

Probes & Wedges

A phased array probe consists of a series of piezo-electric elements, which can be independently excited. By precisely controlling the time delays between the excitation of the individual elements, ultrasonic beams of various angles, focal distance and beam shape can be generated and transmitted. The returning echo from a reflector is detected by the elements of the PA probe with slightly different times. The individual echo signals are then time-shifted before being summed up to reconstruct the A-scan signal.

Zetec offers several families of Phased Array probes designed for different type of inspection requirements. Standard phased array UT probes are offered in different sizes and frequencies to cover a wide spectrum of applications. Special care was put in their design to provide an ergonomic casing with captive screws for easy fixation on wedges or scanning mechanisms.

When used with Zetec’s PA instruments, probes with ZPAC connectors are automatically detected by UltraVision thanks to the auto probe recognition function. All essential parameters are uploaded quickly and easily simplifying the setup creation process and minimizing the risk of errors.

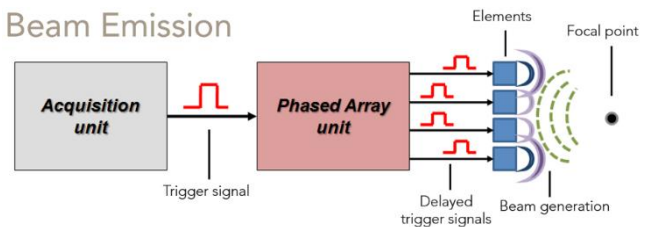
Zetec also offers a complete line of wedges to complement its phased array UT probes. Designed to tackle many applications, wedges come equipped with irrigation channels and easy fixation points for simple interfacing with scanning mechanisms.

In addition to the Standard and Dedicated probe models, Zetec can provide the engineering services for design and manufacturing of custom phased array probes and wedges or minor modifications to standard probes and wedges.

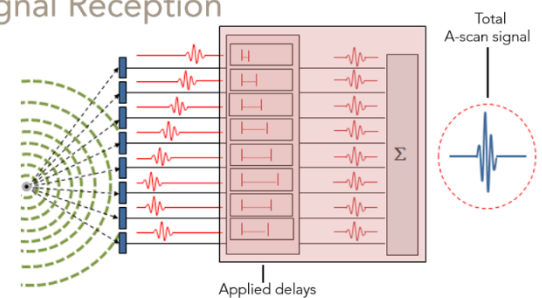
Zetec has the expertise and experience to assist you determining the most appropriate transducers and wedges for your inspection.

Contact your local sales representative or visit us on www.zetec.com for more information.

