



**Sonatest**

Inspect with confidence

**TRANSDUCER CATALOGUE**





Sonatest has one over-riding and driving motivation – to design, manufacture and market the world's best NDT products. The pace of our own R&D investment has increased and we have formed strategic partnerships to provide our customers with an unmatched range of leading NDT instruments, transducers and systems. We are delighted to present our growing range of transducers within this catalogue.

Our global network of distributors should ensure that excellent technical and after-sales support is always available locally to you.

Sonatest manufactures a complete range of high performance, high technology ultrasonic and phased array transducers for flaw detection and thickness measurement applications. Each transducer is made to exacting standards regarding acoustical, electronic and mechanical properties. Our transducers are tested thoroughly, typically at three stages of manufacture. The complete range of transducer types are available with a variety of connector styles, case configurations, frequencies and element sizes. This catalogue presents our standard-build angle, frequency and elements sizes; other combinations are available on request.

Our transducers are used across a wide range of industries including aerospace, automotive, marine, petrochemical, nuclear, power generation, metal and composite fabrication. Applications include a wide spectrum of inspection and evaluation testing procedures, e.g. aircraft engine components, nuclear components such as fuel containers, automotive parts, petrochemical processing equipment and general high performance critical materials.

We are sure that you will find the correct product to provide the results that you require. However, if you find you require further advice or consultation on specific applications, do not hesitate to contact us. With our expertise and knowledge we can guarantee to provide the NDT solutions for the most challenging of applications. Should you require more detailed information, technical assistance, on-site demonstration, training or a quotation, please get in touch; we guarantee a prompt response.



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Due to a policy of continual development and process improvement, the data presented within this catalogue is subject to change without notice.

# Material Acoustic Properties

Material	Longitudinal Velocity in/μs	Longitudinal Velocity m/s	Transverse Velocity in/μs	Transverse Velocity m/s	Acoustic Impedance Mrayl
<b>METALS</b>					
Aluminium 1100	0.248	6.229	0.121	3.073	17.1
Aluminium 2024 - T4	0.251	6.375	0.124	3.150	17.6
Aluminium 6061 - T6	0.248	6.299	0.124	3.150	17.0
Beryllium	0.507	12.878	0.350	8.890	23.5
Brass (70% Cu - 30% Zn)	0.172	4.369	0.083	2.108	37.1
Bronze (Phosphor 5%)	0.139	3.531	0.088	2.235	31.3
Copper (CP)	0.187	4.750	0.092	2.337	42.5
Gold	0.128	3.251	0.047	1.194	62.6
Hastelloy C	0.230	5.842	0.114	2.896	52.2
Hastelloy X	0.228	5.791	0.108	2.743	47.7
Inconel (Wrought)	0.308	7.823	0.119	3.023	64.5
Iron (Cast), Various Alloys	0.138–0.220	3.505–5.588	0.087–0.126	2.210–3.200	24.3–41.2
Lead (94Pb - 6Sb)	0.085	2.159	0.032	0.813	23.5
Magnesium, Various Alloys	0.215–0.228	5.461–5.791	0.119–0.122	3.023–3.099	9.24–10.6
Monel	0.211	5.359	0.107	2.718	47.2
Nickel (CP)	0.222	5.639	0.117	2.972	50.0
Silver (0.99 Fine)	0.142	3.607	0.063	1.600	37.8
Steel 1020	0.232	5.893	0.128	3.251	45.4
Steel 4340	0.230	5.842	0.128	3.251	45.6
Steel, CRES 300 Series	0.221–0.226	5.613–5.740	0.120–0.123	3.048–3.124	44.6–45.4
Steel, CRES 400 Series	0.212–0.237	5.385–6.020	0.118–0.132	2.997–3.353	41.3–46.3
Titanium, 6Al - 4V	0.243	6.172	0.130	3.302	27.3
Zircaloy	0.186	4.724	0.093	2.362	44.2
Zirconium	0.183	4.648	0.089	2.26	30.1
<b>POLYMERS</b>					
Acrylics	0.105–0.109	2.667–2.769	0.044–0.057	1.118–1.448	3.15–3.51
Cellulose Acetate	0.10	2.44	No Shear Component		3.19
Nylon	0.02	2.69	No Shear Component		-----
Phenolic	0.06	1.42	No Shear Component		1.90
Polycarbonate	0.09	2.29	No Shear Component		2.71
Polyethylene	0.11	2.67	No Shear Component		2.94
Polystyrene (Rexolite®)	0.09	2.36	No Shear Component		2.94
Polyether (PEEK™ 20)	0.10	2.57	No Shear Component		3.24
Polyimide (Vespel®)	0.10	2.44	No Shear Component		3.61
Rubber (Natural)	0.06	1.55	No Shear Component		1.74
Rubber (Carbon Filter)	0.07	1.68	No Shear Component		-----
Rubber (Silicone)	0.04	0.94	No Shear Component		1.40
Teflon	0.05	1.37	0.25	6.35	3.00
<b>SOLIDS</b>					
Alumina (Al2O3)	0.43	10.85	No Shear Component		43.10
Concrete	0.167–0.207	4.242–5.258	0.14	3.43	12.40
Glass (Plate)	0.23	5.77	No Shear Component		14.50
Granite	0.16	3.96	0.08	1.93	10.90
Ice (-16°C)	0.15	3.81	No Shear Component		3.60
Quartz, Natural	0.23	5.74	0.14	3.53	15.20
Quartz, Fused	0.22	5.56	0.30	7.67	14.50
Sapphire	0.47	11.91	0.16	3.99	47.20
Tungsten Carbide	0.26	6.66	No Shear Component		67.60
<b>COMPOSITES</b>					
Fiberglass (50 v/o)	0.12	3.15	0.07	1.73	6.04
Graphite/Epoxy (60 v/o)	0.12	2.97	0.08	1.96	4.65
Boron/Epoxy (50v/o)	0.13	3.33	0.07	1.83	6.38
<b>LIQUIDS</b>					
Ethylene Glycol	0.06	1.63	No Shear Component		1.80
Glycerin	0.08	1.93	No Shear Component		2.42
Oil (SAE 20)	0.07	1.75	No Shear Component		1.51
Water (20°C)	0.06	1.47	No Shear Component		1.48
<b>GASES</b>					
Air (20°C)	0.01	0.36	No Shear Component		0.00
Nitrogen (20°C)	0.01	0.36	No Shear Component		0.00
Oxygen (20°C)	0.01	0.33	No Shear Component		0.00

# Conventional App Matrix

Conventional Ultrasonic Inspection Applications Matrix







		Near surface resolution thickness inspection	Deep Penetration thickness inspection	General Thickness inspection	Weld Inspection (thin material)	Weld Inspection (Thick Material)	Weld Inspection (General)	Castings General (bars, Billets)	Castings Deep Penetration	Forgings (Bolts, forged rings, Flanges etc)	Plastics thickness (Homogeneous materials, HDPE, PE, PVC etc)	Composite inspection (Aerospace, Automotive, Shipping)	White Metal Inspection	HHTA	Preferential Attack (weld root erosion)
Compression Transducers	SHM			•				•		•	•	•			
	LHM		•	•				•	•	•					
	SLF	•	•	•				•	•	•	•	•	•		
	PSLF	•	•	•				•	•	•	•	•	•		
	SLM	•	•	•				•	•	•	•	•			
	PSLM	•	•	•				•	•	•	•	•			
	SMM	•	•	•				•	•	•	•	•	•		
	LMM	•	•	•				•	•	•	•	•	•		
	RDT	•		•				•			•	•			
	CD	•		•						•	•	•			
	D	•		•							•	•	•		
	DEM	•	•	•				•		•	•	•	•		
	PDEM	•	•	•				•		•	•	•	•		
	THM	•	•	•				•	•	•	•	•	•		
	FCG	•	•	•				•	•	•	•	•	•		
	PFC	•	•	•				•	•	•	•	•	•		
	RB	•												•	
	Sonapen	•												•	
	STARC	•		•				•		•	•	•	•		
	TSTARC	•		•				•		•	•	•	•		
SLP	•	•	•				•	•	•	•	•	•			
Angle Beam Transducers	SMA				•		•	•		•	•				•
	MMA				•	•	•	•		•	•				•
	LMA				•	•	•	•	•	•	•				•
	TSMA				•		•	•		•	•	•			•
	STARC				•	•	•	•	•	•	•	•			•
	TSTARC				•		•	•		•	•	•			•
	QCG				•	•	•		•	•	•				•
	PQC				•	•	•		•	•	•				•
	SSG				•	•	•		•	•	•				
	PSS				•	•	•		•	•	•				
Immersion	PIM	•	•	•				•	•	•	•	•			
Through Transmission	STP											•			
	RP							•			•	•			

# Specialist App Matrix

		Advanced Ultrasonic Inspection Applications Matrix													
		Near surface resolution corrosion mapping	Deep Penetration corrosion mapping	General Thickness corrosion mapping	Weld Inspection (thin material)	Small Bore weld inspection	Weld Inspection (Thick Material)	Weld Inspection General	Castings General (bars, Billets)	Castings Deep Penetration	Forgings (Bolts, forged rings, Flanges etc)	Plastics thickness (Homogeneous materials, HDPE, PE, PVC etc)	Composite inspection (Aerospace, Automotive, Shipping)	HTHA	Preferential Attack (weld root erosion)
Phased Array Transducers	WP2	•		•					•		•	•	•		
	SEWP	•	•	•					•	•	•	•			
	X0A					•									
	X1A	•			•			•			•	•	•		
	X1B	•			•			•			•	•	•		
	X2A	•			•			•	•		•	•	•		
	X2B	•		•	•		•	•	•		•	•	•	•	
	X3A	•	•	•			•	•	•	•	•	•	•	•	
	X4AZ				•		•	•							•
	X5A		•				•	•	•	•	•	•	•	•	
	X6A		•	•			•		•	•	•	•	•	•	
	X6B		•	•					•	•	•	•	•	•	
	D1A	•	•	•	•		•	•	•	•	•	•	•	•	
	D1B				•		•	•							
	D1S	•			•			•							•
	D1Z						•	•							•
	D5A		•				•	•	•	•	•	•	•	•	
Time of Flight Diffraction transducers	iTOFD		•	•	•		•	•			•	•		•	•
	LIMBOTOFD				•	•		•			•	•		•	•
	D-TOFD		•	•	•		•	•			•	•		•	•
HTHA	HTHA												•		

# Transducers

Sizing Conversion Table for common values			
To convert mm to inches = mm ÷ 25.4 To convert inches to mm = inch x 25.4			
Inch (decimal)	Inch (Fraction)	mm	mm (rounded to nearest common value)
1	1	25.4	25
2	2	50.8	50
0.5	½	12.7	12.5
0.33	1/3	8.4	8
0.25	¼	6.4	6
0.75	¾	19.2	20
0.125	⅛	3.2	3
0.375	⅜	9.5	10
0.1875	3/16	4.8	5
0.3125	5/16	7.9	8

Connector Type		
BNC (B)	Lemo 1 (L)	Lemo 00 (Z)
		
Microdot (D)	Subvis (S)	UHF (U)
		

# Cables

Cable Type	Single / Twin	Part No	Order Code
Lemo 1 to Subvis	Single	PC-LS	152056
	Twin	TPC-LS	152061
Lemo 1 to Microdot	Single	PC-LD	152057
	Twin	TPC-LD	152062
Lemo 1 to Lemo 00	Single	PC-LZ	152076
	Twin	TPC-LZ	152088
Lemo 1 to Lemo 1	Single	PC-LL	152074
	Twin	N/A	152077
Lemo 1 to UHF*	Single	PC-LU	152059
	Twin	N/A	N/A
Lemo1 to BNC	Single	PC-BL	152055
	Twin	N/A	152075
BNC to Subvis	Single	PC-BS	152022
	Twin	TPC-BS	152023
BNC to Microdot	Single	PC-BD	152052
	Twin	TPC-BD	152060
BNC to Lemo 00	Single	PC-BZ	152086
	Twin	TPC-BZ	152087
BNC to BNC	Single	PC-BB	152053
	Twin	N/A	N/A
BNC to UHF*	Single	PC-BU	152058
	Twin	N/A	N/A
BNC to Lemo 1	Single	PC-BL	152055
	Twin	N/A	N/A
Lemo 00 to Lemo 00	Single	PC-ZZ	152122
	Twin	TPC-ZZ	152089
Fischer to Lemo 00	Single	PC-FZ	152124
	Twin	TPC-FZ	152129
Fischer to Lemo 1	Single	PC-FL	152126
	Twin	N/A	N/A
Fischer to Microdot	Single	PC-FD	152128
	Twin	TPC-FD	152131
Lemo 00 to Microdot	Single	PC-ZD	152102
Lemo 00 to Subvis	Single	PC-ZS	152123
	Twin	TPC-ZS	152108
Fischer to Subvis	Single	PC-FS	152125
	Twin	TPC-FS	152130
Fischer to BNC	Single	PC-FB	152127
	Twin	N/A	N/A

Adapters (F) Female (M) Male	Order Code
UHF (M) to BNC (F)	136166
UHF (F) to UHF (F)	136167
BNC (M) to BNC (F)	136168
BNC (F) to LEMO1 (M)	136169
BNC (M) to LEMO1 (F)	152018
BNC (M) to UHF(F)	136178



BNC



Fischer



Lemo 00



Lemo 1



Microdot



Subvis



UHF\*



# SHM & LHM

## Small / Large Single Compression Contact Transducers

### Features

- Single normal beam compression wave contact transducer
- Circular, lead metaniobate crystal
- Max operating temperature 50°C / 120°F
- Medium damped for medium bandwidth
- Hard ceramic wear face for higher durability

### Common Applications

- Ceramics
- Composites
- Machine parts
- Thickness surveys



Transducer Models				
Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
SHM2-10	Single Hardface 2Mhz 0°	2	10mm / 0.394"	8.4mm / 0.331"
SHM4-10	Single Hardface 4Mhz 0°	4	10mm / 0.394"	16.8mm / 0.661"

Transducer Models				
Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
LHM2-24	Single Hardface 2Mhz 0°	2	24mm / 0.945"	48.3mm / 1.902"
LHM4-24	Single Hardface 4Mhz 0°	4	24mm / 0.945"	96.6mm / 3.803"

Case Dimensions and Details				
Transducer Version Crystal size	"A (Width/Diameter) (mm / Inches)"	"Height (mm / Inches)"	Connector Options	Position Options
SHM	23mm / 0.906"	42mm / 1.654"	Z	Side
LHM	32mm / 1.26"	59mm / 2.323"	L	Side

# SLF

## Single Compression Transducer with Replaceable Face Attachments

### Features

- Single normal beam compression wave contact transducer
- Circular, lead metaniobate crystal composite versions available, see PSLF transducers
- Max operating temperature 50°C / 120°F
- High temperature option available up to 400°C using delay line materials
- Medium damped for general use
- Polymer membrane protected face option for 'soft nose' applications
- Delay line attachments available at varying lengths

### Common Applications

- Castings
- Forgings
- White metal bearings
- High temperature



Transducer Models

Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
SLF5025	2.25MHz ½" SC Soft Face	2.25	12.7mm / ½"	15.2mm / 0.598"
SLF1025	2.25MHz 1" SC Soft Face	2.25	25.4mm / 1"	60.9mm / 2.398"
SLF5050	5MHz ½" SC Soft Face	5	12.7mm / ½"	33.8mm / 1.331"
SLF1050	5MHz 1" SC Soft Face	5	25.4mm / 1"	135.3mm / 5.327"

Case Dimensions and Details

Transducer Version Crystal size	Width/Diameter (mm / Inches)	Height (mm / Inches)	Connector Options	Position Options
12.7mm / ½"	26mm / 1.024"	32mm / 1.26"	B L D Z	Side
25.4mm / 1"	36mm / 1.417"	38mm / 1.496"	B L D Z	Side

# PSLF

## Single Compression Transducer with Replaceable Soft Membrane

### Features

- Single normal beam compression wave contact transducer
- Circular composite crystal
- Max operating temperature 50°C / 120°F
- Medium damped for general use
- Polymer membrane protected face option for 'soft nose' applications

### Common Applications

- Castings
- Forgings
- White metal bearings
- High temperature



Transducer Models				
Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
PSLF10.5	0.5MHz 1" SC Soft Face	0.5	25.4mm / 1"	13.5mm / 0.531"
PSLF50.5	0.5MHz ½" SC Soft Face	0.5	12.7mm / ½"	3.4mm / 0.134"
PSLF101	1MHz 1" SC Soft Face	1	25.4mm / 1"	27.1mm / 1.067"
PSLF501	1MHz ½" SC Soft Face	1	12.7mm / ½"	6.8mm / 0.268"
PSLF5025	2.25MHz ½" SC Soft Face	2.25	12.7mm / ½"	15.2mm / 0.598"
PSLF1025	2.25MHz 1" SC Soft Face	2.25	25.4mm / 1"	60.9mm / 2.398"
PSLF5050	5MHz ½" SC Soft Face	5	12.7mm / ½"	33.8mm / 1.331"
PSLF1050	5MHz 1" SC Soft Face	5	25.4mm / 1"	135.3mm / 5.327"

Case Dimensions and Details				
Transducer Version Crystal size	Width/Diameter (mm / Inches)	Height (mm / Inches)	Connector Options	Position Options
12.7mm / ½"	26mm / 1.024"	32mm / 1.26"	B L D Z	Side
25.4mm / 1"	36mm / 1.417"	38mm / 1.496"	B L D Z	Side

# SLM

## Single Compression Medium Damped Transducers

### Features

- Single normal beam compression wave contact transducer
- Circular, lead metaniobate crystal
- Composite versions available, see PSLM transducers
- Max operating temperature 50°C / 120°F
- Medium damped for medium bandwidth
- Hard ceramic wear face for higher durability

### Common Applications

- Ceramics
- Composites



Transducer Models				
Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
SLM5025	2.25MHz ½" SC M.Damped	2.25	12.7mm / ½"	15.2mm / 0.598"
SLM7525	2.25MHz ¾" SC M.Damped	2.25	19mm / ¾"	34.1mm / 1.343"
SLM1025	2.25MHz 1" SC M.Damped	2.25	25.4mm / 1"	60.9mm / 2.398"
SLM5050	5MHz ½" SC M.Damped	5.0	12.7mm / ½"	33.8mm / 1.331"
SLM7550	5MHz ¾" SC M.Damped	5.0	19mm / ¾"	75.7mm / 2.98"
SLM1050	5MHz 1" SC M.Damped	5.0	25.4mm / 1"	135.3mm / 5.327"

Case Dimensions and Details				
Transducer Version Crystal size	Width/Diameter (mm / Inches)	Height (mm / Inches)	Connector Options	Position Options
10mm / ¾"	21mm / 0.827"	19mm / 0.748"	B L Z	Side
12.7mm / ½"	26mm / 1.024"	24mm / 0.945"	B L Z	Side
19mm / ¾"	36mm / 1.417"	34mm / 1.339"	B L Z	Side
25.4mm / 1"	36mm / 1.417"	34mm / 1.339"	B L Z	Side

# PSLM

## Single Compression Medium Damped Transducers

### Features

- Single normal beam compression wave contact transducer
- Circular, ceramic crystal
- Max operating temperature 50°C / 120°F
- Medium damped for medium band width
- Hard ceramic wear face for higher durability

### Common Applications

- Ceramics
- Composites



Transducer Models				
Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
PSLM50.5	0.5MHz ½" SC H.Damped	0.5	12.7mm / ½"	3.4mm / 0.134"
PSLM10.5	0.5MHz 1" SC H.Damped	0.5	25.4mm / 1"	13.5mm / 0.531"
PSLM501	1MHz ½" SC H.Damped	1	12.7mm / ½"	6.8mm / 0.268"
PSLM751	1MHz ¾" SC H.Damped	1	19mm / ¾"	15.1mm / 0.594"
PSLM101	1MHz 1" SC H.Damped	1	25.4mm / 1"	27.1mm / 1.067"
PSLM5025	2.25MHz ½" SC H.Damped	2.25	12.7mm / ½"	15.2mm / 0.598"
PSLM1025	2.25MHz 1" SC H.Damped	2.25	25.4mm / 1"	60.9mm / 2.398"
PSLM503.5	3.5MHz ½" SC H.Damped	3.5	12.7mm / ½"	23.7mm / 0.933"
PSLM5050	5MHz ½" SC H.Damped	5	12.7mm / ½"	33.8mm / 1.331"
PSLM1050	5MHz 1" SC H.Damped	5	25.4mm / 1"	135.3mm / 5.327"

Case Dimensions and Details				
Transducer Version Crystal size	Width/Diameter (mm / Inches)	Height (mm / Inches)	Connector Options	Position Options
10mm / ⅜"	21mm / 0.827"	19mm / 0.748"	B L Z	Side
12.7mm / ½"	26mm / 1.024"	24mm / 0.945"	B L Z	Side
19mm / ¾"	36mm / 1.417"	34mm / 1.339"	B L Z	Side
25.4mm / 1"	36mm / 1.417"	34mm / 1.339"	B L Z	Side

# SMM & LMM

Small and Large Single Compression Transducer with Replaceable Soft Membrane

## Features

- Single normal beam compression wave transducer
- Circular, lead metaniobate crystal
- Max operating temperature 50°C / 120°F
- Medium damped for medium bandwidth

## Common Applications

- Castings
- Forgings
- White metal bearings



Transducer Models				
Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
SMM2-10	Single Softface 2Mhz 0°	2	10mm / 0.394"	8.4mm / 0.331"
SMM 4-10	Single Softface 4Mhz 0°	4	10mm / 0.394"	16.8mm / 0.661"

Transducer Models				
Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
LMM1-24	Single Softface 1Mhz 0°	1	24mm / 0.945"	24.2mm / 0.953"
LMM2-24	Single Softface 2Mhz 0°	2	24mm / 0.945"	48.3mm / 1.902"
LMM4-24	Single Softface 4Mhz 0°	4	24mm / 0.945"	96.6mm / 3.803"

Case Dimensions and Details				
Transducer Version Crystal size	Width/Diameter (mm / Inches)	Height (mm / Inches)	Connector Options	Position Options
SMM	23mm / 0.906"	42mm / 1.654"	Z	Side
LMM	32mm / 1.26"	60mm / 2.362"	L	Side

# RDT

## Delay Line Transducers

### Features

- Single normal beam compression wave contact transducer
- Circular lead metaniobate crystal
- Max operating temperature 50°C / 120°F
- High temperature delay lines available on request
- High dampening for a wide bandwidth
- Rexolite delay lines available, custom length available on request

### Common Applications

- Composites
- Thin walled parts
- Machine parts



Transducer Models				
Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
RDT2525	2.25Mhz ¼" DelayLine	2.25	6.4mm / ¼"	3.9mm / 0.154"
RDT5025	2.25Mhz ½" DelayLine	2.25	12.7mm / ½"	15.2mm / 0.598"
RDT1250	5Mhz ⅛" DelayLine	5	3.2mm / ⅛"	2.1mm / 0.083"
RDT2550	5Mhz ¼" DelayLine	5	6.4mm / ¼"	8.6mm / 0.339"
RDT5050	5Mhz ½" DelayLine	5	12.7mm / ½"	33.8mm / 1.331"
RDT1210	10Mhz ⅛" DelayLine	10	3.2mm / ⅛"	4.3mm / 0.169"
RDT2510	10Mhz ¼" DelayLine	10	6.4mm / ¼"	17.2mm / 0.677"
RDT5010	10Mhz ½" DelayLine	10	12.7mm / ½"	67.7mm / 2.665"
RDT1215	15Mhz ⅛" DelayLine	15	3.2mm / ⅛"	6.4mm / 0.252"
RDT2515	15Mhz ¼" DelayLine	15	6.4mm / ¼"	25.8mm / 1.016"
RDT1220	20Mhz ⅛" DelayLine	20	3.2mm / ⅛"	8.6mm / 0.339"
RDT2520	20Mhz ¼" DelayLine	20	6.4mm / ¼"	34.4mm / 1.354"

Case Dimensions and Details				
Transducer Version Crystal size	Width/Diameter (mm / Inches)	Height (mm / Inches)	Connector Options	Position Options
3.2mm / ⅛"	12.7mm / 0.5"	19mm / 0.748"	D	Side
6.4mm / ¼"	12.7mm / 0.5"	19mm / 0.748"	D	Side
12.7mm / ½"	19.5mm / 0.768"	40mm / 1.575"	D	Side

Delay Line	
Product Code	Description
DT12	Used for 3.2mm / ⅛" crystal diameter probe delay line attachment (sold in packs of 3)
DT25	Used for 6.4mm / ¼" crystal diameter probe delay line attachment (sold in packs of 3)
DT50	Used for 12.7mm / ½" crystal diameter probe delay line attachment (sold in packs of 3)

# CD

## Twin Compression Transducers

### Features

- Dual normal beam compression wave contact transducers
- Semi circular and rectangular lead zirconate titanate crystals
- Max operating temperature 50°C / 120°F
- High temperature options available up to 400°C denoted by "HT" in the title
- Medium dampening for medium bandwidth.
- Short focus shoe available, denoted by "F" in the title

### Common Applications

- Composites
- Thin and general thickness inspection
- Plastics



Transducer Models				
Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
PCD1-25	1,25MHz TC Twin (composite only)	1.25	25mm / 0.984"	32.8mm / 1.291"
CD2-10	2MHz TC Twin	2	4 x 8mm / 0.157 x 0.315"	8.4mm / 0.331"
CD2-15	2MHz TC Twin	2	5 x 13mm / 0.197 x 0.512"	18.9mm / 0.744"
CD2-20	2MHz TC Twin	2	6 x 17mm / 0.236 x 0.669"	33.6mm / 1.323"
CD2-25	2MHz TC Twin	2	25mm / 0.984"	52.4mm / 2.063"
CD5-10	5MHz TC Twin	5	4 x 8mm / 0.157 x 0.315"	21mm / 0.827"
CDF5-10	5MHz TC Twin with short focus shoe	5	4 x 8mm / 0.157 x 0.315"	21mm / 0.827"
CD5-15	5MHz TC Twin	5	5 x 13mm / 0.197 x 0.512"	47.2mm / 1.858"
CD5-20	5MHz TC Twin	5	6 x 17mm / 0.236 x 0.669"	83.9mm / 3.303"
CD5-25	5MHz TC Twin	5	25mm / 0.984"	131.1mm / 5.161"
CD2-20HT	2MHz TC High Temp Twin	2	6 x 17mm / 0.236 x 0.669"	33.6mm / 1.323"
CD5-10HT	5MHz TC High Temp Twin	5	4 x 8mm / 0.157 x 0.315"	21mm / 0.827"
CD5-15HT	5MHz TC High Temp Twin	5	5 x 13mm / 0.197 x 0.512"	47.2mm / 1.858"
CD5-20HT	5MHz TC High Temp Twin	5	6 x 17mm / 0.236 x 0.669"	83.9mm / 3.303"

Case Dimensions and Details				
Transducer Version Crystal size	Width/Diameter (mm / Inches)	Height (mm / Inches)	Connector Options	Position Options
4 x 8mm / 0.157 x 0.315"	17mm / 0.669"	41mm / 1.614"	Z D S	Top
5 x 13mm / 0.197 x 0.512"	22mm / 0.866"	48mm / 1.89"	Z D S	Top
6 x 17mm / 0.236 x 0.669"	27mm / 1.063"	56mm / 2.205"	Z D S	Top
25mm / 0.984"	35mm / 1.378"	66mm / 2.598"	Z D S	Top



# D

## Twin Compression Potted Transducers

### Features

- Dual normal beam compression wave contact transducers
- Semi circular lead zirconate titanate crystals
- Max operating temperature 50°C / 120°F
- Medium dampening for medium bandwidth
- Acrylic shoe allows for contouring to curved surfaces

