



T5 HyTec Probe Advantages

The T5 HyTec Hybrid probe includes VM Products wide bandwidth ferritic bobbin coil set along with a T5 HyTec coil set.

The T5 HyTec coil set attaches to the instrument the same as a differential bobbin probe. This consists of an overlapping array of coils which is optimized for crack detection and which suppresses signals from fully circumferential objects.

- An array with the speed and simplicity of a differential bobbin probe.
- Full circumferential coverage, no dead spots.
- Detects axial cracks.
- Detects circumferential cracks.
- Detects pitting, not as well as the bobbin coils but allows sizing of ID pits more accurately.
- Suppresses tube sheet expansion.
- Suppresses tube supports.
- Suppresses fin noise, both external and internal.
- Suppresses signals from landed areas and transitions.
- Suppresses tube pilger noise.
- Suppresses dent signals.
- Suppresses 360 degree grooves and 4 x 20% flat bottom holes on ASME standard.

T5 HyTec Industries

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Manufactured by VM Products, Inc.

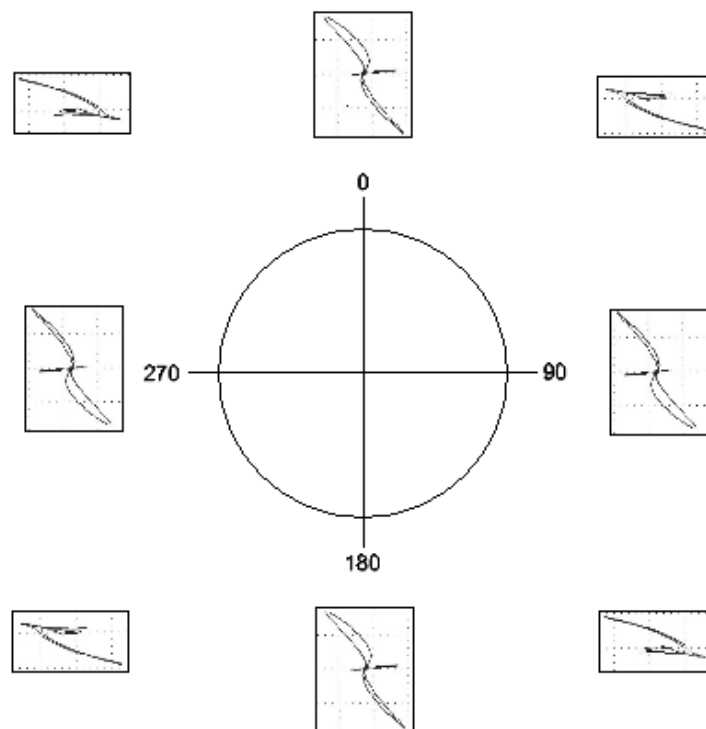
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T5 HyTec Hybrid Probe Setup

The T5 HyTec Hybrid probe is intended to provide a conventional bobbin test with the additional capability of the circumferential crack detection and suppression of non-defect signals.

The T5 HyTec coils are arrayed around the probe covering 90 degree sectors and overlapping to eliminate any dead zones. Typical signals from a 60% pit are shown in the following diagram:



- Between 0 and 90 degrees and between 180 and 270 degrees an absolute type signal will be generated in one direction as the coil passes directly under the pit.
- Between 90 and 180 degrees and between 270 and 360 degrees an absolute type signal in the **opposite** direction will be generated as the opposing coil passes directly under the pit.
- At 0, 90, 180 and 270 degrees, the overlapping coils produce a differential type signal.

Due to the subtraction of one coil set from the other, signals of exactly 180 degree extent or 360 degree extent are suppressed. This provides suppression of expansions, transitions, support plates, fins, dents, etc.



This also suppresses the 4 20% flat bottom holes and the OD groove of the ASME standard and the signal from a 360 degree crack which has no axial component. To account for this, the T5 HyTec coils may also be operated in an absolute mode with a remote reference probe (or autobalance) in the same way as a bobbin probe.

The following picture illustrates the MIZ-27ET setup for testing 5/8" OD x 0.065" wall thickness, 304 stainless using a .480 T5 HyTec Hybrid probe with a second probe as remote reference:

SAVE TO Config#: 19 Name: 065 SS PR 480
 RECALL Config#: 19 Name: 065 SS PR 480
 Current Config#: 19 Name: 065 SS PR 480

Samples per sec - 1684 Max: 2000

Probe-1				Probe-2	
Freq	Drive	Ch Type	Gain	Ch Type	Gain
68kHz	10.0v	1 Df_a	58dB	2 Ab_a	58dB
34kHz	10.0v	3 Df_a	58dB	4 Ab_a	58dB
68kHz	10.0v	5 Df_d	58dB	6 Ab_d	58dB
34kHz	10.0v	7 Df_d	58dB	8 Ab_d	58dB

Driver Pickup Gain F1: x2 (< 6dB)
 F2: x2 (< 6dB)
 F3: x2 (< 6dB)
 F4: x2 (< 6dB)