Beam Emission

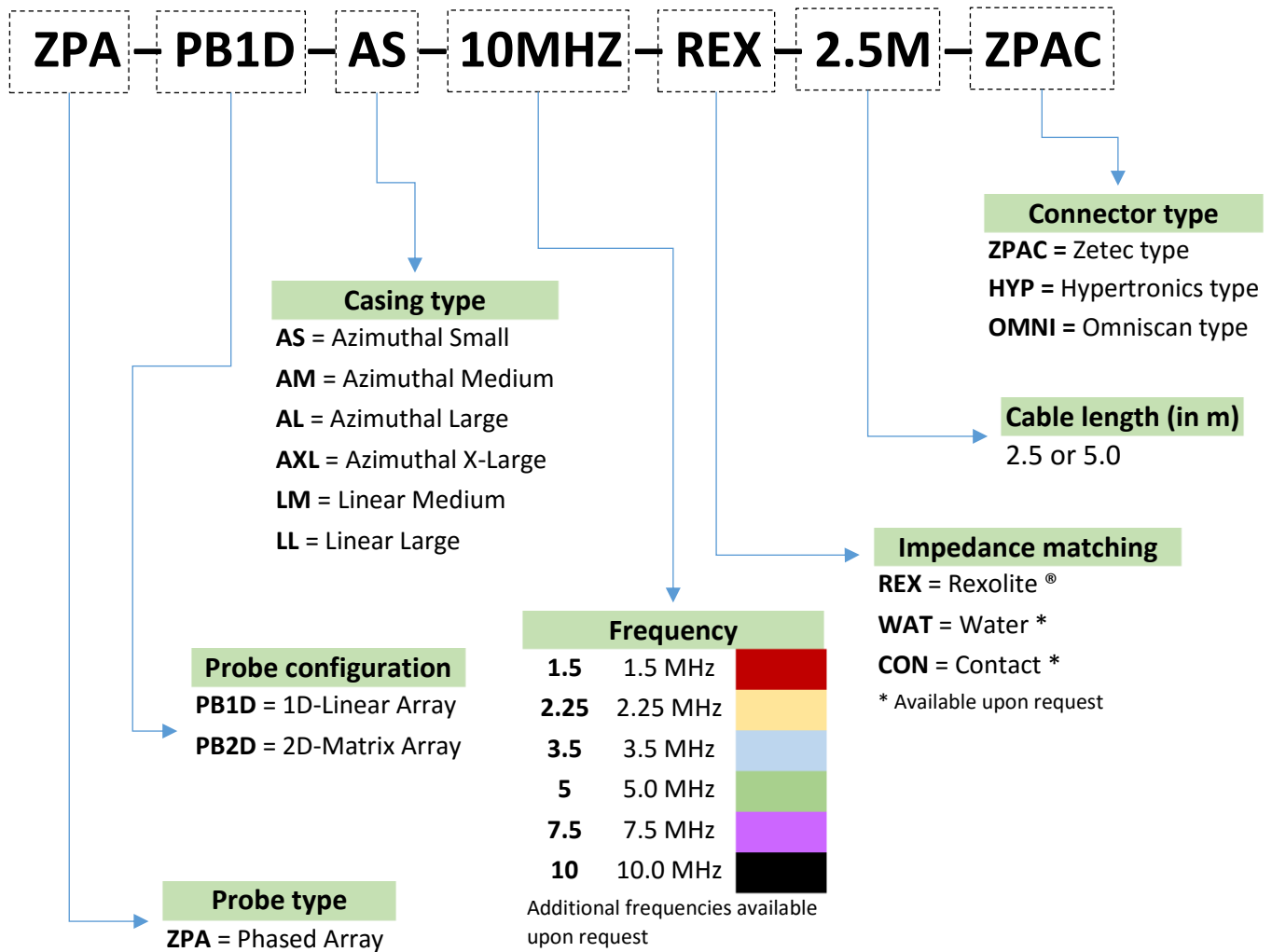


Signal Reception



Ordering information

Probes



Wedges

ZPA – ACC – W – AM – 55SW – IH – FL

Probe casing type

AS = Azimuthal Small
 AM = Azimuthal Medium
 AL = Azimuthal Large
 AXL = Azimuthal X-Large
 LM = Linear Medium
 LL = Linear Large

Contact surface

FL = Flat

ODX-CIRCFLAW = Curved wedge for X" pipe diameter. Circumferential inspection*

ODX-AXFLAW* = Curved wedge for X" pipe diameter. Axial inspection*

* X indicates the pipe external diameter in inches

Irrigation feature

IH = with irrigation channels

Nominal refracted angle in carbon steel and wave mode

LW = Longitudinal Wave (5920 m/s) / SW = Shear Wave (3230 m/s)

Standard = 0LW / 55LW / 55SW *

*Additional refracted angles available upon request

Probe Selection Guideline

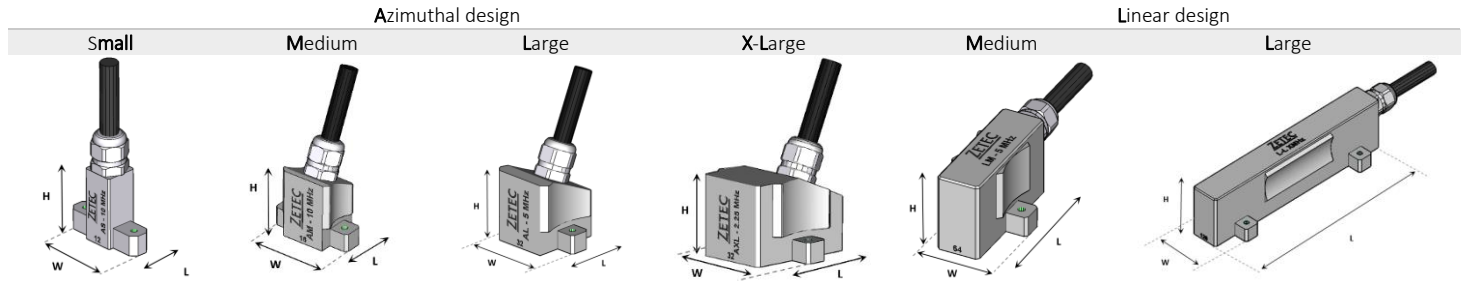
Type	Zetec Portfolio	Probe Family	Generic Inspection / Welds	Deep penetration / Attenuative material	Restricted Access / Limited clearance	Corrosion / Paintbrush	Austenitic / Dissimilar Metal Welds	Time reversal / Flexible wedge (*)	High temperature (*)	Heavy forging / DGS (*)
1D-Linear	Standard	Linear / Azimuthal	✓	✓				✓		
		ExtrA-Thin (AT)			✓					
		Pitch / Catch				✓				
	Dedicated	Linear / Azimuthal		✓						
		ExtrA-Thin (AT)			✓					
		Linear Curved (*)						✓		
		High-Temp. (*)						✓		
2D-Matrix	Standard	Dual Matrix-Array					✓			
	Dedicated	Semi-Flexible (*)								✓

