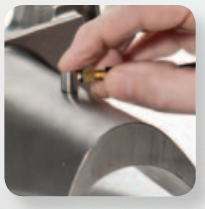
OLYMPUS®

Your Vision, Our Future

ULTRASONIC THICKNESS GAGE

38DL PLUS



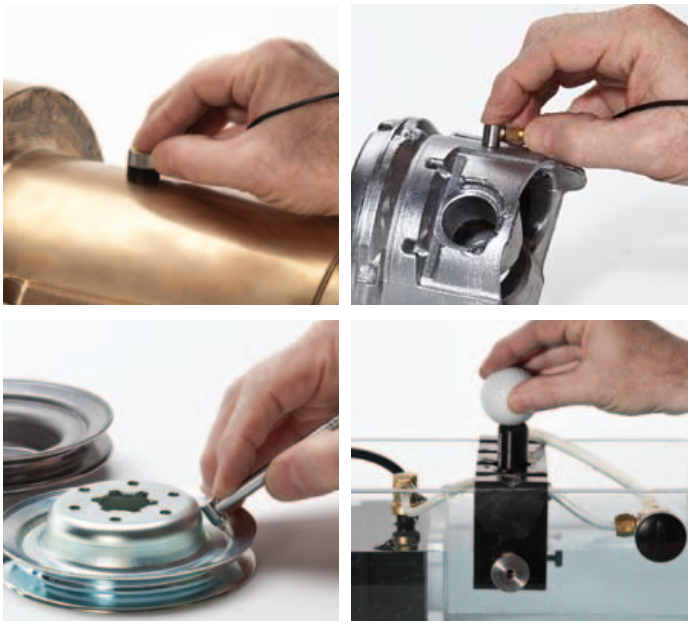
- **Dual and Single Element Transducers**
- **Rugged, designed for IP67**
- **Thickness range from 0.08 mm (0.003 in.) to 635 mm (25 in.)**
- **Color Transflective VGA Display**

920-212C-EN

38DL PLUS Ultrasonic Thickness Gage: Advanced Features, Simple Operation, Rugged, Reliable

The 38DL PLUS is an innovative instrument that signals a new era in ultrasonic thickness gaging. Ideally suited for almost every ultrasonic thickness application, this handheld thickness gage is fully compatible with a full line of dual and single element transducers. The versatile 38DL PLUS can be used in applications ranging from wall thinning measurements of internally corroded pipes with dual element probes to very precise thickness measurements of thin or multilayer materials with single element transducers.

The 38DL PLUS comes standard with many powerful but easy-to-use measurement features and a host of application-specific software options. Its sealed case is designed to meet IP67 requirements to withstand the rigors of very wet or dusty environments. The color transflective VGA display provides superior readability from bright sunlight to complete darkness. It features a simple, ergonomic keypad that can be operated with the left or right hand for easy access to all functions.



Ultrasonic thickness measurements are accurate, reliable, and repeatable. Instant readings can be achieved from one side of a material, making it unnecessary to cut up or destroy the part.

Key Features

- Dual and single element transducer compatibility
- Wide thickness range: 0.08 mm (0.003 in.) to 635 mm (25 in.) depending on material and transducer selection
- Corrosion thickness gaging with dual element transducers
- THRU-COAT® and Echo-to-Echo measurements on painted and coated surfaces
- Internal Oxide/Scale software option
- Standard resolution of 0.01 mm or 0.001 in. for all transducers
- High Resolution software option of 0.001 mm or 0.0001 in. with single element transducers 2.25 MHz to 30 MHz
- Multilayer software option for measurements of up to four layers simultaneously
- High Penetration software option for attenuating materials such as fiberglass, rubber and thick casting
- Thickness, Velocity, and time-of-flight measurements
- Differential mode and Reduction Rate mode
- Time-based B-scan mode; 10,000 reviewable readings per scan
- Olympus High Dynamic Gain technology with digital filters
- V-Path Builder for custom V-path compensation
- Designed for EN15317

What Makes This Thickness Gage Different From Others?

