

# Transducers and Accessories Catalogue 2018



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# Phoenix Inspection Systems Limited

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Established in 1983, Phoenix Inspection Systems are specialists in design and manufacture of ultrasonic non-destructive testing (NDT) systems and offers a dynamic range of manual and automated; transducers, tools, scanners, manipulators and instrumentation through to sophisticated nuclear inspection and turbine and generator systems.

From the company headquarters in the U.K., Phoenix operates in 25 countries worldwide through a network of agents and distributors providing expert product knowledge in convenient regional locations.

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## Why Phoenix?

Our technical support services team provide expertise in NDT inspection design and qualification while our research and development activities have gained worldwide acclaim for our participation in advanced NDT projects which help us maintain our position at the forefront of NDE technology.

Phoenix products encompass the full range of ultrasonic NDT techniques, including; Phased array, TOFD and Pulse-echo and offer NDT professionals solutions to inspection requirements for:

- Weld testing
- Crack detection
- C-Scan inspection
- Corrosion mapping
- Composite inspection

Custom and application specific solutions are also an alternative to the standard range, offered by Phoenix. From a small modification to an existing product, through to fully customised systems, Phoenix can offer solutions to the most challenging NDT inspection requests.

## Phoenix Inspection Systems Limited holds the ISO 9001:2008 Quality Management Systems (QMS).

The ISO 9001 certification is an internationally recognised framework for monitoring and measuring process performance and operations. This ensures increased efficiency, providing customers with confidence that Phoenix designs and manufactures its products in accordance with the ISO 9001 QMS to ensure consistency in supply and commitment to continuous improvement.



**Phoenix products are used by some of the world's leading companies, to ensure safety standards and improve quality and efficiency and serve a wide range of industry sectors including:**



Offshore Oil, Gas & Petrochemical



Aerospace and Composites



Rail and Transport



Nuclear Power



Power Generation

## Phoenix Transducers and Accessories

Over the past 30 years, Phoenix has refined and developed a comprehensive range of high-performance ultrasonic transducers for general flaw detection and thickness measurement. Phoenix transducers offer superior performance in a range of frequencies, crystal sizes, case construction, angles and connector types.

Transducers are manufactured at the Phoenix headquarters in the UK, in accordance with quality standard \*BS EN 12668-2:2010.

### Standard Transducer Range

This comprehensive catalogue features the wide range of transducers available from Phoenix conveniently organised into sections:

- Shearwave
- Compression wave
- Creep wave
- Flexible array
- High temperature
- TOFD



### Accessories

In addition to transducers, Phoenix offers a wide range of accessories to complement their use:

- IR Emitters
- TOFD Wedges
- Calibration blocks
- Step wedges
- Cables (with connector combinations)
- Adaptors

### Special Transducers

Custom and application specific special transducers are an alternative to our standard transducer ranges. Often, a small modification to one of our standard transducers will deliver an economical solution for your particular inspection needs.

For the more challenging applications, we can work with you to design and produce a fully customised transducer, which could help in the design of your inspection technique and procedure and may reduce overall inspection costs.

### **\*BS EN 12668-2:2010 Non-destructive testing. Characterization and verification of ultrasonic examination equipment.**

BS EN 12668-2:2010 is a European standard that covers probes used for ultrasonic non-destructive examination.

#### Disclaimer

*The information in this brochure is accurate at time of publication. Actual products may differ from those presented herein. Phoenix Inspection Systems Limited reserves the right to change products, specifications and pricing without forward notice.*

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**For further information on Transducers or to place an order, contact the sales team:**

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# 01/

## Shear Wave Transducers



## 1.1 Single Crystal Shear Wave Transducers

The single crystal range of shear wave transducers are available with various angles and ideal for the general purpose testing of welds, plate, pipe tubing, castings and forgings. (See also GSW range section 1.2)



SSW Probe



RMSW Probe



LSW Probe

| Product Code | Frequency MHz | Crystal Dia (mm) | Probe Size L x W x H (mm) | Angle A°       | Connector |         |
|--------------|---------------|------------------|---------------------------|----------------|-----------|---------|
| SSW 2/*A     | 2             | 10               | 29 x 16.5 x 24            | 38, 45, 60, 70 | Subvis    | Lemo 00 |
| SSW 2.5/*    | 2.5           |                  |                           |                |           |         |
| SSW 4/*      | 4             |                  |                           |                |           |         |
| RMSW 2.5/*   | 2.5           | 15               | 37 x 22 x 27              | 38, 40, 45, 70 |           |         |
| LSW 1/*      | 1             | 20               | 51.5 x 26.5 x 30.5        | 38, 45, 60, 70 |           |         |
| LSW 2/*      | 2             |                  |                           |                |           |         |
| LSW 4/*      | 4             |                  |                           |                |           |         |

\*A - please insert angle required. Additional charge for non-standard angles.

## 1.2 Shear Wave Gold Series Transducers

Phoenix developed the gold series transducer range to offer superior performance. Available with a stainless steel case, modified internal design and rear entry connectors, gold series transducers provide exceptional results.

- Supplied with Lemo 00 connectors
- 4MHz GSW probes manufactured with composite crystal



GSW 2MHz 45° Probe



GSW 4MHz Composite Probe

| Product Code                       | Frequency MHz | Crystal Size (mm) | Probe Size L x W x H (mm) | Angle A°       | Connector |
|------------------------------------|---------------|-------------------|---------------------------|----------------|-----------|
| GSW 2/*A                           | 2             | 8 x 9             | 29 x 17 x 23.5            | 38, 45, 60, 70 | Lemo 00   |
| GSW 4/*A-C                         | 4             |                   |                           | 70             |           |
| GSW 4/70-C<br>Forward Emission 7mm |               |                   |                           |                |           |

\*A - please insert angle required. Additional charge for non-standard angles.

### 1.3 Twin Crystal Shear Wave Transducers

Twin crystal shear wave transducers hold two crystals mounted at inward angles that provide improved near-surface resolution and superior signal-to-noise ratio. Ideal for inspecting thin materials for small flaws, occurring directly under the surface.



TSW Probe

| Product Code | Frequency MHz | Crystal Size (mm) | Probe Size L x W x H (mm) | Angle A°       | Connector |
|--------------|---------------|-------------------|---------------------------|----------------|-----------|
| TSW 2/*A     | 2             | 2 (4 x 8)         | 29 x 16.5 x 24            | 38, 45, 60, 70 | Subvis    |
| TSW 4/*A     | 4             |                   |                           |                |           |

\*A - please insert angle required. Additional charge for non-standard angles.

### 1.4 Twin Crystal Boiler Tube Transducers

The TBP range has been specifically designed for use on boiler tubes. It features exceptional gain and resolution together with very low crosstalk. The emission point is less than 8mm from the front of the housing. Four stainless steel wear studs are fitted to prevent unnecessary wear.



TBP Probe

| Product Code | Frequency MHz | Composite Crystal Size (mm) | Probe Size L x W x H (mm) | Angle A° | Integral 2m Lead |
|--------------|---------------|-----------------------------|---------------------------|----------|------------------|
| TBP 5/70 L   | 5             | 2 (3 x 6)                   | 22 x 17 x 13              | 70       | Lemo No 1        |
| TBP 5/70 BNC |               |                             |                           |          | BNC              |
| TBP 5/70 L00 |               |                             |                           |          | Lemo 00          |

Also available in 45° and 60° angles. Please specify requirement when ordering.

## 1.5 Automated Single Crystal Shear Wave Transducers

Manufactured in a 30 x 30mm case with gimbal pins, ASSW probes are designed for use with the extensive range of Phoenix manual and automated scanners. Suitable for use in scanners with 30 x 30mm forks for general purpose testing of welds, plate, pipe tubing, castings and forgings. Supplied with:

- Couplant irrigation, electrically isolated connector and M4 gimbal mountings
- Lemo 00 connectors



ASSW 45° Probe



ASSW 60° Probe



ASSW 70° Probe

| Product Code | Frequency MHz | Crystal Size (mm) | Probe Size L x W x H (mm) | Angle A°       | Connector |
|--------------|---------------|-------------------|---------------------------|----------------|-----------|
| ASSW 2/*A    | 2             | 10                | 30 x 30 x 28              | 38, 45, 60, 70 | Lemo 00   |
| ASSW 2.5/*A  | 2.5           |                   |                           |                |           |
| ASSW 4/*A    | 4             |                   |                           |                |           |

\*A - please insert angle required. Additional charge for non-standard angles.

## 1.6 Automated Shear Wave Gold Series Transducers

Developed by Phoenix, AGSW probes offer superior performance and provide exceptional results when used in manual or automated scanners with 30 x 30mm forks. The 4MHz AGSW includes a modified internal design with the addition of an interface layer. Supplied with:

- Couplant irrigation, electrically isolated connector and M4 gimbal mountings
- Lemo 00 connectors
- 4MHz AGSW probes manufactured with composite crystal
- 30 x 30mm case



AGSW Probe

| Product Code | Frequency MHz | Crystal Size (mm) | Probe Size L x W x H (mm) | Angle A°       | Connector |
|--------------|---------------|-------------------|---------------------------|----------------|-----------|
| AGSW 2/*A    | 2             | 8 x 9             | 30 x 30 x 28              | 38, 45, 60, 70 | Lemo 00   |
| AGSW 4/*A    | 4             |                   |                           |                |           |

## 1.7 Automated Twin Crystal Shear Wave Transducers

ATSW probes hold two crystals mounted at inward angles that provide improved near-surface resolution and superior signal-to-noise ratio. Manufactured in a 30 x 30mm case with gimbal pins, ATSW probes are designed for use with the extensive range of Phoenix manual and automated scanners and ideal for inspecting thin materials for small flaws occurring directly under the surface. Supplied with:

- Couplant irrigation, electrically isolated connector and M4 gimbal mountings
- Lemo 00 connectors



ATSW Probe

| Product Code | Frequency MHz | Crystal Size (mm) | Probe Size L x W x H (mm) | Angle A°       | Connector |
|--------------|---------------|-------------------|---------------------------|----------------|-----------|
| ATSW 2/*A    | 2             | 2 (4 x 8)         | 30 x 30 x 28              | 38, 45, 60, 70 | Lemo 00   |
| ATSW 4/*A    | 4             |                   |                           |                |           |

\*A - please insert angle required. Additional charge for non-standard angles.

## 1.8 Sub Miniature Single Crystal Shear Wave Transducers

Ideal for inspections in areas with reduced access.