(*) New products – Coming soon – Stay tuned and visit us on www.zetec.com for more information

Standard Probes Portfolio

Standard 1D-Linear Probes

The standard 1D-Linear probes family cover the requirements for most typical weld and components integrity inspection configurations.



Type	Part Number	Acronym	Short description	Frequency (MHz)	Number of element	Primary aperture (mm)	Elevation (mm)	External dimensions (mm)			
								Length (L)	Width (W)	Height (H)	
AS Type	Probe	10045789	ZPA-PB1D-AS-10MHZ-REX-2.5M-ZPAC	AS-10MHZ	10.0	16	5.0	5.0	11.0	30.0	25.0
	Wedge	10038853	ZPA-ACC-W-AS-55SW-IH-FL	AS-55SW					16.3	30.0	10.2
		10038854	ZPA-ACC-W-AS-55LW-IH-FL	AS-55LW					17.2		16.9
AM Type	Probe	10045792	ZPA-PB1D-AM-5MHZ-REX-2.5M-ZPAC	AM-5MHZ	5.0	16	9.6	10.0	16.0	30.0	25.0
	Wedge	10038855	ZPA-ACC-W-AM-55SW-IH-FL	AM-55SW					23.5	30.0	12.5
		10038856	ZPA-ACC-W-AM-55LW-IH-FL	AM-55LW					25.0		23.3
AL Type	Probe	10045795	ZPA-PB1D-AL-5MHZ-REX-2.5M-ZPAC	AL-5MHZ	5.0	32	19.2	15.0	24.0	33.0	25.0
	Wedge	10038857	ZPA-ACC-W-AL-55SW-IH-FL	AL-55SW					38.2	33.0	22.0
		10038858	ZPA-ACC-W-AL-55LW-IH-FL	AL-55LW					41.4		41.2
AXL Type	Probe	10045797	ZPA-PB1D-AXL-2.25MHZ-REX-2.5M-ZPAC	AXL-2.25MHZ	2.25	32	32.0	20.0	36.0	38.0	25.0
	Wedge	10038859	ZPA-ACC-W-AXL-55SW-IH-FL	AXL-55SW					58.7	38.0	33.8
		10038860	ZPA-ACC-W-AXL-55LW-IH-FL	AL-55LW					62.4		65.6
LM Type	Probe	10045798	ZPA-PB1D-LM-2.25MHZ-REX-2.5M-ZPAC	LM-2.25MHZ	2.25						
		10045800	ZPA-PB1D-LM-5MHZ-REX-2.5M-ZPAC	LM-5MHZ	5.0	64	38.4	10.0	43.0	28.0	25.0
		10045801	ZPA-PB1D-LM-10MHZ-REX-2.5M-ZPAC	LM-10MHZ	10.0						
	Wedge	10038861	ZPA-ACC-W-LM-55SW-IH-FL	LM-55SW					63.8		34.2
		10038862	ZPA-ACC-W-LM-55LW-IH-FL	LM-55LW					57.7	28.0	40.0
10038863	ZPA-ACC-W-LM-0LW-IH-FL	LM-0LW					51.0		30.0		

All probes come with a standard cable length of 2.5 m (8.2 ft) with a TOPAZ / ZIRCON / QUARTZ compatible connector and an acoustic impedance matching layer for Rexolite®.