### Common Applications

- Aerospace
- Composites
- Thickness inspection



Transducer Models				
Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
D2-10	2Mhz TC Medium Damped	2	10mm / 0.394"	8.4mm / 0.331"
D5-5	5Mhz TC Medium Damped	5	5mm / 0.197"	5.2mm / 0.205"
D5-10	5Mhz TC Medium Damped	5	10mm / 0.394"	21mm / 0.827"

Case Dimensions and Details				
Transducer Version Crystal size	Width/Diameter (mm / Inches)	Height (mm / Inches)	Connector Options	Position Options
5mm / 0.197"	7mm / 0.276"	10mm / 0.394"	B L Z	Side
10mm / 0.394"	12.5mm / 0.492"	16mm / 0.63"	B L Z	Side

# DEM

## Twin Compression Transducers

### Features

- Dual normal beam compression wave contact transducers
- Semi circular lead zirconate titanate crystals
- Max operating temperature 50°C / 120°F
- High temperature options available up to 285°C / 545°F denoted by "HT" in the title
- Medium dampening for medium bandwidth
- Versions available with improved resolution and sensitivity see PDEM Transducers



### Common Applications

- Aerospace
- Composites
- Thickness inspection
- High temp inspection

Transducer Models				
Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
DEM2525	2.25MHz ¼" Twin element	2.25	6.4mm / ¼"	3.9mm / 0.154"
DEM3725	2.25MHz ⅜" Twin element	2.25	9.5mm / ⅜"	8.5mm / 0.335"
DEM5025	2.25MHz ½" Twin element	2.25	12.7mm / ½"	15.2mm / 0.598"
DEM2550	5MHz ¼" Twin element	5	6.4mm / ¼"	8.6mm / 0.339"
DEM3750	5MHz ⅜" Twin element	5	9.5mm / ⅜"	18.9mm / 0.744"
DEM5050	5MHz ½" Twin element	5	12.7mm / ½"	33.8mm / 1.331"
DEM3710	10MHz ⅜" Twin element	10	9.5mm / ⅜"	37.9mm / 1.492"
DEM5010	10MHz ½" Twin element	10	12.7mm / ½"	67.7mm / 2.665"

Case Dimensions and Details				
Transducer Version Crystal size	Width/Diameter (mm / Inches)	Height (mm / Inches)	Connector Options	Position Options
6.4mm / ¼"	10mm / 0.394"	25.4mm / 1"	D	Side
9.5mm / ⅜"	12.7mm / 0.5"	25.4mm / 1"	D	Side
12.7mm / ½"	16.2mm / 0.638"	25.4mm / 1"	D	Side

# PDEM

## Twin Compression Transducers

### Features

- Dual normal beam compression wave contact transducers
- Semi circular lead zirconate titanate crystals
- Max operating temperature 50°C / 120°F
- High temp versions available see DEM transducers
- Medium dampening for medium bandwidth

### Common Applications

- Aerospace
- Composites
- Thickness inspection



Transducer Models				
Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
PDEM2525	2.25MHz ¼" Twin element	2.25	6.4mm / ¼"	3.9mm / 0.154"
PDEM3725	2.25MHz ⅜" Twin element	2.25	9.5mm / ⅜"	8.5mm / 0.335"
PDEM5025	2.25MHz ½" Twin element	2.25	12.7mm / ½"	15.2mm / 0.598"
PDEM2550	5MHz ¼" Twin element	5	6.4mm / ¼"	8.6mm / 0.339"
PDEM3750	5MHz ⅜" Twin element	5	9.5mm / ⅜"	18.9mm / 0.744"
PDEM5050	5MHz ½" Twin element	5	12.7mm / ½"	33.8mm / 1.331"
PDEM2510	10MHz ¼" Twin element	10	6.4mm / ¼"	17.2mm / 0.677"

Case Dimensions and Details				
Crystal size	Width/Diameter (mm / Inches)	Height (mm / Inches)	Connector Options	Position Options
6.4mm / ¼"	10mm / 0.394"	25.4mm / 1"	D	Side
9.5mm / ⅜"	12.7mm / 0.5"	25.4mm / 1"	D	Side
12.7mm / ½"	16.2mm / 0.638"	25.4mm / 1"	D	Side

# RB

## Rubber Ball Delay Line Transducers

### Features

- Single normal beam compression wave contact transducer
- Circular, lead metaniobate crystal
- Max operating temperature 50°C / 120°F
- Standard rubber ball delay line and RBSL (slim line) version for smaller contact areas

### Common Applications

- Spot weld / rivet testing
- Automotive
- Aerospace



Transducer Models				
Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
RB2050	¼" X 5MHz Rubber ball Delay line	5	6.4mm / ¼"	8.6mm / 0.339"
RBSL2050	¼" X 5MHz Slim line Rubber ball Delay line	5	6.4mm / ¼"	8.6mm / 0.339"
RB2010	¼" X 10MHz Rubber ball Delay line	10	6.4mm / ¼"	17.2mm / 0.677"

Case Dimensions and Details			
Width/Diameter (mm / Inches)	Height (mm / Inches)	Connector Options	Position Options
13mm / 0.512"	18mm / 0.709"	D	Side

Rubber Ball Delay Line	
Product Code	Description
151632	12mm Rubber Ball
151628	Pencil Style Rubber delay

# Sonapen

## Delay Line Contact Transducer

### Features

- Single normal beam compression wave contact transducer
- Circular composite crystal
- Max operating temperature 50°C / 120°F
- Replaceable delay line tip producing a focused beam
- Straight and right angle head options available

### Common Applications

- Ceramics / Composites
- Machine parts



Transducer Models				
Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
SONAPEN	10MHz 3/16" Pencil Transducer	10	5mm / 3/16"	10.5mm / 0.413"

Case Dimensions and Details				
Transducer Version	Width/Diameter (mm / Inches)	Height (mm / Inches)	Connector Options	Position Options
Straight Head	10mm / 0.394"	112mm / 4.409"	D	Top
Right Angle Head	17mm / 0.669"	110mm / 4.331"	D	Top

Delay Line	
Product Code	Description
PRD-1	Delay tip 10uS, 0.0625" Dia. Tip
PRD-2	Delay Tip, 10uS, 0.125" Dia. Tip

# THM

## Twin Crystal Compression Transducers

### Features

- Dual normal beam compression wave contact transducers
- Rectangular lead zirconate titanate crystals
- Max operating temperature 50°C / 120°F
- High temperature option available
- Medium damped for medium bandwidth

### Common Applications

- Castings / Forgings / Thickness surveys



Transducer Models				
Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
THM2-10	Twin Contact 2Mhz 0° LEMO 00	2	11mm / 0.433"	10.2mm / 0.402"
THM2-24	Twin Contact 2Mhz 0° LEMO 00	2	7 x 18mm / 0.276 x 0.709"	27.2mm / 1.071"
THM4-10	Twin Contact 4Mhz 0° LEMO 00	4	3.5 x 10mm / 0.138 x 0.394"	16.8mm / 0.661"
THM4-24	Twin Contact 4Mhz 0° LEMO 00	4	6 x 20mm / 0.236 x 0.787"	67.1mm / 2.642"

Case Dimensions and Details				
Transducer Version	Width/Diameter (mm / Inches)	"Height (mm / Inches)"	Connector Options	Position Options
11mm / 0.433"	20mm / 0.787"	45mm / 1.772"	Z	Side
7 x 18mm / 0.276 x 0.709"	32mm / 1.26"	60mm / 2.362"	Z	Side
3.5 x 10mm / 0.138 x 0.394"	20mm / 0.787"	45mm / 1.772"	Z	Side
6 x 20mm / 0.236 x 0.787"	32mm / 1.26"	60mm / 2.362"	Z	Side

# FCG & PFC

## Single Crystal Compression 'Fingertip' Transducers

### Features

- Single normal beam compression wave contact transducers
- Circular, lead metaniobate crystal
- Max operating temperature 50°C / 120°F
- PFC – range highly damped for wide band use
- FCG – range Medium damped for medium bandwidth use
- Ceramic wear face and steel wear ring for prolonged service life



### Common Applications

- Castings / Forgings / Thickness surveys

Transducer Models				
Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
PFC501	1MHz ½" Fingertip	1	12.7mm / ½"	6.8mm / 0.268"
PFC2525	2.25MHz ¼" Fingertip	2.25	6.4mm / ¼"	3.9mm / 0.154"
PFC3725	2.25MHz ⅜" Fingertip	2.25	9.5mm / ⅜"	8.5mm / 0.335"
PFC5025	2.25MHz ½" Fingertip	2.25	12.7mm / ½"	15.2mm / 0.598"
PFC1250	5MHz ⅛" Fingertip	5	3.2mm / ⅛"	2.1mm / 0.083"
PFC2550	5MHz ¼" Fingertip	5	6.4mm / ¼"	8.6mm / 0.339"
PFC3750	5MHz ⅜" Fingertip	5	9.5mm / ⅜"	18.9mm / 0.744"
PFC5050	5MHz ½" Fingertip	5	12.7mm / ½"	33.8mm / 1.331"
PFC1210	10MHz ⅛" Fingertip	10	3.2mm / ⅛"	4.3mm / 0.169"
PFC2510	10MHz ¼" Fingertip	10	6.4mm / ¼"	17.2mm / 0.677"
FCG2525	2.25MHz ¼" Fingertip	2.25	6.4mm / ¼"	3.9mm / 0.154"
FCG3725	2.25MHz ⅜" Fingertip	2.25	9.5mm / ⅜"	8.5mm / 0.335"
FCG5025	2.25MHz ½" Fingertip	2.25	12.7mm / ½"	15.2mm / 0.598"
FCG1250	5MHz ⅛" Fingertip	5	3.2mm / ⅛"	2.1mm / 0.083"
FCG2550	5MHz ¼" Fingertip	5	6.4mm / ¼"	8.6mm / 0.339"
FCG3750	5MHz ⅜" Fingertip	5	9.5mm / ⅜"	18.9mm / 0.744"
FCG5050	5MHz ½" Fingertip	5	12.7mm / ½"	33.8mm / 1.331"
FCG1210	10MHz ⅛" Fingertip	10	3.2mm / ⅛"	4.3mm / 0.169"
FCG2510	10MHz ¼" Fingertip	10	6.4mm / ¼"	17.2mm / 0.677"
FCG3710	10MHz ⅜" Fingertip	10	9.5mm / ⅜"	37.9mm / 1.492"
FCG5010	10MHz ½" Fingertip	10	12.7mm / ½"	67.7mm / 2.665"
FCG1220	20MHz ⅛" Fingertip	20	3.2mm / ⅛"	8.6mm / 0.339"

Case Dimensions and Details				
Transducer Version	"Width/Diameter (mm / Inches)"	"Height (mm / Inches)"	Connector Options	Position Options
3.2mm / ⅛"	13mm / 0.512"	22mm / 0.866"	D S	Side
6.4mm / ¼"	14mm / 0.551"	26mm / 1.024"	D S	Side
9.5mm / ⅜"	16mm / 0.63"	28mm / 1.102"	D S	Side
12.7mm / ½"	19mm / 0.748"	28mm / 1.102"	D S	Side

# STARC

## Single Crystal Compression Transducers

### Features

- Single normal beam compression wave contact transducers
- Circular, lead zirconate titanate crystal
- Max operating temperature 50°C / 120°F
- High temperature option available
- Ceramic faced for prolonged service life

### Common Applications

- Castings
- Forgings
- Composites
- Thickness inspection



Transducer Models				
Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
STARC2-10	Single Crystal Ø10mm 2Mz	2	10mm / 0.394"	8.4mm / 0.331"
STARC2-20	Single Crystal Ø20mm 2Mz	2	20mm / 0.787"	33.6mm / 1.323"
STARC4-10	Single Crystal Ø10mm 4Mz	4	10mm / 0.394"	16.8mm / 0.661"
STARC4-20	Single Crystal Ø20mm 4Mz	4	20mm / 0.787"	67.1mm / 2.642"

Case Dimensions and Details				
Transducer Version Crystal size	Width/Diameter (mm / Inches)	Height (mm / Inches)	Connector Options	Position Options
10mm / 0.394"	20mm / 0.787"	30mm / 1.181"	Z S	Side
20mm / 0.787"	30mm / 1.181"	30mm / 1.181"	Z S	Side

# TSTARC

## Dual Crystal Normal Beam Transducers

### Features

- Dual normal beam compression wave contact transducers
- Semi-circular, lead zirconate titanate crystal
- Max operating temperature 50°C / 120°F
- High temperature option available
- Ceramic faced for prolonged service life

### Common Applications

- Castings
- Forgings
- Composites
- Thickness inspection



Transducer Models				
Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
TSTARC2-10	Twin Crystal Ø10mm 2Mz	2	10mm / 0.394"	8.4mm / 0.331"
TSTARC2-20	Twin Crystal Ø20mm 2Mz	2	20mm / 0.787"	33.6mm / 1.323"
TSTARC4-10	Twin Crystal Ø10mm 4Mz	4	10mm / 0.394"	16.8mm / 0.661"
TSTARC4-20	Twin Crystal Ø20mm 4Mz	4	20mm / 0.787"	67.1mm / 2.642"

Case Dimensions and Details				
Transducer Version Crystal size	Width/Diameter (mm / Inches)	Height (mm / Inches)	Connector Options	Position Options
10mm / 0.394"	25mm / 0.984"	37mm / 1.457"	Z S	Top
20mm / 0.787"	33mm / 1.299"	43mm / 1.693"	Z S	Top



# SLP

## Single Compression Transducer with Ceramic Wear Face

### Features

- Single normal beam compression wave contact transducer
- Circular, lead metaniobate crystal
- Max operating temperature 50°C / 120°F
- High dampening for high resolution
- Ceramic wear face for prolonged service life

### Common Applications

- Castings
- Forgings
- White metal bearings
- High temperature



Transducer Models				
Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
SLP2-10	2.25MHz 10mm SC H.Damped	2	10mm / 0.394"	8.4mm / 0.331"
SLP2-15	2.25MHz 15mm SC H.Damped	2	15mm / 0.591"	18.9mm / 0.744"
SLP2-20	2.25MHz 20mm SC H.Damped	2	20mm / 0.787"	33.6mm / 1.323"
SLP2-25	2.25MHz 25mm SC H.Damped	2	25mm / 0.984"	52.3mm / 2.059"
SLP4-10	4MHz 10mm SC H.Damped	4	10mm / 0.394"	16.8mm / 0.661"
SLP4-25	4MHz 25mm SC H.Damped	4	25mm / 0.984"	104.9mm / 4.13"
SLP5-5	5MHz 5mm SC H.Damped	5	5mm / 0.197"	5.2mm / 0.205"
SLP5-10	5MHz 10mm SC H.Damped	5	10mm / 0.394"	21mm / 0.827"
SLP5-15	5MHz 15mm SC H.Damped	5	15mm / 0.591"	47.2mm / 1.858"
SLP5-20	5MHz 20mm SC H.Damped	5	20mm / 0.787"	83.9mm / 3.303"
SLP5-25	5MHz 25mm SC H.Damped	5	25mm / 0.984"	131.1mm / 5.161"
SLP10-5	10MHz 5mm SC H.Damped	10	5mm / 0.197"	10.5mm / 0.413"
SLP10-10	10MHz 10mm SC H.Damped	10	10mm / 0.394"	41.9mm / 1.65"

Case Dimensions and Details				
Transducer Version Crystal size	Width/Diameter (mm / Inches)	Height (mm / Inches)	Connector Options	Position Options
5mm / 0.197"	13mm / 0.512"	12mm / 0.472"	D S	Side
10mm / 0.394"	17mm / 0.669"	15mm / 0.591"	D S	Side
15mm / 0.591"	22mm / 0.866"	15mm / 0.591"	D S	Side
20mm / 0.787"	27mm / 1.063"	15mm / 0.591"	D S	Side
25mm / 0.984"	32mm / 1.26"	15mm / 0.591"	D S	Side

# SMA

## Small, Angle Beam Shear Wave Transducers

### Features

- Single angle beam shear wave contact transducer
- Rectangular, lead zirconate titanate crystal
- Max operating temperature 50°C / 120°F
- High temperature option available
- Medium damped for medium bandwidth

### Common Applications

- General Welds
- Tube & Pipe
- Forgings



Transducer Models					
Product Code	Description	Angle in Steel (°)	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
SMA2-45	Single Shear 2Mhz 45°	45	2	8 x 9mm / 0.315 x 0.354"	12.5mm / 0.492"
SMA2-60	Single Shear 2Mhz 60°	60	2	8 x 9mm / 0.315 x 0.354"	12.5mm / 0.492"
SMA2-70	Single Shear 2Mhz 70°	70	2	8 x 9mm / 0.315 x 0.354"	12.5mm / 0.492"
SMA4-45	Single Shear 4Mhz 45°	45	4	8 x 9mm / 0.315 x 0.354"	25.1mm / 0.988"
SMA4-60	Single Shear 4Mhz 60°	60	4	8 x 9mm / 0.315 x 0.354"	25.1mm / 0.988"
SMA4-70	Single Shear 4Mhz 70°	70	4	8 x 9mm / 0.315 x 0.354"	25.1mm / 0.988"

Case Dimensions and Details				
Width/Diameter (mm / Inches)	Height (mm / Inches)	Length (mm / Inches)	Connector Options	Position Options
14mm / 0.551"	22mm / 0.866"	24mm / 0.945"	Z D S	Side

# MMA

## Medium, Angle Beam Shear Wave Transducers

### Features

- Single angle beam shear wave contact transducer
- Rectangular, lead zirconate titanate crystal
- Max operating temperature 50°C / 120°F
- High temperature option available
- Medium damped for medium bandwidth

### Common Applications

- General Welds
- Tube & Pipe
- Forgings
- Castings



ANGLE BEAMS

Transducer Models					
Product Code	Description	Angle in Steel (°)	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
MMA1-45	Single Shear 1Mhz 45°	45.0	1	14 x 16mm / 0.551 x 0.63"	19.8mm / 0.78"
MMA1-60	Single Shear 1 Mhz 60°	60.0	1	14 x 16mm / 0.551 x 0.63"	19.8mm / 0.78"
MMA1-70	Single Shear 1Mhz 70°	70.0	1	14 x 16mm / 0.551 x 0.63"	19.8mm / 0.78"
MMA2-38	Single Shear 2Mhz 38°	38.0	2	14 x 16mm / 0.551 x 0.63"	79.3mm / 3.122"
MMA2-45	Single Shear 2Mhz 45°	45.0	2	14 x 16mm / 0.551 x 0.63"	39.6mm / 1.559"
MMA2-60	Single Shear 2Mhz 60°	60.0	2	14 x 16mm / 0.551 x 0.63"	39.6mm / 1.559"
MMA2-70	Single Shear 2Mhz 70°	70.0	2	14 x 16mm / 0.551 x 0.63"	39.6mm / 1.559"
MMA4-45	Single Shear 4Mhz 45°	45.0	4	14 x 16mm / 0.551 x 0.63"	79.3mm / 3.122"
MMA4-60	Single Shear 4Mhz 60°	60.0	4	14 x 16mm / 0.551 x 0.63"	79.3mm / 3.122"
MMA4-70	Single Shear 4Mhz 70°	70.0	4	14 x 16mm / 0.551 x 0.63"	79.3mm / 3.122"

Case Dimensions and Details				
Width/Diameter (mm / Inches)	Height (mm / Inches)	Length (mm / Inches)	Connector Options	Position Options
22mm / 0.866"	29mm / 1.142"	41mm / 1.614"	Z D S	Side

# LMA

## Large, Angle Beam Shear Wave Transducers

ANGLE BEAMS

### Features

- Single angle beam shear wave contact transducer
- Rectangular, lead zirconate titanate crystal
- Max operating temperature 50°C / 120°F
- High temperature option available
- Medium damped for medium bandwidth



### Common Applications

- General Welds
- Tube & Pipe
- Forgings
- Castings

Transducer Models					
Product Code	Description	Angle in Steel (°)	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
LMA2-45	Single Shear 2MHz 45°	45	2	20 x 22mm / 0.787 x 0.866"	74.9mm / 2.949"
LMA2-60	Single Shear 2MHz 60°	60	2	20 x 22mm / 0.787 x 0.866"	74.9mm / 2.949"
LMA2-70	Single Shear 2MHz 70°	70	2	20 x 22mm / 0.787 x 0.866"	74.9mm / 2.949"
LMA4-45	Single Shear 4MHz 45°	45	4	20 x 22mm / 0.787 x 0.866"	149.8mm / 5.898"
LMA4-60	Single Shear 4MHz 60°	60	4	20 x 22mm / 0.787 x 0.866"	149.8mm / 5.898"
LMA4-70	Single Shear 4MHz 70°	70	4	20 x 22mm / 0.787 x 0.866"	149.8mm / 5.898"

Case Dimensions and Details				
Width/Diameter (mm / Inches)	Height (mm / Inches)	Length (mm)	Connector Options	Position Options
29mm / 1.142"	44mm / 1.732"	54mm / 2.126"	Z D S	Side

# T SMA

## Small, Twin Angle Beam Shear Wave Transducers

### Features

- Dual angle beam shear wave contact transducer
- Rectangular, lead zirconate titanate crystal
- Max operating temperature 50°C / 120°F
- High temperature option available
- Medium damped for medium bandwidth

### Common Applications

- General Welds
- Tube & Pipe
- Forgings
- Castings



ANGLE BEAMS

Transducer Models					
Product Code	Description	Angle in Steel (°)	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
T SMA4-45	Twin Shear 4 MHz 45°	45	4	3.5 x 10mm / 0.138 x 0.394"	31mm / 1.22"
T SMA4-60	Twin Shear 4Mhz 60°	60	4	3.5 x 10mm / 0.138 x 0.394"	31mm / 1.22"
T SMA4-70	Twin Shear 4Mhz 70°	70	4	3.5 x 10mm / 0.138 x 0.394"	31mm / 1.22"

Case Dimensions and Details				
Width/Diameter (mm / Inches)	Height (mm / Inches)	Length (mm)	Connector Options	Position Options
16mm / 0.63"	22mm / 0.866"	31mm / 1.22"	Z D	Top / Rear

# STARC

## Angle Beam Shear Wave Transducers

ANGLE BEAMS

### Features

- Single ceramic hard face contact transducers
- Circular lead zirconate titanate crystal
- Max operating temperature 50°C / 120°F
- High resolution and sensitivity inspections



### Common Applications

- Ceramics
- Composites
- Machine parts



Transducer Models

Product Code	Description	Angle in Steel (°)	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
STARC2-45	Single Shear 2Mhz 45°	45	2	10mm / 0.394"	15.5mm / 0.61"
STARC2-60	Single Shear 2Mhz 60°	60	2	10mm / 0.394"	15.5mm / 0.61"
STARC2-70	Single Shear 2Mhz 70°	70	2	10mm / 0.394"	15.5mm / 0.61"
STARC 2-90	Single Shear 2mhz 90	90	2	10mm / 0.394"	15.5mm / 0.61"
STARC4-45	Single Shear 4Mhz 45°	45	4	10mm / 0.394"	31mm / 1.22"
STARC4-60	Single Shear 4Mhz 60°	60	4	10mm / 0.394"	31mm / 1.22"
STARC4-70	Single Shear 4Mhz 70°	70	4	10mm / 0.394"	31mm / 1.22"
STARC4-90	Single Shear 4 mhz 90	90	4	10mm / 0.394"	31mm / 1.22"
STARC4-45HT	STARC4-45HTS Single 4Mhz	45	4	10mm / 0.394"	31mm / 1.22"
STARC4-60HT	STARC4-60HTS Single 4Mhz	60	4	10mm / 0.394"	31mm / 1.22"
STARC4-70HT	STARC4-70HTS Single 4Mhz	70	4	10mm / 0.394"	31mm / 1.22"

Case Dimensions and Details

Width/Diameter (mm / Inches)	Height (mm / Inches)	Length (mm)	Connector Options	Position Options
15mm / 0.591"	29mm / 1.142"	21mm / 0.827"	Z S	Top

# TSTARC

## Features

- Dual crystal, ceramic hard face contact transducers
- Rectangular lead zirconate titanate crystal
- Max operating temperature 50°C / 120°F
- High resolution and sensitivity inspections

## Common Applications

- Ceramics
- Composites
- Machine parts



ANGLE BEAMS

Transducer Models					
Product Code	Description	Angle in Steel (°)	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
TSTARC2-45	Twin Shear 2Mhz 45°	45	2	8 x 5mm / 0.315 x 0.197"	15.5mm / 0.61"
TSTARC2-60	Twin Shear 2Mhz 60°	60	2	8 x 5mm / 0.315 x 0.197"	15.5mm / 0.61"
TSTARC2-70	Twin Shear 2Mhz 70°	70	2	8 x 5mm / 0.315 x 0.197"	15.5mm / 0.61"
TSTARC4-45	Twin Shear 4Mhz 45°	45	4	8 x 5mm / 0.315 x 0.197"	31mm / 1.22"
TSTARC4-60	Twin Shear 4Mhz 60°	60	4	8 x 5mm / 0.315 x 0.197"	31mm / 1.22"
TSTARC4-70	Twin Shear 4Mhz 70°	70	4	8 x 5mm / 0.315 x 0.197"	31mm / 1.22"

Case Dimensions and Details				
Width/Diameter (mm / Inches)	Height (mm / Inches)	Length (mm)	Connector Options	Position Options
15mm / 0.591"	29mm / 1.142"	21mm / 0.827"	Z S	Top

# QCG and QW

Single Crystal transducers, threaded for use with "Quick Change" shear wave wedges

## Features

- Single crystal angle beam shear wave quick change transducer and wedges
- Circular lead metaniobate crystal
- Max operating temperature 50°C / 120°F
- High temperature options available up to 285°C / 545°F on request
- Medium damped for medium bandwidth
- Highly damped option for wide bandwidth available see PQC transducer list
- Wedges available in refracted longitudinal angles on request



## Common Applications

- General Welds / Tube & Pipe • Forgings

Transducer Models				
Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
QCG2525	2.25MHz ¼" QuickChange	2.25	6.4mm / 0.252"	7.1mm / 0.28"
QCG3725	2.25MHz ⅜" QuickChange	2.25	9.5mm / 0.374"	15.7mm / 0.618"
QCG5025	2.25MHz ½" QuickChange	2.25	12.7mm / 0.5"	28.1mm / 1.106"
QCG2550	5MHz ¼" QuickChange	5	6.4mm / 0.252"	15.9mm / 0.626"
QCG3750	5MHz ⅜" QuickChange	5	9.5mm / 0.374"	34.9mm / 1.374"
QCG5050	5MHz ½" QuickChange	5	12.7mm / 0.5"	62.4mm / 2.457"
QCG2510	10MHz ¼" QuickChange	10	6.4mm / 0.252"	31.7mm / 1.248"
QCG3710	10MHz ⅜" QuickChange	10	9.5mm / 0.374"	69.9mm / 2.752"
QCG5010	10MHz ½" QuickChange	10	12.7mm / 0.5"	124.8mm / 4.913"

Case Dimensions and Details				
Transducer Size	Width/Diameter (mm)	Height (mm)	Connector Options	Position Options
6.4mm / 0.252"	12.7mm / 0.5"	19.05mm / 0.75"	D S	Top
9.5mm / 0.374"	14.5mm / 0.571"	19.05mm / 0.75"	D S	Top
12.7mm / 0.5"	17.2mm / 0.677"	19.05mm / 0.75"	D S	Top