- Available with side or top entry connectors



SMS Probes

| Product Code  | Frequency MHz | Crystal Size (mm) | Probe Size L x W x H (mm) | Angle A°           | Connector         |
|---------------|---------------|-------------------|---------------------------|--------------------|-------------------|
| SMS 5/*A/SE   | 5             | 5 x 5             | 12.7 x 8 x 10.75          | 38, 40, 45, 60, 70 | Side Entry Subvis |
| SMS 7.5/*A/SE | 7.5           |                   |                           |                    |                   |
| SMS 5/*A/TE   | 5             |                   |                           |                    | Top Entry Subvis  |
| SMS 7.5/*A/TE | 7.5           |                   |                           |                    |                   |

Please specify material to be inspected i.e. steel or aluminium, when ordering. \*A - please insert angle required. Additional charge for non-standard angles.

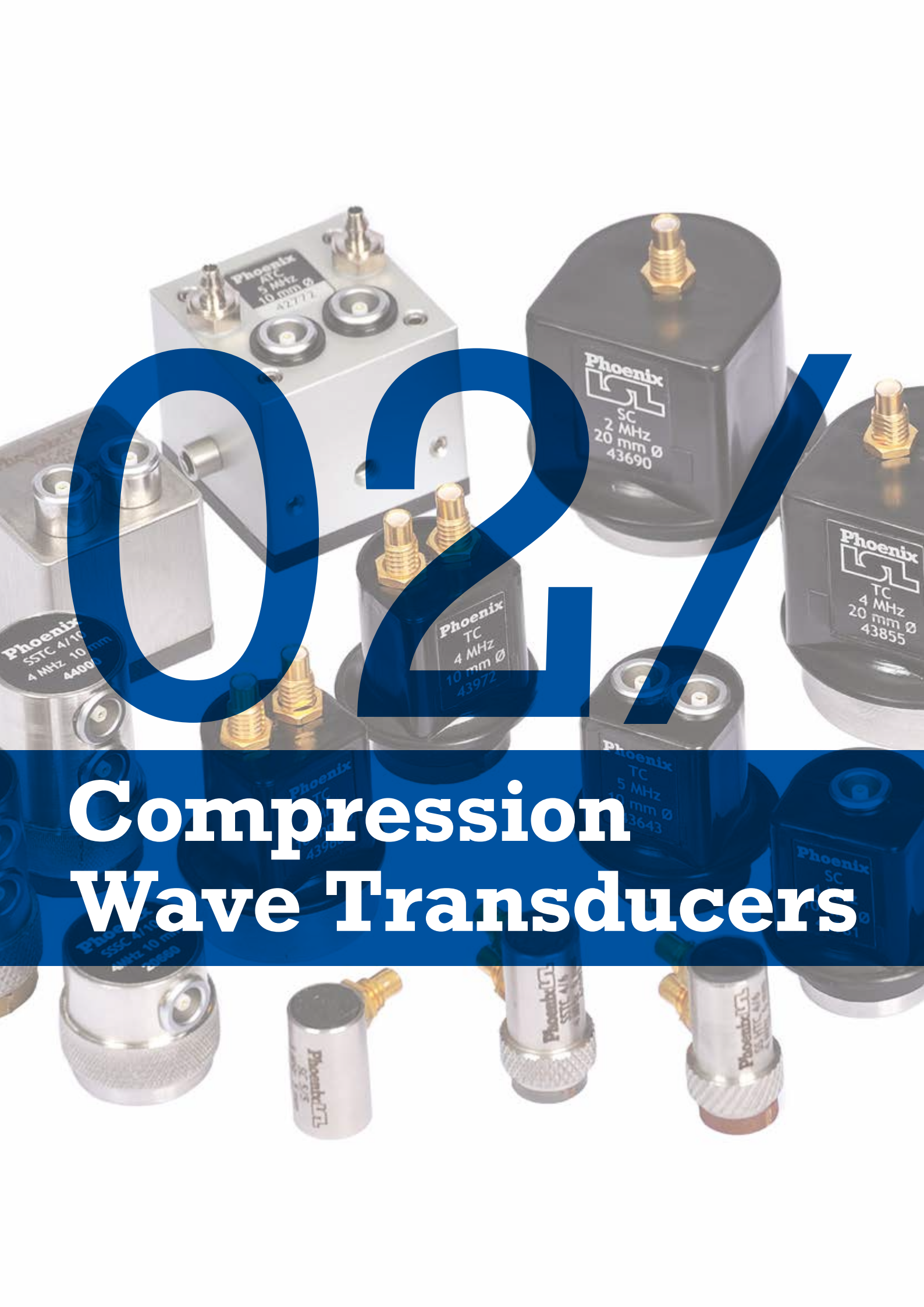
- Probe dimensions supplied exclude connectors, gimbal pins and couplant nozzles
- Probe diameter measurements are to the widest point
- Contouring available per probe (please specify relative to beam direction)
- Please refer to Section 8.4 for transducer certificate and document options

- Technical datasheets available free of charge upon request, for certain transducers across the range
- Conditions of sale are available upon request
- Certificate of Conformity supplied free of charge with all probes

**For further information on Shear Wave Transducers or to place an order, contact the sales team:**

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# Compression Wave Transducers

## 2.1 Single Crystal Compression Wave Transducers

Single crystal compression wave probes are used to measure thickness and detect flaws on plates, bars, forgings and castings.

- Constructed in a durable plastic case with a ceramic face and integrated stainless steel wear ring.



SC 10mm Probe



SC 20mm Probe

| Product Code | Frequency MHz | Crystal Dia (mm) | Probe Size Dia x H (mm) | Connector |         |
|--------------|---------------|------------------|-------------------------|-----------|---------|
| SC 1/20      | 1             | 20               | 40 x 35                 | Subvis    | Lemo 00 |
| SC 2/20      | 2             |                  |                         |           |         |
| SC 2.5/10    | 2.5           | 10               | 27 x 30                 |           |         |
| SC 4/10      | 4             |                  |                         |           |         |
| SC 4/20      |               | 20               | 40 x 35                 |           |         |
| SC 5/10      | 5             | 10               | 27 x 30                 |           |         |
| SC 5/20      |               | 20               | 40 x 35                 |           |         |

Resin face available on request.

## 2.2 Single Crystal Compression Wave Transducers – Stainless Steel

This range of compression wave probes are manufactured in stainless steel cases for extra durability.



SSSC 6mm Probe



SSSC 10mm Probe



SSSC 5mm Probe

| Product Code | Frequency MHz | Crystal Dia (mm) | Probe Size Dia x H (mm) | Connector |
|--------------|---------------|------------------|-------------------------|-----------|
| SSSC 1/20    | 1             | 20               | 31 x 20                 | Lemo 00   |
| SSSC 2/20    | 2             |                  |                         |           |
| SSSC 2.5/10  | 2.5           | 10               | 20 x 30                 | Subvis    |
| SSSC 4/6     | 4             | 6                | 10 x 18                 |           |
| SSSC 4/10    |               | 10               | 20 x 30                 | Lemo 00   |
| SSSC 4/20    |               | 20               | 31 x 20                 |           |
| SSSC 5/20    | 5             | 5                | 10 x 18                 | Subvis    |
| SSSC 5/5     |               |                  |                         |           |

2.3 Twin Crystal Compression Wave Transducers

Twin crystal compression wave probes are suitable for use on corroded and pitted surfaces, thickness measurement, brazed joint testing and for lamination detecting. High gain and resolution are achieved with a very low cross-talk.

■ Wear rings available for 10mm and 20mm TC probes - see below to order separately



TC 4/10S Probe



TC 5/10L Probe



Pit Probe

| Product Code | Frequency MHz | Crystal Dia (mm) | Nominal Focus (mm) | Probe Size Dia x H (mm) | Connector |         |
|--------------|---------------|------------------|--------------------|-------------------------|-----------|---------|
| TC 2.5/10    | 2.5           | 10               | 13                 | 27 x 30                 | Subvis    | Lemo 00 |
| TC 4/10      | 4             |                  | 15                 |                         |           |         |
| TC 5/10      | 5             |                  | 16                 |                         |           |         |
| TC 5/10 SF   |               |                  | 8                  |                         |           |         |
| TC 1/20      | 1             | 20               | 28                 | 40 x 35                 |           |         |
| TC 2/20      | 2             |                  |                    |                         |           |         |
| TC 4/20      | 4             |                  |                    |                         |           |         |
| TC 5/20      | 5             |                  |                    |                         |           |         |
| PIT-PROBE    |               | 2 (4 x 4)        | 6                  | L 7 x W 19 x H 34       | -         |         |



Wear Rings for 10mm and 20mm Probes



10mm Probe with Wear Ring



20mm Probe with Wear Ring

| Options Manual Transducers                                       |
|------------------------------------------------------------------|
| Wear Rings (only on TC 10mm and 20mm crystal dia probes)         |
| Contouring per probe (please specify relative to beam direction) |

## 2.4 Twin Crystal Compression Wave Transducers – Stainless Steel

Standard twin crystal transducers housed in a stainless steel case for extra durability.



SSTC 4/10L Probe



SSTC 4/6S Probe



SSTC 5/5S Probe

| Product Code             | Frequency MHz | Crystal Dia (mm) | Nominal Focus (mm) | Probe Size Dia x H (mm) | Connector |
|--------------------------|---------------|------------------|--------------------|-------------------------|-----------|
| SSTC 2/20                | 2             | 20               | 28                 | 31 x 41                 | Lemo 00   |
| SSTC 2.5/10              | 2.5           | 10               | 12                 | 20 x 33                 |           |
| SSTC 4/6                 | 4             | 6                | 8                  | 12 x 24                 | Subvis    |
| SSTC 4/10                |               | 10               | 12                 | 20 x 33                 | Lemo 00   |
| SSTC 4/20                |               | 20               | 28                 | 31 x 41                 |           |
| SSTC 5/5                 | 5             | 5                | 5                  | 10 x 25                 | Subvis    |
| SSTC 5/10                | 5             | 10               | 12                 | 20 x 33                 | Lemo 00   |
| SSTC 5/20                |               | 20               | 28                 | 31 x 41                 |           |
| SSTC 10/6<br>12mm Ø case | 10            | 6                | 3                  | 12 x 25                 | Subvis    |
| SSTC 10/6<br>20mm Ø case |               |                  |                    | 20 x 33                 | Lemo 00   |

## 2.5 Twin Crystal Compression Wave Transducers with Integral Lead

Twin crystal compression wave probes are suitable for use on corroded and pitted surfaces, thickness measurement, brazed joint testing and lamination detecting. High gain and resolution are achieved with a very low cross-talk.

- Integral lead length 2m as standard



TC 5/5 Integral Lead

| Product Code         | Frequency MHz | Composite Crystal Dia (mm) | Nominal Focus (mm) | Probe Size Dia x H (mm) | Integral 2m Lead |
|----------------------|---------------|----------------------------|--------------------|-------------------------|------------------|
| TC 5/5 Int Lead L    | 5             | 5                          | 5                  | 19-10 x 21              | Lemo No 1        |
| TC 5/5 Int Lead BNC  |               |                            |                    |                         | BNC              |
| TC 5/5 Int Lead L 00 |               |                            |                    | 10 x 25                 | Lemo 00          |

## 2.6 Automated Single Crystal Compression Wave Transducers

ASC probes are designed for use with the extensive range of Phoenix manual and automated scanners.