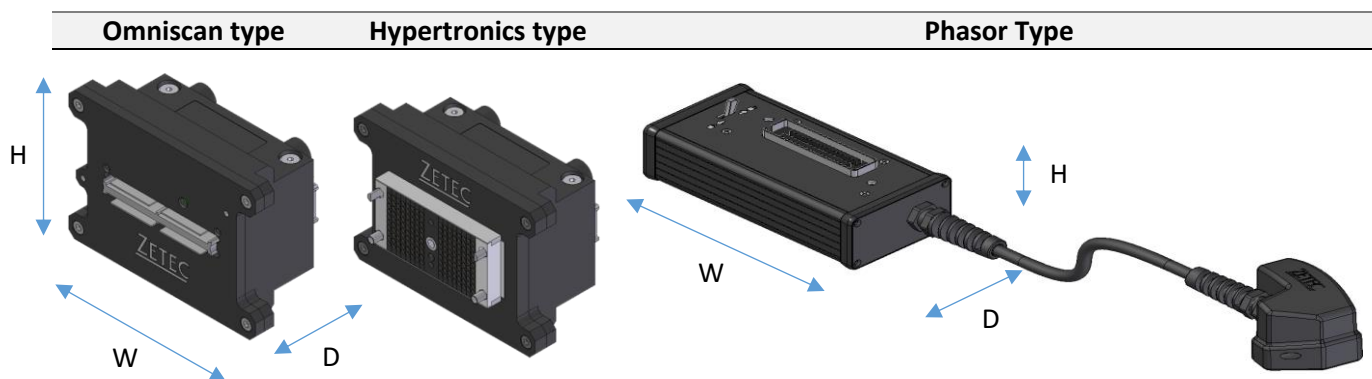
Other configurations (frequency, cable length and / or connector) are available upon request.

All Shear Waves (**SW**) and Longitudinal Waves (**LW**) wedges are designed for azimuthal scanning from 40 to 70 degree with a nominal refracted angle of 55° in Carbon Steel.

For your contoured wedge needs, please contact your local sales representative or see section Dedicated Contoured Wedges and Ordering information.

Probes Adapters

You can also use your own probe fleet with Zetec's PA System (ZIRCON / TOPAZ / QUARTZ) by using the following probes connector adapters.



Probe Connector	Part Number	Acronym	External dimensions (mm)		
			Width (W)	Height (H)	Depth (D)
Omniscan type	10037251	ZPA-ACC-ADPBOX-ZPAC-OMNI	98.5	68.0	50.0
Hypertronics type	10037252	ZPA-ACC-ADPBOX-ZPAC-HYP			
Phasor type	10041988	ZPA-ACC-ADPCBL-ZIRCON-PHAS	166.0	46.0	81.0

Standard 1D-Linear Low-profile Probes (extra-Thin) & Wedges

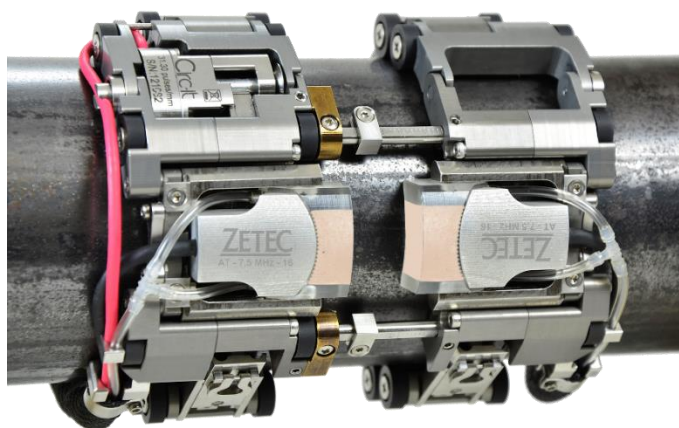
Low-profile phased array probes (AT) are optimized for the detection of small defects in thin-wall pipes.

Wedges are designed for a 60° Shear Wave nominal refracted angle in Carbon Steel (5920 m/s) and to cover from 0.5” up to 4” NPS.

Low-profile probes can operate with only 11.0 mm (0.433 in.) clearance.

Low-profile probes are offered in standard configuration with Dual probe heads 7.5 MHz (2 x 16 elements) on one ZPAC connector and 2.5 m cable length.

See Dedicated 1D-Linear Low-profile Probes for additional configurations.