Wedge Details						
Product Code	Description	θ wedge Angle in Steel (°)	Applicable Probe Diameter	Width (mm / Inches)	Height (mm / Inches)	Length (mm / Inches)
QW2545	45° wedge for ¼" QCG probe	45	6.4mm / 0.252"	12.7mm / 0.5"	11.5mm / 0.453"	20.3mm / 0.799"
QW2560	60° wedge for ¼" QCG probe	60	6.4mm / 0.252"	12.7mm / 0.5"	12.6mm / 0.496"	23.5mm / 0.925"
QW2570	70° wedge for ¼" QCG probe	70	6.4mm / 0.252"	12.7mm / 0.5"	12.7mm / 0.5"	26mm / 1.024"
QW3745	45° wedge for ⅜" QCG probe	45	9.5mm / 0.374"	16mm / 0.63"	12.7mm / 0.5"	25.2mm / 0.992"
QW3760	60° wedge for ⅜" QCG probe	60	9.5mm / 0.374"	16mm / 0.63"	15mm / 0.591"	28.5mm / 1.122"
QW3770	70° wedge for ⅜" QCG probe	70	9.5mm / 0.374"	16mm / 0.63"	15.5mm / 0.61"	30.5mm / 1.201"
QW5045	45° wedge for ½" QCG probe	45	12.7mm / 0.5"	22.2mm / 0.874"	15.3mm / 0.602"	28.6mm / 1.126"
QW5060	60° wedge for ½" QCG probe	60	12.7mm / 0.5"	22.2mm / 0.874"	18.1mm / 0.713"	34.4mm / 1.354"
QW5070	70° wedge for ½" QCG probe	70	12.7mm / 0.5"	22.2mm / 0.874"	18.6mm / 0.732"	36.8mm / 1.449"

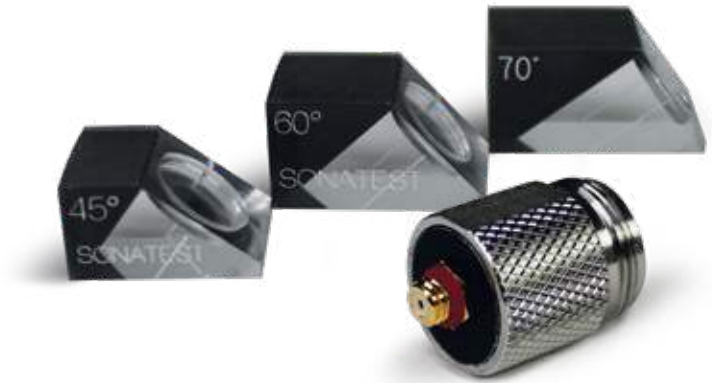


# PQC and QW

Single Crystal transducers, threaded for use with "Quick Change" shear wave wedges

## Features

- Single crystal angle beam shear wave quick change transducer and wedges
- Circular lead metaniobate crystal
- Max operating temperature 50°C / 120°F
- High temperature options available up to 285°C / 545°F see QCG transducer list
- Highly damped for wide bandwidth
- Medium damped for medium bandwidth option see QCG transducer list
- Wedges available in refracted longitudinal angles on request



ANGLE BEAMS

## Common Applications

- General Welds / Tube & Pipe / Forgings

Transducer Models				
Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
PQC501	1MHz ½" QuickChange MICRODOT	1	12.7mm / 0.5"	12.5mm / 0.492"
PQC2525	2.25MHz ¼" QuickChange	2.25	6.4mm / 0.252"	7.1mm / 0.28"
PQC3725	2.25MHz ⅜" QuickChange	2.25	9.5mm / 0.374"	15.7mm / 0.618"
PQC5025	2.25MHz ½" QuickChange	2.25	12.7mm / 0.5"	28.1mm / 1.106"
PQC2550	5MHz ¼" QuickChange	5	6.4mm / 0.252"	15.9mm / 0.626"
PQC3750	5MHz ⅜" QuickChange	5	9.5mm / 0.374"	34.9mm / 1.374"
PQC5050	5MHz ½" QuickChange	5	12.7mm / 0.5"	62.4mm / 2.457"
PQC2510	10MHz ¼" QuickChange	10	6.4mm / 0.252"	31.7mm / 1.248"

Case Dimensions and Details				
Probe size	Width/Diameter (mm / Inches)	Height (mm / Inches)	Connector Options	Position Options
6.4mm / 0.252"	13mm / 0.512"	19.05mm / 0.75"	D S	Top
9.5mm / 0.374"	14.5mm / 0.571"	19.05mm / 0.75"	D S	Top
12.7mm / 0.5"	17.2mm / 0.677"	19.05mm / 0.75"	D S	Top

Wedge Details						
Product Code	Description	∅ wedge Angle in Steel (°)	Applicable Transducer ∅ (mm / Inches)	Width (mm)	Height (mm / Inches)	Length (mm)
QW2545	45° wedge for ¼" QCG probe	45	6.4mm / 0.252"	12.7mm / 0.5"	11.5mm / 0.453"	20.3mm / 0.799"
QW2560	60° wedge for ¼" QCG probe	60	6.4mm / 0.252"	12.7mm / 0.5"	12.6mm / 0.496"	23.5mm / 0.925"
QW2570	70° wedge for ¼" QCG probe	70	6.4mm / 0.252"	12.7mm / 0.5"	12.7mm / 0.5"	26mm / 1.024"
QW3745	45° wedge for ⅜" QCG probe	45	9.5mm / 0.374"	16mm / 0.63"	12.7mm / 0.5"	25.2mm / 0.992"
QW3760	60° wedge for ⅜" QCG probe	60	9.5mm / 0.374"	16mm / 0.63"	15mm / 0.591"	28.5mm / 1.122"
QW3770	70° wedge for ⅜" QCG probe	70	9.5mm / 0.374"	16mm / 0.63"	15.5mm / 0.61"	30.5mm / 1.201"
QW5045	45° wedge for ½" QCG probe	45	12.7mm / 0.5"	22.2mm / 0.874"	15.3mm / 0.602"	28.6mm / 1.126"
QW5060	60° wedge for ½" QCG probe	60	12.7mm / 0.5"	22.2mm / 0.874"	18.1mm / 0.713"	34.4mm / 1.354"
QW5070	70° wedge for ½" QCG probe	70	12.7mm / 0.5"	22.2mm / 0.874"	18.6mm / 0.732"	36.8mm / 1.449"

# PSS and SW / SNW Wedges

Single Crystal detachable transducers, for use with "Standard" and "Snail" wedge variants shear wave wedges

## Features

- Single crystal angle beam shear wave quick change transducer and wedges
- Rectangular lead metaniobate crystal
- Max operating temperature 50°C / 120°F
- High temperature options available up to 285°C, see SSG Transducer list
- AWS standard compatible transducers and wedges
- 3/4 x 3/4 inch crystal probes are compatible with both 3/4 x 3/4 and 5/8 x 5/8 inch wedges.



## Common Applications

- General weld inspection
- Critical weld inspection

Transducer Models				
Product Code	Description	Frequency (MHz)	Crystal Size (mm / Inches)	Nearfield Length in Steel (mm / Inches)
PSS62621	1MHz 5/8" x 5/8" Shearwave	1	15.9 x 15.9mm / 5/8" x 5/8"	19.6mm / 0.77"
PSS75751	1MHz 3/4" x 3/4" Comp. SW	1	19.2 x 19.2mm / 3/4" x 3/4"	28.5mm / 1.12"
PSS50101	1MHz 1/2" x 1" Std SW	1	12.7 x 25.4mm / 1/2" x 1"	49.9mm / 1.97"
PSS50102	2.25MHz 1/2" x 1" Shearwave BNC	2.25	12.7 x 25.4mm / 1/2" x 1"	28.1mm / 1.11"
PSS50502	2.25MHz 1/2" x 1/2" Shearwave BNC	2.25	12.7 x 12.7mm / 1/2" x 1/2"	28.1mm / 1.11"
PSS62622	2.25MHz 5/8" x 5/8" Shearwave BNC	2.25	15.9 x 15.9mm / 5/8" x 5/8"	112.4mm / 4.42"
PSS62752	2.25MHz 3/4" x 5/8" Shearwave BNC	2.25	19.2 x 15.9mm / 3/4" x 5/8"	64.2mm / 2.53"
PSS75752	2.25MHz 3/4" x 3/4" Shearwave BNC	2.25	19.2 x 19.2mm / 3/4" x 3/4"	64.2mm / 2.53"
PSS50105	5MHz 1/2" x 1" Shearwave BNC	5	12.7 x 25.4mm / 1/2" x 1"	249.7mm / 9.83"
PSS50505	5MHz 1/2" x 1/2" Shearwave BNC	5	12.7 x 12.7mm / 1/2" x 1/2"	62.4mm / 2.46"
PSS62625	5MHz 5/8" x 5/8" Shearwave BNC	5	15.9 x 15.9mm / 5/8" x 5/8"	249.7mm / 9.83"
PSS62755	5MHz 3/4" x 5/8" Shearwave BNC	5	19.2 x 15.9mm / 3/4" x 5/8"	142.7mm / 5.62"
PSS75755	5MHz 3/4" x 3/4" Shearwave BNC	5	19.2 x 19.2mm / 3/4" x 3/4"	142.7mm / 5.62"

Case Dimensions and Details					
Transducer Size	Width/Diameter (mm / Inches)	Height (mm / Inches)	Length (mm / Inches)	Connector Options	Position Options
12.7 x 12.7mm / 1/2" x 1/2"	19mm / 0.75"	19mm / 0.75"	28.4mm / 1.12"	B	Top
12.7 x 25.4mm / 1/2" x 1"	19.1mm / 0.75"	19mm / 0.75"	41.1mm / 1.62"	B	Top
15.9 x 15.9mm / 5/8" x 5/8"	21.5mm / 0.85"	19mm / 0.75"	34.3mm / 1.35"	B	Top
15.9mm X 19.2mm / 5/8" x 3/4"	21.5mm / 0.85"	19mm / 0.75"	34.3mm / 1.35"	B	Top
19.2mm x 19.2mm / 3/4" x 3/4"	24.1mm / 0.95"	19mm / 0.75"	34.4mm / 1.35"	B	Top



Standard Wedge Details

Product Code	Description	θ wedge Angle in Steel (°)	Applicable Transducer Ø (mm / Inches)	Width (mm / Inches)	Height (mm / Inches)	Length (mm / Inches)
SW5045	45° wedge for ½" x ½" Transducer	45	12.7 x 12.7mm / ½" x ½"	28.5mm / 1.12"	38mm / 1.50"	38mm / 1.50"
SW5060	60° wedge for ½" x ½" Transducer	60	12.7 x 12.7mm / ½" x ½"	28.5mm / 1.12"	38mm / 1.50"	44.3mm / 1.74"
SW5070	70° wedge for ½" x ½" Transducer	70	12.7 x 12.7mm / ½" x ½"	28.5mm / 1.12"	38mm / 1.50"	46.8mm / 1.84"
SW5145	45° wedge for ½" x 1" Transducer	45	12.7 x 25.4mm / ½" x 1"	41.5mm / 1.63"	39.3mm / 1.55"	38mm / 1.50"
SW5160	60° wedge for ½" x 1" Transducer	60	12.7 x 25.4mm / ½" x 1"	41.5mm / 1.63"	37mm / 1.46"	44.5mm / 1.75"
SW5170	70° wedge for ½" x 1" Transducer	70	12.7 x 25.4mm / ½" x 1"	41.5mm / 1.63"	37mm / 1.46"	46.8mm / 1.84"
SW6245	45° wedge for ⅝" x ⅝" Transducer	45	15.9 x 15.9mm / ⅝" x ⅝"	34.3mm / 1.35"	44mm / 1.73"	44.3mm / 1.74"
SW6260	60° wedge for ⅝" x ⅝" Transducer	60	15.9 x 15.9mm / ⅝" x ⅝"	34.3mm / 1.35"	43.8mm / 1.72"	46.8mm / 1.84"
SW6270	70° wedge for ⅝" x ⅝" Transducer	79	15.9 x 15.9mm / ⅝" x ⅝"	34.3mm / 1.35"	44mm / 1.73"	49.3mm / 1.94"

Snail Wedge Details

Product Code	Description	θ wedge Angle in Steel (°)	Applicable Transducer Ø (mm / Inches)	Width (mm / Inches)	Height (mm / Inches)	Length (mm / Inches)
SNW6245	45° wedge for ⅝" x ⅝" Transducer	45	15.9 x 15.9mm / ⅝" x ⅝"	34.1mm / 1.34"	56.3mm / 2.22"	54.7mm / 2.15"
SNW6260	60° wedge for ⅝" x ⅝" Transducer	60	15.9 x 15.9mm / ⅝" x ⅝"	34.1mm / 1.34"	56.4mm / 2.22"	56mm / 2.20"
SNW6270	70° wedge for ⅝" x ⅝" Transducer	70	15.9 x 15.9mm / ⅝" x ⅝"	34.1mm / 1.34"	56.4mm / 2.22"	60.5mm / 2.38"

# SSG and SW / SNW Wedges

Single Crystal detachable transducers, for use with "Standard" and "Snail" wedge variants shear wave wedges

## Features

- Single crystal angle beam shear wave quick change transducer and wedges
- Rectangular lead metaniobate crystal
- Max operating temperature 50°C / 120°F
- High temperature options available up to 285°C / 545°F on request
- Low dampening for narrow bandwidth
- Wide Bandwidth option see PSS transducer list
- AWS standard compatible transducers and wedges

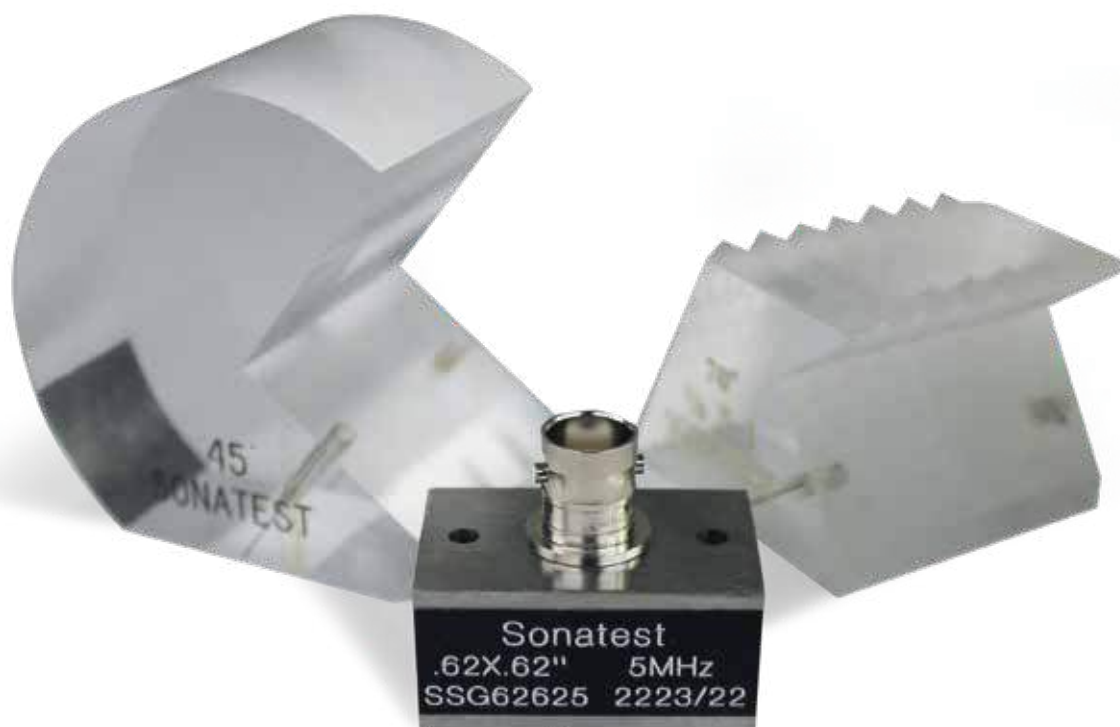


## Common Applications

- General weld inspection
- Critical weld inspection

Transducer Models				
Product Code	Description	Frequency (MHz)	Crystal Size (mm / Inches)	Nearfield Length in Steel (mm / Inches)
SSG50502	1/2" x 1/2" Shearwave BNC	2.25	12.7 x 12.7mm / 1/2" x 1/2"	28.1mm / 1.1"
SSG50102	1/2" x 1" Shearwave BNC	2.25	12.7 x 25.4mm / 1/2" x 1"	28.1mm / 1.1"
SSG62622	5/8" x 5/8" Shearwave BNC	2.25	15.9 x 15.9mm / 5/8" x 5/8"	112.4mm / 4.4"
SSG62752	3/4" x 5/8" Shearwave BNC	2.25	19.2 x 15.9mm / 3/4" x 5/8"	64.2mm / 2.5"
SSG75752	3/4" x 3/4" Shearwave BNC	2.25	19.2 x 19.2mm / 3/4" x 3/4"	64.2mm / 2.5"
SSG50505	1/2" x 1/2" Shearwave BNC	5	12.7 x 12.7mm / 1/2" x 1/2"	62.4mm / 2.5"
SSG50105	1/2" x 1" Shearwave BNC	5	12.7 x 25.4mm / 1/2" x 1"	249.7mm / 9.8"
SSG62625	5/8" x 5/8" Shearwave BNC	5	15.9 x 15.9mm / 5/8" x 5/8"	249.7mm / 9.8"
SSG62755	3/4" x 5/8" Shearwave BNC	5	19.2 x 15.9mm / 3/4" x 5/8"	142.7mm / 5.6"
SSG75755	3/4" x 3/4" Shearwave BNC	5	19.2 x 19.2mm / 3/4" x 3/4"	142.7mm / 5.6"

Case Dimensions and Details					
Transducer Size	Width/Diameter (mm / Inches)	Height (mm / Inches)	Length (mm / Inches)	Connector Options	Position Options
12.7 x 12.7mm / 1/2" x 1/2"	19mm / 0.75"	19mm / 0.75"	28.4mm / 1.12"	B	Top
12.7 x 25.4mm / 1/2" x 1"	19.1mm / 0.75"	19mm / 0.75"	41.1mm / 1.62"	B	Top
15.9 x 15.9mm / 5/8" x 5/8"	21.5mm / 0.85"	19mm / 0.75"	34.3mm / 1.35"	B	Top
15.9 x 19.2mm / 5/8" x 3/4"	21.5mm / 0.85"	19mm / 0.75"	34.3mm / 1.35"	B	Top
19.2 x 19.2mm / 3/4" x 3/4"	24.1mm / 0.95"	19mm / 0.75"	34.4mm / 1.35"	B	Top



Standard Wedge Details

Product Code	Description	θ wedge Angle in Steel (°)	Applicable Transducer Ø (mm / Inches)	Width (mm / Inches)	Height (mm / Inches)	Length (mm / Inches)
SW5045	45° wedge for ½" x ½" Transducer	45	12.7 x 12.7mm / ½" x ½"	28.5mm / 1.12"	38mm / 1.50"	38mm / 1.50"
SW5060	60° wedge for ½" x ½" Transducer	60	12.7 x 12.7mm / ½" x ½"	28.5mm / 1.12"	38mm / 1.50"	44.3mm / 1.74"
SW5070	70° wedge for ½" x ½" Transducer	70	12.7 x 12.7mm / ½" x ½"	28.5mm / 1.12"	38mm / 1.50"	46.8mm / 1.84"
SW5145	45° wedge for ½" x 1" Transducer	45	12.7 x 25.4mm / ½" x 1"	41.5mm / 1.63"	39.3mm / 1.55"	38mm / 1.50"
SW5160	60° wedge for ½" x 1" Transducer	60	12.7 x 25.4mm / ½" x 1"	41.5mm / 1.63"	37mm / 1.46"	44.5mm / 1.75"
SW5170	70° wedge for ½" x 1" Transducer	70	12.7 x 25.4mm / ½" x 1"	41.5mm / 1.63"	37mm / 1.46"	46.8mm / 1.84"
SW6245	45° wedge for ⅝" x ⅝" Transducer	45	15.9 x 15.9mm / ⅝" x ⅝"	34.3mm / 1.35"	44mm / 1.73"	44.3mm / 1.74"
SW6260	60° wedge for ⅝" x ⅝" Transducer	60	15.9 x 15.9mm / ⅝" x ⅝"	34.3mm / 1.35"	43.8mm / 1.72"	46.8mm / 1.84"
SW6270	70° wedge for ⅝" x ⅝" Transducer	79	15.9 x 15.9mm / ⅝" x ⅝"	34.3mm / 1.35"	44mm / 1.73"	49.3mm / 1.94"

Snail Wedge Details

Product Code	Description	θ wedge Angle in Steel (°)	Applicable Transducer Ø (mm / Inches)	Width (mm / Inches)	Height (mm / Inches)	Length (mm / Inches)
SNW6245	45° wedge for ⅝" x ⅝" Transducer	45	15.9 x 15.9mm / ⅝" x ⅝"	34.1mm / 1.34"	56.3mm / 2.22"	54.7mm / 2.15"
SNW6260	60° wedge for ⅝" x ⅝" Transducer	60	15.9 x 15.9mm / ⅝" x ⅝"	34.1mm / 1.34"	56.4mm / 2.22"	56mm / 2.20"
SNW6270	70° wedge for ⅝" x ⅝" Transducer	70	15.9 x 15.9mm / ⅝" x ⅝"	34.1mm / 1.34"	56.4mm / 2.22"	60.5mm / 2.38"

# PIM

## Immersion Transducers

IMMERSION

### Features

- Single crystal immersion beam compression wave transducers
- Circular lead metaniobate crystal
- Max operating temperature 50°C / 120°F
- Spherical (point focus) / Cylindrical (line focus) options available on request, bespoke focus distance available on consultation

### Common Applications

- Ceramics
- Composites
- Machine Parts
- Thickness inspection



Transducer Models

Product Code	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel"unfocused" (mm / Inches)	Standard point and line focus distance options (mm)	Minimum and maximum focal range for the Transducer (mm / Inches)
PIM501	1	12.7mm / 0.5"	6.8mm / 0.268"	25.4	17.8 - 25.4mm / 0.701 - 1"
PIM751	1	19.2mm / 0.756"	15.5mm / 0.61"	38.1, 50.8	31.7 - 50.8mm / 1.248 - 2"
PIM 101	1	25.4mm / 1"	27.1mm / 1.067"	50.8, 63.5, 76.2	45.7 - 81.3mm / 1.799 - 3.201"
PIM2525	2.25	6.4mm / 0.252"	3.9mm / 0.154"	12.7	10.2 - 12.7mm / 0.402 - 0.5"
PIM3725	2.25	9.5mm / 0.374"	8.5mm / 0.335"	25.4	20.3 - 25.4mm / 0.799 - 1"
PIM5025	2.25	12.7mm / 0.5"	15.2mm / 0.598"	25.4, 38.1, 50.8	22.8 - 50.8mm / 0.898 - 2"
PIM7525	2.25	19.2mm / 0.756"	34.8mm / 1.37"	38.1, 50.8, 63.5, 76.2, 88.9, 101.6	31.7 - 101.6mm / 1.248 - 4"
PIM1025	2.25	25.4mm / 1"	60.9mm / 2.398"	50.8, 63.5, 76.2, 88.9, 101.6	48.2 - 152.4mm / 1.898 - 6"
PIM2550	5	6.4mm / 0.252"	8.6mm / 0.339"	12.7	12.7 - 25.4mm / 0.5 - 1"
PIM3750	5	9.5mm / 0.374"	18.6mm / 0.732"	25.4, 38.1	17.8 - 43.2mm / 0.701 - 1.701"
PIM5050	5	12.7mm / 0.5"	33.8mm / 1.331"	25.4, 38.1, 50.8, 63.5, 76.2, 88.9, 101.6	22.8 - 101.6mm / 0.898 - 4"
PIM7550	5	19.2mm / 0.756"	77.3mm / 3.043"	38.1, 50.8, 63.5, 76.2, 88.9, 101.6	31.7 - 203.2mm / 1.248 - 8"
PIM1050	5	25.4mm / 1"	135.3mm / 5.327"	50.8, 63.5, 76.2, 88.9, 101.6	50.8 - 203.2mm / 2 - 8"
PIM2510	10	6.4mm / 0.252"	17.2mm / 0.677"	12.7, 25.4, 38.1, 50.8	12.7 - 50.8mm / 0.5 - 2"

Case Dimensions and Details

Transducer Type (mm / Inches)	Width/Diameter (mm / Inches)	Height (mm / Inches)	Connector Options	Position Options
6.4mm / 0.252"	15.8mm / 0.622"	52.6mm / 2.071"	U	Top
9.5mm / 0.374"	15.8mm / 0.622"	52.6mm / 2.071"	U	Top
12.7mm / 0.5"	15.8mm / 0.622"	52.6mm / 2.071"	U	Top
19.2mm / 0.756"	22.7mm / 0.894"	52.6mm / 2.071"	U	Top
25.4mm / 1"	30mm / 1.181"	52.6mm / 2.071"	U	Top

# STP Soft Tip Dryscan, through Transmission Transducers

## Features

- Pair of normal beam compression wave Dryscan transducers
- Circular lead metaniobate crystal
- Max operating temperature 50°C / 120°F
- Low dampening for wide bandwidth

## Common Applications

- Composites / Bond testing



THROUGH TRANSMISSION

Transducer Models				
Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
STP5-2	0.5MHz Soft Tip L.Damp	0.5	5mm / 0.197"	0.5mm / 0.02"
STP10-2	0.5MHz Soft Tip L.Damp	0.5	10mm / 0.394"	2.1mm / 0.083"
STP5-1	1.25MHz Soft Tip L.Damp	1.25	5mm / 0.197"	1.3mm / 0.051"
STP10-1	1.25MHz Soft Tip L.Damp	1.25	10mm / 0.394"	5.2mm / 0.205"
STP20-1	1.25MHz Soft Tip L.Damp	1.25	20mm / 0.787"	21mm / 0.827"

Case Dimensions and Details				
Transducer Type (mm / Inches)	Width/Diameter (mm / Inches)	Height (mm / Inches)	Connector Options	Position Options
5mm / 0.197"	9.8mm / 0.386"	30mm / 1.181"	S Z	Top
10mm / 0.394"	20mm / 0.787"	36mm / 1.417"	S	Top
15mm / 0.591"	25mm / 0.984"	36mm / 1.417"	S	Top
20mm / 0.787"	30mm / 1.181"	36mm / 1.417"	S	Top

# RP Dryscan Roller, through Transmission Transducers

## Features

- Pair of normal beam compression Transducers positioned in Dryscan rollers
- Circular lead metaniobate crystals
- Max operating temperature 50°C / 120°F

## Common Applications

- Composites / Polymer inspection
- Bond inspection



Transducer Models				
Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)
RP25HS-2	0.5 roller Transducer	0.5	10mm / 0.394"	2.1mm / 0.083"
RP25HS-1	1.25 roller Transducer	1.25	10mm / 0.394"	5.2mm / 0.205"
RP25HS-3C	1.25 Special Design	1.25	10mm / 0.394"	5.2mm / 0.205"

Case Dimensions and Details				
Width (mm / Inches)	Height (mm / Inches)	Length (mm / Inches)	Connector Options	Position Options
25mm / 0.984"	36mm / 1.417"	113mm / 4.449"	Z	Top