Supplied with:

- Couplant irrigation, electrically isolated connector and M4 gimbal mountings
- Lemo 00 connectors



ASC Probe

| Product Code | Frequency MHz | Crystal Dia (mm) | Probe Size L x W x H (mm) | Connector |
|--------------|---------------|------------------|---------------------------|-----------|
| ASC 2.5/10   | 2.5           | 10               | 30 x 30 x 28              | Lemo 00   |
| ASC 4/10     | 4             |                  |                           |           |
| ASC 5/10     | 5             |                  |                           |           |

## 2.7 Automated Twin Crystal Compression Wave Transducers

ATC probes hold two crystals mounted at inward angles that provide improved near-surface resolution and superior signal-to-noise ratio.

- Supplied with couplant irrigation, electrically isolated connector and M4 gimbal mountings



ATC Probe

| Product Code  | Frequency MHz | Crystal Dia (mm) | Nominal Focus (mm) | Probe Size L x W x H (mm) | Connector |
|---------------|---------------|------------------|--------------------|---------------------------|-----------|
| ATC 2.5/10-L  | 2.5           | 10               | 12                 | 30 x 30 x 28              | Lemo 00   |
| ATC 4/10-L    | 4             |                  |                    |                           |           |
| ATC 5/10-L    | 5             |                  | 8                  |                           |           |
| ATC 5/10 SF-L |               |                  |                    |                           |           |
| ATC 1/20-L    | 1             | 20               | 28                 | 40 x 40 x 34.5            |           |
| ATC 2/20-L    | 2             |                  |                    |                           |           |
| ATC 4/20-L    | 4             |                  |                    |                           |           |

## 2.8 High Temperature Twin Crystal Compression Wave Transducers

Durable steel cased twin compression wave transducers with side entry connectors. (See section 4 for the full range of high temperature transducers).

- Recommended temperature rating:
  - Continuously at 120°C
  - Intermittently at 200°C i.e. 10 sec contact with 1 minute air cooling



SSHTC 4/10 Probe



SSHTC 4/6 Probe

| Product Code | Frequency MHz | Crystal Dia (mm) | Nominal Focus (mm) | Probe Size Dia x H (mm) | Connector |
|--------------|---------------|------------------|--------------------|-------------------------|-----------|
| SSHTC 1/20   | 1             | 20               | 28                 | 31 x 41                 | Lemo 00   |
| SSHTC 2.5/10 | 2.5           | 10               | 12                 | 20 x 33                 |           |
| SSHTC 4/6    | 4             | 6                | 8                  | 12 x 25                 | Subvis    |
| SSHTC 4/10   |               | 10               | 12                 | 20 x 33                 | Lemo 00   |
| SSHTC 4/20   |               | 20               | 28                 | 31 x 41                 |           |
| SSHTC 5/10   | 5             | 10               | 12                 | 20 x 33                 |           |
| SSHTC 5/20   |               | 20               | 28                 | 31 x 41                 |           |

## 2.9 Creep Wave Transducers

Twin crystal short focus probes for detecting near surface defects.

Note: The useful inspection range for CW probes is limited by mode conversion effects.

- Designed for use on carbon steel (Austenitic available on request)

Supplied with:

- Top entry Lemo 00 connectors
- Certificate of Individual Parameters



Creep Wave Probe

| Product Code | Frequency MHz | Crystal Size (mm) | Probe Size L x W x H (mm) | Connector |
|--------------|---------------|-------------------|---------------------------|-----------|
| CW 2/13      | 2             | 2 (6 x 13)        | 25 x 25 x 25              | Lemo 00   |
| CW 2/20      |               | 2 (10 x 20)       | 30 x 30 x 28              |           |
| CW 4/13      | 4             | 2 (6 x 13)        | 25 x 25 x 25              |           |
| CW 4/20      |               | 2 (10 x 20)       | 30 x 30 x 28              |           |

## 2.10 Automated Creep Wave Transducers

The ACW range are twin crystal short focus irrigated probes for detecting near surface defects and designed for use with the extensive range of Phoenix manual and automated scanners.

Note: The useful inspection range for ACW probes is limited by mode conversion effects.

- For scanners with 30 x 30mm forks (other options available)

Supplied with:

- Top entry Lemo 00 connectors
- Certificate of Individual Parameters
- Couplant irrigation, electrically isolated connector and M4 gimbal mountings (and wear pins)



ACW 4/13 Probe

| Product Code | Frequency MHz | Crystal Size (mm) | Probe Size L x W x H (mm) | Connector |
|--------------|---------------|-------------------|---------------------------|-----------|
| ACW 2/13     | 2             | 2 (6 x 13)        | 30 x 30 x 28              | Lemo 00   |
| ACW 2/20*    |               | 2 (10 x 20)       |                           |           |
| ACW 4/13     | 4             | 2 (6 x 13)        |                           |           |
| ACW 4/20*    |               | 2 (10 x 20)       |                           |           |

\*ACW 4/20 and ACW 2/20 do not include wear pins.

## 2.11 Single Crystal Angle Compression Wave Transducers

Single crystal angled beam compression wave transducers are used for the inspection of coarse grained and attenuative materials such as stainless steel or duplex.



SAC Probe

| Product Code | Frequency MHz | Crystal Dia (mm) | Probe Size L x W x H (mm) | Angle A°       | Connector |         |
|--------------|---------------|------------------|---------------------------|----------------|-----------|---------|
| SAC 2/*A     | 2             | 10               | 29 x 16 x 20              | 38, 45, 60, 70 | Subvis    | Lemo 00 |
| SAC 2.5/*A   | 2.5           |                  |                           |                |           |         |
| SAC 4/*A     | 4             |                  |                           |                |           |         |
| LAC 1/*A     | 1             | 20               | 52 x 26 x 28              |                |           |         |
| LAC 2/*A     | 2             |                  |                           |                |           |         |
| LAC 4/*A     | 4             |                  |                           |                |           |         |

\*A - Please insert angle required. Additional charge for non-standard angles.

## 2.12 Twin Crystal Angled Compression Wave Transducers

TAC probes can be used on a wide range of materials. They offer improved resolution and signal-to-noise ratio when inspecting coarse-grained and attenuative materials due to the in-built focussing of the probes.

- Standard TAC probes are designed for use on carbon steel. If inspecting other materials please state this when placing an order.
- Other focal depths and frequencies available on request

Supplied with:

- Top entry Lemo 00 connectors
- Certificate of Individual Parameters (pre-contouring)



Range of TAC Probes

| Product Code | Frequency MHz | Angle A°   | Crystal Size (mm) | Probe Size L x W x H (mm) | Focal Depth (mm) | Connector |
|--------------|---------------|------------|-------------------|---------------------------|------------------|-----------|
| TAC F/A/25   | 2, 4          | 45, 60, 70 | 2 (6 x 13)        | 25 x 25 x 25              | 12               | Lemo 00   |
| TAC F/A/30   |               |            | 2 (8 x 15)        | 30 x 30 x 28              | 18               |           |

Additional charges apply for non-standard:

- Angles, Frequencies and Focal depths
- Probes for other material velocities
- Contouring

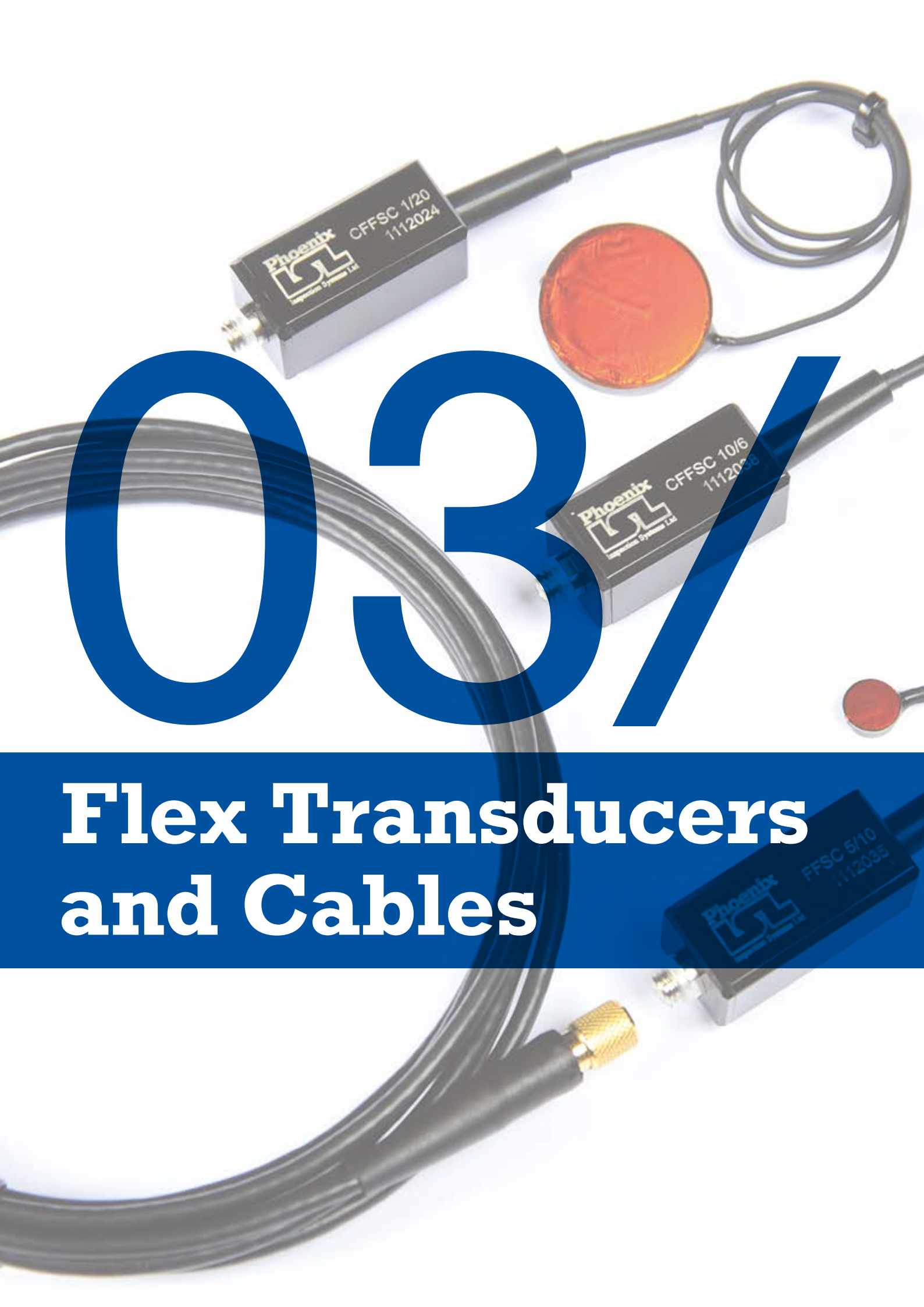
- Probe dimensions supplied exclude connectors, gimbal pins and couplant nozzles
- Probe diameter measurements are to the widest point
- Contouring available per probe (please specify relative to beam direction)
- Please refer to Section 8.4 for transducer certificate and document options

- Technical datasheets available free of charge upon request, for certain transducers across the range
- Conditions of sale are available upon request
- Certificate of Conformity supplied free of charge with all probes

**For further information on Compression Wave Transducers or to place an order, contact the sales team:**

**t:** +44 (0) 1925 826000 | **e:** sales@phoenixisl.com

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The background image shows three Phoenix LGL flex transducers and their associated cables. The top transducer is labeled 'CFFSC 1/20 1112024' and has a black cable with a coiled end. The middle transducer is labeled 'CFFSC 10/6 1112038' and has a black cable with a braided section. The bottom transducer is labeled 'FFSC 5/10 1112035' and has a black cable with a braided section. A large blue '03/' is overlaid on the image, partially obscuring the transducers and cables.