Type	Part Number	Acronym	Frequency (MHz)	Number of elements	Primary aperture (mm)	Elevation (mm)	External dimensions (mm)		
							Length (L)	Width (W)	Height (H)
Probe	10042357	ZPA-PB1D-AT-7.5MHZ-16-REX-2.5M-ZPAC-D	7.5	2x (16)	7.9	10	25.0	22.0	10.0
AT Type Wedges	10041895	ZPA-ACC-W-AT-60SW-IH-FL							
	10041896	ZPA-ACC-W-AT-60SW-IH-0.5NPS							
	10042470	ZPA-ACC-W-AT-60SW-IH-0.75NPS							
	10041897	ZPA-ACC-W-AT-60SW-IH-1NPS							
	10041898	ZPA-ACC-W-AT-60SW-IH-1.25NPS							
	10041899	ZPA-ACC-W-AT-60SW-IH-1.5NPS		N/A			16.2	22.0	< 11.0
	10041900	ZPA-ACC-W-AT-60SW-IH-2NPS							
	10041901	ZPA-ACC-W-AT-60SW-IH-2.5NPS							
	10041902	ZPA-ACC-W-AT-60SW-IH-3NPS							
	10041903	ZPA-ACC-W-AT-60SW-IH-3.5NPS							
10041904	ZPA-ACC-W-AT-60SW-IH-4NPS								

Note: the set of 11 AT-type wedges is also available in one kit 10042492 (Quantity x2 for each wedge) – see ordering information in the table below.

Part Number	Acronym	Note
10042492	ZPA-ACC-W-AT-KIT-0.5TO4NPS	kit contains 10 contoured pairs of wedges to cover OD from 0.5 to 4 in NPS and a pair of flat wedges

Corrosion Probes

Corrosion probes are offered in two different configurations: Pitch-catch and Pulse-echo techniques.

When using Pitch-catch, there is a considerable reduction of interface echo for optimum near surface resolution.



Configuration		Part Number	Acronym	Frequency (MHz)	Number of elements	Primary aperture (mm)	Elevation [mm]	External dimensions (mm)		
								Length (L)	Width (W)	Height (H)
Pitch / Catch Large Aperture	Probe	10053850	ZPA-PB1D-TR-5M48x10-6.0-ZPAC-WM	5.0	2x (32)	48.0	2x (5.0)	65.5	25.4	24.4
	Probe-holder	10050956	ZPA-ACC-PTBR-PROBEHOLDER-01			N/A		74.1	35.2	15.0
Pitch / Catch Small Aperture	Probe	10053851	ZPA-PB1D-TR-5M24x10-6.0-ZPAC-WM	5.0	2x (32)	24.0	2x (5.0)	41.0	25.4	24.4
	Probe-holder	10052071	ZPA-ACC-PTBR-PROBEHOLDER-02			N/A		74.1	35.2	15.0
Pulse / Echo	Probe	10039141	ZPA-PB1D-LM-5MHZ-REX-5M-ZPAC	5.0	64	38.4	10.0	43.0	28.0	25.0
	Wedge	10050954	ZPA-ACC-W-LM-0LW-IH-PTBR-01			N/A		74.1		15.0

Standard 2D-Matrix Probes

The use of Transmit-Receive configurations yield better sensitivity and SNR. Compression waves are less affected by propagation through anisotropic materials than Shear waves.

With its 2D Dual Matrix Array probe family, Zetec offers a comprehensive solution for the inspection of coarse-grained, austenitic materials, corrosion-resistant alloys, and dissimilar metal welds, offering a superior signal-to-noise ratio.

The beam skewing capability of 2D Matrix Array probes improve the detection capability on mis-oriented flaws.

See Dedicated 2D-Matrix Probes for additional configurations.



	Part Number	Acronym	Frequency (MHz)	Number of elements	Primary aperture (mm)	Elevation (mm)	External dimensions (mm)		
							Length (L)	Width (W)	Height (H)
Probe	10053377	ZPA-PB2D-2.25M10X3E20-12-REX-3.0M-ZPAC-DUAL	2.25	2x (30)	19.8	11.8	30.0	16.0	20.0
Wedge	10053534	ZPA-ACC-W-TRL-23.0-4.0RF-FL-2.25M10x3E20-12					32.0	48.0	18.5
	10054148	ZPA-ACC-W-TRS-36.2-4.0RF-FL-2.25M10x3E20-12		N/A			40.0	48.0	25.0