# Thickness Gauge Transducers

Dual crystal potted transducers for use with Thickness Gauges

THICKNESS GAUGE TRANSDUCERS

Transducer Models					
Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Nearfield Length in Steel (mm / Inches)	Connector Options
SG-1	Dual 5MHz ¼" Potted transducer	5	6.4mm / 0.252"	8.6mm / 0.339"	Z
SG-1HT	High Temp Dual 5MHz ¼" Potted transducer	5	6.4mm / 0.252"	8.6mm / 0.339"	Z
SG-2	Dual 2.25MHz ½" Potted transducer	2.25	12.7mm / 0.5"	15.2mm / 0.598"	Z
SG-5	Dual 10MHz ¼" Potted transducer	10	6.4mm / 0.252"	17.2mm / 0.677"	Z
DC-110	Dual 1MHz 1" Potted transducer	1	25.4mm / 1"	27.1mm / 1.067"	Z
DC-175	Dual 1MHz ¾" Potted transducer	1	19.2mm / 0.756"	15.5mm / 0.61"	Z
DC250	Dual 2.25MHz ½" Potted transducer	2.25	12.7mm / 0.5"	15.2mm / 0.598"	Z
DC525	Dual 5MHz ¼" Potted transducer	5	6.3mm / 0.248"	8.3mm / 0.327"	Z
DC537	Dual 5MHz ⅜" Potted transducer	5	9.5mm / 0.374"	18.9mm / 0.744"	Z
DC550	Dual 5MHz ½" Potted transducer	5	12.7mm / 0.5"	33.8mm / 1.331"	Z
DK250	Dual 2.25MHz ½" Potted transducer	2.25	12.7mm / 0.5"	15.2mm / 0.598"	Z
DK525	Dual 5MHz ¼" Potted transducer	5	6.3mm / 0.248"	8.3mm / 0.327"	Z
DK550	Dual 5MHz ½" Potted transducer	5	12.7mm / 0.5"	33.8mm / 1.331"	Z
DK537	Dual 5MHz ⅜" Potted transducer	5	9.5mm / 0.374"	18.9mm / 0.744"	Z
DKS-537	Dual 5MHz ⅜" Potted transducer	5	9.5mm / 0.374"	18.9mm / 0.744"	Z
DK537EE	Dual 5MHz ⅜" Potted transducer	5	9.5mm / 0.374"	18.9mm / 0.744"	Z
DK718	Dual 7.5MHz 0.187" Potted transducer	7.5	4.7mm / 0.185"	6.9mm / 0.272"	Z
DK718EE	Dual 7.5MHz 0.187" Potted transducer	7.5	4.7mm / 0.185"	6.9mm / 0.272"	Z
DK1025	Dual 10MHz ¼" Potted transducer	10	6.3mm / 0.248"	16.6mm / 0.654"	Z
DHT-537	High Temp Dual 5MHz ⅜" Potted transducer	5	9.5mm / 0.374"	18.9mm / 0.744"	Z
DLK-525	5MHz ¼" Potted transducer	5	6.3mm / 0.248"	8.3mm / 0.327"	Z
DLK1025	10MHz ¼" Potted transducer	10	6.3mm / 0.248"	16.6mm / 0.654"	Z
DLK2025	20MHz ¼" Potted transducer	20	6.3mm / 0.248"	33.3mm / 1.311"	D
DLK20125	20MHz ⅛" Potted transducer	20	3.1mm / 0.122"	8.1mm / 0.319"	D
DCK1018	10MHz 0.187" Potted transducer	10	4.7mm / 0.185"	9.3mm / 0.366"	D
DCK-250	2.25MHz 1.2" Potted transducer	2.25	12.7mm / 0.5"	15.2mm / 0.598"	D
DCK-525	5MHz ¼" Potted transducer	5	6.4mm / 0.252"	8.6mm / 0.339"	D
DCK-537	5MHz ⅜" Potted transducer	5	9.5mm / 0.374"	18.9mm / 0.744"	D
DCK-550	5MHz ½" Potted transducer	5	12.7mm / 0.5"	33.8mm / 1.331"	D
DCK-718	7.5MHz 0.187" Potted transducer	7.5	4.7mm / 0.185"	6.9mm / 0.272"	D
DCK-1025	10MHz ¼" Potted transducer	10	6.4mm / 0.252"	17.2mm / 0.677"	D
DCK-20125	20MHz ⅛" Potted transducer	20	3.1mm / 0.122"	8.1mm / 0.319"	D

Delay Line Tip			
Product Code	Description	Product Code	Description
DLRT-2520-1	.25" delayline replacement tip	DLRT-125-1	0.125" delayline tip
DLRT-2520-10	.25" delayline replacement tip	DLRT-125-10	0.125" delayline tip
DLRT-25-1	.25" delayline replacement tip	DLRT-1225-1	0.188" delayline tip
DLRT-25-10	.25" delayline replacement tip		





# TULA™

## High Temperature Hydrogen Attack (HTHA)

### Features

- Duel Crystal in a single housing
- Semi circular crystals
- Max operating temperature 50°C / 120°F
- Further focus options available on request
- Contouring available on request
- Uses the ToFD principle for inspection

### Common Applications

- HTHA inspections



HTHA

Transducer Models				
Product Code	Description	Frequency (MHz)	Crystal Dimensions (mm / Inches)	Focus Depth (mm / Inches)
TULA-001	TULA A 10MHz, No focus	10	6mm / 0.236"	N/A
TULA-002	TULA B 10MHz, 10mm focus	10	6mm / 0.236"	10mm / 0.394"
TULA-003	TULA C 10MHz, 25mm focus	10	6mm / 0.236"	25mm / 0.984"

# TOFD

## De-Mountable TOFD Transducer

### Features

- De-mountable ToFD transducers
- Highly damped versions available for high temperature wedges, see the Non-Composite transducer list
- Max operating temperature range 50C° to 120F°
- High temperature wedge options up to 200°C available on request for standard and WREN wedges

### Common Applications

- Weldments
- Weld root erosion inspection
- HTHA inspection



Piezo-composite ToFD Transducers including mini range				
Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Probe size (mm / Inches)
CDTOF 2/02	ToFD transducer 2MHz, 6mm M12 thread size	2	6mm / 0.236"	10 x 30mm / 0.394 x 1.181"
CDTOF 2/04	ToFD transducer 2MHz, 12mm M20 thread size	2	12mm / 0.472"	17 x 30mm / 0.669 x 1.181"
CDTOF 3.5/03	ToFD transducer 3.5MHz, 9mm M20 thread size	3.5	9mm / 0.354"	17 x 30mm / 0.669 x 1.181"
CDTOF 3.5/04	ToFD transducer 3.5MHz, 12mm M20 thread size	3.5	12mm / 0.472"	17 x 30mm / 0.669 x 1.181"
CDTOF 5/01	ToFD transducer 5MHz, 3mm M12 thread size	5	3mm / 0.118"	10 x 30mm / 0.394 x 1.181"
CDTOF 5/02	ToFD transducer 5MHz, 6mm M12 thread size	5	6mm / 0.236"	10 x 30mm / 0.394 x 1.181"
CDTOF 5/03	ToFD transducer 5MHz, 9mm M20 thread size	5	9mm / 0.354"	17 x 30mm / 0.669 x 1.181"
CDTOF 5/04	ToFD transducer 5MHz, 12mm M20 thread size	5	12mm / 0.472"	17 x 30mm / 0.669 x 1.181"
CDTOF 7.5/01	ToFD transducer 7.5MHz, 3mm M12 thread size	7.5	3mm / 0.118"	10 x 30mm / 0.394 x 1.181"
CDTOF 7.5/02	ToFD transducer 7.5MHz 6mm M12 thread size	7.5	6mm / 0.236"	10 x 30mm / 0.394 x 1.181"
CDTOF 10/01	ToFD transducer 10MHz, 3mm M12 thread size	10	3mm / 0.118"	10 x 30mm / 0.394 x 1.181"
CDTOF 10/02	ToFD transducer 10MHz,6mm M12 thread size	10	6mm / 0.236"	10 x 30mm / 0.394 x 1.181"
CDTOF 15/01	ToFD transducer 15MHz, 3mm M12 thread size	15	3mm / 0.118"	10 x 30mm / 0.394 x 1.181"
CDTOF 15/02	ToFD transducer 15MHz,6mm M12 thread size	15	6mm / 0.236"	10 x 30mm / 0.394 x 1.181"
CDTOFM-5/01	Mini ToFD transducer 5MHz, 3mm M12 thread size	5	3mm / 0.118"	10 x 20mm / 0.394 x 0.787"
CDTOFM-5/02	Mini ToFD transducer 5MHz,6mm M12 thread size	5	6mm / 0.236"	10 x 20mm / 0.394 x 0.787"
CDTOFM-10/01	Mini ToFD transducer 10MHz, 3mm M12 thread size	10	3mm / 0.118"	10 x 20mm / 0.394 x 0.787"
CDTOFM-15/01	Mini ToFD transducer 15MHz,3mm M12 thread size	15	3mm / 0.118"	10 x 20mm / 0.394 x 0.787"

WREN De-Mountable ToFD Wedges with small contact area						
Product Code	Description	θ wedge Angle in Steel (°)	Probe thread diameter	Material	Width (mm / Inches)	Length (mm / Inches)
WREN-12/45	WREN Brass ToFD wedge 45°, M12 Thread	45	M12	Brass	30mm / 1.181"	9mm / 0.354"
WREN-12/60	WREN Brass ToFD wedge 60°, M12 Thread	60	M12	Brass	30mm / 1.181"	9mm / 0.354"
WREN-12/70	WREN Brass ToFD wedge 70°, M12 Thread	70	M12	Brass	30mm / 1.181"	9mm / 0.354"
WRENSSI-HT-12/45	WREN High temperature Stainless steel ToFD wedge 45°, M12 Thread	45	M12	Stainless Steel	30mm / 1.181"	9mm / 0.354"
WRENSSI-HT-12/60	WREN High temperature Stainless steel ToFD wedge 45°, M12 Thread	60	M12	Stainless Steel	30mm / 1.181"	9mm / 0.354"
WRENSSI-HT-12/70	WREN High temperature Stainless steel ToFD wedge 45°, M12 Thread	70	M12	Stainless Steel	30mm / 1.181"	9mm / 0.354"



### Non-composite ceramic faced ToFD Transducers including mini range

Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Transducer size (mm / Inches)
DTOF 2/04	ToFD transducer 2MHz, 12mm M20 thread size	2	12mm / 0.472"	10 x 30mm / 0.394 x 1.181"
DTOF 2/06	ToFD transducer 2MHz, 20mm M20 thread size	2	20mm / 0.787"	17 x 30mm / 0.669 x 1.181"
DTOF 3.5/03	ToFD transducer 3.5MHz, 9mm M20 thread size	3.5	9mm / 0.354"	17 x 30mm / 0.669 x 1.181"
DTOF 3.5/04	ToFD transducer 3.5MHz, 12mm M20 thread size	3.5	12mm / 0.472"	17 x 30mm / 0.669 x 1.181"
DTOF 5/01	ToFD transducer 5MHz, 3mm M12 thread size	5	3mm / 0.118"	10 x 30mm / 0.394 x 1.181"
DTOF 5/02	ToFD transducer 5MHz, 6mm M12 thread size	5	6mm / 0.236"	10 x 30mm / 0.394 x 1.181"
DTOF 5/03	ToFD transducer 5MHz, 9mm M20 thread size	5	9mm / 0.354"	17 x 30mm / 0.669 x 1.181"
DTOF 5/04	ToFD transducer 5MHz, 12mm M20 thread size	5	12mm / 0.472"	17 x 30mm / 0.669 x 1.181"
DTOF 7.5/01	ToFD transducer 7.5MHz, 3mm M12 thread size	7.5	3mm / 0.118"	10 x 30mm / 0.394 x 1.181"
DTOF 7.5/02	ToFD transducer 7.5MHz 6mm M12 thread size	7.5	6mm / 0.236"	10 x 30mm / 0.394 x 1.181"
DTOF 10/01	ToFD transducer 10MHz, 3mm M12 thread size	10	3mm / 0.118"	10 x 30mm / 0.394 x 1.181"
DTOF 10/02	ToFD transducer 10MHz,6mm M12 thread size	10	6mm / 0.236"	10 x 30mm / 0.394 x 1.181"
DTOF 15/01	ToFD transducer 15MHz, 3mm M12 thread size	15	3mm / 0.118"	10 x 30mm / 0.394 x 1.181"
DTOF 15/02	ToFD transducer 15MHz,6mm M12 thread size	15	6mm / 0.236"	10 x 30mm / 0.394 x 1.181"
DTOFM-5/01	Mini ToFD transducer 5MHz, 3mm M12 thread size	5	3mm / 0.118"	10 x 20mm / 0.394 x 0.787"
DTOFM-5/02	Mini ToFD transducer 5MHz,6mm M12 thread size	5	6mm / 0.236"	10 x 20mm / 0.394 x 0.787"
DTOFM-10/01	Mini ToFD transducer 10MHz, 3mm M12 thread size	10	3mm / 0.118"	10 x 20mm / 0.394 x 0.787"
DTOFM-15/01	Mini ToFD transducer 15MHz,3mm M12 thread size	15	3mm / 0.118"	10 x 20mm / 0.394 x 0.787"

### De-Mountable ToFD Wedges

Product Code	Description	θ wedge Angle in Steel (°)	Transducer thread Ø	Material	Width (mm / Inches)	Length (mm / Inches)
WTOFI 12/45	Plastic ToFD wedge, 45°, M12 Thread	45°	M12	Plastic	40mm / 1.575"	20mm / 0.787"
WTOFI 12/60	Plastic ToFD wedge, 60°, M12 Thread	60°	M12	Plastic	40mm / 1.575"	20mm / 0.787"
WTOFI 12/70	Plastic ToFD wedge, 70°, M12 Thread	70°	M12	Plastic	40mm / 1.575"	20mm / 0.787"
WTOFI 20/45	Plastic ToFD wedge, 45°, M20 Thread	45°	M20	Plastic	40mm / 1.575"	20mm / 0.787"
WTOFI 20/60	Plastic ToFD wedge, 60°, M20 Thread	60°	M20	Plastic	40mm / 1.575"	20mm / 0.787"
WTOFI 20/70	Plastic ToFD wedge, 70°, M20 Thread	70°	M20	Plastic	40mm / 1.575"	20mm / 0.787"
WTOF-SSI-12/45	S/Steel ToFD wedge, 45°, M12 Thread	45°	M12	S/Steel	40mm / 1.575"	20mm / 0.787"
WTOF-SSI-12/60	S/Steel ToFD wedge, 60°, M12 Thread	60°	M12	S/Steel	40mm / 1.575"	20mm / 0.787"
WTOF-SSI-12/70	S/Steel ToFD wedge, 70°, M12 Thread	70°	M12	S/Steel	40mm / 1.575"	20mm / 0.787"
WTOF-SSI-20/45	S/Steel ToFD wedge, 45°, M20 Thread	45°	M20	S/Steel	40mm / 1.575"	20mm / 0.787"
WTOF-SSI-20/60	S/Steel ToFD wedge, 60°, M20 Thread	60°	M20	S/Steel	40mm / 1.575"	20mm / 0.787"
WTOF-SSI-20/70	S/Steel ToFD wedge, 70°, M20 Thread	70°	M20	S/Steel	40mm / 1.575"	20mm / 0.787"
WTOF-BI-12/45	Brass ToFD wedge, 45°, M12 Thread	45°	M12	Brass	40mm / 1.575"	20mm / 0.787"
WTOF-BI-12/60	Brass ToFD wedge, 60°, M12 Thread	60°	M12	Brass	40mm / 1.575"	20mm / 0.787"
WTOF-BI-12/70	Brass ToFD wedge, 70°, M12 Thread	70°	M12	Brass	40mm / 1.575"	20mm / 0.787"
WTOF-BI-20/45	Brass ToFD wedge, 45°, M20 Thread	45°	M20	Brass	40mm / 1.575"	20mm / 0.787"
WTOF-BI-20/60	Brass ToFD wedge, 60°, M20 Thread	60°	M20	Brass	40mm / 1.575"	20mm / 0.787"
WTOF-BI-20/70	Brass ToFD wedge, 70°, M20 Thread	70°	M20	Brass	40mm / 1.575"	20mm / 0.787"

S/Steel = Stainless Steel

# iTOFD

## Features

- Integrated Transducer and wedge, provides a faster and easier setup time
- Consistent sensitivity without the need for coupling between Transducer and wedge.
- Max operating temperature range 50C° to 120F°
- High temperature options available
- Contoung available on request



## Common Applications

- Weldments
- Weld root erosion inspection
- HTHA inspection

ToFD TRANSDUCERS



Transducer Models					
Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Integrated Wedge angle in steel (°)	Connector Options
ITOFD-001	Integrated ToFD probe and wedge 5MHz 3mm, 45°	5	3mm / 0.118"	45	D, S, Z
ITOFD-002	Integrated ToFD probe and wedge 5MHz 3mm, 60°	5	3mm / 0.118"	60	D, S, Z
ITOFD-003	Integrated ToFD probe and wedge 5MHz 3mm, 70°	5	3mm / 0.118"	70	D, S, Z
ITOFD-004	Integrated ToFD probe and wedge 5MHz 6mm, 45°	5	6mm / 0.236"	45	D, S, Z
ITOFD-005	Integrated ToFD probe and wedge 5MHz 6mm, 60°	5	6mm / 0.236"	60	D, S, Z
ITOFD-006	Integrated ToFD probe and wedge 5MHz 6mm, 70°	5	6mm / 0.236"	70	D, S, Z
ITOFD-007	Integrated ToFD probe and wedge 10MHz 3mm, 45°	10	3mm / 0.118"	45	D, S, Z
ITOFD-008	Integrated ToFD probe and wedge 10MHz 3mm, 60°	10	3mm / 0.118"	60	D, S, Z
ITOFD-009	Integrated ToFD probe and wedge 10MHz 3mm, 70°	10	3mm / 0.118"	70	D, S, Z
ITOFD-010	Integrated ToFD probe and wedge 10MHz 6mm, 45°	10	6mm / 0.236"	45	D, S, Z
ITOFD-011	Integrated ToFD probe and wedge 10MHz 6mm, 60°	10	6mm / 0.236"	60	D, S, Z
ITOFD-012	Integrated ToFD probe and wedge 10MHz 6mm, 70°	10	6mm / 0.236"	70	D, S, Z

# LIMBO TOFD

## Features

- Low profile integrated ToFD Transducer and wedges
- Consistent sensitivity without the need for coupling between Transducer and wedge.
- Max operating temperature range 50C° to 120F°
- Contouring available on request

## Common Applications

- Poor access weldments
- Weldments
- HTHA
- Weld root erosion inspection



Transducer Models					
Product Code	Description	Frequency (MHz)	Crystal Diameter (mm / Inches)	Integrated Wedge angle in steel (°)	Connector Options
LIMBOTOFD-001	45° low-profile-TOFD 10M 3mm L	10	3mm / 0.118"	45	integrated
LIMBOTOFD-002	45° low-profile-TOFD 10M 3mm R	10	3mm / 0.118"	45	integrated
LIMBOTOFD-003	60° low-profile-TOFD 10M 3mm L	10	3mm / 0.118"	60	integrated
LIMBOTOFD-004	60° low-profile-TOFD 10M 3mm R	10	3mm / 0.118"	60	integrated
LIMBOTOFD-005	70° low-profile-TOFD 10M 3mm L	10	3mm / 0.118"	70	integrated
LIMBOTOFD-006	70° low-profile-TOFD 10M 3mm R	10	3mm / 0.118"	70	integrated
LIMBOTOFD-007	45° low-profile-TOFD 10M 6mm L	10	6mm / 0.236"	45	integrated
LIMBOTOFD-008	45° low-profile-TOFD 10M 6mm R	10	6mm / 0.236"	45	integrated
LIMBOTOFD-009	60° low-profile-TOFD 10M 6mm L	10	6mm / 0.236"	60	integrated
LIMBOTOFD-010	60° low-profile-TOFD 10M 6mm R	10	6mm / 0.236"	60	integrated
LIMBOTOFD-011	70° low-profile-TOFD 10M 6mm L	10	6mm / 0.236"	70	integrated
LIMBOTOFD-012	70° low-profile-TOFD 10M 6mm R	10	6mm / 0.236"	70	integrated
LIMBOTOFD-013	45° low-profile-TOFD 15M 3mm L	15	3mm / 0.118"	45	integrated
LIMBOTOFD-014	45° low-profile-TOFD 15M 3mm R	15	3mm / 0.118"	45	integrated
LIMBOTOFD-015	60° low-profile-TOFD 15M 3mm L	15	3mm / 0.118"	60	integrated
LIMBOTOFD-016	60° low-profile-TOFD 15M 3mm R	15	3mm / 0.118"	60	integrated
LIMBOTOFD-017	70° low-profile-TOFD 15M 3mm L	15	3mm / 0.118"	70	integrated
LIMBOTOFD-018	70° low-profile-TOFD 15M 3mm R	15	3mm / 0.118"	70	integrated
LIMBOTOFD-019	45° low-profile-TOFD 15M 6mm L	15	6mm / 0.236"	45	integrated
LIMBOTOFD-020	45° low-profile-TOFD 15M 6mm R	15	6mm / 0.236"	45	integrated
LIMBOTOFD-021	60° low-profile-TOFD 15M 6mm L	15	6mm / 0.236"	60	integrated
LIMBOTOFD-022	60° low-profile-TOFD 15M 6mm R	15	6mm / 0.236"	60	integrated
LIMBOTOFD-023	70° low-profile-TOFD 15M 6mm L	15	6mm / 0.236"	70	integrated
LIMBOTOFD-024	70° low-profile-TOFD 15M 6mm R	15	6mm / 0.236"	70	integrated

# X0 Series Transducers

Small Bore, Thin Wall Weld Inspection

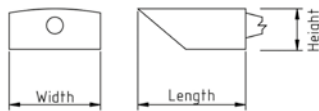
## Features

- Quick I-PEX Connector (QX)
- Quick I-Pex Bracket
- 5m Cable (other cable lengths upon request)
- Armoured Cable on request
- Max operating temperature 50°C / 120°F

Elements



Transducer Dimensions



PHASED ARRAY TRANSDUCERS

Transducer List

Product Code	Transducer Description	Frequency	Number of Elements	Elevation	Element Pitch	Aperture	External Dimensions		
		F (MHz)	Qty	E (mm)	P (mm)	L (mm)	L (mm)	W (mm)	H (mm)
X0A-001	X0A-2.25M16EFC35-0.5x10-SQX5	2.25	16	10	0.5	8	26	22	9.7
X0A-002	X0A-5M16EFC35-0.5x10-SQX5	5	16	10	0.5	8	26	22	9.7
X0A-003	X0A-7.5M16EFC35-0.5x10-SQX5	7.5	16	10	0.5	8	26	22	9.7
X0A-004	X0A-10M16EFC35-0.5x10-SQX5	10	16	10	0.5	8	26	22	9.7
X0A-005	X0A-10M32EFC35-0.25x10-SQX5	10	32	10	0.25	8	26	22	9.7

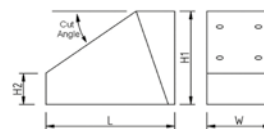
## X0 Wedges

Wedge Materials available

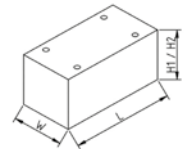
NOTE: all wedge dimensions listed below are made with Rexolite, high temperature materials will require consultation on the most suitable wedge and Transducer solution for your inspection requirements, below are listed common materials used in our wedges

Material	Max Service Temp (°C)	Max Service Temp (°F)	Compression Velocity at 5MHz (mm/μs)	Wedge Types (Angled / Flat)
Rexolite	60	140	2.33	Both
Torlon	260	500	2.71	Both
Vespel	300	572	2.51	Flat

Angled Wedges



0° Wedges



Wedge List

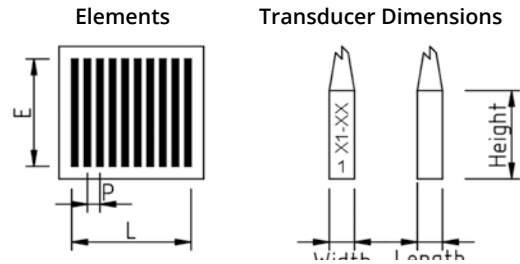
Product Code	Wedge Description	Wave Type	Nominal Refracted Angle in Steel	Recommended Sweep (in steel)		Delay Line Length (mm)	Wedge Dimensions					
				Min (°)	Max (°)		Cut Angle (°)	Length (mm)	Width (mm)	IHC Width (mm)	Front Height H1 (mm)	Back Height H2 (mm)
X0AW-001	X0AW-N60S-IH	S	60	45	75	0	39	18	N/A	21	13.2	2.4
X0AW-002	X0AW-N55S-IH	S	55	40	70	0	36	18	N/A	21	13.2	2.4
X0AW-003	X0AW-N45S-IH	S	45	35	60	0	31	18	N/A	21	13.2	2.4
X0AW-004	X0AW-N60L-IH	L	60	30	75	0	20	18	N/A	21	9	2.4

# X1 Series Transducers

## Small Footprint

### Features

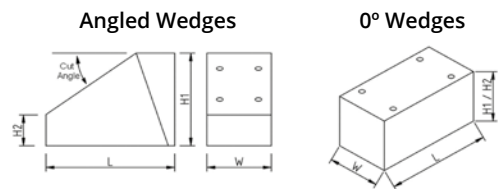
- Quick I-PEX Connector (QX)
- Quick I-Pex Bracket
- 2.5m Cable (other cable lengths upon request)
- Armoured Cable on request
- Hard Faced Option on request
- Max operating temperature 50°C / 120°F



Transducer List									
Product Code	Transducer Description	Frequency	Number of Elements	Elevation	Element Pitch	Aperture	External Dimensions		
		F (MHz)	Qty	E (mm)	P (mm)	L (mm)	L (mm)	W (mm)	H (mm)
X1A-001	X1A-5M10E-0.6x5-SQX2.5	5	10	5	0.6	6	13	10	23
X1A-002	X1A-10M10E-0.6x5-SQX2.5	10	10	5	0.6	6	13	10	23
X1B-001	X1B-10M16E-0.3x5-SQX2.5	10	16	5	0.3	4.8	8	8	23

## X1 Wedges

Wedge Materials available				
NOTE: all wedge dimensions listed below are made with Rexolite, high temperature materials will require consultation on the most suitable wedge and Transducer solution for your inspection requirements, below are listed common materials used in our wedges				
Material	Max Service Temp (°C)	Max Service Temp (°F)	Compression Velocity at 5MHz (mm/μs)	Wedge Types (Angled / Flat)
Rexolite	60	140	2.33	Both
Torlon	260	500	2.71	Both
Vespel	300	572	2.51	Flat



Wedge List												
Product Code	Wedge Description	Wave Type	Nominal Refracted Angle in Steel	Recommended Sweep (in steel)		Delay Line Length (mm)	Wedge Dimensions					
				Min (°)	Max (°)		Cut Angle (°)	Length (mm)	Width (mm)	IHC Width (mm)	Front Height H1 (mm)	Back Height H2 (mm)
X1AW-001	X1AW-0L10	L	0	-20	20	10	0	23	15	N/A	11	10
X1AW-002	X1AW-0L20	L	0	-20	20	20	0	23	15	N/A	21	20
X1AW-003	X1AW-N55S	S	55	40	70	0	36	35.5	16	N/A	24.9	12.3
X1AW-004	X1AW-N60L	L	60	30	75	0	20	29.1	16	N/A	22.6	15
X1BW-001	X1BW-0L5	L	0	-20	20	5	0	15	15	N/A	15	5
X1BW-002	X1BW-0L20	L	0	-20	20	20	0	15	15	N/A	30	20
X1BW-003	X1BW-N45S	S	45	35	60	0	31	23	16	N/A	16.03	8
X1BW-004	X1BW-N55S	S	55	40	70	0	36	23	16	N/A	15.39	6.8
X1BW-005	X1BW-N60S	S	60	45	75	0	39	23	16	N/A	15.36	6.1
X1BW-006	X1BW-N60L	L	60	30	75	0	20	23	16	N/A	21.4	15.9
X1BW-007	X1BW-N80S	S	80	60	90	0	45	25	16	N/A	18.4	8.1