# 03/

## **Flex Transducers and Cables**

## Flex Transducers and Cables



Flex transducers are ideal for inspecting radius areas of composites and accessing complex geometries in metals, such as weld cap areas or castings.

The transducers are thin, compliant ultrasonic probes that can conform to curved surfaces using finger-tip pressure.

Flex transducers are made of a thin but durable piezo-electric material that is soft enough to bend and can be shaped to suit curved geometry.

The Flex series are available as single element (FFSC) and composite single element (CFFSC).

### 3.1 Flex Transducers – Single Element, Microdot

| Product Code | Frequency MHz | Crystal Dia (mm) |
|--------------|---------------|------------------|
| FFSC 1/10    | 1             | 10               |
| FFSC 1/20    |               | 20               |
| FFSC 2/6     | 2             | 6                |
| FFSC 2/10    |               | 10               |
| FFSC 2/15    |               | 15               |
| FFSC 2/20    |               | 20               |
| FFSC 3.5/6   | 3.5           | 6                |
| FFSC 3.5/10  |               | 10               |
| FFSC 3.5/15  |               | 15               |
| FFSC 3.5/20  |               | 20               |
| FFSC 5/6     | 5             | 6                |
| FFSC 5/10    |               | 10               |
| FFSC 5/15    |               | 15               |
| FFSC 5/20    |               | 20               |
| FFSC 10/6    | 10            | 6                |
| FFSC 10/10   |               | 10               |

### 3.2 Flex Transducers – Single Element (Composite), Microdot

| Product Code | Frequency MHz | Crystal Dia (mm) |
|--------------|---------------|------------------|
| CFFSC 1/10   | 1             | 10               |
| CFFSC 1/20   |               | 20               |
| CFFSC 2/6    | 2             | 6                |
| CFFSC 2/10   |               | 10               |
| CFFSC 2/15   |               | 15               |
| CFFSC 2/20   |               | 20               |
| CFFSC 3.5/6  | 3.5           | 6                |
| CFFSC 3.5/10 |               | 10               |
| CFFSC 3.5/15 |               | 15               |
| CFFSC 3.5/20 |               | 20               |
| CFFSC 5/6    | 5             | 6                |
| CFFSC 5/10   |               | 10               |
| CFFSC 5/15   |               | 15               |
| CFFSC 5/20   |               | 20               |
| CFFSC 10/6   | 10            | 6                |
| CFFSC 10/10  |               | 10               |

### 3.3 Cables for use with Flex Transducers, Microdot

| Product Code | Description     | Instrument Connector |
|--------------|-----------------|----------------------|
| PCL00-M      | Single 2m cable | Lemo 00              |
| PCL1-M       |                 | Lemo 1               |
| PCBNC-M      |                 | BNC                  |
| TPCL00-M     | Twin 2m cable   | Lemo 00              |
| TPCL1-M      |                 | Lemo 1               |
| TPCBNC-M     |                 | BNC                  |

- Please refer to Section 8.4 for transducer certificate and document options
- Technical datasheets available free of charge upon request, for certain transducers across the range
- Conditions of sale are available upon request

**For further information on Flex Transducers and Cables or to place an order, contact the sales team:**

**t:** +44 (0) 1925 826000 | **e:** sales@phoenixisl.com



# High Temperature Transducers

## High Temperature Transducers

Many applications call for transducers to be used in harsh environments, such as high temperatures. The Phoenix range of high temperature probes allow rapid and cost effective testing by removing the need to cool surfaces in advance and are available in a variety of transducer designs to perform reliably on surfaces at temperatures from 80°C to 200°C.

Special formulated high temperature couplants are required for use with these probes and care should be taken to use the correct couplant for the temperature of the component to be inspected. As a general guideline duty cycles of no more than 10 seconds with the hot surface followed by a minute of air cooling is advised. (See also section 9 for other special transducers for use in harsh environments).

### 4.1 High Temperature Twin Compression Transducers: 80°C - 100°C



HTC Probe

- HTC range - Durable plastic case**
- Recommended temperature rating:
- Continuously at 80°C
  - Intermittently at 100°C i.e. 10 sec contact with 1 minute air cooling

| Product Code                | Frequency MHz | Crystal Dia (mm) | Nominal Focus (mm) | Probe Size Dia x H (mm) | Connector         |         |
|-----------------------------|---------------|------------------|--------------------|-------------------------|-------------------|---------|
| HTC 2.5/10                  | 2.5           | 10               | 12                 | 27 x 30                 | Subvis            | Lemo 00 |
| HTC 4/10                    | 4             |                  |                    |                         |                   |         |
| HTC 5/10                    | 5             |                  |                    |                         |                   |         |
| HTC 5/5<br>integral 2m lead |               | 5                | 5                  | 19-10 x 21              | Lemo No 1<br>only | -       |
| HTC 5/5<br>integral 2m lead |               |                  |                    |                         | BNC only          |         |

## 4.2 High Temperature Single Shear Wave Transducers: 120°C - 200°C



HSSW Probe

### HSSW Range - Metal case

Recommended temperature rating:

- Continuously at 120°C
- Intermittently at 200°C i.e. 10 sec contact with 1 minute air cooling

| Product Code | Frequency MHz | Crystal Dia (mm) | Probe Size L x W x H (mm) | Angle A°       | Connector |         |
|--------------|---------------|------------------|---------------------------|----------------|-----------|---------|
| HSSW 2/*A    | 2             | 10               | 29 x 16.5 x 24            | 38, 45, 60, 70 | Subvis    | Lemo 00 |
| HSSW 4/*A    | 4             |                  |                           |                |           |         |

\*A - Please insert angle required. Additional charge for non-standard angles. Angles are measured at RTP ~20°C

## 4.3 High Temperature Stainless Steel Compression Wave Transducers



SSHTC 4/10 Probe



SSHTC 4/6 Probe

### SSHSC (single compression) and SSHTC (twin compression) ranges - Stainless Steel case

Durable steel cased compression wave transducers with side entry connectors.

Recommended temperature rating:

- Continuously at 120°C
- Intermittently at 200°C i.e. 10 sec contact with 1 minute air cooling

| Product Code | Frequency MHz | Crystal Dia (mm) | Nominal Focus (mm) | Probe Size Dia x H (mm) | Connector |
|--------------|---------------|------------------|--------------------|-------------------------|-----------|
| SSHSC 4/10   | 4             | 10               | N/A                | 20 x 30                 | Lemo 00   |
| SSHTC 1/20   | 1             | 20               | 28                 | 31 x 41                 |           |
| SSHTC 2/20L  | 2             |                  |                    |                         |           |
| SSHTC 2.5/10 | 2.5           | 10               | 12                 | 20 x 33                 |           |
| SSHTC 4/6    | 4             | 6                | 8                  | 12 x 25                 | Subvis    |
| SSHTC 4/10   |               | 10               | 12                 | 20 x 33                 | Lemo 00   |
| SSHTC 4/20   |               | 20               | 28                 | 31 x 41                 |           |
| SSHTC 5/10   | 5             | 10               | 12                 | 20 x 33                 |           |
| SSHTC 5/20   |               | 20               | 28                 | 31 x 41                 |           |

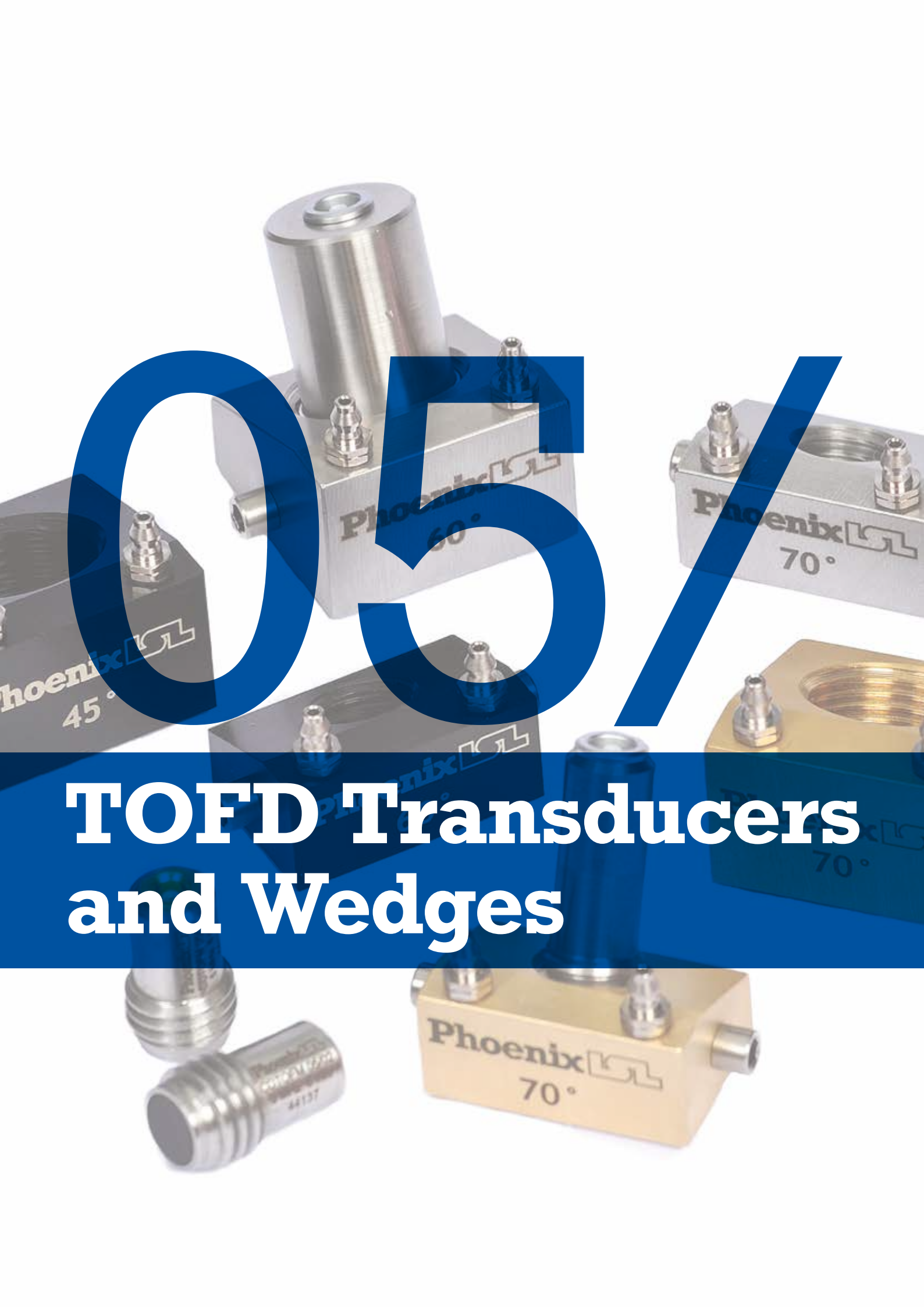
- Probe dimensions supplied exclude connectors, gimbal pins and couplant nozzles
- Probe diameter measurements are to the widest point
- Contouring available per probe (please specify relative to beam direction)
- Please refer to Section 8.4 for transducer certificate and document options