Dedicated Probes Portfolio

Dedicated 1D-Linear Probes

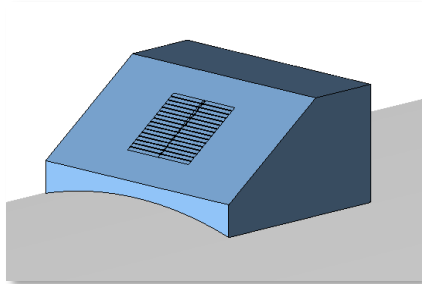
Type	Part Number	Acronym	Frequency (MHz)	Number of element	Primary aperture (mm)	Elevation (mm)	External dimensions (mm)			
							Length (L)	Width (W)	Height (H)	
AS Type	Probe	10045787	ZPA-PB1D-AS-5MHZ-REX-2.5M-ZPAC	5.0	12	7.2	7.2	11.0	30.0	25.0
		10045788	ZPA-PB1D-AS-7.5MHZ-REX-2.5M-ZPAC	7.5	12	7.2	7.2	11.0	30.0	25.0
	Wedge	10038853	ZPA-ACC-W-AS-55SW-IH-FL			N/A		16.3	30.0	10.2
		10038854	ZPA-ACC-W-AS-55LW-IH-FL			N/A		17.2	30.0	16.9
AM Type	Probe	10045790	ZPA-PB1D-AM-2.25MHZ-REX-2.5M-ZPAC	2.25	16	12	12	16.0	30.0	25.0
		10045791	ZPA-PB1D-AM-3.5MHZ-REX-2.5M-ZPAC	3.5	16	9.6	10.0			
	Wedge	10038855	ZPA-ACC-W-AM-55SW-IH-FL			N/A		23.5	30.0	12.5
		10038856	ZPA-ACC-W-AM-55LW-IH-FL			N/A		25.0		23.3
AL Type	Probe	10045794	ZPA-PB1D-AL-3.5MHZ-REX-2.5M-ZPAC	3.5	32	19.2	15.0	24.0	33.0	25.0
	Wedge	10038857	ZPA-ACC-W-AL-55SW-IH-FL					38.2		22.0
		10038858	ZPA-ACC-W-AL-55LW-IH-FL					41.4	33.0	41.2
AXL Type	Probe	10045796	ZPA-PB1D-AXL-1.5MHZ-REX-2.5M-ZPAC	1.5	32	32.0	20.0	36.0	38.0	25.0
	Wedge	10038859	ZPA-ACC-W-AXL-55SW-IH-FL					58.7		33.8
		10038860	ZPA-ACC-W-AXL-55LW-IH-FL			N/A		62.4	38.0	65.6
LM Type	Probe	10045799	ZPA-PB1D-LM-3.5MHZ-REX-2.5M-ZPAC	3.5	64	38.4	10.0	43.0	28.0	25.0
	Wedge	10038861	ZPA-ACC-W-LM-55SW-IH-FL					63.8		34.2
		10038862	ZPA-ACC-W-LM-55LW-IH-FL			N/A		57.7	28.0	40.0
		10038863	ZPA-ACC-W-LM-0LW-IH-FL					51.0		30.0
LL Type	Probe	10045802	ZPA-PB1D-LL-2.25MHZ-REX-2.5M-ZPAC	2.25						
		10045803	ZPA-PB1D-LL-3.5MHZ-REX-2.5M-ZPAC	3.5						
		10045804	ZPA-PB1D-LL-5MHZ-REX-2.5M-ZPAC	5.0	128	96.0	10.0	100.0	28.0	25.0
		10045805	ZPA-PB1D-LL-10MHZ-REX-2.5M-ZPAC	10.0						
	Wedge	10038864	ZPA-ACC-W-LL-55SW-IH-FL					141.2		71.7
		10038865	ZPA-ACC-W-LL-55LW-IH-FL			N/A		120.6	28.0	63.9
		10038866	ZPA-ACC-W-LL-0LW-IH-FL					110.0		50.0

Dedicated Contoured Wedges

Although all wedges listed are designed for flat specimens, you can ask for custom contouring of the contact surface for cylinder shape parts – See Ordering information for Wedges

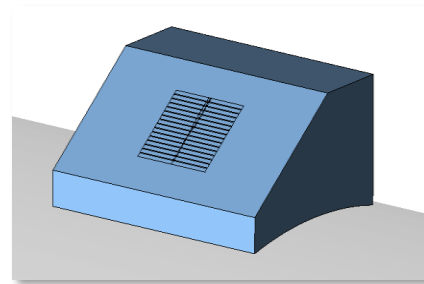
Please contact your local sales representative or see Ordering information for Wedges.

Circumferential flaw detection - CIRCFLAW



Wedges are contoured **along the elevation of the probe**

Axial flaw detection - AXFLAW



Wedges are contoured **along the probe primary axis**

Dedicated 1D-Linear Low-Profile Probes

The “extra-Thin” probes are also available in single configuration (one probe head) with either 16 or 32 elements in 3 frequencies 5.0, 7.5 and 10.0 MHz.

Configuration	Part Number	Acronym	Frequency (MHz)	Number of element	Primary aperture (mm)		External dimensions (mm)		
							Elevation (mm)	Length (L)	Width (W)
Single head	10041890	ZPA-PB1D-AT-5MHZ-16-REX-2.5M-ZPAC	5.0	16	7.9	10	25.0	22.0	10.0
	10041891	ZPA-PB1D-AT-7.5MHZ-16-REX-2.5M-ZPAC	7.5						
	10041893	ZPA-PB1D-AT-10MHZ-16-REX-2.5M-ZPAC	10.0						
	10041892	ZPA-PB1D-AT-7.5MHZ-32-REX-2.5M-ZPAC	7.5	32					
	10041894	ZPA-PB1D-AT-10MHZ-32-REX-2.5M-ZPAC	10						
Dual heads	10042356	ZPA-PB1D-AT-5MHZ-16-REX-2.5M-ZPAC-D	5.0	16	7.9	10	25.0	22.0	10.0
	10042359	ZPA-PB1D-AT-10MHZ-16-REX-2.5M-ZIRCON-D	10.0						
	10042358	ZPA-PB1D-AT-7.5MHZ-32-REX-2.5M-ZPAC-D	7.5	32					
	10042360	ZPA-PB1D-AT-10MHZ-32-REX-2.5M-ZIRCON-D	10.0						

Dedicated 2D-Matrix Probes

The 2D-Matrix Probes are also proposed with the following configurations (1.5 and 3.5 MHz) for specific inspection needs.

Please contact your local sales representative for additional information.

	Part Number	Acronym	Frequency (MHz)	Number of elements	Primary aperture (mm)	Elevation (mm)	External dimensions (mm)		
							Length (L)	Width (W)	Height (H)
Probe	10052832	ZPA-PB2D-1.5M8X4E20-12-REX-3.0M-ZPAC-DUAL	1.5	2x (32)	19.8	11.8	30.0	16.0	20.0
Wedge	10053813	ZPA-ACC-W-TRL-23.0-4.0RF-FL-1.5M8x4E20-12			N/A		32.0	48.0	18.5
	10054144	ZPA-ACC-W-TRS-36.2-4.0RF-FL-1.5M8x4E20-12					40.0	48.0	25.0
Probe	10053438	ZPA-PB2D-1.5M8x4E28-16-REX-3.0M-ZPAC-DUAL	1.5	2x (32)	27.8	15.8	39.0	20.0	25.0
Wedge	10054146	ZPA-ACC-W-TRL-23.0-4.0RF-FL-1.5M8x4E28-16			N/A		40.0	56.0	22.5
	10054147	ZPA-ACC-W-TRS-36.2-4.0RF-FL-1.5M8x4E28-16					48.0	56.0	30.0
Probe	10053440	ZPA-PB2D-3.5M16X2E20-12-REX-3.0M-ZPAC-DUAL	3.5	2x (32)	19.8	11.8	30.0	16.0	20.0
Wedge	10053814	ZPA-ACC-W-TRL-23.0-4.0RF-FL-3.5M16x2E20-12			N/A		32.0	48.0	18.5
	10054149	ZPA-ACC-W-TRS-36.2-8.0RF-FL-3.5M16x2E20-12					40.0	48.0	25.0

Custom Probes

In addition to the standard probe models, Zetec can provide engineering and consulting services for the design and manufacturing of custom phased array probes and wedges.

Regardless of the application, Zetec can provide you the probes and wedges you need:

- 1D Linear and 2D Matrix arrays
- Dual configuration of 1D Linear and 2D Matrix arrays
- Low-frequency probes
- Special wedges

Please contact your local sales representative for more information about Custom PA Probes.

TOFD Probes, Wedges & Accessories

Zetec also offers conventional UT TOFD transducers in 3 crystal diameter sizes (\varnothing 3.0, \varnothing 6.0 and \varnothing 12.0 mm) and 5 center frequencies (from 2 MHz to 15 MHz). This standard product line is specifically designed for TOFD applications.

The TOFD transducers are provided with a generic technical datasheet and a Certification Of Conformity whose parameters are specified in accordance with BSEN 12668 pt2: 2010.