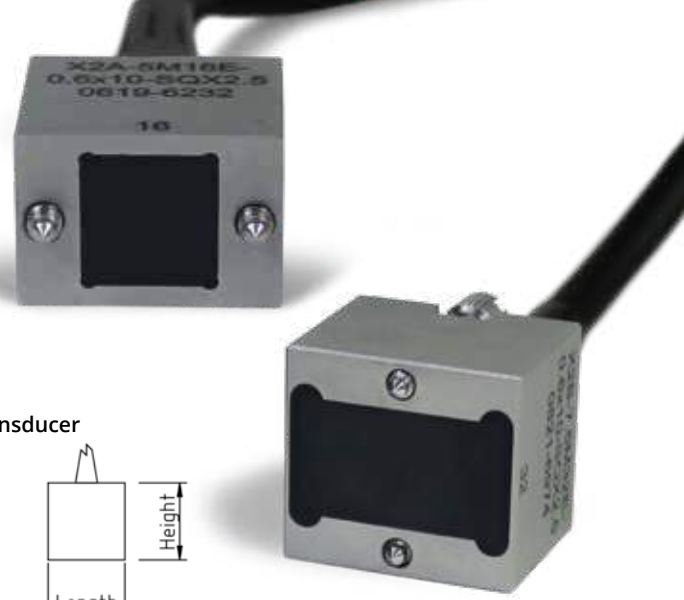
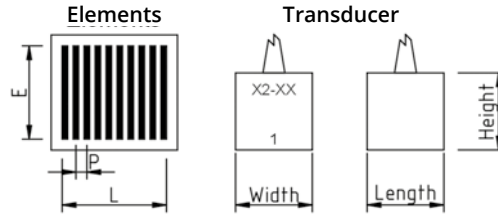
PHASED ARRAY TRANSDUCERS

# X2 Series Transducers

## Small Footprint Weld Inspection

### Features

- Quick I-PEX Connector (QX)
- Quick I-Pex Bracket
- 2.5m Cable (other cable lengths upon request)
- Armoured Cable on request
- Hard Faced Option on request
- Side exit cable available
- Max operating temperature 50°C / 120°F



Transducer List

Product Code	Transducer Description	Frequency	Number of Elements	Elevation	Element Pitch	Aperture	External Dimensions		
		F (MHz)	Qty	E (mm)	P (mm)	L (mm)	L (mm)	W (mm)	H (mm)
X2A-002	X2A-5M16E-0.6x10-SQX2.5	5	16	10	0.6	9.6	16	23	20
X2A-003	X2A-7.5M16E-0.6x10-SQX2.5	7.5	16	10	0.6	9.6	16	23	20
X2A-004	X2A-10M16E-0.6x10-SQX2.5	10	16	10	0.6	9.6	16	23	20
X2A-005	X2A-10M32E-0.3x10-SQX2.5	10	32	10	0.3	9.6	16	23	20
X2B-001	X2B-5M32E-0.6x10-SQX2.5	5	32	10	0.6	19.2	25	23	20
X2B-002	X2B-7.5M32E-0.6x10-SQX2.5	7.5	32	10	0.6	19.2	25	23	20
X2B-005	X2B-2.25M32E-0.6x10-SQX2.5	2.25	32	10	0.6	19.2	25	23	20
X2B-006	X2B-5M64E-0.3x10-SQX2.5	5	64	10	0.3	19.2	25	23	20
X2B-007	X2B-10M32E-0.6x10-SQX2.5	10	32	10	0.6	19.2	25	23	20
X2B-008	X2B-10M64E-0.3x7-SQX2.5	10	64	7	0.3	19.2	25	23	20
X2B-009	X2B-15M64E-0.3x6-SQX2.5	15	64	6	0.3	19.2	25	23	20



# X2 Wedges

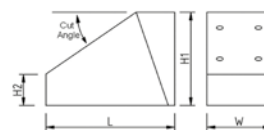


## Wedge Materials available

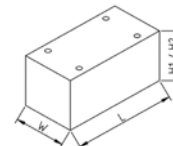
NOTE: all wedge dimensions listed below are made with Rexolite, high temperature materials will require consultation on the most suitable wedge and Transducer solution for your inspection requirements, below are listed common materials used in our wedges

Material	Max Service Temp (°C)	Max Service Temp (°F)	Compression Velocity at 5MHz (mm/μs)	Wedge Types (Angled / Flat)
Rexolite	60	140	2.33	Both
Torlon	260	500	2.71	Both
Vespel	300	572	2.51	Flat

## Angled Wedges



## 0° Wedges



## Wedge List

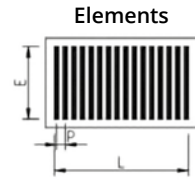
Product Code	Wedge Description	Wave Type	Nominal Refracted Angle in Steel (°)	Recommended Sweep (in steel)		Delay Line Length (mm)	Wedge Dimensions					
				Min (°)	Max (°)		Cut Angle (°)	Length (mm)	Width (mm)	IHC Width (mm)	Front Height H1 (mm)	Back Height H2 (mm)
X2AW-001	X2AW-0L25	L	0	-20	20	25	0	23	25	N/A	25	25
X2AW-002	X2AW-N45S	S	45	35	60	0	31	26.5	25	N/A	14.6	4
X2AW-003	X2AW-N55S	S	55	45	75	0	36	26.5	25	N/A	15.7	4.8
X2AW-004	X2AW-N60S	S	60	45	75	0	39	26.5	25	N/A	15.4	4
X2AW-005	X2AW-N60L	L	60	30	75	0	20	26.5	25	N/A	24	17.5
X2AW-006	X2AW-0L25-IHC	L	0	-20	20	25	0	23	N/A	36	25	25
X2AW-007	X2AW-N45S-IHC	S	45	35	60	0	31	26.5	N/A	36	14.6	4
X2AW-008	X2AW-N55S-IHC	S	55	40	70	0	36	26.5	N/A	36	15.7	4.8
X2AW-009	X2AW-N60S-IHC	S	60	45	75	0	39	26.5	N/A	36	15.4	4
X2AW-010	X2AW-N60L-IHC	L	60	30	75	0	20	26.5	N/A	36	24	17.5
X2BW-001	X2BW-0L25	L	0	-20	20	25	0	33	25	N/A	25	25
X2BW-002	X2BW-N45S	S	45	35	60	0	31	43	25	N/A	26.8	10.6
X2BW-003	X2BW-N60S	S	60	45	75	0	39	43	25	N/A	27.4	10.6
X2BW-004	X2BW-N60L	L	60	30	75	0	20	43	25	N/A	29.2	17.4
X2BW-005	X2BW-0L25-IHC	L	0	-20	20	25	0	33	N/A	36	25	25
X2BW-006	X2BW-N45S-IHC	S	45	35	60	0	31	43	N/A	36	26.8	10.6
X2BW-007	X2BW-N60S-IHC	S	60	45	75	0	39	43	N/A	36	27.4	10.6
X2BW-008	X2BW-N60L-IHC	L	60	30	75	0	20	43	N/A	36	29.2	17.4

# X3 Series Transducers

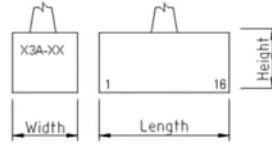
Universal Use Transducer

## Features

- Quick I-PEX Connector (QX)
- Quick I-Pex Bracket
- 2.5m Cable (other cable lengths upon request)
- Armoured Cable on request
- Hard Faced Option on request
- Max operating temperature 50°C / 120°F



Transducer Dimensions



PHASED ARRAY TRANSDUCERS

Transducer List

Product Code	Transducer Description	Frequency	Number of Elements	Elevation	Element Pitch	Aperture	External Dimensions		
		F (MHz)	Qty	E (mm)	P (mm)	L (mm)	L (mm)	W (mm)	H (mm)
X3A-001	X3A-2.25M48E-0.8x10-SQX2.5	2.25	48	10	0.8	38.4	45	23	20
X3A-002	X3A-3.5M64E-0.6x10-SQX2.5	3.5	64	10	0.6	38.4	45	23	20
X3A-003	X3A-5M64E-0.6x10-SQX2.5	5	64	10	0.6	38.4	45	23	20
X3A-004	X3A-10M64E-0.6x7-SQX2.5	10	64	7	0.6	38.4	45	23	20



## X3 Glider Wedges

X3 Glider Wedge

Product Code	Wedge Description	Wave Type	Nominal Refracted Angle in Steel	Recommended Sweep (in steel)		Delay Line Length (mm)	Wedge Dimensions					
			(°)	Min (°)	Max (°)		Cut Angle (°)	Length (mm)	Width (mm)	IHC Width (mm)	Front Height H1 (mm)	Back Height H2 (mm)
X3AG-001	X3AG-0L25	L	0	-20	20	25	0	66	34.1	N/A	25	25

## X3 Wedges

Wedge Materials available

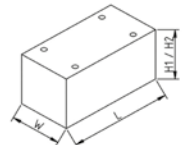
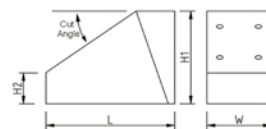
NOTE: all wedge dimensions listed below are made with Rexolite, high temperature materials will require consultation on the most suitable wedge and Transducer solution for your inspection requirements, below are listed common materials used in our wedges

Material	Max Service Temp (°C)	Max Service Temp (°F)	Compression Velocity at 5MHz (mm/μs)	Wedge Types (Angled / Flat)
Rexolite	60	140	2.33	Both
Torlon	260	500	2.71	Both
Vespel	300	572	2.51	Flat



Angled Wedges

0° Wedges



# X3 Wedges

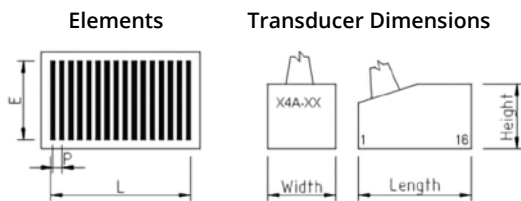
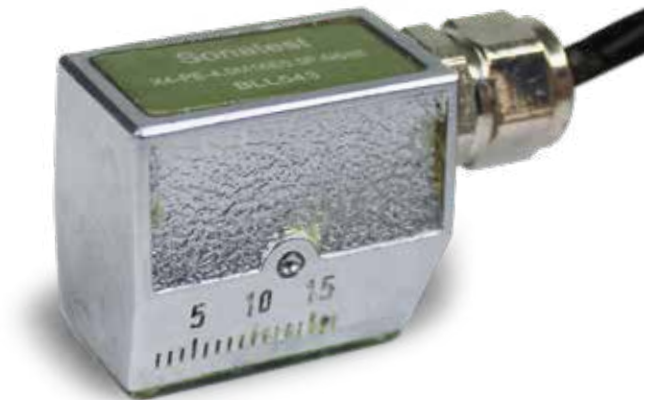
X3 Wedge List												
Product Code	Wedge Description	Wave Type	Nominal Refracted Angle in Steel	Recommended Sweep (in steel)		Delay Line Length (mm)	Wedge Dimensions					
				Min (°)	Max (°)		Cut Angle (°)	Length (mm)	Width (mm)	IHC Width (mm)	Front Height H1 (mm)	Back Height H2 (mm)
X3AW-001	X3AW-0L25	L	0	-20	20	25	0	65	25	N/A	25	25
X3AW-002	X3AW-N45S	S	45	35	60	0	31	65	25	N/A	41	16.7
X3AW-003	X3AW-N55S	S	55	40	70	0	36	65	25	N/A	38.6	11.7
X3AW-004	X3AW-N60S	S	60	45	75	0	39	65	25	N/A	36.3	7.5
X3AW-005	X3AW-N45L	L	45	35	65	0	16	65	25	N/A	34.4	21
X3AW-006	X3AW-N60L	L	60	30	75	0	20	65	25	N/A	43	25
X3AW-007	X3AW-0L25-IHC	L	0	-20	20	25	0	65	N/A	42	25	25
X3AW-008	X3AW-N45S-IHC	S	45	35	60	0	31	65	N/A	38	41	16.7
X3AW-009	X3AW-N55S-IHC	S	55	40	70	0	36	65	N/A	38	38.6	11.7
X3AW-010	X3AW-N60S-IHC	S	60	45	75	0	39	65	N/A	38	36.3	7.5
X3AW-011	X3AW-N45L-IHC	L	45	35	65	0	16	65	N/A	38	34.4	21
X3AW-012	X3AW-N60L-IHC	L	60	30	75	0	20	65	N/A	38	43	25

# X4 Series Transducers

Integrated Wedge Weld Inspection

## Features

- Quick I-PEX Connector (QX)
- Quick I-Pex Bracket
- 2.5m Cable (other cable lengths upon request)
- Armoured Cable on request
- Max operating temperature 50°C / 120°F



Transducer List												
Product Code	Transducer Description	Frequency	Number of Elements	Nominal Refracted Angle in Steel	Recommended Sweep (in steel)		Elevation	Element Pitch	Aperture	Integrated Wedge Dimensions		
					Min (°)	Max (°)				E (mm)	P (mm)	L (mm)
X4Z-001	X4Z-2M8E-N50S-1x9-SQX2.5	2	8	50	35	70	9	1	8	27	16.5	22
X4Z-002	X4Z-4M16E-N50S-0.5x9-SQX2.5	4	16	50	35	70	9	0.5	8	27	16.5	22

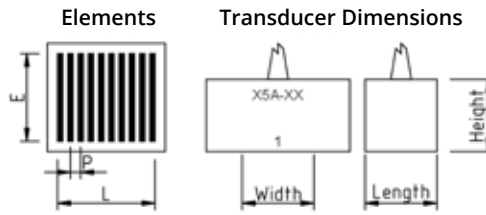
PHASED ARRAY TRANSDUCERS

# X5 Series Transducers

## Deep Penetration Inspection

### Features

- Quick I-PEX Connector (QX)
- Quick I-Pex Bracket
- 2.5m Cable (other cable lengths upon request)
- Armoured Cable on request
- Hard Faced Option on request
- Max operating temperature 50°C / 120°F



Transducer List									
Product Code	Transducer Description	Frequency	Number of Elements	Elevation	Element Pitch	Aperture	External Dimensions		
		F (MHz)	Qty	E (mm)	P (mm)	L (mm)	L (mm)	W (mm)	H (mm)
X5A-001	X5A-2.25M16E-1x16-SQX2.5	2.25	16	16	1	16	23	45	20
X5A-002	X5A-5M16E-1x16-SQX2.5	5	16	16	1	16	23	45	20
X5A-003	X5A-2.25M16EHF-1x16-SQX2.5	2.25	16 (Hard-Face)	16	1	16	23	45	20
X5A-004	X5A-5M16EHF-1x16-SQX2.5	5	16 (Hard-Face)	16	1	16	23	45	20

## X5 Wedges

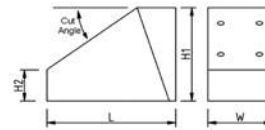
### Wedge Materials available

NOTE: all wedge dimensions listed below are made with Rexolite, high temperature materials will require consultation on the most suitable wedge and Transducer solution for your inspection requirements, below are listed common materials used in our wedges

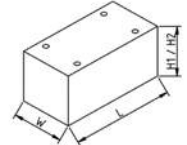
Material	Max Service Temp (°C)	Max Service Temp (°F)	Compression Velocity at 5MHz (mm/μs)	Wedge Types (Angled / Flat)
Rexolite	60	140	2.33	Both
Torlon	260	500	2.71	Both
VespeI	300	572	2.51	Flat



### Angled Wedges



### 0° Wedges



### Wedge List

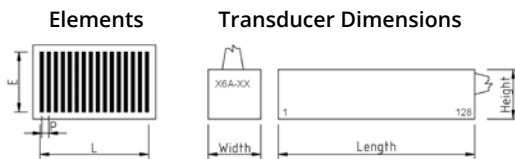
Product Code	Wedge Description	Wave Type	Nominal Refracted Angle in Steel	Recommended Sweep (in steel)		Delay Line Length (mm)	Wedge Dimensions					
			(°)	Min (°)	Max (°)		Cut Angle (°)	Length (mm)	Width (mm)	IHC Width (mm)	Front Height H1 (mm)	Back Height H2 (mm)
X5AW-001	X5AW-0L40	L	0	-20	20	40	0	38	38	N/A	40	40
X5AW-002	X5AW-N60S	S	60	45	75	0	39	45	38	N/A	30.2	13.6
X5AW-003	X5AW-N60L	L	60	30	75	0	20	45	38	N/A	33	21
X5AW-004	X5AW-0L40-IHC	L	0	-20	20	40	0	38	N/A	52	40	40
X5AW-005	X5AW-N60S-IHC	S	60	45	75	0	39	45	N/A	49	30.2	13.6
X5AW-006	X5AW-N60L-IHC	L	60	30	75	0	20	45	N/A	49	33	21

# X6A Series Transducers

## Large Footprint Transducer

### Features

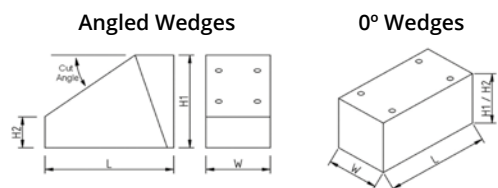
- Quick I-PEX Connector (QX)
- Quick I-Pex Bracket
- 2.5m Cable (other cable lengths upon request)
- Armoured Cable on request
- Hard Faced Option on request
- Max operating temperature 50°C / 120°F



Transducer List									
Product Code	Transducer Description	Frequency	Number of Elements	Elevation	Element Pitch	Aperture	External Dimensions		
		F (MHz)	Qty	E (mm)	P (mm)	L (mm)	L (mm)	W (mm)	H (mm)
X6A-001	X6A-3.5M128E-0.75x10-SQX2.5	3.5	128	10	0.75	96	56	28	27.5
X6A-002	X6A-5M128E-0.75x10-SQX2.5	5	128	10	0.75	96	60	28	27.5

## X6A Wedges

Wedge Materials available				
NOTE: all wedge dimensions listed below are made with Rexolite, high temperature materials will require consultation on the most suitable wedge and Transducer solution for your inspection requirements, below are listed common materials used in our wedges				
Material	Max Service Temp (°C)	Max Service Temp (°F)	Compression Velocity at 5MHz (mm/μs)	Wedge Types (Angled / Flat)
Rexolite	60	140	2.33	Both
Torlon	260	500	2.71	Both
VespeI	300	572	2.51	Flat



Wedge List												
Product Code	Wedge Description	Wave Type	Nominal Refracted Angle in Steel	Recommended Sweep (in steel)		Delay Line Length (mm)	Wedge Dimensions					
				Min (°)	Max (°)		Cut Angle (°)	Length (mm)	Width (mm)	IHC Width (mm)	Front Height H1 (mm)	Back Height H2 (mm)
X6AW-001	X6AW-0L25	L	0	-20	20	25	0	103	30	N/A	25	25
X6AW-002	X6AW-N55S	S	55	40	70	0	36	140	30	N/A	74.8	12.5
X6AW-003	X6AW-0L25-IHC	L	0	-20	20	25	0	103	N/A	45	25	25
X6AW-004	X6AW-N55S-IHC	S	55	40	70	0	36	140	N/A	45	74.8	12.5

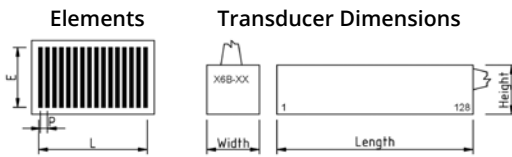
PHASED ARRAY TRANSDUCERS

# X6B Series Transducers

Large Footprint Low Frequency

## Features

- Quick I-PEX Connector (QX)
- Quick I-Pex Bracket
- 2.5m Cable (other cable lengths upon request)
- Armoured Cable on request
- Hard Faced Option on request
- Max operating temperature 50°C / 120°F

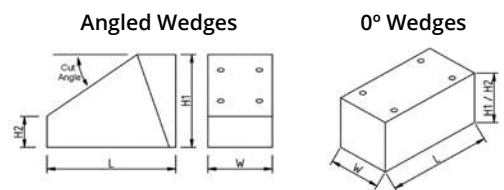


PHASED ARRAY TRANSDUCERS

Transducer List									
Product Code	Transducer Description	Frequency	Number of Elements	Elevation	Element Pitch	Aperture	External Dimensions		
		F (MHz)	Qty	E (mm)	P (mm)	L (mm)	L (mm)	W (mm)	H (mm)
X6B-005	X6B-0.5M64E-2x10-SQX2.5	0.5	64	10	2	128	137	26	28
X6B-006	X6B-1M64E-2x10-SQX2.5	1	64	10	2	128	137	26	28

## X6B Wedges

Wedge Materials available				
NOTE: all wedge dimensions listed below are made with Rexolite, high temperature materials will require consultation on the most suitable wedge and Transducer solution for your inspection requirements, below are listed common materials used in our wedges				
Material	Max Service Temp (°C)	Max Service Temp (°F)	Compression Velocity at 5MHz (mm/μs)	Wedge Types (Angled / Flat)
Rexolite	60	140	2.33	Both
Torlon	260	500	2.71	Both
VespeI	300	572	2.51	Flat



Wedge List												
Product Code	Wedge Description	Wave Type	Nominal Refracted Angle in Steel	Recommended Sweep (in steel)		Delay Line Length	Wedge Dimensions					
				Min (°)	Max (°)		Cut Angle (°)	Length (mm)	Width (mm)	IHC Width (mm)	Front Height H1 (mm)	Back Height H2 (mm)
X6BW-001	X6BW-0L30-IHC	L	0	-20	20	30	0	153	N/A	28	30	30
X6BW-002	X6BW-0L60-IHC	L	0	-20	20	60	0	153	N/A	28	60	60
X6BHG-001	X6BHG-0L HydroGlider	L	0	-20	20	Water Column	0	150	38	N/A	17.2	17.2

# D1A Series Transducers

## Detachable Universal Use Transducers

### Features

- Quick I-PEX Connector (QX)
- Quick I-Pex Bracket
- 2.5m Cable (other cable lengths upon request)
- Armoured Cable on request
- Hard Faced Option on request
- Max operating temperature 50°C / 120°F



Transducer List									
Product Code	Transducer Description	Frequency	Number of Elements	Elevation	Element Pitch	Aperture	External Dimensions		
		F (MHz)	Qty	E (mm)	P (mm)	L (mm)	L (mm)	W (mm)	H (mm)
D1A-001	D1A-2.25M20E-1.2x12	2.25	20	12	1.2	24	32	29.3	14.7
D1A-002	D1A-5M32E-0.8x12	5	32	12	0.8	25.6	32	29.3	14.7
D1A-003	D1A-7.5M44E-0.6x12	7.5	44	12	0.6	26.4	32	29.3	14.7
D1A-004	D1A-2.25M20EHF-1.2x12	2.25	20 (Hardface)	12	1.2	24	32	29.3	14.7
D1A-005	D1A-5M32EHF-0.8x12	5	32 (Hardface)	12	0.8	25.6	32	29.3	14.7
D1A-006	D1A-7.5M20EHF-1.2x12	7.5	44 (Hardface)	12	0.6	26.4	32	29.3	14.7

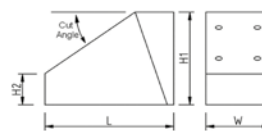
## D1A Wedges

### Wedge Materials available

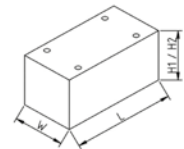
NOTE: all wedge dimensions listed below are made with Rexolite, high temperature materials will require consultation on the most suitable wedge and Transducer solution for your inspection requirements, below are listed common materials used in our wedges

Material	Max Service Temp (°C)	Max Service Temp (°F)	Compression Velocity at 5MHz (mm/μs)	Wedge Types (Angled / Flat)
Rexolite	60	140	2.33	Both
Torlon	260	500	2.71	Both
VespeI	300	572	2.51	Flat

### Angled Wedges



### 0° Wedges



### Wedge List

Product Code	Wedge Description	Wave Type	Nominal Refracted Angle in Steel	Recommended Sweep (in steel)		Delay Line Length (mm)	Wedge Dimensions					
				Min (°)	Max (°)		Cut Angle (°)	Length (mm)	Width (mm)	IHC Width (mm)	Front Height H1 (mm)	Back Height H2 (mm)
		LW/SW	(°)									
D1AW-001	D1AW-0L12.7	L	0	-20	20	12.7	0	42	31.8	N/A	12.7	12.7
D1AW-002	D1AW-0L25.4	L	0	-20	20	25.4	0	42	31.8	N/A	25.4	25.4
D1AW-004	D1AW-N57S	S	57	42	72	0	37	48.6	31.8	N/A	27.2	6.1
D1AW-005	D1AW-N48L	L	48	30	68	0	17	40.2	31.8	N/A	4.5	14.7
D1AW-006	D1AW-0L12.7-IHC	L	0	-20	20	12.7	0	46	N/A	31.8	12.7	12.7
D1AW-007	D1AW-0L25.4-IHC	L	0	-20	20	25.4	0	46	N/A	31.8	25.4	25.4
D1AW-009	D1AW-N57S-IHC	S	57	42	72	0	37	48.6	N/A	31.8	27.2	6.1
D1AW-010	D1AW-N48L-IHC	L	48	30	68	0	17	40	N/A	31.8	25.3	15.4
D1AW-011	D1AW-N45S-IHC	S	45	35	60	0	31	56	N/A	31.8	33.56	12

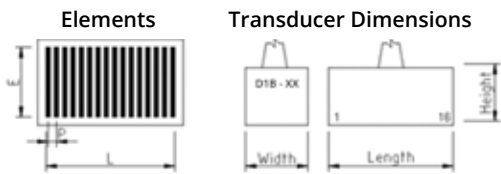
PHASED ARRAY TRANSDUCERS

# D1B Series Transducers

## Detachable Dual Array Weld Inspection

### Features

- Quick I-PEX Connector (QX)
- Quick I-Pex Bracket
- 2.5m Cable (other cable lengths upon request)
- Armoured Cable on request
- Hard Faced Option on request
- Max operating temperature 50°C / 120°F



PHASED ARRAY TRANSDUCERS

Transducer List

Product Code	Transducer Description	Frequency	Number of Elements	Elevation	Element Pitch	Aperture	External Dimensions		
		F (MHz)	Qty	E (mm)	P (mm)	L (mm)	L (mm)	W (mm)	H (mm)
D1B-001	D1B-2.25M20E-1.2x12	2.25	20	12	1.2	24	44	17.6	14.7
D1B-002	D1B-5M32E-0.8x12	5	32	12	0.8	25.6	44	17.6	14.7
D1B-003	D1B-7.5M44E-0.6x12	7.5	44	12	0.6	26.4	44	17.6	14.7



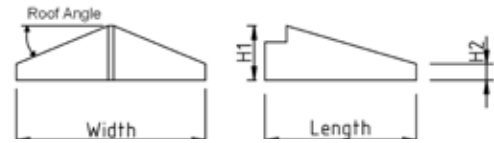
# D1B Wedges

## Wedge Materials available

NOTE: all wedge dimensions listed below are made with Rexolite, high temperature materials will require consultation on the most suitable wedge and Transducer solution for your inspection requirements, below are listed common materials used in our wedges

Material	Max Service Temp (°C)	Max Service Temp (°F)	Compression Velocity at 5MHz (mm/μs)	Wedge Types (Angled / Flat)
Rexolite	60	140	2.33	Both
Torlon	260	500	2.71	Both
Vespel	300	572	2.51	Flat