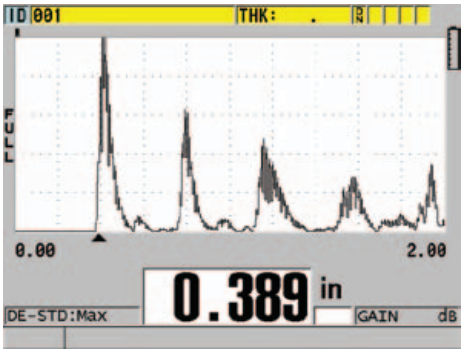
The 38DL PLUS is designed to meet the challenges of demanding applications and built to withstand tough conditions in the field and on the production floor. Whether you work in very wet or dusty conditions, cold or hot climates, or bright or dark areas, the 38DL PLUS can handle any inspection job. Need an instrument tough enough to tolerate shocks, drops, and rough handling? The 38DL PLUS with its protective rubber boot and designed for IP67 rating is your answer.

Built for Tough Environments

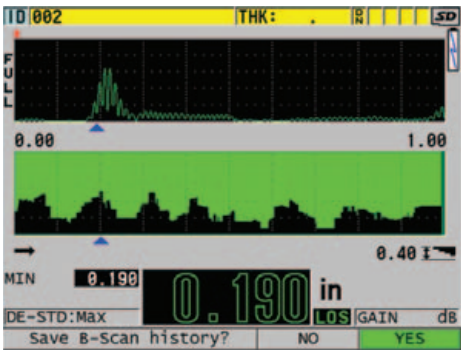
- Compact, weighs only 0.814 kg (1.80 lb)
- Rugged, designed for IP67
- Explosive Atmosphere: Safe operation as defined by Class I, Division 2, Group D, as found in the National Fire Protection Association Code (NFPA 70), Article 500, and tested using MIL-STD-810F, Method 511.4, Procedure I.
- Shock tested using MIL-STD-810F, Method 516.5, Procedure I, 6 cycles each axis, 15 g, 11 msec Half sine.
- Vibration tested using MIL-STD-810F, Method 514.5, Procedure I, Annex C, Figure 6, general exposure: 1 hour each axis.
- Wide operating temperature range
- Protective rubber boot with gage stand
- Color transflective VGA display with indoor and outdoor color settings for superior clarity

Designed for Easy Operation

- Simple keypad for right hand/left hand operation
- Easy operator interface with direct access to all functions
- Internal and External MicroSD memory card storage
- USB and RS-232 communication ports
- Alphanumeric data logger with 475,000 thickness readings or 20,000 waveforms
- VGA output to connect to computer or monitor
- Default/Custom dual element transducer setups
- Default/Custom single element transducer setups
- Password protected function allows locking of instrument features



Outdoor display setting, A-scan mode



Indoor display setting, B-scan mode

38DL PLUS with standard protective rubber boot

Thickness Measurements on Internally Corroded Metals

- Automatic Probe Recognition for standard D79X series dual element transducers
- Ten custom dual element transducer setups
- Optimized default gain during calibration for dual element transducer
- V-Path Builder for custom V-path compensation
- Calibration Doubling when echo doubling may occur during calibration
- THRU-COAT® and Echo-to-Echo measurements on painted and coated surfaces
- High temperature measurements; up to 500 °C (932 °F)
- Boiler tube and Internal Oxide measurements (optional) with M2017 or M2091 single element transducers
- EMAT transducer (E110-SB) for no-couplant measurements of boiler tubes with external oxide/scale buildup

One of the major applications of the 38DL PLUS is measuring the remaining thickness of pipes, tubes, tanks, pressure vessels, hulls, and other structures affected by corrosion or erosion. Dual element transducers are most commonly used for these applications.

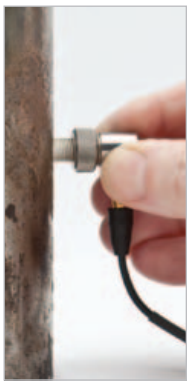
Thru-Coat® Technology

uses a single back-wall echo to measure true metal thickness. You can display the metal and coating thicknesses, each adjusted for their correct material sound velocities. There is no need to remove paint and coatings from surfaces. THRU-COAT® measurements use the D7906-SM, D7906-RM, and D7908 dual element transducers.

