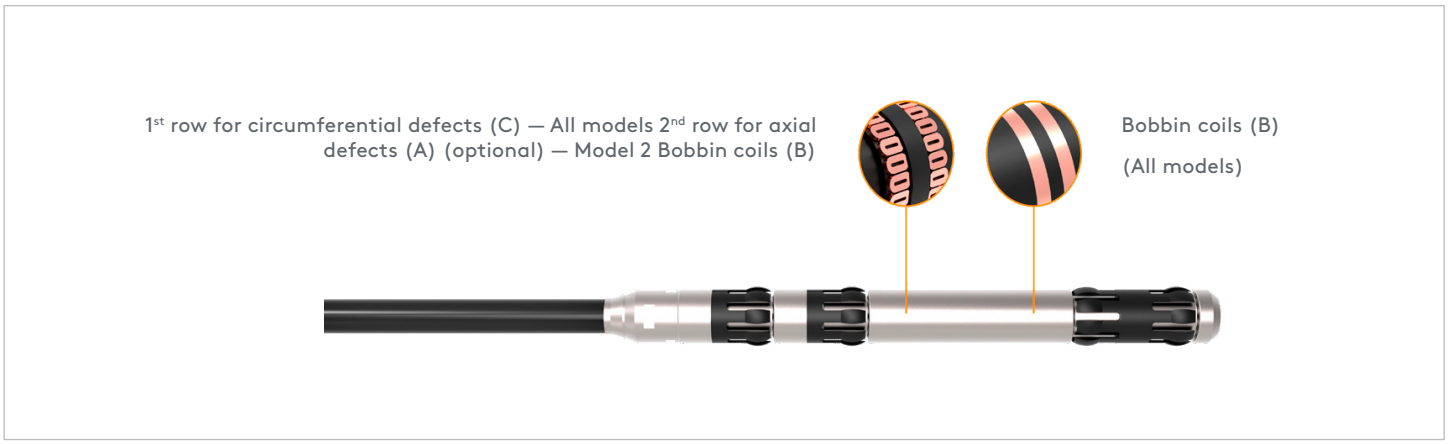

Figure 2: Annotated breakdown of the DefHi probe.

SPECIFICATIONS

GENERAL	
Coil technologies	• Differential and absolute bobbin + transmit/receive array • Patented oval pancake coils - 1 row for circumferential only - 2 rows for circumferential and axial
Material	Non-ferromagnetic. Experience on 300-series stainless steel, INCONEL®, copper/nickel, brass, titanium
Maximum speed	1 m/s (40 in/s)
Poly	9 mm (0.375 in) strong, premium, non-kinkable nylon
Calibration standard	Modified ASME standard
Connector	160-pin Eddyfi Ectane® connector

EDDY CURRENT CHANNELS FOR AVAILABLE SIZES[1]			
TUBE OD	BOBBIN	CIRC.	AXIAL[2]
12.70 mm (0.500 in)	2	18	36
15.87 mm (0.625 in)	2	18	36
19.05 mm (0.750 in)	2	24	48
22.22 mm (0.875 in)	2	24	48
25.40 mm (1.000 in)	2	30	60
Larger sizes	Custom. Inquire for details.		

[1] Values for the MF frequency range. Values differ for HW, HF, and LF ranges.
[2] Advanced options only.

DEFHI-TUV-WWWXX-NZZ

OPTION	MULTIPLEXER	BODY	CONFIGURATION			DIAMETER	FREQUENCY	POLY LENGTH
	ECTANE 2/ PROBE	RIGID/FLEX	BOBBIN	CIRCUM.	AXIAL			
1	E	R	B	C	-	Probe diameter 3-digit code, e.g., 146 = 14.6 mm Contact for availability of required diameters	HW: 4–60 kHz LF: 20–200 kHz MF: 50–500 kHz* HF: 100–1200 kHz**	05: 5 m (16 ft) 15: 15 m (50 ft)
2	E	R	B	C	A			

* Maximum MF is reduced to 400 kHz with 15 m cable.
** Maximum HF is reduced to 1 MHz with 15 m cable.

PROBE DIAMETERS

		TUBE WALL THICKNESS														
	BWG	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	MM	3.40	3.05	2.77	2.41	2.11	1.83	1.65	1.47	1.24	1.07	0.89	0.81	0.71	0.65	0.56
	IN	0.135	0.120	0.109	0.095	0.083	0.072	0.065	0.058	0.049	0.042	0.035	0.032	0.028	0.025	0.022
TUBE OD 12.70 mm	0.500 in	-	-	-	-	-	-	-	-	096	096	102	102	106	106	106
TUBE OD 15.87 mm	0.625 in	-	-	096	102	106	114	118	118	126	126	132	132	136	136	136
TUBE OD 19.05 mm	0.750 in	114	118	126	136	140	148	148	148	156	156	162	162	166	166	170
TUBE OD 22.22 mm	0.875 in	148	148	156	166	170	178	178	186	186	192	192	196	196	196	200
TUBE OD 25.40 mm	1.000 in	178	186	186	196	200	208	208	216	220	220	226	226	226	230	230

PROBE FREQUENCIES

		TUBE WALL THICKNESS														
	BWG	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	mm	3.40	3.05	2.77	2.41	2.11	1.83	1.65	1.47	1.24	1.07	0.89	0.81	0.71	0.65	0.56
	in	0.135	0.120	0.109	0.095	0.083	0.072	0.065	0.058	0.049	0.042	0.035	0.032	0.028	0.025	0.022
MATERIAL	Brass (admiralty)	–	–	–	–	–	HW	HW	HW	HW	HW	LF	LF	LF	LF	LF
	Brass (70/30)	–	–	–	–	–	HW	HW	HW	HW	HW	LF	LF	LF	LF	LF
	Brass (85/15)	–	–	–	–	–	–	HW	HW	HW	HW	HW	LF	LF	LF	LF
	Brass (95/5)	–	–	–	–	–	–	–	–	HW	HW	HW	HW	HW	LF	LF
	Copper	–	–	–	–	–	–	–	–	–	–	HW	HW	HW	HW	HW
	Copper-nickel (70/30)	HW	HW	HW	HW	LF	LF	LF	LF	LF	MF	MF	MF	MF	MF	HF
	Copper-nickel (90/10)	–	HW	HW	HW	HW	HW	LF	LF	LF	LF	LF	MF	MF	MF	MF
	Copper-nickel (95/5)	–	–	–	HW	HW	HW	HW	HW	LF	LF	LF	LF	LF	MF	MF
	INCONEL® 600	LF	LF	LF	LF	LF	MF	MF	MF	MF	MF	HF	HF	HF	HF	HF
	Stainless steel 304/316	HW	LF	LF	LF	LF	LF	MF	MF	MF	MF	HF	HF	HF	HF	HF
	Titanium 99%	HW	HW	HW	LF	LF	LF	LF	LF	MF	MF	MF	MF	HF	HF	HF
	Zirconium	HW	HW	HW	LF	LF	LF	LF	LF	MF	MF	MF	MF	MF	HF	HF

TOTAL NUMBER OF ARRAY CHANNELS

	FREQ. CONFIG.	HW		LF		MF	
		BC	BCA	BC	BCA	BC	BCA
PROBE DIAM.	096-106	–	–	12	36	18	54
	114-140	12	36	18	54	18	54
	148-178	12	36	24	72	24	72
	186-196	18	54	24	72	24	72
	200-230	18	54	30	90	30	90

	FREQ. CONFIG.	HF	
		BC	BCA
PROBE DIAM.	096-106	–	–
	132-136	18	54
	162-170	24	72
	196-200	30	90
	226-230	36	108

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