## Angled Wedges



## Wedge List

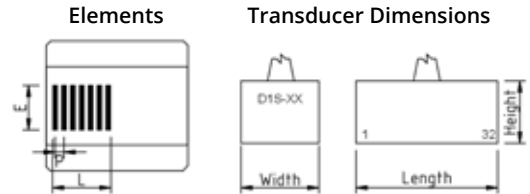
Product Code	Wedge Description	Wave Type	Nominal Refracted Angle in Steel (°)	Recommended Sweep (in steel)		Wedge Dimensions						
				Min (°)	Max (°)	Cut Angle (°)	Roof Angle (°)	Focal Distance (mm)	Length (mm)	Width (mm)	Front / Total Height H1 (mm)	Back / Outer Height H2 (mm)
D1BW-300	DW1B-2N0L-FD0-IHC	L	0	-20	20	0	25	0	50	46	12.48	1.57
D1BW-301	DW1B-2N0L-FD4-IHC	L	0	-20	20	0	20	4	50	46	11.45	3.08
D1BW-302	DW1B-2N0L-FD12-IHC	L	0	-20	20	0	13	12	50	46	11.35	6.04
D1BW-303	DW1B-2N0L-FD25-IHC	L	0	-20	20	0	8	25	50	46	10.35	7.12
D1BW-304	DW1B-2N0L-FD75-IHC	L	0	-20	20	0	3	75	50	46	9.39	8.18
D1BW-004	D1BW-2N45L-FD15-IHC	L	45	30	65	17	11	15	50	46	22	4
D1BW-005	D1BW-2N45L-FD20-IHC	L	45	30	65	17	9.7	20	50	46	22	4
D1BW-006	D1BW-2N45L-FD25-IHC	L	45	30	65	17	7.6	25	50	30 - 65	20.5	4
D1BW-007	D1BW-2N45L-FD50-IHC	L	45	30	65	17	4.1	50	50	45	17.6	4
D1BW-008	D1BW-2N45L-FD75-IHC	L	45	30	65	17	3	75	50	45	18.8	4
D1BW-009	D1BW-2N60L-FD25-IHC	L	60	40	80	20	7.5	25	50	46	24.1	2.99
D1BW-010	D1BW-2N60L-FD50-IHC	L	60	40	80	20	4.5	50	50	46	23.5	3.6
D1BW-011	D1BW-2N60L-FD75-IHC	L	60	40	80	20	3	75	50	46	23.2	3.9
D1BW-012	D1BW-2N80L-FD25-IHC	L	80	60	90	23	7	25	50	46	26.5	2.56
D1BW-013	D1BW-2N80L-FD50-IHC	L	80	60	90	23	4.5	50	50	46	26	3
D1BW-014	D1BW-2N80L-FD75-IHC	L	80	60	90	23	3	75	50	46	25.7	3.3

# D1S Series Transducers

## Detachable High frequency Transducer

### Features

- Quick I-PEX Connector (QX)
- Quick I-Pex Bracket
- 2.5m Cable (other cable lengths upon request)
- Armoured Cable on request
- Hard Faced Option on request
- Max operating temperature 50°C / 120°F

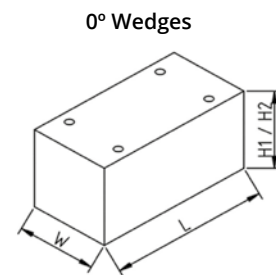


PHASED ARRAY TRANSDUCERS

Transducer List									
Product Code	Transducer Description	Frequency	Number of Elements	Elevation	Element Pitch	Aperture	External Dimensions		
		F (MHz)	Qty	E (mm)	P (mm)	L (mm)	L (mm)	W (mm)	H (mm)
D1S-001	D1S-5M16E-0.6x10	5	16	10	0.6	9.6	32	29.3	14.7
D1S-002	D1S-7.5M16E-0.6x10	7.5	16	10	0.6	9.6	32	29.3	14.7
D1S-003	D1S-10M16E-0.6x10	10	16	10	0.6	9.6	32	29.3	14.7
D1S-004	D1S-10M32E-0.3x10	10	32	10	0.6	9.6	32	29.3	14.7
D1S-010	D1S-5M16EHF-0.6x10	5	16 (Hard Face)	10	0.6	9.6	32	29.3	14.7
D1S-011	D1S-7.5M16EHF-0.6x10	7.5	16 (Hard Face)	10	0.6	9.6	32	29.3	14.7
D1S-012	D1S-10M16EHF-0.6x10	10	16 (Hard Face)	10	0.6	9.6	32	29.3	14.7
D1S-013	D1S-10M32EHF-0.3x10	10	16 (Hard Face)	10	0.6	9.6	32	29.3	14.7

## Wedges

Wedge Materials available				
NOTE: all wedge dimensions listed below are made with Rexolite, high temperature materials will require consultation on the most suitable wedge and Transducer solution for your inspection requirements, below are listed common materials used in our wedges				
Material	Max Service Temp (°C)	Max Service Temp (°F)	Compression Velocity at 5MHz (mm/μs)	Wedge Types (Angled / Flat)
Rexolite	60	140	2.33	Both
Torlon	260	500	2.71	Both
VespeI	300	572	2.51	Flat



Wedge List												
Product Code	Wedge Description	Wave Type	Nominal Refracted Angle in Steel	Recommended Sweep (in steel)		Delay Line Length	Wedge Dimensions					
				Min (°)	Max (°)		Cut Angle (°)	Length (mm)	Width (mm)	IHC Width (mm)	Front Height H1 (mm)	Back Height H2 (mm)
D1SW-001	D1SW-N45S-IHC	S	45	30	65	0	31	29	N/A	32	22.5	6
D1SW-002	D1SW-N55S-IHC	S	55	40	70	0	36	29	N/A	32	24.8	6
D1SW-003	D1SW-N60S-IHC	S	60	45	75	0	39	29	N/A	32	26.1	6
D1SW-004	D1SW-N60L-IHC	L	60	30	75	0	20	30	N/A	32	16.9	6

# D1Z Series Transducers

## Detachable Integrated Wedge Transducer

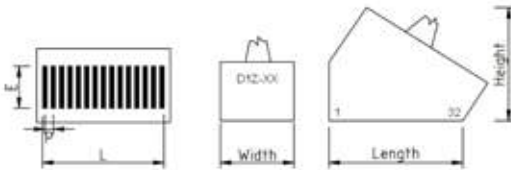
### Features

- Quick I-PEX Connector (QX)
- Quick I-Pex Bracket
- 2.5m Cable (other cable lengths upon request)
- Armoured Cable on request
- Max operating temperature 50°C / 120°F



Elements

Transducer Dimensions



Transducer List

Product Code	Transducer Description	Frequency	Number of Elements	Nominal Refracted Angle in Steel	Recommended Sweep (in steel)		Elevation	Element Pitch	Aperture	Integrated Wedge Dimensions		
					Min (°)	Max (°)				Length (mm)	Width (mm)	Height (mm)
D1Z-001	D1Z-2.25M19E-N48L-1.2x12	2.25	19	48	40	65	12	1.2	22.8	33.8	17.6	22.6
D1Z-002	D1Z-2.25M14E-N53S-1.2x12	2.25	14	53	40	65	12	1.2	16.8	34.1	17.6	27.5
D1Z-003	D1Z-5M26E-N48L-0.8x12	5	26	48	40	65	12	0.8	20.8	33.8	17.6	22.6
D1Z-004	D1Z-5M22E-N53S-0.8x12	5	22	53	40	65	12	0.8	17.6	34.1	17.6	27.5
D1Z-005	D1Z-7.5M40E-N48L-0.6x12	7.5	40	48	40	65	12	0.6	24	33.8	17.6	22.6
D1Z-006	D1Z-7.5M30E-N53S-0.6x12	7.5	30	53	40	65	12	0.6	18	34.1	17.6	27.5

# D5A Series Transducers

## Detachable Universal Use Transducer

### Features

- Quick I-PEX Connector (QX)
- Quick I-Pex Bracket
- 2.5m Cable (other cable lengths upon request)
- Armoured Cable on request
- Hard Faced Option on request
- Max operating temperature 50°C / 120°F



PHASED ARRAY TRANSDUCERS

Transducer List

Product Code	Transducer Description	Frequency	Number of Elements	Elevation	Element Pitch	Aperture	External Dimensions		
		F (MHz)	Qty	E (mm)	P (mm)	L (mm)	L (mm)	W (mm)	H (mm)
D5A-001	D5A-5M64E-0.8x12	5	64	12	0.8	51.2	60	29.2	20.6

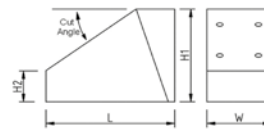
## D5A Wedges

Wedge Materials available

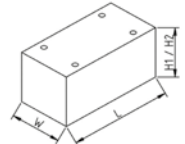
NOTE: all wedge dimensions listed below are made with Rexolite, high temperature materials will require consultation on the most suitable wedge and Transducer solution for your inspection requirements, below are listed common materials used in our wedges

Material	Max Service Temp (°C)	Max Service Temp (°F)	Compression Velocity at 5MHz (mm/μs)	Wedge Types (Angled / Flat)
Rexolite	60	140	2.33	Both
Torlon	260	500	2.71	Both
Vespel	300	572	2.51	Flat

Angled Wedges



0° Wedges



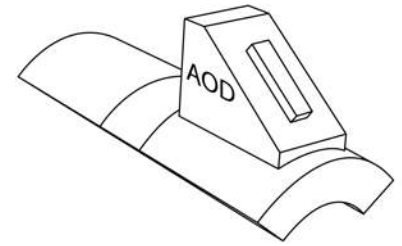
Wedge List

Product Code	Wedge Description	Wave Type	Nominal Refracted Angle in Steel	Recommended Sweep (in steel)		Delay Line Length (mm)	Wedge Dimensions					
				Min (°)	Max (°)		Cut Angle (°)	Length (mm)	Width (mm)	IHC Width (mm)	Front Height H1 (mm)	Back Height H2 (mm)
D5AW-001	D5AW-0L12.7	L	0	-20	20	12.7	0	80	30	N/A	12.7	12.7
D5AW-002	D5AW-0L25.4	L	0	-20	20	25.4	0	80	30	N/A	25.4	25.4
D5AW-003	D5AW-0L12.7-IHC	L	0	-20	20	12.7	0	80	N/A	30	12.7	12.7
D5AW-004	D5AW-0L25.4-IHC	L	0	-20	20	25.4	0	80	N/A	30	25.4	25.4
D5AW-005	D5AW-N57S	S	53	42	72	0	35	109	31.8	N/A	59	16
D5AW-006	D5AW-N57S-IHC	S	53	42	72	0	35	109	N/A	38.8	59	16



# Curved Wedges and Long Seam Weld Pipe Inspection

(AOD Wedge Contouring)



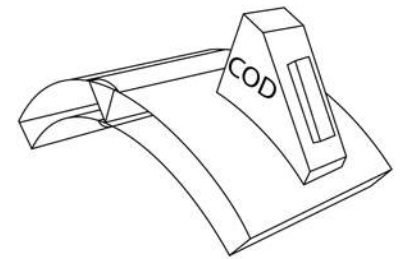
**Basic Kit** recommendations for the most common diameters are highlighted in yellow

Dimensions in Inches			Dimensions in mm			Dimensions in mm 'rounded values'		
Part / wedge Diameter	Wedge Usable range as per EN 16811 (inches)		Part / wedge Diameter	Wedge Usable range as per EN 16811 (mm)		Part / wedge Diameter	Usable range as per EN 16811 (mm)	
	10% Lower	10% Higher		10% Lower	10% Higher		10% Lower	10% Higher
4	2.8	4.4	102	71.1	111.8	100	70.0	110.0
5	3.5	5.5	127	88.9	139.7	125	87.5	137.5
6	4.2	6.6	152	106.7	167.6	150	105.0	165.0
7	4.9	7.7	178	124.5	195.6	175	122.5	192.5
8	5.6	8.8	203	142.2	223.5	200	140.0	220.0
9	6.3	9.9	229	160.0	251.5	225	157.5	247.5
10	7.0	11.0	254	177.8	279.4	250	175.0	275.0
11	7.7	12.1	279	195.6	307.3	275	192.5	302.5
12	8.4	13.2	305	213.4	335.3	300	210.0	330.0
13	9.1	14.3	330	231.1	363.2	325	227.5	357.5
14	9.8	15.4	356	248.9	391.2	350	245.0	385.0
15	10.5	16.5	381	266.7	419.1	375	262.5	412.5
16	11.2	17.6	406	284.5	447.0	400	280.0	440.0
17	11.9	18.7	432	302.3	475.0	425	297.5	467.5
18	12.6	19.8	457	320.0	502.9	450	315.0	495.0
19	13.3	20.9	483	337.8	530.9	475	332.5	522.5
20	14.0	22.0	508	355.6	558.8	500	350.0	550.0
21	14.7	23.1	533	373.4	586.7	525	367.5	577.5
22	15.4	24.2	559	391.2	614.7	550	385.0	605.0
23	16.1	25.3	584	408.9	642.6	575	402.5	632.5
24	16.8	26.4	610	426.7	670.6	600	420.0	660.0
25	17.5	27.5	635	444.5	698.5	625	437.5	687.5
26	18.2	28.6	660	462.3	726.4	650	455.0	715.0
27	18.9	29.7	686	480.1	754.4	675	472.5	742.5
28	19.6	30.8	711	497.8	782.3	700	490.0	770.0
29	20.3	31.9	737	515.6	810.3	725	507.5	797.5
30	21.0	33.0	762	533.4	838.2	750	525.0	825.0
31	21.7	34.1	787	551.2	866.1	775	542.5	852.5
32	22.4	35.2	813	569.0	894.1	800	560.0	880.0
33	23.1	36.3	838	586.7	922.0	825	577.5	907.5
34	23.8	37.4	864	604.5	950.0	850	595.0	935.0
35	24.5	38.5	889	622.3	977.9	875	612.5	962.5
36	25.2	39.6	914	640.1	1005.8	900	630.0	990.0
37	25.9	40.7	940	657.9	1033.8	925	647.5	1017.5
38	26.6	41.8	965	675.6	1061.7	950	665.0	1045.0

WEDGE CONTOURING

# Curved Wedges and Long Seam Weld Pipe Inspection

(COD Wedge Contouring)



**Basic Kit** recommendations for the most common diameters are highlighted in yellow

Dimensions in Inches			Dimensions in mm			Dimensions in mm 'rounded values'		
Part / wedge Diameter	Wedge Usable range as per EN 16811 (inches)		Part / wedge Diameter	Wedge Usable range as per EN 16811 (mm)		Part / wedge Diameter	Usable range as per EN 16811 (mm)	
	10% Lower	10% Higher		10% Lower	10% Higher		10% Lower	10% Higher
4	3.6	4.4	102	91.4	111.8	100	90.0	110.0
5	4.5	5.5	127	114.3	139.7	125	112.5	137.5
6	5.4	6.6	152	137.2	167.6	150	135.0	165.0
7	6.3	7.7	178	160.0	195.6	175	157.5	192.5
8	7.2	8.8	203	182.9	223.5	200	180.0	220.0
9	8.1	9.9	229	205.7	251.5	225	202.5	247.5
10	9.0	11.0	254	228.6	279.4	250	225.0	275.0
11	9.9	12.1	279	251.5	307.3	275	247.5	302.5
12	10.8	13.2	305	274.3	335.3	300	270.0	330.0
13	11.7	14.3	330	297.2	363.2	325	292.5	357.5
14	12.6	15.4	356	320.0	391.2	350	315.0	385.0
15	13.5	16.5	381	342.9	419.1	375	337.5	412.5
16	14.4	17.6	406	365.8	447.0	400	360.0	440.0
17	15.3	18.7	432	388.6	475.0	425	382.5	467.5
18	16.2	19.8	457	411.5	502.9	450	405.0	495.0
19	17.1	20.9	483	434.3	530.9	475	427.5	522.5
20	18.0	22.0	508	457.2	558.8	500	450.0	550.0
21	18.9	23.1	533	480.1	586.7	525	472.5	577.5
22	19.8	24.2	559	502.9	614.7	550	495.0	605.0
23	20.7	25.3	584	525.8	642.6	575	517.5	632.5
24	21.6	26.4	610	548.6	670.6	600	540.0	660.0
25	22.5	27.5	635	571.5	698.5	625	562.5	687.5
26	23.4	28.6	660	594.4	726.4	650	585.0	715.0
27	24.3	29.7	686	617.2	754.4	675	607.5	742.5
28	25.2	30.8	711	640.1	782.3	700	630.0	770.0
29	26.1	31.9	737	662.9	810.3	725	652.5	797.5
30	27.0	33.0	762	685.8	838.2	750	675.0	825.0
31	27.9	34.1	787	708.7	866.1	775	697.5	852.5
32	28.8	35.2	813	731.5	894.1	800	720.0	880.0
33	29.7	36.3	838	754.4	922.0	825	742.5	907.5
34	30.6	37.4	864	777.2	950.0	850	765.0	935.0
35	31.5	38.5	889	800.1	977.9	875	787.5	962.5
36	32.4	39.6	914	823.0	1005.8	900	810.0	990.0
37	33.3	40.7	940	845.8	1033.8	925	832.5	1017.5
38	34.2	41.8	965	868.7	1061.7	950	855.0	1045.0

WEDGE CONTOURING

# WheelProbe 2

The **WheelProbes 2** has demonstrated unparalleled performance in the realm of composite inspection and corrosion monitoring, excelling in terms of both speed and user-friendliness while consistently delivering outstanding results.

Coverage and precision are the keys to a successful mapping inspection. Our **WheelProbes** offer a 0.8 mm lateral resolution and now up to 100 mm

coverage width. (0.031 inch pitch and 4.0 inches respectively in imperial system).

Applications where the **WheelProbes 2** is currently in use include, aeronautical and astronomical aerospace part inspections, marine hull inspections, corrosion mapping asset integrity inspections in the oil and gas industry, composite inspections in the automotive and construction industries and many more.

## Key Features

### Light and Robust Design

You can trust it to perform the most rigorous inspection tasks, day after day.

### Well Defined Laser Rolling

Equipped with two LED feedback indicators (WP2 E128 features two lasers) and the optional display attachment, technicians can now prioritize the acquisition of consistently high-quality UT data. These dual guiding lines serve multiple purposes, including highlighting the anticipated C-scan zone or providing surface guidance along a designated surface geometry.

### Many Detachable Cable Options

Make the best use of your WP2, and connect it to just about any PAUT system. With interchangeable cables, you have the best of all worlds. A longer cable?

A different connector? These options can be held in stock at very little cost, ready for the jobs as they arrive.

### Roller Options

With the profiled, flat and precision roller options, a few moments' effort converts your WP2 from a flat-surface composite inspection tool, to a radial or axial pipe corrosion mapping system. Able to scan right to the edges of the part, convex, concave and even irregular surface area are catered for.

### Perfect fit against OD and ID parts

All WP2 are designed to inspect flat surfaces as well as convex and concave curved surfaces. The curvature adjustment bar offers an intuitive graduated guideline that reads part radius of curvature (in both metric & imperial units).

## Specification

WP2 64 Specifications	
Specification	Description
Weight	1.06kg (2.34lb)
Dimensions H x L x W	125 x 150 x 155mm (4.9 x 5.9 x 6.1in)
Operating temperature	10 to 50°C
Centre frequency options	2 MHz, 3.5MHz, 5MHz and 10MHz
Number of elements	64
Total active length	51.1mm
Sensitivity homogeneity	± 3db

WP2 128 Specifications	
Specification	Description
Weight	1.19Kg (2.62lb)
Dimensions H x L x W	125 x 211 x 155 mm (4.9 x 8.3 x 6.1 in)
Operating temperature	10 to 50°C
Centre frequency options	1 MHz, 2MHz, 3.5MHz, 5MHz and 10MHz
Number of elements	128 (102 for 1 MHz)
Total active length	102.2mm
Sensitivity homogeneity	± 3db

## WheelProbe 2 Options

Description	WP2 64 Element	WP2 128 Element
WP2-5M128/64E-0.8x6.4	WP2-0501	WP2-0601
WP2-10M128/64E-0.8x6.4	WP2-0502	WP2-0602
WP2-2M128/64E-0.8x6.4	WP2-0503	WP2-0603
WP2-3.5M128/64E-0.8x6.4	WP2-0504	WP2-0604
WP2-1M102E-1.0x6.4		WP2-0605



WheelProbe 2 - 64 Element



WheelProbe 2 - 128 Element



## Handle Choices

(must choose 1 minimum)

Description	WP2 64 Element	WP2 128 Element	Both
Horizontal Handle	WP2-ACC-0501	WP2-ACC-0601	
Vertical Handle			WP2-ACC-0702



Horizontal Handle



Vertical Handle

## Roller Choices

(must choose 1 minimum)

Include Front Roller Bracket to use 2 rollers

Description	WP2 64 Element	WP2 128 Element
Roller Only - Profiled	WP2-ACC-0509	
Roller Only - Flat	WP2-ACC-0510	WP2-ACC-0610
Roller Only - Precision	WP2-ACC-0511	WP2-ACC-0611
Front Roller Bracket	WP2-ACC-0517	WP2-ACC-0617



Flat Roller



Profiled Roller



Precision Roller



Front Roller Bracket

## Cable Choices

(must choose 1 minimum)

Description	WP2 64 Element	WP2 128 Element	Both
WP2-CABLE-veo-QX2.5	WP2-CABLE-501	WP2-CABLE-601	
WP2-CABLE-SX-MX2-QX2.5	WP2-CABLE-502	WP2-CABLE-602	
WP2-CABLE-MX-QX2.5	WP2-CABLE-503	WP2-CABLE-603	
WP2-CABLE-veo-QX5	WP2-CABLE-511	WP2-CABLE-611	
WP2-CABLE-SX-MX2-QX5	WP2-CABLE-512	WP2-CABLE-612	
WP2-CABLE-MX-QX5	WP2-CABLE-513	WP2-CABLE-613	
WP2-CABLE-CUSTOM			WP2-CABLE-151



## Other Accessories

Description	WP2 64 Element	WP2 128 Element	Both
Laser Guidance Pack	WP2-ACC-0513	WP2-ACC-0613	
Remote Control			WP2-ACC-0712
Phone Display Holder			WP2-ACC-0714
Demo Plate for WheelProbe 2			WP2-ACC-0718
WP2 Storm Case			WP2-ACC-0716



Demo Plate



Laser Guidance Pack



Phone Display Holder



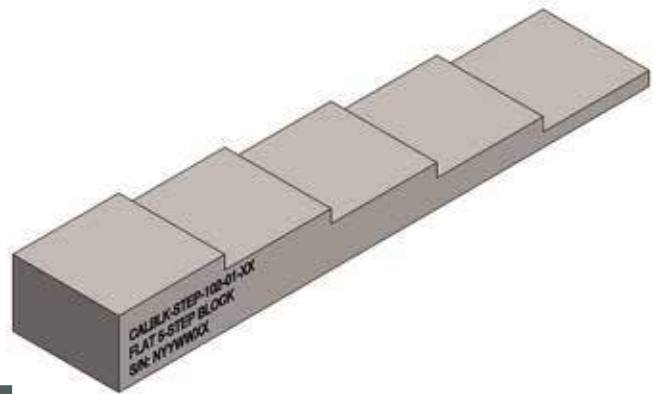
Storm Case



Remote Control

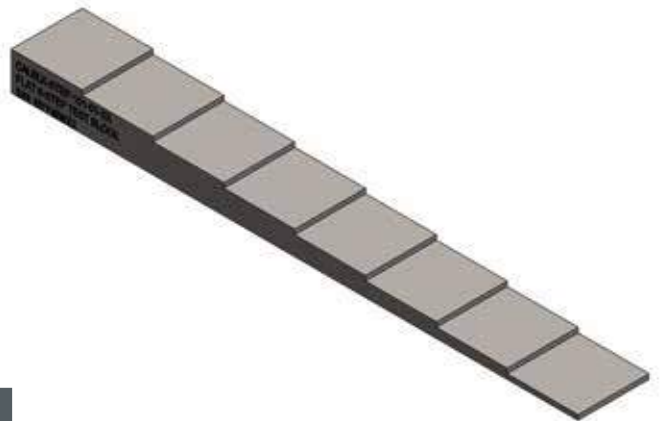
# Step Wedges

- Block Type:** 5 Step Block 2.5mm to 12.5mm
- Calibration Type:** UT system Linearity and thickness calibration
- Description:** 20mm x 100mm block with 2.5mm, 5.0mm, 7.5mm 10mm and 12.5mm steps
- Variants:**
- Alternate material choices available, define the material on RFQ
  - Nickel plating and black anodising available on RFQ



5 Step Block	
Product Code	Block Type
CALBLK-STEP-102	5 Step Block, Material Mild Steel (S355J0)

- Block Type:** 8 Step Block 1.0mm to 8.0mm
- Calibration Type:** UT system Linearity and thickness calibration
- Description:** 15mm x 120mm block with 1.0mm, 2.0mm, 3.0mm, 4.0mm, 5.0mm, 6.0mm, 7.0mm, 8.0mm steps
- Variants:**
- Alternate material choices available, define the material on RFQ
  - Nickel plating and black anodising available on RFQ



8 Step Block	
Product Code	Block Type
CALBLK-STEP-101	8 Step Block, Material Mild Steel (S355J0)

- Block Type:** 10 Step Block 2.0mm to 20.0mm
- Calibration Type:** UT system Linearity and thickness calibration
- Description:** 20mm x 200mm block with 2.0mm, 4.0mm, 6.0mm, 8.0mm, 10.0mm, 12.0mm, 14.0mm, 16.0mm, 18.0mm, 20.0mm steps
- Variants:**
- Alternate material choices available, define the material on RFQ
  - Nickel plating and black anodising available on RFQ



10 Step Block	
Product Code	Block Type
CALBLK-STEP-103	10 Step Block, Material Mild Steel (S355J0)

# Step Wedges

**Block Type:** 5 Step OD Curved Block 2.0mm to 10.0mm thick, 18.0 to 26.0mm radii

**Calibration Type:** UT system Linearity and thickness calibration of OD curved surfaces

**Description:** 100mm long curved block with 2.0mm, 4.0mm, 6.0mm 8.0mm and 10.0mm steps

**Variants:**

- Alternate material choices available, define the material on RFQ
- Nickel plating and black anodising available on RFQ



5 Step OD Curved Block	
Product Code	Block Type
CALBLK-STEP-104	5 Step OD Curved Block, Material Mild Steel (S355J0)

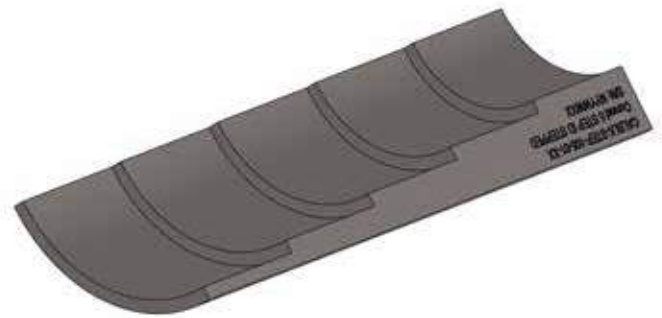
**Block Type:** 5 Step ID Curved Block 2.0mm to 10.0mm thick, 16.0 to 24.0mm radii

**Calibration Type:** UT system Linearity and thickness calibration of ID curved surfaces

**Description:** 100mm long curved block with 2.0mm, 4.0mm, 6.0mm 8.0mm and 10.0mm steps

**Variants:**

- Alternate material choices available, define the material on RFQ
- Nickel plating and black anodising available on RFQ



5 Step ID Curved Block	
Product Code	Block Type
CALBLK-STEP-105	5 Step ID Curved Block, Material Mild Steel (S355J0)

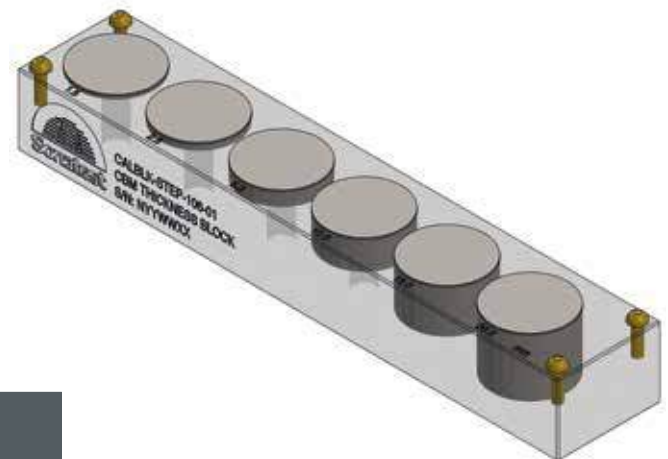
**Block Type:** 6 disks in plastic 1.5mm to 20mm

**Calibration Type:** UT system Linearity and thickness calibration

**Description:** 35mm x 183mm block with 1.5mm, 2.5mm, 5.0mm, 10.0mm, 15.0mm, 20.0mm steps

**Variants:**

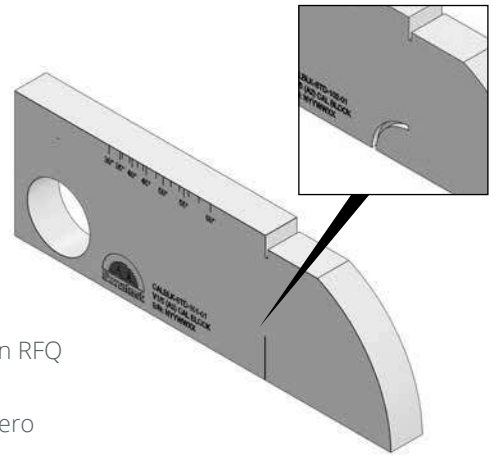
- Alternate material choices available, define the material on RFQ
- Nickel plating and black anodising available on RFQ



6 Step Block	
Product Code	Block Type
CALBLK-STEP-106	6 Step Block, Material Mild Steel (S355J0)

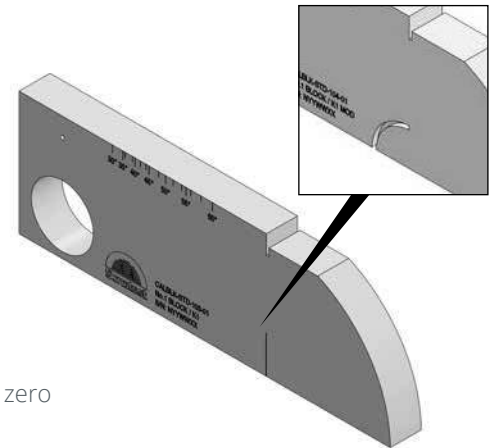
# Standard Calibration Blocks

- Block Type:** V1 / A2 Calibration Block
- Calibration Type:** Used for conventional and PA ultrasonic 0° and angle beam calibrations
- Description:** Block Dimensions - 300mm x 100mm x 25mm, Includes a 100mm radius, 1.5mm and 50mm holes, engraved reference mark scales, two slots at the zero point as per ISO 2400 Mod 8.2 are included as standard
- Variants:**
- Alternate material choices available, define the material on RFQ
  - Nickel plating and black anodising available on RFQ
  - Modifications to the V1 / A2 block to include slots at the zero point or circular reflector are available



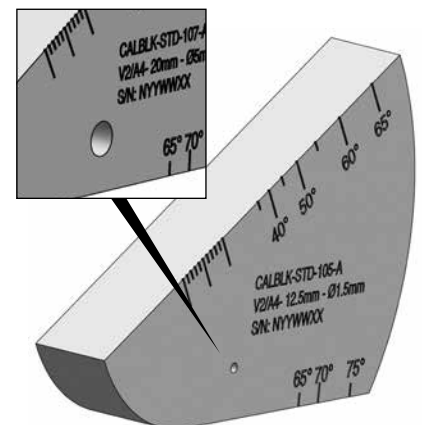
V1 / A2 Calibration Block		
Product Code	Block Type	Variant
CALBLK-STD-101	V1 / A2 Calibration block in Mild steel	Two slots at the zero point as per ISO 2400 Mod 8.2)
CALBLK-STD-102	V1 / A2 Calibration block with modification in Mild Steel	Circular refelector as per ISO 2400 mod 8.3 in mild steel

- Block Type:** No1 / K1 Calibration Block
- Calibration Type:** Used for conventional and PA ultrasonic 0° and angle beam calibrations
- Description:** Block Dimensions - 300mm x 100mm x 25mm, Includes a 100mm radius, 3.0mm and 50mm holes, engraved reference mark scales, two slots at the zero point as per ISO 2400 Mod 8.2 are included as standard
- Variants:**
- Alternate material choices available, define the material on RFQ
  - Nickel plating and black anodising available on RFQ
  - Modifications to the No1 / K1 block to include slots at the zero point or circular reflector are available"



No1 / K1 Calibration Block		
Product Code	Block Type	Variant
CALBLK-STD-103	No1 / K2 Calibration block in Mild steel	Two slots at the zero point as per ISO 2400 Mod 8.2)
CALBLK-STD-104	No1 / K2 Calibration block with modification in Mild Steel	Circular reflector as per ISO 2400 mod 8.3 in mild steel

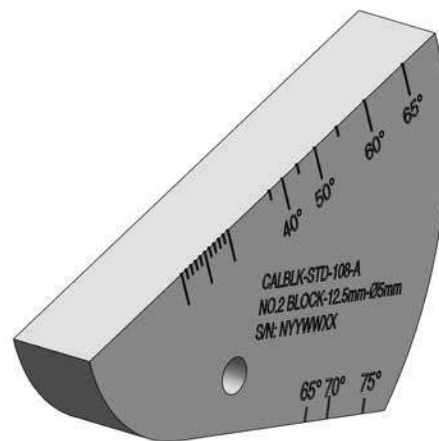
- Block Type:** V2 - A4 Calibration Block
- Calibration Type:** Used for conventional ultrasonic 0° and angle beam calibrations
- Description:** Block dimensions - W75mm x L43mm x T 20mm , includes 25mm and 50mm radii, includes 1.5mm 5mm diameter SDH
- Variants:**
- Alternate material choices available, define the material on RFQ
  - Nickel plating and black anodising available on RFQ
  - Blocks can be made in 12.5mm, 20mm and 25mm thicknesses in accordance with ISO 7963 Annex A A.1
  - Blocks can be made with a 1.5mm or 5mm side drilled hole



V2 - A4 Calibration Block		
Product Code	Block Type	Variant
CALBLK-STD-105	V2 / A4 block in Mild Steel,	20mm thickness, 1.5mm diameter side drilled hole
CALBLK-STD-106	V2 / A4 block in Mild Steel,	12.5mm thickness, 1.5mm diameter side drilled hole
CALBLK-STD-107	V2 / A4 block in Mild Steel,	20mm thickness, 5.0mm diameter side drilled hole

# Standard Calibration Blocks

- Block Type:** No2 / K2 Calibration Block
- Calibration Type:** Used for conventional ultrasonic 0° and angle beam calibrations
- Description:** Block dimensions - W75mm x L43mm x T 12.5mm, includes 25mm and 50mm radii, includes 5mm diameter SDH
- Variants:**
- Alternate material choices available, define the material on RFQ
  - Nickel plating and black anodising available on RFQ
  - Blocks can be made in 12.5mm and 25mm thicknesses in accordance with ISO 7963 Annex A A.1



No2 / K2 Calibration Block		
Product Code	Block Type	Variant
CALBLK-STD-108	No2 / K2 Calibration block in Mild Steel	12.5mm thickness

- Block Type:** A5 / IOW / BCB / BCB-N Calibration Block
- Calibration Type:** Used for conventional ultrasonic angle beam profile and beam angle calibrations
- Description:**
- Block Dimensions (Imperial) - Block 12" x 3" x 2", Contains 9 x 1.5mm diameter x 22mm deep side drilled holes
  - Block Dimensions (Metric) - Block 305mm x 75mm x 50mm, Contains 9 x 1.5mm diameter x 22mm deep side drilled holes
- Variants:**
- Alternate material choices available, define the material on RFQ
  - Nickel plating and black anodising available on RFQ



A5 / IOW / BCB / BCB-N Calibration Block	
Product Code	Block Type
CALBLK-STD-109	A5 / IOW / BCB / BCB-N Calibration Block in Mild Steel

- Block Type:** A6 Calibration Block
- Calibration Type:** Used to determine dominant frequency, pulse length, dead zone and resolution for conventional 0° and angle beam Transducers
- Description:** Block Dimensions - 25mm x 50mm x 150mm, includes a notch, 2 x large SDHs and multiple small SDHs at different depths
- Variants:**
- Alternate material choices available, define the material on RFQ
  - Nickel plating and black anodising available on RFQ



A6 Calibration Block	
Product Code	Block Type
CALBLK-STD-110	A6 Calibration Block in Mild Steel

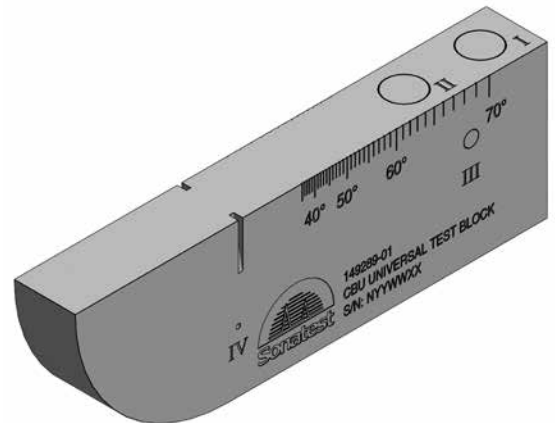
# Standard Calibration Blocks

- Block Type:** A7 / RTB Calibration Block
- Calibration Type:** Used for checking conventional shear wave beam resolution
- Description:** Block Dimensions - 75mm thick, 180° radius, R60mm, R62mm, R65mm, R69mm, R74mm
- Variants:**
- Alternate material choices available, define the material on RFQ
  - Nickel plating and black anodising available on RFQ



A7 / RTB Calibration Block	
Product Code	Block Type
CALBLK-STD-111	A7 / RTB Calibration Block in Mild Steel

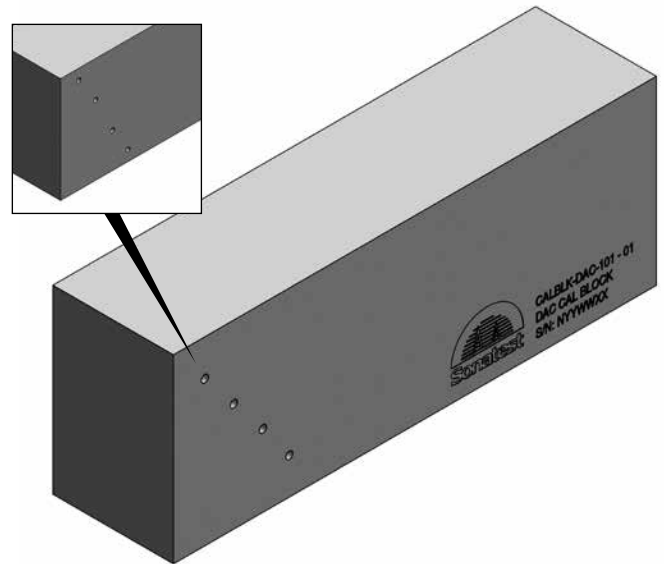
- Block Type:** MU / CBU Calibration Block
- Calibration Type:** Used for conventional 0° and angle beam inspections
- Description:** Block Dimensions - 155mm long, 20mm wide, 50mm tall. Includes 3 x 1.5mm FBH at 5mm, 40mm and 55mm depths. 1 x 1.5mm SDH, 50mm radius
- Variants:**
- Alternate material choices available, define the material on RFQ
  - Nickel plating and black anodising available on RFQ



MU / CBU Calibration Block	
Product Code	Block Type
CALBLK-STD-112	MU/CBU Universal Calibration Block in Mild Steel

# DAC Blocks

- Block Type:** DAC Block
- Calibration Type:** Used for setting DAC curves in shear and compression wave inspections
- Description:** 200mm x 50mm x 75mm block with 4 x 3mm side drilled holes (SDH) at specified depths
- Variants:**
- Alternate material choices available, define the material on RFQ
  - Nickel plating and black anodising available on RFQ
  - Side drilled hole diameters can be changed on RFQ
  - A1 Depth of side drilled holes can be modified on RFQ



DAC Block		
Product Code	Block Type	Variant
DAC Block	V2 / A4 block in Mild Steel,	12.5mm thickness, 1.5mm diameter side drilled hole
CALBLK-STD-107	V2 / A4 block in Mild Steel,	20mm thickness, 5.0mm diameter side drilled hole

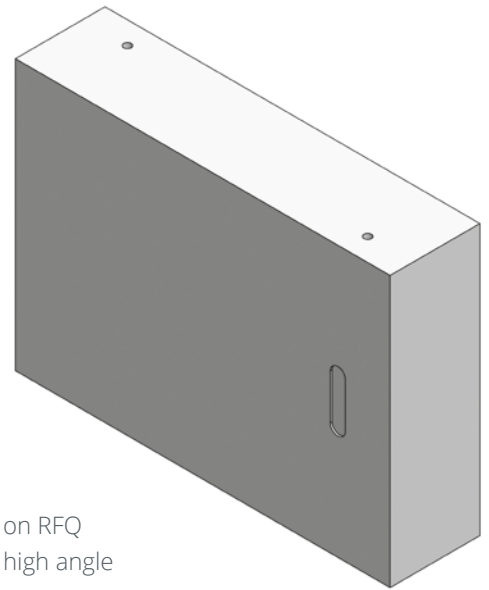
# ASME Plate and Piping Blocks

**Block Type:** ASME V T-434.2.1 Plate Calibration Block  
**Calibration Type:** Used for calibration of shear wave transducers in the inspection of welds in flat plate

**Description:** Calibration blocks made in accordance with ASME V 434.2.1, each block contains 3 side drilled holes at 1/4, 1/2 and 3/4 depths and 2 notches on the OD and ID surfaces at 2%T depth. 3 standard blocks of 3/4" (19mm), 2 1/2" (38mm) and 3" (75mm) thicknesses are available, specific thicknesses can be constructed to the specifications detailed in the standard.  
 Surface finish on ASME blocks are intended to represent actual real world test samples and have a rough texture

**Variants:**

- Alternate material choices available, define the material on RFQ
- Nickel plating and black anodising available on RFQ
- Specific thicknesses and SDH diameters can be requested on RFQ
- A1 Long versions of the block can be requested for PA and high angle uses on RFQ



ASME V T-434.2.1 Plate Calibration Block		
Product Code	Block Type	Variant
CALBLK-ASME-101	ASME V 434.2.1 Plate block	3/4" (19mm thick), 3mm side drilled holes
CALBLK-ASME-102	ASME V 434.2.1 Plate block	2 1/2" (38mm) thick, 3mm side drilled holes
CALBLK-ASME-103	ASME V 434.2.1 Plate block	3" (75mm) thick, 5mm side drilled holes
CALBLK-ASME-104	ASME V 434.2.1 Custom plate block	Custom thickness, SHD diameter and block length, to be decided on consultation.

**Block Type:** ASME V T-434.3 Piping Calibration Block  
**Calibration Type:** Used for calibration of shear wave transducers in the inspection of welds in piping

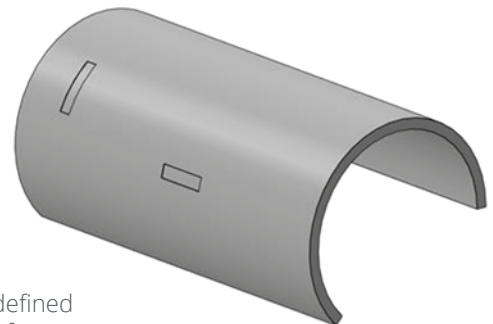
**Description:** Blocks made in accordance with ASME V 434.3 which contains two piping block options:

- Option 1 in accordance with 434.3-1 a curved block of a defined thickness with 4 off notches located on the ID and OD surfaces oriented in the axial and circumferential directions.
- Option 2 in accordance with 434.3-2 a curved block of a defined thickness with 4 off notches located on the ID and OD surfaces oriented in the axial and circumferential directions, also includes a number of side drilled holes whose location and size are defined by the block thickness.

Surface finish on ASME blocks are intended to represent actual real world test samples and have a rough texture

**Variants:**

- Alternate material choices available, define the material on RFQ
- Nickel plating and black anodising available on RFQ
- Decision on diameter, thickness, block type and cladding to be made on RFQ



ASME V T-434.3 Piping Calibration Block		
Product Code	Block Type	Variant
CALBLK-ASME-105	ASME V 434.3 Custom piping block	Custom diameter, thickness, SHD diameter and block length, to be decided on consultation.



# IIW Type Blocks

**Block Type:** IIW Type 1 Block

**Calibration Type:** Used for the calibration of shear and compression transducers, calibrations include: Index point, refracted angle, resolution and sensitivity

**Description:**

- Dimensions Block (Imperial) - 1" x 4" x 12", includes 4" radius 2"Ø and 0.06" diameter hole, 0.24" deep x 0.08" wide slot, and 1" radiused slot x 0.06" deep x 0.12" wide
- Dimensions Block (Metric) - 25mm x 100mm x 300mm, includes 100.0mm radius, 1.5mm diameter hole, 6.0mm deep x 2.0mm wide slot, and 25.0mm radiused slot x 1.5mm deep x 3.0mm wide.

**Variants:**

- Alternate material choices available, define the material on RFQ
- Nickel plating and black anodising available on RFQ



IIW Type 1 Block	
Product Code	Block Type
CALBLK-IIW-101	IIW Type 1 Block in Mild Steel

**Block Type:** IIW Type 2 Block

**Calibration Type:** Used for the calibration of shear and compression transducers, calibrations include: Index point, refracted angle, resolution and sensitivity

**Description:**

- Dimensions Block (Imperial) - 1" x 4" x 12", includes 2" and 4" radius, 2"Ø, 3/64", 5/64", 8/64" and 0.06" SDHs
- Dimensions Block (Metric) - 25mm x 100mm x 300mm, includes 50mm and 100mm radius, 50mm, 1mm, 2mm, 3mm and 1.5mm SDHs.

**Variants:**

- Alternate material choices available, define the material on RFQ
- Nickel plating and black anodising available on RFQ



IIW Type 2 Block	
Product Code	Block Type
CALBLK-IIW-102	IIW Type 2 block in Mile Steel

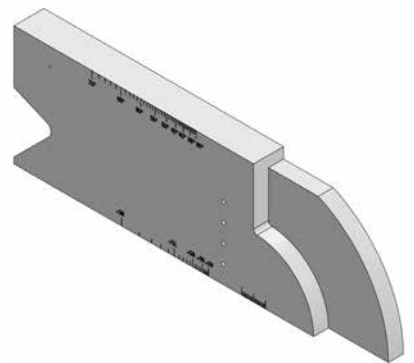
**Block Type:** PAUT IIW Block

**Calibration Type:** Used for the calibration of phased array focal laws, shear and compression transducers, calibrations include: Beam angle, Transducer index, Beam squint angle, Time base calibrations, sreet height linearity, pulse duration, signal to noise ratio, wedge delay, sensitivity

**Description:** Dimensions Block - 300mm x 100mm x 25mm, includes 50mm and 100mm radius, 4 vertical 3mm diameter SDHs and a 1.6mm diameter SDH. Cut out at 45° and 113°

**Variants:**

- Alternate material choices available, define the material on RFQ
- Nickel plating and black anodising available on RFQ



PAUT IIW Block	
Product Code	Block Type
CALBLK-IIW-103	PAUT IIW Block in Mild Steel

CALIBRATION BLOCKS

# Specialist Use Blocks

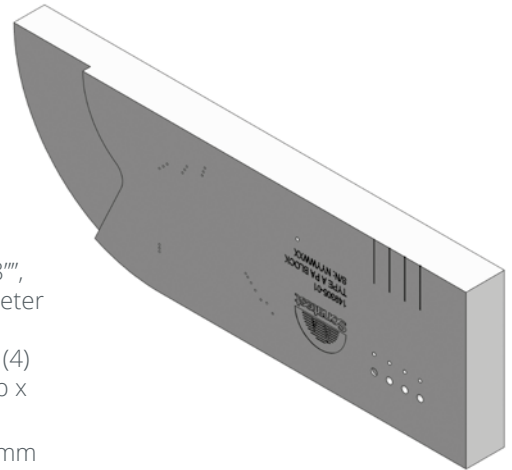
**Block Type:** Type A Phased Array Block  
**Calibration Type:** Used for the calibration of phased array setups and acquisition units, calibrations include: wedge delay, beam angle, sensitivity, TCG, resolution

**Description:**

- Dimensions Block (Imperial) - Include both 4" and 2" radii, (19) through holes at 0.04" diameter, (1) through hole at 0.08" diameter, (4) FBHs at 0.08" diameter x 0.08", 0.16", 0.235", and 0.315" deep, (4) FBHs at 0.157" diameter x 0.04", 0.12", 0.2", and 0.275" deep, (3) FBHs at 0.08" diameter x 0.12" deep machined into the 2" radius, and (4) EDM notches at 0.004", 0.008", 0.012", and 0.016" deep x 0.02" wide x 1" long
- Dimensions Block (Metric) - Include both 100mm and 50mm radii, (19) through holes at 1mm diameter, (1) through hole at 2mm diameter, (4) FBHs at 2mm diameter x 2, 4, 6, and 8mm deep, (4) FBHs at 4mm diameter x 1, 3, 5, and 7mm deep, (3) FBHs at 2mm diameter x 3mm deep machined into the 50mm radius, and (4) EDM notches at 0.1, 0.2, 0.3, and 0.4mm deep x 0.5mm wide x 25mm long

**Variants:**

- Alternate material choices available, define the material on RFQ
- Nickel plating and black anodising available on RFQ



Type A Phased Array Block	
Product Code	Block Type
CALBLK-SPC-101	Type A Phased Array Block in Mild Steel

CALIBRATION BLOCKS

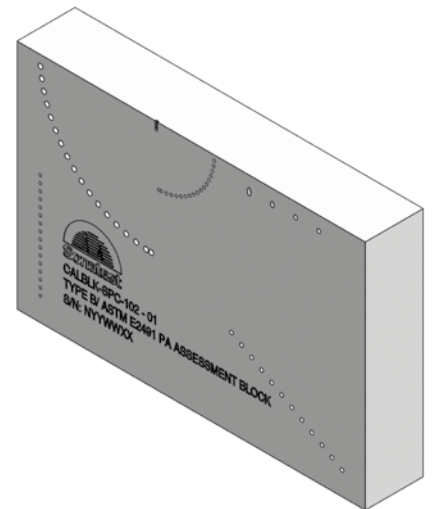
**Block Type:** Type B / ASTM E2491 Phased Array Block  
**Calibration Type:** Used for phased array setup verifications, linear / angular resolution, focusing ability, beam steering capability. Can also be used as a demonstration block.

**Description:**

- Dimensions Block (Imperial) - Block 1" x 4" x 6", 4 x angles holes (30°, 45°, 60°, 75°) at 1/16" diameter, 18 holes on 1" radius at 0.04" diameter, 18 holes on 2" radius at 5/64" diameter, 16 hole vertical column 0.04" diameter 0.12" between holes, 12 hole angled row 1/16" diameter and 0.2" between holes
- Dimensions Block (Metric) - Block 150mm x 100mm x 25mm, 4 x angles holes (30°, 45°, 60°, 75°) at 1.5mm diameter, 18 holes on 25mm radius at 1mm diameter, 18 holes on 50mm radius at 2mm diameter, 16 hole vertical column 1mm diameter 3mm between holes, 12 hole angled row 1.5mm diameter and 5mm between holes

**Variants:**

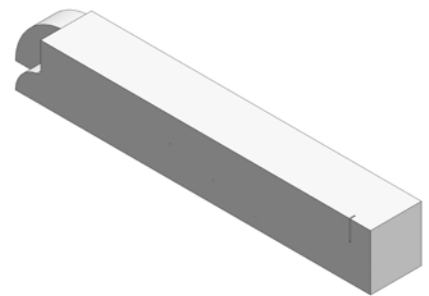
- Alternate material choices available, define the material on RFQ
- Nickel plating and black anodising available on RFQ



Type B / ASTM E2491 Phased Array Block	
Product Code	Block Type
CALBLK-SPC-102	Type B ASTM E2491 phased array block in mild steel

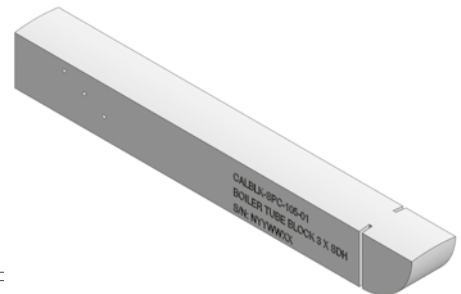
# Specialist Use Blocks

- Block Type:** PACS Block
- Calibration Type:** Used for angle beam verification, Transducer angle exit point, calibration for wedge delay, sensitivity, DAC/TCG for thicknesses up to 55mm
- Description:** Block dimensions - 50mm x 55mm x 375mm, includes 25mm and 50mm radii, 3 x 3mm diameter SDHs and a 5mm deep 20mm long notch
- Variants:**
- Alternate material choices available, define the material on RFQ
  - Nickel plating and black anodising available on RFQ



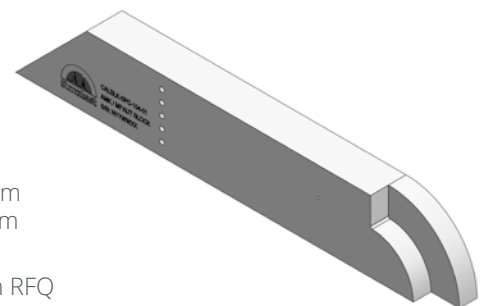
PACS Block	
Product Code	Block Type
CALBLK-SPC-103	PACS Calibration block in Mild Steel

- Block Type:** Boiler tube calibration block
- Calibration Type:** Used for calibration of conventional and PA inspections of small bore piping / thin walled materials, Velocity, Wedge delay, index point and DAC calibrations possible
- Description:** Dimensions Block - 25mm x 20mm x 155mm, includes 25mm radius and 3 - 5 side drilled holes. Curved scanning surface to be defined on RFQ
- Variants:**
- Alternate material choices available, define the material on RFQ
  - Nickel plating and black anodising available on RFQ



Boiler Tube Calibration Block		
Product Code	Block Type	Variant
CALBLK-SPC-105	Boiler tube block with 3 x SDHs in mild steel	3 x 1.5mm SDHs. Test surface can be flat or have a radius decided by the client.
CALBLK-SPC-106	Boiler tube block with 5 x SDHs in mild steel	5 x 1.5mm SDHs. Test surface can be flat or have a radius decided by the client.
CALBLK-SPC-107	Custom boiler tube block, SDH number and size and scan surface curvature to be decided by consultation	SDH number and position to be decided by client. Test surface radius to be decided by the client.

- Block Type:** AMK / MPAUT Calibration block
- Calibration Type:** Used for Transducer index, Beam angle, Beam squint angle, Linearity of time base, Calibration of time base, Linearity of attenuator, Linearity of screen height, Pulse duration, Measurement of dominant frequency, Signal-to-noise ratio (SNR,) Wedge delay, Active element assessment
- Description:** Dimensions Block - 300mm x 50mm x 25mm, includes 30mm and 50mm radii, 5 vertical 3mm diameter SDHs and a 1.5mm diameter SDH. Cut out at 45°
- Variants:**
- Alternate material choices available, define the material on RFQ
  - Nickel plating and black anodising available on RFQ



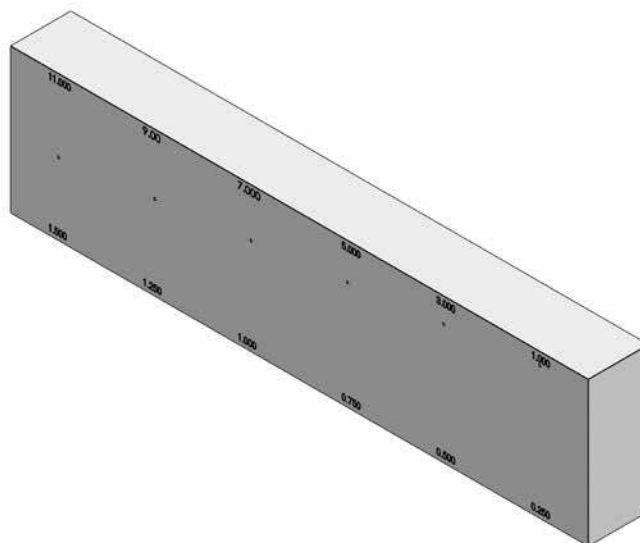
AMK / MPAUT Calibration block	
Product Code	Block Type
CALBLK-SPC-104	AMK / MPAUT Calibration block in mild steel

# Navships Blocks

- Block Type:** Navships blocks
- Calibration Type:** Used for distance amplitude correction / Time corrected gain curve generation, sensitivity calibration
- Description:** Navships block dimensions 12" x 3" x 1.25", (30mm x 75mm x 300mm) available in 4 and 6 hole versions
- Variants:**
- Alternate material choices available, define the material on RFQ
  - Nickel plating and black anodising available on RFQ

Navships Blocks		
Product Code	Block Type	Variant
CALBLK-NAV-101	Navships calibration block with 6 holes in mild steel	3/64 diameter side-drilled through-holes at distances of 0.25 to 2.75 in 0.25 increments (6.25mm to 68.75mm in 6.25mm increments)
CALBLK-NAV-102	Navships calibration block with 4 holes in mild steel	3/64 diameter drilled through the 1.250 width. The holes are located at 0.250, 0.750, 1.250, 1.750, 2.250, and 2.750 (1.2mm diameter drilled through the 30mm width. The holes are located at 6.25mm (68.75mm), 18.75mm (56.25mm), 31.25mm, and 43.75mm)

CALIBRATION BLOCKS



# ASTM E127 FBH Test Blocks

**Block Type:** ASTM E127 Area Amplitude Set of 8

**Calibration Type:** DGS curve calibration

**Description:** Set of 8 blocks with FBHs of varying sizes set at a fixed distance from the surface, this block set helps determine the relationship between travel distance and signal amplitude. FBH diameters = 1/64", 1/32", 3/64", 1/16", 5/64", 3/32", 7/64", 1/8" or 1.6mm, 3.2mm, 4.8mm, 6.4mm, 8mm, 9.6mm, 11.2mm, 12.8mm

**Variants:**

- Alternate material choices available, define the material on RFQ
- Nickel plating and black anodising available on RFQ
- Individual blocks and other sets available on request

ASTM E127 Area Amplitude Set of 8	
Product Code	Block Type
CALBLK-ASTM-101	Area Amplitude set of 8 ASTM E127 blocks in Mild Steel

**Block Type:** 30 FBH Resolution Block

**Calibration Type:** DGS curve calibration

**Description:** A block with 30 FBHs of varying sizes and depths,, this block set helps determine the relationship between travel distance and signal amplitude can be used as an area amplitude and distance amplitude set

- Dimensions (Imperial): Block - 11.000 x 4.000 x 1.500, FBHs - 10 x 3/64", 10 x 5/64", 10 x 8/64", FBH Depth Range - 0.050" to 1.250
- Dimensions (Metric ) Block - 38mm x 100mm x 280mm, FBHs - 10 x 1.2mm, 10 x 2.0mm, 10 x 3.2mm, FBH Depth Range - 1.27mm - 31.75mm

**Variants:**

- Alternate material choices available, define the material on RFQ
- Nickel plating and black anodising available on RFQ

30 FBH Resolution Block	
Product Code	Block Type
CALBLK-ASTM-102	30 FBH Resolution Block in Mild Steel



# Sonagel

The **Sonagel** range is designed for use on all types of metallic surface and is especially suited to solving the problems of rough, pitted, uneven surfaces allowing smooth Transducer movement during testing.

The thixotropic properties of Sonagel give excellent wetting and acoustic transmission and do not allow the product to flow all over the test area. This makes it very economical to use as you only cover the working area and not the whole piece, and is especially suitable for vertical and overhead surfaces.

**Sonagel** incorporates chemicals, which allow very slow drying even at elevated temperatures, whilst being free of VOC's and other hazardous materials.

However, it does contain a special tracer dye to enable areas to be checked for coverage but the couplant is still very easily removed with gentle washing or solvent wipes.

For further information on pricing and availability please email our dedicated Consumables team.



SONAGEL

**Sonagel W** is a stable clear yellow couplant gel specifically designed for ultrasonic inspection. It is non-toxic and safe for the environment.

Sonagel W is available in easy to use 125ml applicator bottles, 250ml bottles, as well as in plastic 1 litre, 5 litre and 20 litre bulk containers (with suitable carrying handles).

**\*NB:** this product will have a flash point of 160°C (PM) when used for long periods at elevated temperatures.



**Sonagel D1** is a bright yellow fine powder that when mixed with water, forms a stable clear yellow gel specifically designed for ultrasonic inspection. 1 kilo of D1 powder makes 20 litres of couplant when mixed with water. This product is specifically designed for 'on site' spot tests where it is impractical to carry or deliver ready to use couplant in bulk.



**Sonagel LTHT** is a thick translucent couplant paste specifically designed for ultrasonic inspection at temperatures up to 250°C and is non-toxic and safe for the environment.

**Sonagel LTHT** is easily removed with solvents such as Alcohol, Acetone or Hydrocarbon distillates.

Hazardous decomposition does not occur at elevated temperatures, the product will start to liquify as temperatures increase up to 300°C.

**Sonagel LTHT** is available in easy to use 1 litre plastic container.



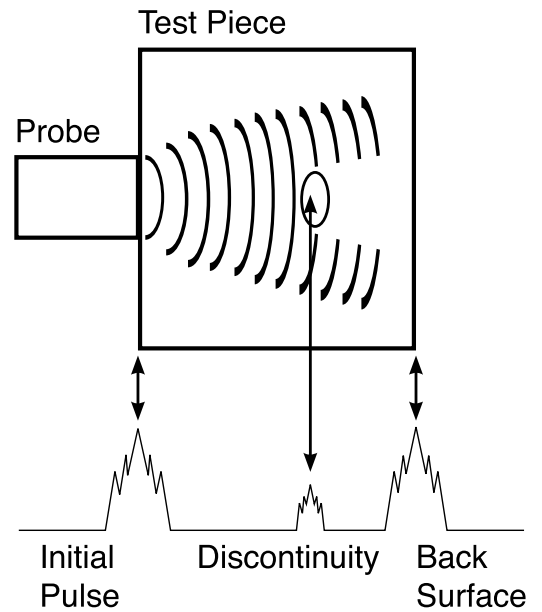
**All products meet the sulphur and halogen requirements of nuclear and industrial specifications.**

Please contact [sales@sonatest.com](mailto:sales@sonatest.com) for further details

# Fundamentals of Ultrasonic NDT

In ultrasonic non-destructive testing (NDT) short pulses of sound at ultrasonic frequencies are introduced into the test item by a transducer. Any changes in the material property of the test material or boundaries will produce reflections to varying degrees. If these reflections eventually return to the transducer, then the time delay between their introduction and return may indicate how far into the test item they originated from. This time delay or path length may permit the identification of the position of the reflector. Similarly the amplitude of the echo may indicate the size or nature of the reflector. In cases when the reflector introduces a significant change in the material acoustic impedance (which is the product of material density and sound speed in the material) the reflection is strong, for instance at metal-air boundary.

The generation of ultrasonic pulses for NDT generally relies on the piezoelectric effect, whereby an electrical voltage pulse of between 50 and 500 V is applied across a piezo-ceramic crystal. This causes the crystal to deform. The motion of the crystal is transmitted to the test item via a coupling layer, thus introducing the ultrasound to the test item. The detection of echoes works in the same fashion but in reverse. The attenuated echo causes the crystal to vibrate disturbing the internal charge distribution in the crystal and thus creating a very small voltage which is measured. Thus the electronics in ultrasonic inspection equipment must be able to generate a precise, short high voltage pulse as well as amplify and accurately measure a short, very low voltage pulse.



## Transducer Characteristics

Ultrasonic transducers for non-destructive testing come in a wide variety of configurations in order to facilitate numerous inspections possibilities. Despite this, there are a small number of physical characteristics which are commonly used to describe the performance of ultrasonic transducers and therefore identify them in inspection procedures and manufacturers' documentation.

## Frequency

Transducers are classified by the nominal frequency of the ultrasound that they emit or are most sensitive to. This is the number of cycles per second of the pressure fluctuations in the material. Because ultrasound is high frequency it is usually measured in megahertz (MHz), which are million multiples of a hertz. So 1 MHz is 1 million cycles per second. Occasionally kilohertz (kHz) are used where the frequencies are thousand multiples of a hertz. It is the high frequency range that classifies this branch of acoustics as ultrasonics. The frequency is important because in conjunction with the speed of sound in the material it determines the wavelength of the sound, which is one of the factors that determine whether a reflection or echo is generated by a target object or defect.

## Element Size

Transducers are also classified according to the size of their active sensor elements. The size of the element in conjunction with the frequency determines the shape of the beam emitted by the element. The size of the element determines the size of the transducer enclosure and so also affects how the transducer couples to the test item.

## Element Type

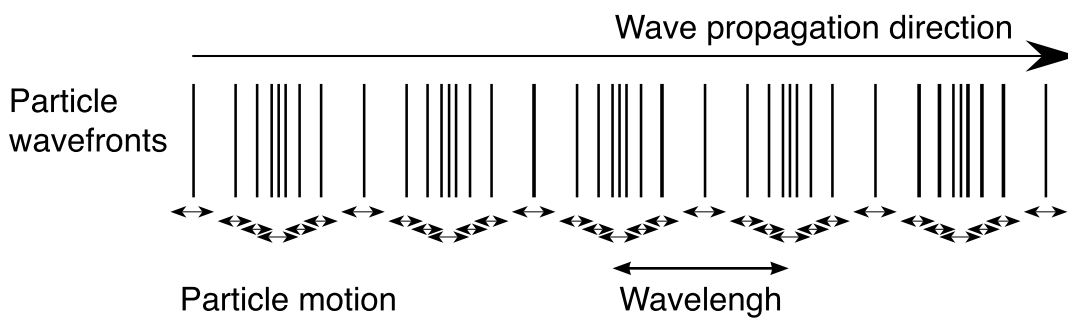
Transducer elements are commonly made from the piezo-ceramic materials lead zirconate titanate (PZT) or lead metaniobate (PMN). They can be single crystals, composite crystals or phased arrays. Single crystals are a block of piezo-ceramic with one electrode on either side. Composite crystals comprise an array of vertical fingers of piezo-ceramic embedded in a resin matrix. The fingers are electrically connected by two electrodes in the same way as single crystals. The resin matrix permits both the acoustic impedance and mechanical resonances of the crystal to be manipulated, typically resulting higher bandwidth and sensitivity. In phased arrays the individual elements are similarly embedded in a resin matrix, but are electronically independent, i.e. individual electrodes for each element.



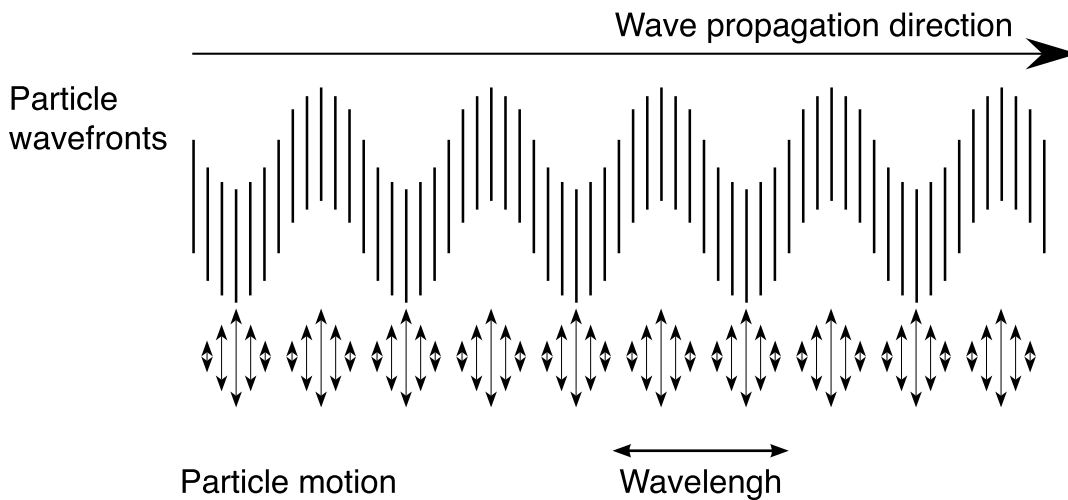
## Bandwidth and Damping

An ultrasonic transducer emits a burst or pulse of ultrasonic energy which will contain a discrete number of pressure cycles at the transducer's nominal frequency. In practice this pulse contains cycles that start with small amplitude grow to large amplitude and reduce to small amplitude at the end of the pulse. This in fact means that the pulse contains a spread of frequencies of which the transducer's nominal frequency is the most prevalent. The shorter and sharper the pulse, the fewer cycles and the broader the spread of frequencies involved. The longer the pulse, the more cycles and the narrower the spread of frequencies involved. The breadth of the frequency content is measured by the quantity called the bandwidth. The bandwidth has a significant impact on the ability of a transducer to resolve defects and penetrate into the material. The bandwidth is controlled by the application of acoustic damping to the sensor crystal. An undamped crystal will oscillate for a longer time generating a pulse with many cycles thus containing much acoustic energy and having a narrow bandwidth, good penetration but poor resolution. A highly damped crystal will oscillate for a short time generating a pulse with few cycles thus containing less acoustic energy and having a broad bandwidth, poor penetration but good resolution.

### Longitudinal Wave Propagation



### Transverse Wave Propagation



## Wave Type

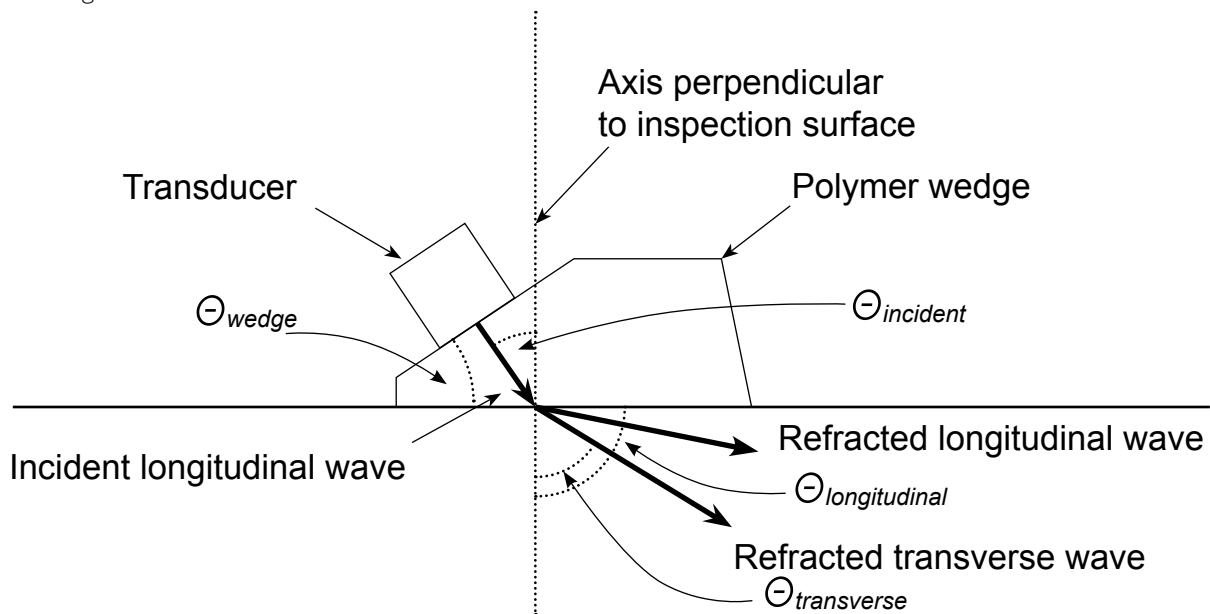
There are several different types, or modes, of ultrasonic wave propagation, not all are possible in all materials. Compression waves, also known as longitudinal waves, oscillate along the direction of propagation. Shear waves, also known as transverse waves, oscillate perpendicular to the direction of propagation. Less common are various types of surface and body waves. Solid materials support both compression and shear waves and the wave speed, or sound velocity, for the compression wave is always greater or faster than the shear wave. Liquids do not support shear waves and so immersion tests use compression waves. A wave of one type may generate a wave of another type when it passes from one material into another. This process is called mode conversion. Some transducer types rely on this phenomenon in order to generate the required ultrasonic sound beam. Some materials, e.g. austenitic steels, propagate shear waves very poorly and practical inspection requires compression waves.

## Beam Angle

In order to detect certain defects it is sometimes necessary to produce beams of ultrasound at different angles. The beam angle is always measured with respect to an axis perpendicular, or normal, to the inspection surface. Therefore a transducer with a beam looking directly into the material is referred to as 0° or normal beam Transducer. A 90° Transducer has a beam looking along the inspection surface and may well propagate a surface wave. The beam angles that are possible are determined by Snell's Law which relates the beam in the transducer to the relative sound velocities in the transducer and the test material. Snell's Law is given by the formula

$$\frac{\sin \Theta_{incident}}{c_{incident}} = \frac{\sin \Theta_{transverse}}{c_{transverse}} = \frac{\sin \Theta_{longitudinal}}{c_{longitudinal}}$$

The incident longitudinal wave in the wedge is mode converted into two refracted beams in the material, one longitudinal and one transverse. The angles  $\Theta$  and sound speeds  $c$  are the corresponding beam angle and sound speeds for a given wave type in the two materials. Snell's Law is used to calculate the necessary wedge (or cut) angle in order to achieve a specified beam angle for a specified combination of wedge material and test material. If either the wedge material or the test material is changed a different beam angle will result. As the speed of sound for compression waves is always greater than for shear waves, then the compression wave beam angle will always be greater than that of shear waves in the same material. Above a certain angle the longitudinal beam will be reflected back into the wedge.



## Coupling and Lens Configuration

In a similar way to which the beam angle is determined, it is possible to influence the geometry of the beam of ultrasound by the application of lenses or delay-lines between the crystal and the test material. This may change the focal length of a flat faced transducer or may focus the beam to line or spot in the case of Transducers to which curved faces are introduced. The selection of lens or interface layer may also provide benefits for coupling to the test item by providing a compliant face that fills gaps or by providing improved matching of the acoustic impedances. A delay-line may also help to minimise wear to the transducer face thus prolonging the operational life of the transducer. Delay-lines are also useful in the protection of transducers when testing items at high temperatures. The difference in the acoustic impedances of two adjoining materials determines the proportion of the incident sound is reflected at the interface and what proportion is transmitted. The acoustic impedance,  $Z$ , is the product of the material's density,  $\rho$ , and its velocity,  $c$ . Knowledge of the density and speed of sound for each wave type allows the reflection and transmission coefficients,  $R$  and  $T$ , to be calculated. Hence a near-perfect reflection occurs at the surface of a metal calibration block on account of the large differences in the densities and speeds of sound in steel and air and also the acoustic impedances. (See the table of acoustic properties of materials.)

## Transducer Size, Frequency and Beam Profile

On leaving a transducer ultrasound forms a sound field, or spatial distribution, described by the beam profile, which is determined by the size, geometry and frequency of the transducer. Close to the transducer, in a region called the Near Field or Fresnel Zone, the sound field varies in a complicated manner and so the detection of defects within this region is more difficult. A flat-faced transducer will have a natural focal zone that occurs at the end of the Near Field and beyond which the sound field becomes more easily predictable in a region called the Far Field or Fraunhofer Zone. In this zone the detection of defects is more straightforward, however, as one moves further from the focal point the beam diverges and gets weaker. The combination of frequency and aperture size determines the rate, or angle of beam divergence. Large aperture, low frequency Transducers have wide beams, but smaller angles of divergence, whereas, small aperture, high frequency Transducers have narrow beams with larger angles of divergence. The combination of Transducer aperture and frequency therefore affects the ability of a Transducer to detect defects.

$$Z = \rho c \quad R = \frac{Z_2 - Z_1}{Z_2 + Z_1} \quad T = \frac{2Z_2}{Z_2 + Z_1}$$

$$\sin Y_6 = \frac{0.51c}{Df} \quad N = \frac{D^2 f}{4c}$$

$N$  = Nearfield length (mm)

$c$  = Speed of sound (m/s)

$f$  = Frequency (MHz)

$D$  = Crystal Diameter

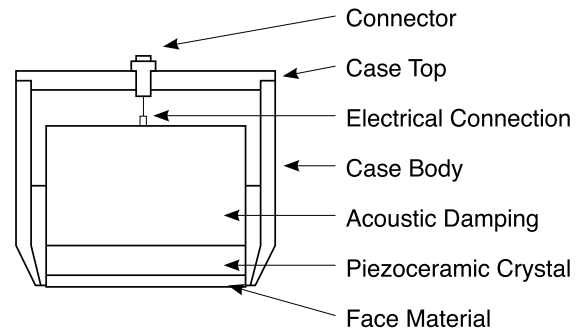
(mm / Inches)

$Y_6$  = Divergence angle for -6 dB beam edge (°)

# Transducer Types

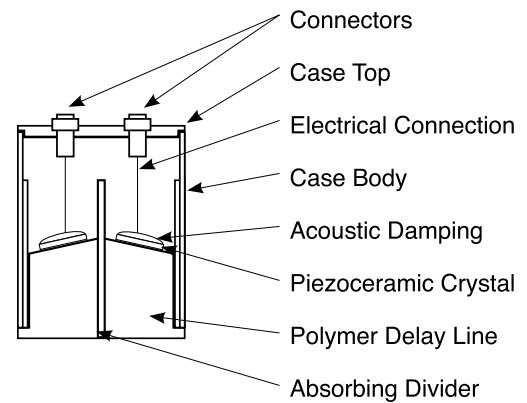
## Single Element Transducers

Single element transducers have one active element which is used for both the transmission and reception of ultrasound. Single element transducers can generate compression or shear waves, normal or angled beams, be contact or immersion and can have variety of coupling/lens configurations. These transducers can be used on thickness gauges, flaw detectors and phased array instruments.



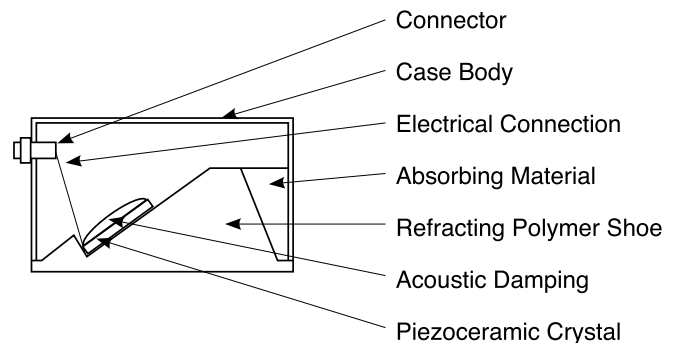
## Dual Element Transducers

Dual element transducers have two active elements, one is used for the transmission and one for the reception of ultrasound. Dual element transducers typically are contact transducers and use an integral delay-line or shoe, they can generate compression or shear waves, normal or angled beams. These transducers can be used on thickness gauges, flaw detectors and phased array instruments.



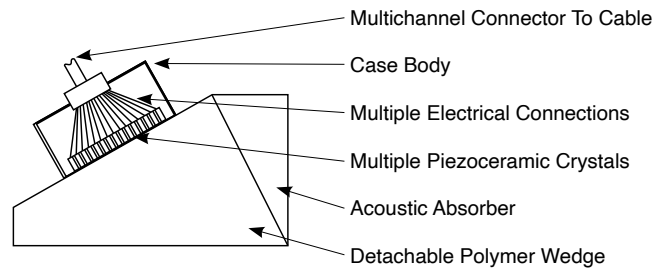
## Angle Beam Transducers

Angle beam transducers create a beam of ultrasound at the specified angle to the normal to the inspection surface. Most angle beam transducers generate shear waves in the inspection material by refraction and mode conversion of a compression wave, however some refracted longitudinal angle beams are possible. Angle beam shoes or wedges, onto which the compression transducer is mounted are typically made of polymer such as acrylic or polystyrene. The shoe or wedge can be integral to the transducer or detachable and may be profiled and damped to minimise internal reflections. Dual element angle beam Transducers are also common, bringing the benefits of a dual Transducer to an angle beam.



## Phased Array Transducers

Phased array transducers have multiple elements, typically ranging in number from 8 to 128. The elements may transmit simultaneously or individually in a timed sequence. This facilitates a variety of composite beam profiles to be synthesised significantly increasing the flexibility of the transducer's application. Phased array transducers can be used with delay-lines, angled wedges and water delay-lines. These can only be used with phased array instruments.



## Immersion Transducers

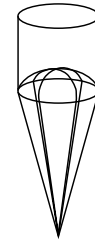
Immersion transducers are design to operate submerged in water which provides the coupling and delay between the transducer and the test item. These transducers are commonly used in automated inspection systems which scan the Transducer over the test object and handle the ultrasonic inspection. These transducers can be flat faced and unfocused, or have profiled faces to focus them to a point or a line, referred to respectively as spherical and cylindrical focusing.

### Immersion Transducer Focusing

Cylindrical or Line Focusing

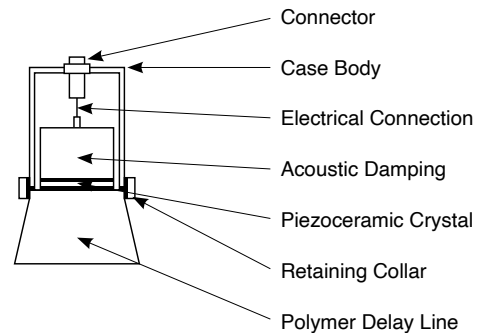


Spherical or Point Focusing



## Delay Line Transducers

Delay line transducers transmit and receive sound waves with one element coupled to the surface, as with compression transducers. The crystal is held off from the surface of the test piece by a delay block. This permits inspection very close to the test piece surface.



## Wheel Transducers

Wheel transducers combine aspects of immersion and delay-line transducers to create a Transducer where the contact with the test item is a rolling tyre. This facilitates the inspection of large areas or continuous feeds of material. The transducer is mounted in the hub of the wheel and the tyre is filled with water allowing the ultrasound to pass from the transducer, through the water, through the tyre and into the test item. The compliant rubber tyre material is carefully chosen to have an acoustic impedance that allows for good coupling to the test item with the minimum, or no couplant. Thus wheel Transducers are good for inspecting materials which are sensitive to conventional ultrasonic couplants.

## Time-Of-Flight-Diffraction (TOFD) Transducers

TOFD transducers are especially high damped single element transducers that are used in conjunction with special wedges in a pitch-catch pair format. They are typically attached to the wedge by a quick change screw thread. The high damping produces the short pulse width and broadband response required by the TOFD technique, which assesses the different wave transit times between the transducers and in particular looks for transit time commensurate with a path involving diffraction from defects located midway between the pair of transducers.

## Custom and Application Specific Transducers

Custom designed transducers are often required for the inspection of specialist parts. These often contain a number of elements facilitating the simultaneous inspection at specific locations and angles and often have integral or specialised couplant delivery systems. Some bespoke inspection tools contain several different types of transducer, such as phased array, time of flight diffraction and conventional ultrasonic Transducers. These systems are designed and optimised for customers' specific needs.







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