- Technical datasheets available free of charge upon request, for certain transducers across the range
- Conditions of sale are available upon request
- Certificate of Conformity supplied free of charge with all probes

**For further information on High Temperature Transducers or to place an order, contact the sales team:**

**t:** +44 (0) 1925 826000 | **e:** sales@phoenixisl.com

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# TOFD Transducers and Wedges

## TOFD Transducers and Wedges

TOFD transducers and wedges generate refracted longitudinal waves in steel. These highly damped longitudinal wave probes provide a high resolution and performance.

Phoenix manufactures a wide range of composite and non-composite TOFD transducers of varying frequencies from 2MHz to 15MHz and crystal diameters ranging from approximately 3mm (0.125") to 20mm (0.787"). They are for use with the Phoenix range of TOFD wedges.

### 5.1 De-mountable Piezo-composite TOFD Transducers

Phoenix offers a full range of transducers designed specifically for TOFD applications. They are highly damped transducers in a threaded housing, for use with demountable wedges in piezo-composite materials.

- Case height 30mm (approximately)
- For use with Phoenix ISL TOFD wedges
- Probes fitted with Lemo 00 connectors



M12 TOFD Probe



M20 TOFD Probe

| Product Code | Frequency MHz | Crystal Dia (mm) | Probe Size Dia x H (mm) | Thread Size | Connector |
|--------------|---------------|------------------|-------------------------|-------------|-----------|
| CDTOF 2/02   | 2             | 6                | 10 x 30                 | M12         | Lemo 00   |
| CDTOF 2/04   |               | 12               | 17 x 30                 | M20         |           |
| CDTOF 3.5/03 | 3.5           | 9                |                         |             |           |
| CDTOF 3.5/04 |               | 12               |                         |             |           |
| CDTOF 5/01   | 5             | 3                | 10 x 30                 | M12         |           |
| CDTOF 5/02   |               | 6                |                         |             |           |
| CDTOF 5/03   |               | 9                | 17 x 30                 | M20         |           |
| CDTOF 5/04   |               | 12               |                         |             |           |
| CDTOF 7.5/01 | 7.5           | 3                | 10 x 30                 | M12         |           |
| CDTOF 7.5/02 |               | 6                |                         |             |           |
| CDTOF 10/01  | 10            | 3                |                         |             |           |
| CDTOF 10/02  |               | 6                |                         |             |           |
| CDTOF 15/01  | 15            | 3                |                         |             |           |
| CDTOF 15/02  |               | 6                |                         |             |           |

## 5.2 De-mountable Non-Composite TOFD Transducers

Highly damped ceramic faced transducers in a threaded housing, For use with high temperature wedges - see Sections 5.9 and 5.10.

- Case height 30mm
- Probes fitted with Lemo 00 connectors



M12 TOFD Probe



M20 TOFD Probe

| Product Code | Frequency MHz | Crystal Dia (mm) | Probe Size Dia x H (mm) | Thread Size | Connector |
|--------------|---------------|------------------|-------------------------|-------------|-----------|
| DTOF 2/04    | 2             | 12               | 10 x 30                 | M20         | Lemo 00   |
| DTOF 2/06    |               | 20               | 17 x 30                 | M30         |           |
| DTOF 3.5/03  | 3.5           | 9                |                         | M20         |           |
| DTOF 3.5/04  |               | 12               |                         |             |           |
| DTOF 5/01    | 5             | 3                | 10 x 30                 | M12         |           |
| DTOF 5/02    |               | 6                |                         |             |           |
| DTOF 5/03    |               | 9                | 17 x 30                 | M20         |           |
| DTOF 5/04    |               | 12               |                         |             |           |
| DTOF 7.5/01  | 7.5           | 3                | 10 x 30                 | M12         |           |
| DTOF 7.5/02  |               | 6                |                         |             |           |
| DTOF 10/01   | 10            | 3                |                         |             |           |
| DTOF 10/02   |               | 6                |                         |             |           |
| DTOF 15/01   | 15            | 3                |                         |             |           |
| DTOF 15/02   |               | 6                |                         |             |           |

5.3 Mini TOFD Transducers

Highly damped TOFD transducers, for use in confined spaces.

- Case height 20mm
- Probes fitted with MCX connector only



M12 Mini TOFD Probe

| Product Code | Frequency MHz | Crystal Dia (mm) | Thread Size | Connector |
|--------------|---------------|------------------|-------------|-----------|
| DTOFM-5/01   | 5             | 3                | M12         | MCX       |
| DTOFM-10/01  | 10            |                  |             |           |
| DTOFM-15/01  | 15            |                  |             |           |
| DTOFM-5/02   | 5             | 6                |             |           |

5.4 Piezo-composite Mini TOFD Transducers

Highly damped TOFD transducers in a piezo-composite material, for use in confined spaces.

- Case height 20mm
- Probes fitted with MCX connector only



CDTOFM Probes

| Product Code | Frequency MHz | Crystal Dia (mm) | Thread Size | Connector |
|--------------|---------------|------------------|-------------|-----------|
| CDTOFM-5/01  | 5             | 3                | M12         | MCX       |
| CDTOFM-10/01 | 10            |                  |             |           |
| CDTOFM-15/01 | 15            |                  |             |           |
| CDTOFM-5/02  | 5             | 6                |             |           |

## TOFD Wedges

Phoenix produces a wide range of Time of Flight Diffraction wedges manufactured from durable plastic, brass or stainless steel. The wedges fit the universal Metric Threaded probes (M12, M20 and M30) and are suitable for use with the Phoenix range of TOFD probes.

- All TOFD wedges are supplied with M3 irrigation channels as standard



### Technical Specification

- Sound Velocity: 2320m/s.
- Beam angles specified are for longitudinal waves.
- Nozzle fits a 2.5-3mm tube.
- Gimbal centre is 7.00mm from wedge base.
- Gimbal is 5mm Ø x 3.85mm long (hex 3mm key).
- All wedges are irrigated as standard and can be coupled with couplant gel or water as required.

| Wedge Product Code | Beam Angle | Thread Size | To Fit Probe Types          | W x L (mm) | Wedge Delay |      | Emission point (mm from front) |
|--------------------|------------|-------------|-----------------------------|------------|-------------|------|--------------------------------|
|                    |            |             |                             |            | mm          | µs   |                                |
| WTOFI 12/45        | 45°        | M12         | M12 DTOF and CDTOF 3-6mm Ø  | 30 x 20    | 7.1         | 3.06 | 8                              |
| WTOFI 12/60        | 60°        |             |                             |            | 7.0         | 3.01 |                                |
| WTOFI 12/70        | 70°        |             |                             |            | 7.0         | 3.01 |                                |
| WTOFI 20/45        | 45°        | M20         | M20 DTOF and CDTOF 9-12mm Ø | 30 x 30    | 8.1         | 3.42 | 13                             |
| WTOFI 20/60        | 60°        |             |                             |            | 7.5         | 3.25 |                                |
| WTOFI 20/70        | 70°        |             |                             |            | 7.5         | 3.25 |                                |
| WTOFI 30/45        | 45°        | M30         | M30 DTOF and CDTOF 20mm Ø   | 40 x 45    | 7.5         | 3.25 | 20                             |
| WTOFI 30/60        | 60°        |             |                             |            | 7.5         | 3.25 |                                |
| WTOFI 30/70        | 70°        |             |                             |            | 7.5         | 3.25 |                                |

Wedges can be contoured to suit any surface profile - Diameter and direction must be stated.

### Accessories

- Wear Plates or Couplant Skids must be ordered with the wedge as the addition of M3 x 5 deep hole is required. Wear plates are available for the front and rear of the wedge.
- Side Skids are available but incompatible with tool-post applications.

### Usage

Couplant must be applied to the probe face and the wedge shoe during use (this can be pumped or applied manually). Phoenix Inspection Systems Limited assumes no responsibility, explicit or implicit, if these results are found to vary under different test conditions.

5.5 De-mountable TOFD Wedges - Plastic

For use with DTOF and CDTOF transducers. Manufactured in black plastic with irrigation and gimbal pin options.

N.B. M30 thread wedges are 40mm wide. All other wedges are 30mm wide

■ Contoured wedges available on request



Plastic De-mountable TOFD Wedges

| Product Code        | Beam Angle                                  | Thread Size |
|---------------------|---------------------------------------------|-------------|
| WTOFI 12/45         | 45°                                         | M12         |
| WTOFI 12/60         | 60°                                         |             |
| WTOFI 12/70         | 70°                                         |             |
| WTOFI 20/45         | 45°                                         | M20         |
| WTOFI 20/60         | 60°                                         |             |
| WTOFI 20/70         | 70°                                         |             |
| WTOFI 30/45         | 45°                                         | M30         |
| WTOFI 30/60         | 60°                                         |             |
| WTOFI 30/70         | 70°                                         |             |
| COUPLANT SKIDS - FR | 1 set per wedge<br>(1 x front and 1 x rear) |             |

Additional charges apply for non-standard wedge angles and contoured wedges.

5.6 De-mountable TOFD Wedges - Stainless Steel

For use with DTOF and CDTOF transducers. Manufactured in stainless steel with irrigation and gimbal pin options.  
N.B. M30 thread wedges are 40mm wide. All other wedges are 30mm.

■ Contoured wedges available on request



Stainless Steel De-mountable TOFD Wedges

| Product Code        | Beam Angle                                  | Thread Size |
|---------------------|---------------------------------------------|-------------|
| WTOF-SSI-12/45      | 45°                                         | M12         |
| WTOF-SSI-12/60      | 60°                                         |             |
| WTOF-SSI-12/70      | 70°                                         |             |
| WTOF-SSI-20/45      | 45°                                         | M20         |
| WTOF-SSI-20/60      | 60°                                         |             |
| WTOF-SSI-20/70      | 70°                                         |             |
| WTOF-SSI-30/45      | 45°                                         | M30         |
| WTOF-SSI-30/60      | 60°                                         |             |
| WTOF-SSI-30/70      | 70°                                         |             |
| COUPLANT SKIDS - FR | 1 set per wedge<br>(1 x front and 1 x rear) |             |

Additional charges apply for non-standard wedge angles and contoured wedges.

5.7 De-mountable TOFD Wedges - Brass

For use with DTOF and CDTOF transducers. Manufactured in brass with irrigation and gimbal pin options.

N.B. M30 thread wedges are 40mm wide. All other wedges are 30mm.

■ Contoured wedges available on request



Brass De-mountable TOFD Wedges

| Product Code        | Beam Angle                                  | Thread Size |
|---------------------|---------------------------------------------|-------------|
| WTOF-BI-12/45       | 45°                                         | M12         |
| WTOF-BI-12/60       | 60°                                         |             |
| WTOF-BI-12/70       | 70°                                         |             |
| WTOF-BI-20/45       | 45°                                         | M20         |
| WTOF-BI-20/60       | 60°                                         |             |
| WTOF-BI-20/70       | 70°                                         |             |
| WTOF-BI-30/45       | 45°                                         | M30         |
| WTOF-BI-30/60       | 60°                                         |             |
| WTOF-BI-30/70       | 70°                                         |             |
| COUPLANT SKIDS - FR | 1 set per wedge<br>(1 x front and 1 x rear) |             |

Additional charges apply for non-standard wedge angles and contoured wedges.

## 5.8 WREN TOFD Wedges – Brass

Ideal for use with the WREN Scanner and DTOF and CDTOF transducers with a reduced land, enabling wedges to sit closer to the weld cap. Includes irrigation and gimbal pin options.

■ Contoured wedges available on request



WREN TOFD Wedge - Brass

| Product Code | Beam Angle | Thread Size | W x L (mm)<br>(Contact face) | Wedge Delay |      | Emission Point |
|--------------|------------|-------------|------------------------------|-------------|------|----------------|
|              |            |             |                              | mm          | µs   |                |
| WRENI 12/45  | 45°        | M12         | 30 x 8.5                     | 10.3        | 4.44 | 4              |
| WRENI 12/60  | 60°        |             | 30 x 9                       | 10.0        | 4.31 |                |
| WRENI 12/70  | 70°        |             |                              | 9.8         | 4.22 |                |

Additional charges apply for non-standard wedge angles and contoured wedges.

## 5.9 High Temperature WREN TOFD Wedges – Stainless Steel

Ideal for use with the WREN Scanner and DTOF transducers. The wedge is designed to withstand 200°C, however the temperature limit of the transducer must be considered. Includes irrigation and gimbal pin options.

■ Contoured wedges available on request

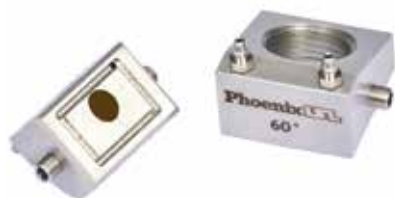
| Product Code     | Beam Angle | Thread Size | W x L (mm)<br>(Contact face) | Wedge Delay |      | Emission Point |
|------------------|------------|-------------|------------------------------|-------------|------|----------------|
|                  |            |             |                              | mm          | µs   |                |
| WRENSSI HT 12/45 | 45°        | M12         | 30 x 8.5                     | 10.3        | 4.20 | 4              |
| WRENSSI HT 12/60 | 60°        |             | 30 x 9                       | 10.0        | 4.08 |                |
| WRENSSI HT 12/70 | 70°        |             |                              | 9.8         | 4.00 |                |

Additional charges apply for non-standard wedge angles and contoured wedges.  
Wedge delay times measured at 20°C.

## 5.10 High Temperature TOFD Wedges – Stainless Steel

Can be used with the full range of Phoenix scanners and DTOF transducers. The material used in this wedge is designed to withstand 200°C, however the temperature limit of the transducer must be considered. Includes irrigation and gimbal pin options.

- Contoured wedges available on request



High Temp TOFD Wedges -  
Stainless Steel

| Product Code     | Beam Angle | Thread Size | W x L (mm)<br>(Contact face) | Wedge Delay |      | Emission Point |  |
|------------------|------------|-------------|------------------------------|-------------|------|----------------|--|
|                  |            |             |                              | mm          | µs   |                |  |
| WTOFSSI HT 12/45 | 45°        | M12         | 30 x 20                      | 7.1         | 2.90 | 8              |  |
| WTOFSSI HT 12/60 | 60°        |             |                              |             |      |                |  |
| WTOFSSI HT 12/70 | 70°        |             |                              | 7.0         | 2.86 |                |  |
| WTOFSSI HT 20/45 | 45°        | M20         | 30 x 30                      | 8.1         | 3.31 | 13             |  |
| WTOFSSI HT 20/60 | 60°        |             |                              | 7.5         | 3.06 |                |  |
| WTOFSSI HT 20/70 | 70°        |             |                              |             |      |                |  |

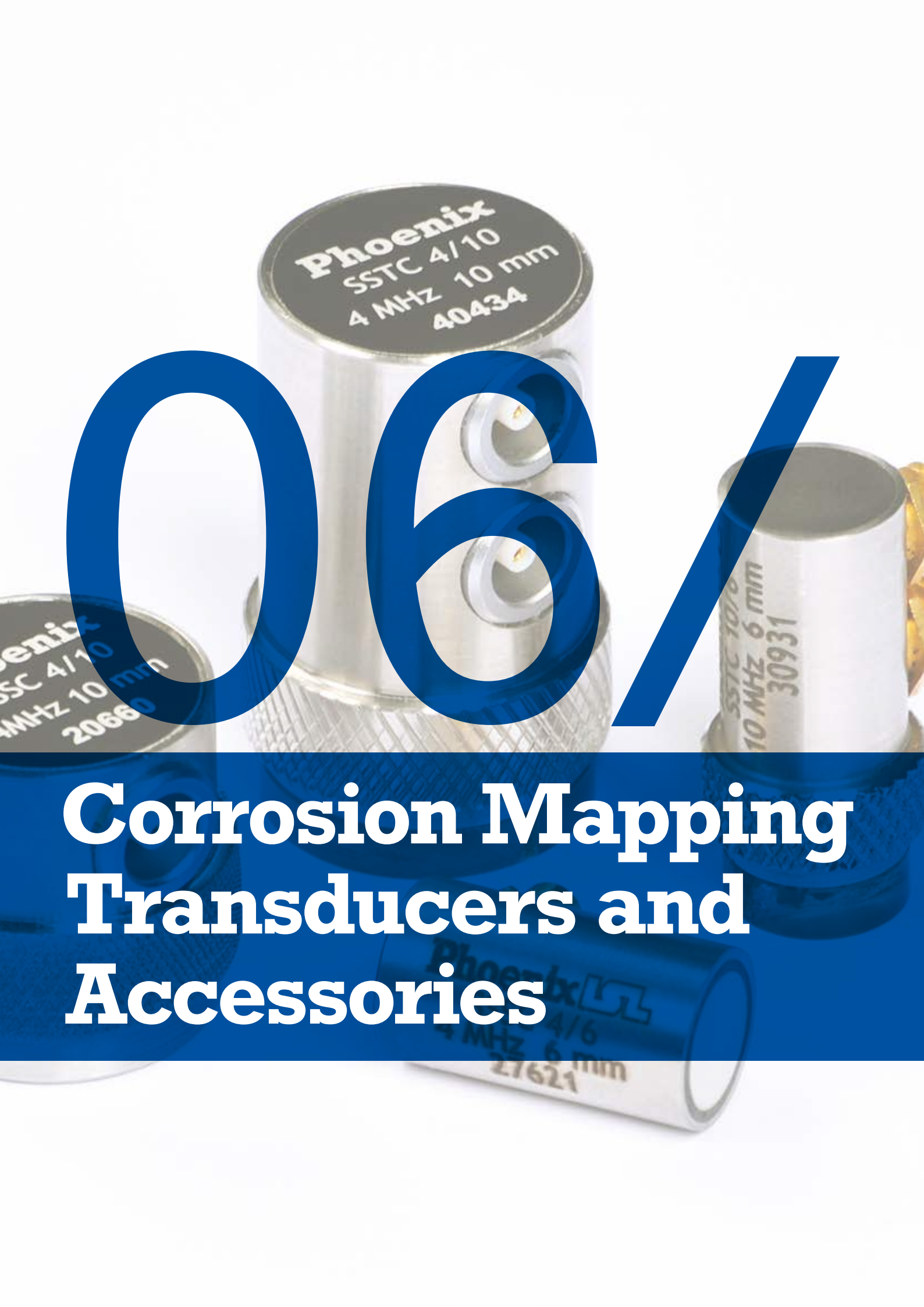
Additional charges apply for non-standard wedge angles and contoured wedges.  
Wedge delay times measured at 20°C.

- Probe dimensions supplied exclude connectors, gimbal pins and couplant nozzles
- Probe diameter measurements are to the widest point
- Contouring available per probe (please specify relative to beam direction)
- Please refer to Section 8.4 for transducer certificate and document options
- Technical datasheets available free of charge upon request, for certain transducers across the range
- Conditions of sale are available upon request
- Certificate of Conformity supplied free of charge with all probes

**For further information on TOFD Transducers and Wedges or to place an order, contact the sales team:**

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The background image shows several cylindrical metal transducers. The top one is labeled 'Phoenix SSTC 4/10 4 MHz 10 mm 40434'. To its left is another labeled 'Phoenix SSTC 4/10 4 MHz 10 mm 20660'. To its right is one labeled 'SSTC 10/6 10 MHz 6 mm 30931'. At the bottom is one labeled 'Phoenix SSTC 4/6 4 MHz 6 mm 27621'. A large blue '06/' is overlaid on the image.

# 06/

## Corrosion Mapping Transducers and Accessories

## Corrosion Mapping Transducers and Accessories

Corrosion mapping identifies and maps variations in material thickness due to corrosion. Results for corrosion mapping provide a high degree of repeatability and the advantage of position and size data for every flaw. This can be compared for repeat scans of the same area to track flaw growth or corrosion rates both generally and for individual pits.

The Phoenix range of standard and high temperature corrosion mapping transducers complement the compression wave probe range and are compatible with Phoenix automatic or semi-automatic scanners. They are housed in a durable steel case with side entry connections. The range is popular as stand-alone transducers for manual inspections or to enable fitting a detachable Light Emitting Diode on top of the transducer which can be utilised with various manufacturers video tracking systems.

### 6.1 Twin Crystal Compression Wave Transducers

The SSTC range are housed in a durable steel case with side entry connections, which enable the fitting of a detachable tracking facility.



SSTC 4/10 Probe



SSTC 4/6 Probe

| Product Code             | Frequency MHz | Twin Crystal Dia (mm) | Nominal Focus | Probe Size Dia x H (mm) | Connector |
|--------------------------|---------------|-----------------------|---------------|-------------------------|-----------|
| SSTC 2/20                | 2             | 20                    | 28            | 31 x 41                 | Lemo 00   |
| SSTC 2.5/10              | 2.5           | 10                    | 12            | 20 x 33                 |           |
| SSTC 4/6                 | 4             | 6                     | 8             | 12 x 24                 | Subvis    |
| SSTC 4/10                |               | 10                    | 12            | 20 x 33                 | Lemo 00   |
| SSTC 4/20                |               | 20                    | 28            | 31 x 41                 |           |
| SSTC 5/10                | 5             | 10                    | 12            | 20 x 33                 |           |
| SSTC 5/20                |               | 20                    | 28            | 31 x 41                 |           |
| SSTC 10/6<br>12mm Ø case | 10            | 6                     | 3             | 12 x 25                 | Subvis    |
| SSTC 10/6<br>20mm Ø case |               |                       |               | 20 x 33                 | Lemo 00   |

## 6.2 High Temperature Twin Crystal Compression Wave Transducers

The SSHTC range are housed in a durable steel case with side entry connections, which enable the fitting of a detachable tracking facility. Recommended temperature rating:

- Continuously at 120°C
- Intermittently at 200°C i.e. 10 sec contact with 1 minute air cooling



SSHTC 4/10 Probe

| Product Code | Frequency MHz | Crystal Dia (mm) | Nominal Focus | Probe Size Dia x H (mm) | Connector |
|--------------|---------------|------------------|---------------|-------------------------|-----------|
| SSHTC 1/20   | 1             | 20               | 28            | 31 x 41                 | Lemo 00   |
| SSHTC 2/20   | 2             |                  |               |                         |           |
| SSHTC 2.5/10 | 2.5           | 10               | 12            | 20 x 33                 | Subvis    |
| SSHTC 4/6    | 4             | 6                | 8             | 12 x 25                 |           |
| SSHTC 4/10   |               | 10               | 12            | 20 x 33                 | Lemo 00   |
| SSHTC 4/20   |               | 20               | 28            | 31 x 41                 |           |
| SSHTC 5/10   | 5             | 10               | 12            | 20 x 33                 |           |
| SSHTC 5/20   |               | 20               | 28            | 31 x 41                 |           |

## 6.3 IR Emitters

Phoenix offer a range of infrared emitters that can be fitted temporarily or permanently to the range of corrosion mapping probes. These emitters when used in conjunction with a C-Scan system enable accurate corrosion maps to be generated whilst still scanning the work piece manually.

- Supplied as standard with Lemo 00 connectors



IR Emitter 6mm



IR Emitter 10mm



IR Emitter 20mm

| Product Code   | Description                                                                  |
|----------------|------------------------------------------------------------------------------|
| DEM-6 Push On  | Infra red emitter for 6mm range. Push fit onto 10mm dia probe. 2m cable      |
| DEM-6 Glue On  | Infra red emitter to glue on any probe                                       |
| DEM-10 Push On | Infra red emitter for 10mm range. Push fit onto 10-18mm dia probes. 2m cable |
| DEM-20 Push On | Infra red emitter for 20mm range. Push fit onto 29mm dia probe max. 2m cable |
| Permanent      | For fitting to SSTC 4/10 Probe 2m cable                                      |

- 
- Probe dimensions supplied exclude connectors, gimbal pins and couplant nozzles
  - Probe diameter measurements are to the widest point
  - Contouring available per probe (please specify relative to beam direction)
  - Please refer to Section 8.4 for transducer certificate and document options

- Technical datasheets available free of charge upon request, for certain transducers across the range
- Conditions of sale are available upon request
- Certificate of Conformity supplied free of charge with all probes

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**For further information on Corrosion Mapping Transducers or to place an order, contact the sales team:**

**t:** +44 (0) 1925 826000 | **e:** [sales@phoenixisl.com](mailto:sales@phoenixisl.com)

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# 071

## Calibration Blocks

PISL PHASED ARRAY  
TEST BLOCK  
12/17/05

W20/26

2149/33  
40° 50° 60° 65°

60° 70° 75°

## 7.1 Calibration Blocks

All calibration blocks are engraved with a unique serial number and certified to the applicable standard. All blocks are supplied with a calibration certificate.

### Quality Assurance

- Each block is engraved with a unique serial number and fully certified to the applicable standard
- Material reports are available but must be requested at the point of ordering
- A full independent NAMAS/UKAS approval for physical measurements is offered, if required (price on application)

| Product                                                                                                         | Description                                                                                                                                                                                                                                                                                                                               | Specification    | Size (mm)                                                                             |
|-----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------------------------------------------------------------------------|
| BLOCK NO 1<br>                 | Calibration standard for the calibration of shear and compression wave probes, time base and sensitivity settings, verification of beam angle, emission point, resolution, <b>3mm Ø target hole</b> . Includes case. (Stainless Steel and Aluminium conform dimensionally to EN ISO 2400:2012).                                           | EN ISO 2400 2012 | 25 x 100 x 300<br>(weight 6.2kgs)<br><br>Carbon Steel<br>Stainless Steel<br>Aluminium |
| BLOCK NO 1<br>50mm THICK<br>   | Calibration standard for the calibration of shear and compression wave probes, time base and sensitivity settings, verification of beam angle, emission point, resolution, <b>3mm Ø target hole</b> . Includes case.                                                                                                                      | EN ISO 2400 2012 | 50 x 100 x 300<br>(weight 9.6kgs)<br><br>Carbon Steel                                 |
| V1 (A2)<br>                   | V1 (A2) Calibration standard for the calibration of shear and compression wave probes, time base and sensitivity settings, verification of beam angle, emission point, resolution, <b>1.5mm Ø target hole</b> . Includes case. (Compliant with EN ISO 2400:2012).                                                                         | BS2704           | 25 x 100 x 300<br>(weight 6.2kgs)<br><br>Carbon Steel<br>Stainless Steel<br>Aluminium |
| V1 (A2)<br>50mm THICK<br>    | V1 (A2) Calibration standard for the calibration of shear and compression wave probes, time base and sensitivity settings, verification of beam angle, emission point, resolution, <b>1.5mm Ø target hole</b> . Includes case. (Compliant with EN ISO 2400:2012).                                                                         | BS2704           | 50 x 100 x 300<br>(weight 9.6kgs)<br><br>Carbon Steel                                 |
| BLOCK NO 2<br>               | Miniature calibration block for site checking of shear wave probes, verification of beam angles, calibration of time base and sensitivity settings with <b>5mm Ø target hole</b> . Includes case. (Stainless Steel and Aluminium conform dimensionally to EN ISO 7963:2010).                                                              | EN ISO 7963 2010 | 12.5 Thick<br><br>Carbon Steel<br>Stainless Steel<br>Aluminium                        |
| V2/12/5 (A4)<br>             | V2/12.5 (A4) Miniature calibration block for site checking of shear wave probes, verification of beam angles, calibration of time base and sensitivity settings with <b>1.5mm Ø target hole</b> . Includes case. (Compliant with EN ISO 7963:2010).                                                                                       | BS2704           | 12.5 Thick<br><br>Carbon Steel<br>Stainless Steel<br>Aluminium                        |
| BLOCK NO 2<br>20mm THICK<br> | 20mm Thick miniature calibration block with <b>5mm Ø target hole</b> . For site checking of shear wave probes, verification of beam angles, calibration of time base and sensitivity settings. The thicker 20mm block reduces side wall echoes. Includes case. (Stainless Steel and Aluminium conform dimensionally to EN ISO 7963:2010). | EN ISO 7963 2010 | 20 Thick<br><br>Carbon Steel<br>Stainless Steel<br>Aluminium                          |
| V2/20 (A4)<br>               | 20mm Thick miniature calibration block with <b>1.5mm Ø target hole</b> . For site checking of shear wave probes, verification of beam angles, calibration of time base and sensitivity settings. The thicker 20mm block reduces side wall echoes. Includes case. (Compliant with EN ISO 7963:2010).                                       | BS2704           | 20 Thick<br><br>Carbon Steel<br>Stainless Steel<br>Aluminium                          |

| Product                                                                                                                  | Description                                                                                                                                                                                                                                                    | Specification     | Size (mm)                  |
|--------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------------------|
| BCB IOW (A5)<br>                        | Beam calibration block for beam profile measurement and resolution checks for shear wave probes, also sensitivity levels for shear and compression wave probes. <b>9 x 1.5mm Ø target holes.</b> Includes case.                                                | BS2704            | 50 x 75 x 305              |
| A6<br>                                  | For checking the dominant frequency of compression wave probes, the pulse length dead zone and resolving power for both shear and compression wave probes as per BS4331 Part 3 1974. (1987).                                                                   | BS2704            | 25 x 50 x 150              |
| A7 (RTB)<br>                            | Resolution Block for checking shear wave probe resolution as per BS4331 Part 3 1974. 4 steps at 2, 3, 4 and 5mm.                                                                                                                                               | -                 | 74 radius x 75 thick (4kg) |
| BTB<br>                                 | Contoured Boiler Tube Calibration Block (BTB) - boiler tube block for calibrating low profile PA probes for use with Bracelet scanner, 3 x 1.5mm dia SDH and contoured for 1.9" OD (1.5" NPS) (other contours available incl. 2" / 2.5" / 3" / 3.5" / 4" NPS). | 3 x 1.5mm dia SDH | 25 x 20 x 165 (0.6kg)      |
|                                        | BTB as above with 5 x 1.5mm dia SDH                                                                                                                                                                                                                            | 5 x 1.5mm dia SDH | 25 x 20 x 165 (0.6kg)      |
|                                       | BTB as above with 5 x 1mm dia SDH                                                                                                                                                                                                                              | 5 x 1mm dia SDH   | 25 x 20 x 165 (0.6kg)      |
| Rail Block CB87<br>                   | Calibration block for the Rail industry. Includes certificate and wallet.                                                                                                                                                                                      | -                 | -                          |
| Rail Block CB91<br>                   | Calibration block for the Rail industry. Includes certificate.                                                                                                                                                                                                 | -                 | -                          |
| Flat Phased Array Test Block<br>      | Flat phased array calibration block for calibrating TCG, sensitivity, velocity and wedge delay. Includes case.                                                                                                                                                 | 3 x 1.5mm SDH     | (5.6kg)                    |
| Contoured Phased Array Test Block<br> | Contoured phased array calibration block for calibrating TCG, sensitivity, velocity and wedge delay. Contour to be advised by customer. Includes case.                                                                                                         | 3 x 1.5mm SDH     | -                          |

## 7.2 Step Wedges

Step Wedges are not covered by any EN standard, however Phoenix step wedges are manufactured to Material Specification of BSEN 12223:2000 and each step wedge is engraved with a unique serial number.

| Product                                                                                                           | Description                                                                         | Material                                     |
|-------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------|
| LSW 1-8mm Carbon Steel<br>       | 8 steps from 1mm to 8mm<br>Pad size: 15mm<br>Includes case                          | Carbon Steel                                 |
| LSW 1-8mm Aluminium<br>          | 8 steps from 1mm to 8mm<br>Pad size: 15mm<br>Includes case                          | Aluminium                                    |
| LSW 1-8mm Stainless Steel<br>    | 8 steps from 1mm to 8mm<br>Pad size: 25mm<br>Includes case                          | Stainless Steel                              |
| LSW 4-20<br>                     | 4 steps at 5, 10, 15, 20mm<br>Pad size: 20mm                                        | Carbon Steel<br>Stainless Steel<br>Aluminium |
| LSW 4-25<br>                    | 4 steps at 5, 10, 15, 20mm<br>Pad size: 25mm                                        | Carbon Steel<br>Stainless Steel              |
| LSW 1-10<br>                   | 10 steps at 1mm<br>Pad size: 15mm                                                   | Carbon Steel<br>Stainless Steel              |
| LSW 2-20<br>                   | 10 steps at 2mm<br>Pad size: 20mm                                                   | Carbon Steel                                 |
| LSW 5-25<br>                   | 5 steps at 5, 10, 15, 20, 25mm<br>Pad size: 20mm                                    | Carbon Steel<br>Stainless Steel<br>Aluminium |
| LSW 1.5- 20 Perspex holder<br> | 6 steps at 1.5, 2.5, 5, 10, 15, 20mm<br>Inserts: 25mm diameter                      | Mild Steel                                   |
| CSW - Curved Step Wedge<br>    | 5 steps at 2, 4, 6, 8, 10mm for time base calibration of thickness measuring probes | Carbon Steel                                 |

Note: Rugged fabric carry cases are included where indicated.

### Quality Assurance

- A full independent NAMAS/UKAS approval for physical measurements is offered, if required (price on application)
- Material reports also available on request

**For further information on Calibration Blocks or to place an order, contact the sales team:**

**t:** +44 (0) 1925 826000 | **e:** sales@phoenixisl.com

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# 081

## Accessories

## Accessories

In addition to transducers Phoenix offer a comprehensive range of accessories to complement their use.

### 8.1 Cables – 2m Long

Phoenix standard cables are 2m in length. Extra length cables are available to order, please contact the sales team to discuss your specific requirement.



#### Single Probe Cable – PC 2 metre

| Part Code | Instrument | Transducer             |
|-----------|------------|------------------------|
| PCL1-S    | Lemo 1     | Subvis                 |
| PCL1-L00  |            | Lemo 00                |
| PCL1-M    |            | Microdot               |
| PCL1-BNC  |            | BNC                    |
| PCL1-L1   |            | Lemo 1                 |
| PCBNC-S   | BNC        | Subvis                 |
| PCBNC-L00 |            | Lemo 00                |
| PCBNC-M   |            | Microdot               |
| PCBNC-BNC |            | BNC                    |
| PCL00-L00 | Lemo 00    | Lemo 00                |
| PCL00-S   |            | Subvis                 |
| PCL00-M   |            | Microdot               |
| PCL00-MCX |            | MCX                    |
| PCL00-MCX |            | MCX (right angle)      |
| PCL00-MRA |            | Microdot (right angle) |
| PCL1-MRA  | Lemo 1     | Microdot (right angle) |
| PCBNC-MRA | BNC        | Microdot (right angle) |
| PCL1-UHF  | Lemo 1     | UHF (Waterproof)       |
| PCBNC-UHF | BNC        | UHF (Waterproof)       |

Additional charge for Extra Length Cables.

#### Twin Probe Cable – TPC 2 metre

| Part Code  | Instrument | Transducer             |
|------------|------------|------------------------|
| TPCL1-S    | Lemo 1     | Subvis                 |
| TPCL1-L00  |            | Lemo 00                |
| TPCL1-M    |            | Microdot               |
| TPCL1-BNC  |            | BNC                    |
| TPCL1-L1   |            | Lemo 1                 |
| TPCBNC-S   | BNC        | Subvis                 |
| TPCBNC-L00 |            | Lemo 00                |
| TPCBNC-M   |            | Microdot               |
| TPCBNC-BNC |            | BNC                    |
| TPCL00-L00 | Lemo 00    | Lemo 00                |
| TPCL00-S   |            | Subvis                 |
| TPCL00-M   |            | Microdot               |
| TPCL00-MCX |            | MCX                    |
| TPCL00-MCX |            | MCX (right angle)      |
| TPCL00-MRA |            | Microdot (right angle) |
| TPCL1-MRA  | Lemo 1     | Microdot (right angle) |
| TPCBNC-MRA | BNC        | Microdot (right angle) |

Additional charge for Extra Length Cables.

## 8.2 Re-Shoe Kits

| Part Code   | Description                     |
|-------------|---------------------------------|
| REP-SSW/GSW | SSW/GSW Single Angle (10 Shoes) |
| REP-LSW     | LSW Single Angle (10 Shoes)     |
| REP-TSW     | TSW Twin Angles (10 pairs)*     |
| REP-TC10    | TC 10 (10 pairs)*               |
| REP-TC20    | TC 20 (10 pairs)*               |
| REP-TC5     | TC 5/5 (10 pairs)*              |

Please note adhesive is not supplied with re-shoe kits.

\* Acoustic barrier included.

## 8.3 Adaptors

Adaptor options are available to order and can be supplied as any combination of plugs and sockets on short 100mm tails of required cable.



BNC (M) to Lemo 1 (F)

Lemo 1 (M) to BNC (F)

| Part Code      | Adaptor Description                                |
|----------------|----------------------------------------------------|
| ADAPTOR-BNC/L1 | Adapts instrument with BNC (M) to Lemo 1 (F) cable |
| ADAPTOR-L1/BNC | Adapts instrument with Lemo 1 (M) to BNC (F) cable |

M = Male

F = Female

## 8.4 Certificates and Documents

Certificates and documents are optional and can be supplied with all transducers (please request at point of ordering).

| Certification Options |                                                                         |
|-----------------------|-------------------------------------------------------------------------|
| C-OF-C                | Certification of Conformity (per transducer)                            |
| CERT-IP               | Certificate (individual parameters of the specific transducer recorded) |
| CERT-BSEN             | Full BSEN 12668 Part 2 documentation package                            |
| CERT-SN               | Signal to Noise Curve plotted - Contact probes only (per transducer)    |
| CERT-EU               | EU Certificate of Origin (per order)                                    |
| CERT-SARA             | Saudi Arabia Certificate of Origin (per order)                          |

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**For further information about probe accessories and certificates, contact the sales team:**

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09

# Special Transducers

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**For further information about special transducers, contact the sales team:**

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## Special Transducers

### Can't find what you are looking for?...

Phoenix's custom and application specific special transducers are an alternative to our standard transducer ranges.

At Phoenix Inspection Systems Ltd, we like a challenge and can take on your particular ultrasonic transducer problems and deliver a reliable and repeatable solution.

#### Modified standard or full custom?

Often we can make a small modification to one of our standard range to deliver a very economical solution based on proven technology. If nothing in the standard range comes close, we can look at a full customised transducer to suit your application.

So where do we start? First you need to have a problem to solve. It's best if you know the specification of the transducer that you are looking for, but talk to us early as a custom transducer may help in the design of the inspection procedure, and reduce overall costs. If you need help specifying the transducer, we can assist you if you let us know your inspection requirements.

#### Inspection Standards and Codes

Phoenix transducers are manufactured in accordance with quality standard BS EN 12668-2:2010.

Some companies or countries have specific procedures or standards which specify an obsolete transducer or a transducer which is simply unavailable. Please contact us to discuss your particular specification as we are usually able to build a transducer which will match or exceed the required performance criteria.

#### Technique Development

We are frequently asked to help with novel technique development. This can require a significant deviation from accepted practices and require novel ways of thinking about an ultrasonic problem. Aerospace composites, wind turbine, marine, cable, rail, nuclear, subsea and power plants are all areas where we have provided solutions to customers that go beyond simply supplying transducers.

#### Harsh Environments

Our transducers end up in the most surprising of places, from the ocean bed (depths up to 1500m), to radiation environments that turn PTFE to chalk! We also manufacture transducers for elevated temperatures. Often, it's the coupling rather than the transducer which limits the inspection parameters. The particularities of nuclear plants severely restrict the materials that can contact the metal. We have expert knowledge of what's currently acceptable and work with various laboratories to acquire certifications of chemical composition.

#### Phased Array

We work with all the major suppliers of phased array transducers to deliver your custom solutions. Often the transducer is just the starting point with the wedge performing the difficult functions of coupling, contouring and minimising internal reflections.

**To discuss your particular special transducer requirements contact the sales team on:**

**t: +44 (0) 1925 826 000**

**e: [sales@phoenixisl.com](mailto:sales@phoenixisl.com)**



Multi-Element  
Probes



Train Scanner  
Probe



SubSea Shear  
Wave Probe



Bore Probe

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**For further information about special transducers, contact the sales team:**

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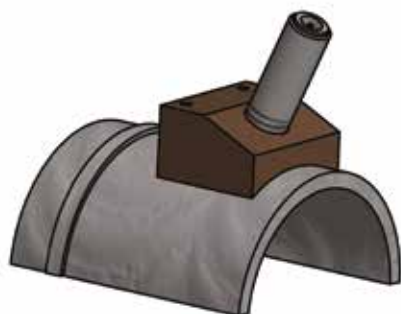
The background of the entire image is a light gray surface covered with numerous 3D question marks. In the center, the number '10' is rendered in a large, bold, blue font. A blue diagonal slash follows the '0', extending towards the right edge of the frame.

**10/**

**Useful  
Information**

## 10.1 Contouring Conventions

Transducer and Wedge contouring is available. Please specify one of the four options illustrated below, at the time of ordering.



**AOD**

Axial Outside Diameter



**COD**

Circumferential Outside Diameter



**AID**

Axial Inside Diameter



**CID**

Circumferential Inside Diameter

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**For further information and technical advice about transducers and wedges, contact the sales team:**

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