	CHANNELS							
	1	2	3	4	5	6	7	8
NULL-1:	1	2	3	4	5	6	7	8
NULL-2:	-	-	-	-	-	-	-	-

STRIP CHART SCROLL: 40 pixels/sec LENGTH: 60 secs

Date: 09:36:40 02 SEP 09
 Date: 09:36:40 02 SEP 09
 Date: Modified

ZETEC
MIZ-27

14:09:05
11 SEP 09

SET
GAIN

DN

UP

1 CONFIG LIST

2 SAVE CONFIG

3 -

4 IO CONFIG

5 UTILITY

6 CHECK CALIBR

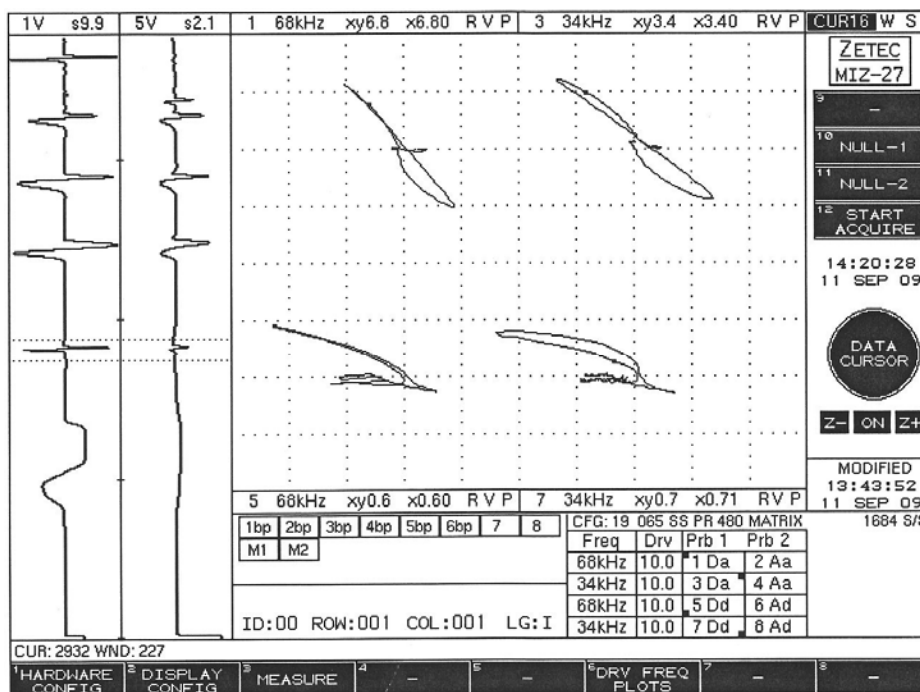
7 -

8 RETURN

The bobbin coils are attached to Df_a & Ad_a and the T5 HyTec coils to Df_d & Ab_d.



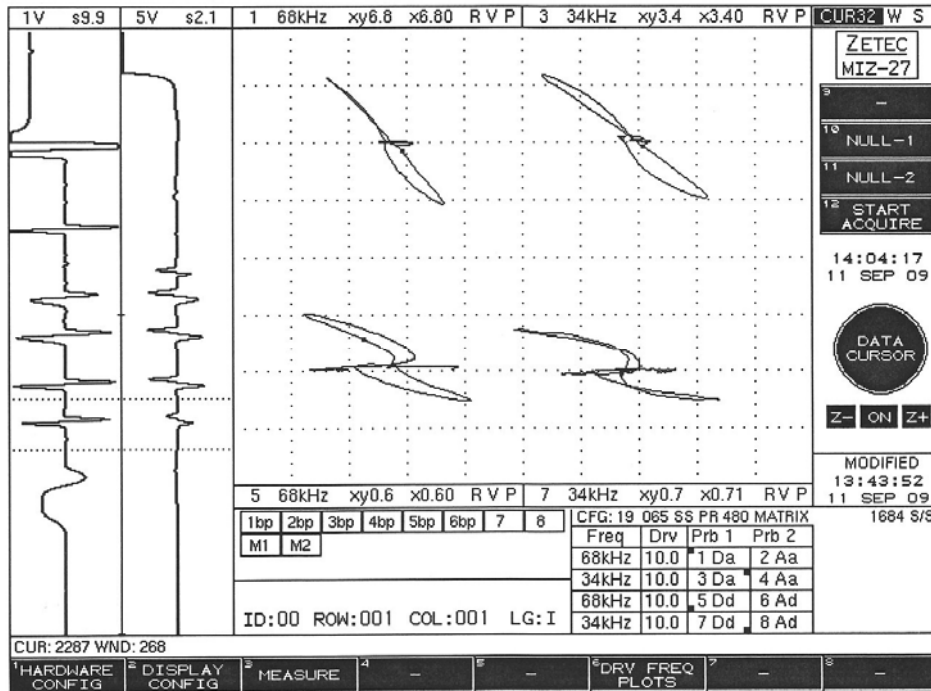
The following pictures illustrate some of the signals from an ASME standard. Note that the coil spacing between the bobbin and T5 HyTec coils is the same as the spacing between the holes of the standard, so that, for example, a window will show the 80% flat bottom hole with the bobbin at the same time as the 100% through wall hole with the T5 HyTec coils:



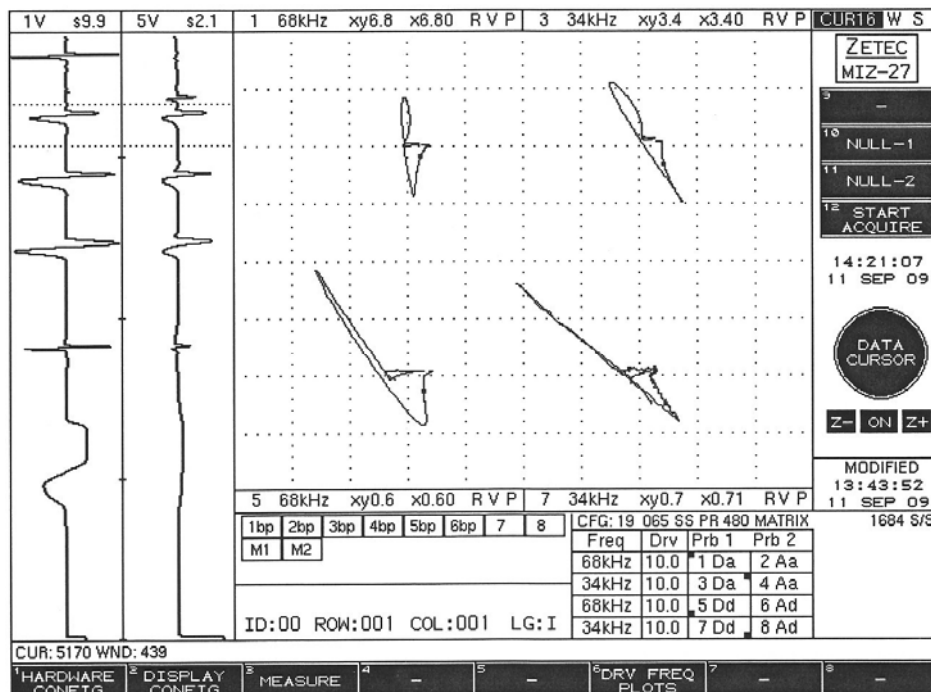
Channels 1 & 3 show the bobbin signal from the 80% flat bottom hole and channels 5 & 7 show the through wall hole passing directly under one of the T5 HyTec coils.



The following picture shows the same through wall hole passing directly under an area where the coils overlap:

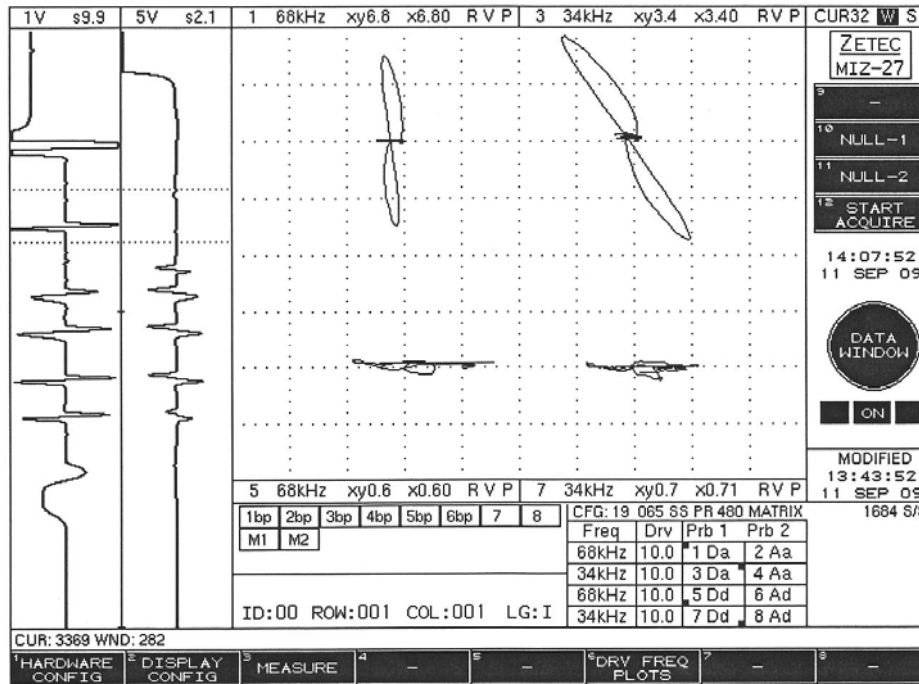


The following picture illustrates the bobbin passing under the 20% flat bottom hole as the T5 HyTec passes under the 40% flat bottom hole:





The following picture illustrates the suppression of the OD groove on the standard. The window has been opened enough to show both bobbin and T5 HyTec coils within the window. The very small signal on the T5 HyTec channel is from a very small volume, 40% edm circ notch:



Note that the 20% flat bottom holes signal is visible on the T5 HyTec in these pictures. This is because this particular standard was machined with only two 20% holes so that they could be seen by the T5 HyTec coils in order to set up the cal curve:

