

## Ultrasonic Transducer Options



Ultrasonic Transducer Options

### At a glance

- *Wide range of probes to suit your particular substrate under inspection.*
- *Maximum measuring depth 254mm (10") - in steel.*
- *High temperature, extra resolution and Exxon specification transducers available.*

### Ultrasonic Transducer Options

Elcometer have a complete range of transducers to meet your requirements, including:

- A Range of Frequencies and Sizes
- Straight and Right Angle Transducers available as Potted or Microdot Transducers
  - *Potted Transducers:*  
Transducer cable is fixed to the transducer head
  - *Microdot Transducers:*  
Allows the user to insert the cables themselves, allowing transducer heads to be replaced quickly and easily.
- High Temperature Transducers: Temperature up to 340°C (650°F)

When selecting a transducer, it is important to choose one which will best meet your application, taking into consideration:

- The measurement range
- The type of material to be tested
- The design of the transducer probe

### Material Thickness

The thickness of materials cannot always be determined by direct measurement as access to both sides is not always possible.

The effects of corrosion and erosion at the back of a metal panel may reduce its thickness significantly yet not affect the front surface. Pipelines, for example, may appear corrosion free on the outside but can be eroded by the flow of material on the inside.

Machined or cast items may have thin walls that cannot be determined by callipers or other non-destructive tests.

| ULTRASONIC TRANSDUCER SELECTION TABLE FOR ELCOMETER 205, 206, 206DL, 208, 208DL |           |         |             |                  |        |       |              |           |            |                |                   |          |                         |                  |             |                                |                     |      |                   |
|---|-----------|---------|-------------|------------------|--------|-------|--------------|-----------|------------|----------------|-------------------|----------|-------------------------|------------------|-------------|--------------------------------|---------------------|------|-------------------|
| Measurement Range<br><br>(in steel)<br><br>mm<br><br>inches                     | Material  |         |             |                  |        |       |              |           | Probe Type |                |                   |          |                         |                  | Part Number | Frequency MHz<br>(Colour Code) | Crystal Diameter    |      | Wearface Diameter |
|   | Cast Iron | Plastic | Glass Fibre | Thin Glass Fibre | Steels | Glass | Thin Plastic | Aluminium | Potted     | Straight Probe | Right Angle Probe | Microdot | High Temp (340°C/650°F) | Extra Resolution |             |                                | Exxon Specification | mm   |                   |
| 3.8 – 50.8  | •         | •       | •           |                  |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015620                      | 1.0                 | 12.7 | 15.88             |
|   | •         | •       | •           |                  |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015621                      |                     |      |                   |
| 0.15 – 2.0  | •         | •       | •           |                  |        |       |              |           |            | •              |                   | •        |                         |                  |             | T92015622                      | (brown)             | ½    | ⅝                 |
|   | •         | •       | •           |                  |        |       |              |           |            |                | •                 | •        |                         |                  |             | T92015623                      |                     |      |                   |
| 1.5 – 101.6   | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015626                      | 2.25                | 6.35 | 9.53              |
|   | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015627                      |                     |      |                   |
| 0.06 – 4.0  | •         | •       |             | •                |        |       |              |           |            | •              | •                 | •        |                         |                  |             | T92015628                      | (red)               | ¼    | ⅝                 |
|   | •         | •       |             | •                |        |       |              |           | •          | •              |                   | •        |                         |                  |             | T92015629                      |                     |      |                   |
| 1.5 – 127.0   | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015631                      | 2.25                | 12.7 | 15.88             |
|   | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015632                      |                     |      |                   |
| 0.06 – 5.0  | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          | •                       |                  |             | T92015633                      | (red)               | ½    | ⅝                 |
|   | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          | •                       |                  |             | T92015634                      |                     |      |                   |
| 1.5 – 50.8  | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015635                      | 5.0                 | 4.76 | 6.35              |
|   | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015636                      |                     |      |                   |
| 1.02 – 152.4  | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015637                      | 5.0                 | 6.35 | 9.53              |
|   | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015638                      |                     |      |                   |
| 0.04 – 6.0  | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          | •                       |                  |             | T92015641                      | (green)             | ¼    | ⅝                 |
|   | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          | •                       |                  |             | T92015642                      |                     |      |                   |
| 1.27 – 507.7  | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015644                      | 5.0                 | 12.7 | 15.88             |
|   | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015645                      |                     |      |                   |
| 0.05 – 19.99  | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015646                      | (green)             | ½    | ⅝                 |
|   | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015647                      |                     |      |                   |
| 1.02 – 152.4  | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015648                      | 7.5                 | 6.35 | 9.53              |
|   | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015649                      |                     |      |                   |
| 0.04 – 6.0  | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015655                      | (grey)              | ¼    | ⅝                 |
|   | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015656                      |                     |      |                   |
| 0.635 – 152.4   | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  | •           | T92015657                      | 7.5                 | 6.35 | 9.53              |
|   | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  | •           | T92015658                      |                     |      |                   |
| 0.025 6.0   | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  | •           | T92015659                      | (blue)              | ¼    | ⅝                 |
|   | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  | •           | T92015660                      |                     |      |                   |
| 1.02 – 152.4  | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015661                      | 10.0                | 6.35 | 9.35              |
|   | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015662                      |                     |      |                   |
| 0.04 – 6.0  | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015663                      | (white)             | ¼    | ⅝                 |
|   | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015664                      |                     |      |                   |
| 1.52 – 254.0  | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015665                      | 10.0                | 12.7 | 15.88             |
|   | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015666                      |                     |      |                   |
| 0.06- 10.0  | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015667                      | (white)             | ½    | ⅝                 |
|   | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015668                      |                     |      |                   |
| 0.06- 10.0  | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015669                      | 10.0                | 12.7 | 15.88             |
|   | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015670                      |                     |      |                   |
| 0.06- 10.0  | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015671                      | (white)             | ½    | ⅝                 |
|   | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015672                      |                     |      |                   |
| 0.06- 10.0  | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015673                      | 10.0                | 12.7 | 15.88             |
|   | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015674                      |                     |      |                   |
| 0.06- 10.0  | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015676                      | (white)             | ½    | ⅝                 |
|   | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015677                      |                     |      |                   |
| 0.06- 10.0  | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015678                      | 10.0                | 12.7 | 15.88             |
|   | •         | •       |             | •                |        |       |              |           | •          | •              |                   |          |                         |                  |             | T92015679                      |                     |      |                   |

## Speed of Sound Reference Table

### SPEED OF SOUND THROUGH MATERIALS

Elcometer Ultrasonic Thickness Gauges can be programmed by the user to the appropriate material in two ways:

- Known standard of the same material – set the calibration to the thickness
- The frequency calibration – set the frequency to the appropriate material using the Velocity Chart below.

| Material           | km/sec | in/msec |
|--------------------|--------|---------|
| Air                | 0.33   | 0.013   |
| Aluminium 2024-T4  | 6.38   | 0.251   |
| Beryllium          | 12.88  | 0.507   |
| Boron Carbide      | 10.92  | 0.430   |
| Brass              | 4.39   | 0.173   |
| Cadmium            | 2.77   | 0.109   |
| Copper             | 4.65   | 0.183   |
| Glass (plate)      | 5.77   | 0.227   |
| Glycerine          | 1.93   | 0.076   |
| Gold               | 3.25   | 0.128   |
| Inconel            | 5.82   | 0.229   |
| Iron               | 5.89   | 0.232   |
| Iron, Cast         | 4.55   | 0.179   |
| Lead               | 2.16   | 0.085   |
| Magnesium          | 5.84   | 0.230   |
| Mercury            | 1.45   | 0.057   |
| Molybdenum         | 6.25   | 0.246   |
| Monel              | 5.36   | 0.211   |
| Motor Oil (SAE 30) | 1.75   | 0.069   |

| Material              | km/sec | in/msec |
|-----------------------|--------|---------|
| Neoprene              | 1.60   | 0.063   |
| Nickel                | 5.64   | 0.222   |
| Nylon                 | 2.69   | 0.106   |
| Platinum              | 3.96   | 0.156   |
| Plexiglass            | 2.69   | 0.106   |
| Polystyrene           | 2.34   | 0.092   |
| Polyurethane          | 1.78   | 0.070   |
| PVC                   | 2.39   | 0.094   |
| Quartz                | 5.74   | 0.226   |
| Silver                | 3.61   | 0.142   |
| Steel (4340)          | 5.84   | 0.230   |
| Steel (303 Stainless) | 5.66   | 0.223   |
| Teflon                | 1.52   | 0.060   |
| Tin                   | 3.33   | 0.131   |
| Titanium              | 6.10   | 0.240   |
| Tungsten              | 5.18   | 0.204   |
| Uranium               | 3.38   | 0.133   |
| Water                 | 1.47   | 0.058   |
| Zinc                  | 4.32   | 0.170   |

## Related products



Elcometer 205/206

These robust, hand held instruments are used for measuring the thickness of materials where access to only one side of the test piece is available. Many different materials can be measured including steel, cast iron, plastic, epoxy resin and glass fibre, etc.



Elcometer 208

The Elcometer 208 and 208DL are simple to use hand held Ultrasonic Thickness Gauges with the capability to measure material thickness whilst eliminating the thickness of the coating (on metal substrates only) making these the ideal gauges for measuring the thickness of the metal substrate without worrying about taking into account the thickness of the coating in your measurement.



Elcometer 207

Elcometer's series of precision ultrasonic thickness gauges are designed to provide accurate measurements on thin materials. Using the latest transducer designs the Elcometer 207 gauges will measure thin materials in one mode and then automatically switch to another mode when measuring thicker materials and plastics.

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