The measurement report of the individual parameters is not included and shall be ordered with the additional ZETEC Reference 10054725 (one per transducer).

Other configurations (frequency, cable length and / or connector) are available upon request.



Type	Part Numbers	Acronym	Frequency (MHz)	Crystal diameter (mm)	Short description	Thread type	Connector	External dimensions (mm)		
								Diam. (D) Width (W)	Height (H) Length (L)	
Transducer (D x L)	10042086	ZUT-PB-PIEZO-TOFD2-6-LEMO00	2.0	6.0	TOFD2-6	M12	LEMO 00	10.0	30.0	
	10042061	ZUT-PB-PIEZO-TOFD2-12-LEMO00		12.0	TOFD2-12	M20		17.0		
	10039845	ZUT-PB-PIEZO-TOFD5-3-LEMO00	5.0	3.0	TOFD5-3	M12		10.0		
	10038328	ZUT-PB-PIEZO-TOFD5-6-LEMO00		6.0	TOFD5-6					
	10039846	ZUT-PB-PIEZO-TOFD7.5-3-LEMO00	7.5	3.0	TOFD7.5-3					
	10039847	ZUT-PB-PIEZO-TOFD7.5-6-LEMO00		6.0	TOFD7.5-6					
	10039848	ZUT-PB-PIEZO-TOFD10-3-LEMO00	10.0	3.0	TOFD10-3					
	10039849	ZUT-PB-PIEZO-TOFD10-6-LEMO00		6.0	TOFD10-6					
	10039850	ZUT-PB-PIEZO-TOFD15-3-LEMO00	15.0	3.0	TOFD15-3					
Wedges (W x L)	10038329	ZUT-ACC-WEDGE-TOFD-45LW-M12-IRR	N/A		TOFD-45LW-M12		N/A		30.0	20.0
	10038330	ZUT-W-TOFD-60LW-M12-IH-FL		TOFD-60LW-M12						
	10038331	ZUT-W-TOFD-70LW-M12-IH-FL		TOFD-70LW-M12						
	10042062	ZUT-ACC-WEDGE-TOFD-30LW-M20-IRR		TOFD-30LW-M20						
	10036027	ZUT-ACC-WEDGE-TOFD-45LW-M20-IRR		TOFD-45LW-M20						
	10036028	ZUT-ACC-WEDGE-TOFD-60LW-M20-IRR		TOFD-60LW-M20						
Cables	10038332	ZUT-ACC-CBL-LEMO-LEMO-2M		CBL-LEMO-LEMO-2M	N/A					
	10039746	ZUT-ACC-CBL-LEMO-LEMO-DOUBLE-5M		CBL-LEMO-LEMO-5M						
	10054725	ZUT-PB-PIEZO-TOFD-CERT-IP	Certificate (individual parameters of the specific TOFD transducer recorded)							

Glossary

Frequency: Theoretical central frequency of the ultrasonic pulse generated by your probe.

Primary Axis: Axis along which the individual elements are aligned for 1D linear probe

Secondary Axis / Elevation : Axis perpendicular to the primary axis of a probe

Number of Elements (Primary Axis): Total number of elements aligned along the primary axis

Number of Elements (Secondary Axis): Total number of elements aligned along the secondary axis (2D Matrix Array only)

Primary Axis Pitch: Center-to-center distance between two consecutive elements along the primary axis

Secondary Axis Pitch: Center-to-center distance between two consecutive elements along the secondary axis (2D Matrix Array only)

Primary Axis Aperture: Dimension of the probe surface along the primary axis

Secondary Axis Aperture: Dimension of the probe surface along the secondary axis

Active Aperture: Group of elements effectively used for the generation and reception of an ultrasonic beam

Near Field Length: Distance along the beam axis from the probe surface to the position where the maximum sound field intensity is reached

Maximum Sound Field Depth: Depth at which the maximum sound field intensity on the beam axis is reached

Focal Zone Length: Distance along the beam axis between the positions before and beyond the focal point (maximum intensity) where the sound field intensity is reduced by 6 dB

Wedge Angle: Angle between the primary axis of the probe and the flat projection of the specimen surface along the mechanical axis (scan or index)

Height at the Middle of the First Element (H1): Height of the first element of the probe when placed on a wedge

Primary Axis Offset at the Middle of the First Element (X1): Position along the primary axis of the first element of the probe from the wedge reference

Secondary Axis Offset at the Middle of the First Element (Y1): Position along the secondary axis of the first element of the probe from the wedge reference