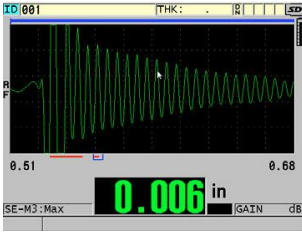


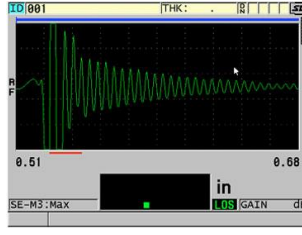


Measuring Thin Single-Layer Material Using a High-Frequency Thickness Gauge and Transducer (Above 20 MHz)

Many handheld ultrasonic corrosion thickness gauges only use dual element transducers and have an upper frequency limit of about 10 MHz. These gauges work well for most traditional corrosion applications but have a minimum thickness of about 0.020 inches or 0.5 millimeters. In contrast, ultrasonic precision thickness gauges can use single element transducers with frequencies between 0.50 and 20 MHz. Despite having a better minimum thickness capability than corrosion gauges, these instruments are still limited in their minimum thickness capability when using 20 MHz transducers. A 20 MHz single element transducer enables thickness measurements down to about 0.006–0.008 in. (0.150–0.200 mm).



M208 20 MHz delay line transducer with multiple echo separation



The gauge, at 0.005 inches, displays no reading with no clear echo separation



Measuring the Thickness of Thin Plastic and Metal Materials Using Ultrasonics

Measuring the thickness of plastic or metal materials thinner than 0.006 in. (0.150 mm) using ultrasonics historically required high-frequency pulser receivers, 30 MHz to 125 MHz transducers, and an oscilloscope. This equipment can be difficult to set up and required the user to manually measure the time between echoes with a digital oscilloscope, then calculate the thickness manually. For these reasons, users normally turned to other technology for these measurements.

The 72DL PLUS™ gauge using high-frequency transducers with a much shorter wavelength enables better echo separation and ultimately improved minimum thickness. These high-frequency transducers offer a significantly reduced maximum thickness range. Frequencies above 30 MHz are more easily attenuated in many materials.

High-Frequency Thickness Gauge for Measuring Ultra-Thin Materials

The 72DL PLUS ultrasonic precision thickness gauge in its standard model can use a single element transducer in the frequency range of 0.5–20 MHz. The high-frequency model can use transducers up to 125 MHz and offers a multilayer software option. Pairing the gauge with a high-frequency transducer enables thickness measurements far below the minimum thickness capability of conventional ultrasonic thickness gauges. It is possible to measure single-layer material down to approximately 0.0005 in. (0.013 mm), depending on the application.

The 72DL PLUS gauge can store transducer configurations for a full range of Olympus transducers from 0.5 to 125 MHz. Many of these default transducer configurations will work for many thickness applications. Custom applications can be created, stored, and recalled. This enables a user to easily recall a stored application, connect the correct transducer, and start making measurements. Adjustments are made via a large touch screen and a simple user interface. Once a transducer setup is created, the instrument can be used by inspectors with limited ultrasonic experience. The 72DL PLUS gauge can display direct thickness in inches, mils, millimeters, and microns.

Common High-Frequency Transducers for Thin Material Applications

Part Number	Frequency	Tip Diameter
M2104	125 MHz	0.74 in (18.8 mm)
M2102	75 MHz	0.74 in. (18.8 mm)
V215-BB-RM	50 MHz	0.334 in. (8.48 mm)
B126	Bubbler for M2104 and M2102	

*Note: other transducers are also available.



Thin plastic film 0.0005 in. (0.013 mm) thick measured using a 72DL PLUS gauge and 125 MHz M2104 offset immersion transducer in a Mode 2 measurement from the front surface to the back wall echo.



Thin steel shims 0.0015 in. (0.040 mm) thick measured using a 72DL PLUS gauge and 125 MHz M2104 offset immersion transducer in a Mode 3 measurement from multiple back wall echoes.

Related Product



38DL PLUS

Wszechstronnego grubościomierza 38DL PLUS™ można używać z głowicami dwuprzetwornikowymi do wykonywania pomiarów skorodowanych rur oraz z głowicami jednoprzetwornikowymi do wykonywania bardzo precyzyjnych pomiarów grubości cienkich lub wielowarstwowych materiałów.

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72DL PLUS

The 72DL PLUS™ advanced ultrasonic thickness gauge delivers precision thickness measurements at high speed in a portable, easy-to-use device. Compatible with single element transducers up to 125 MHz, this innovative instrument is ideally suited to measure the thickness of ultra-thin materials, including multilayer paint, coatings, and plastic. It can simultaneously display the thickness of up to 6 layers.

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