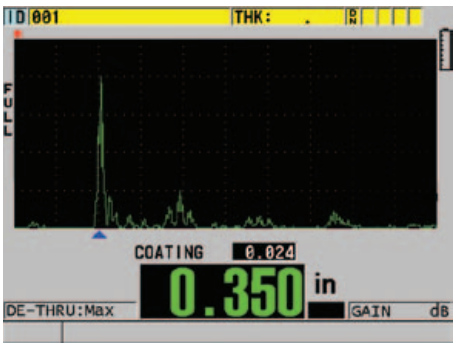
Temperature Compensation

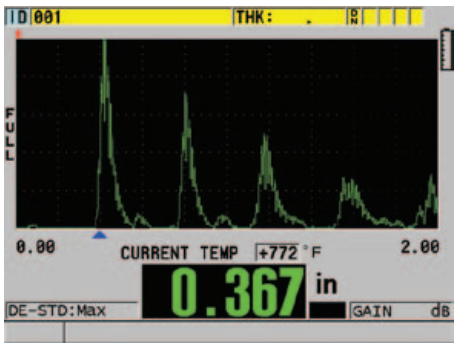
variations in material temperature affect sound velocity and accuracy of thickness measurements. The temperature compensation feature allows you to manually enter the calibration block's temperature and the current (high) temperature at the measurement points. The 38DL PLUS automatically displays the temperature-corrected thickness.

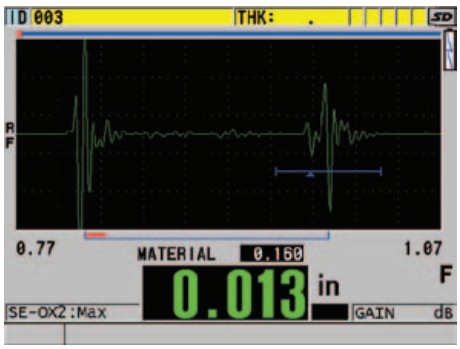
Optional Oxide/ Scale Measurement



uses advanced algorithms to measure the thickness of oxide/ scale buildups inside boiler tubes. The gage simultaneously displays the metal thickness of the boiler tube and the thickness of the oxide layer. Knowing the thickness of the oxide/ scale helps predict tube life. We recommend using M2017 or M2091 transducers in this application.





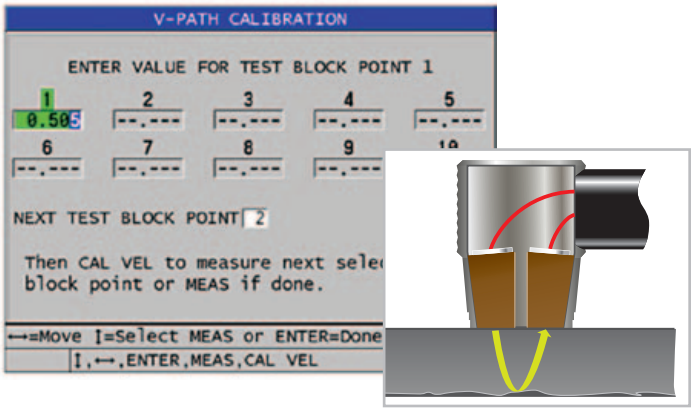


V-Path Builder

This new and patented feature allows you to build a custom V-Path compensation curve for almost any dual element transducer. These curves can be saved and recalled along with custom setups for most dual element transducers. You simply calibrate and enter the known thickness with a minimum of 3 and up to 10 calibration points, and the instrument will create the V-path.

Automatic Probe Recognition

All standard dual element transducers (see chart below) feature Automatic Probe Recognition, which automatically recalls a default V-path correction for each specific transducer.



Dual Element Transducers with Automatic Probe Recognition for Corrosion Gaging Applications

Transducer	Item Number	Freq. (MHz)	Connector	Tip Dia. mm (in.)	Range (Steel)* mm (in.)	Temp. Range** °C (°F)	Cable	Item Number
D790	U8450002	5.0	Straight	11.00 (0.434)	1.00 to 500.00 (0.040 to 20.000)	–20 to 500 (–5 to 932)	Potted	—
D790-SM	U8450009		Straight				LCMD-316-5B†	U8800353
D790-RL	U8450007		90°				LCLD-316-5G†	U8800330
D790-SL	U8450008		Straight				LCLD-316-5H	U8800331
D791	U8450010	5.0	90°	11.00 (0.434)	1.00 to 500.00 (0.040 to 20.000)	–20 to 500 (–5 to 932)	Potted	—
D791-RM	U8450011	5.0	90°	11.00 (0.434)	1.00 to 500.00 (0.040 to 20.000)	–20 to 400 (–5 to 752)	LCMD-316-5C	U8800354
D792	U8450012	10	Straight	7.20 (0.283)	0.50 to 25.00 (0.020 to 1.000)	0 to 50 (32 to 122)	Potted	—
D793	U8450013		90°				Potted	—
D794	U8450014	5.0	Straight	7.20 (0.283)	0.75 to 50.00 (0.030 to 2.000)	0 to 50 (32 to 122)	Potted	—
D795	U8450015		90°				Potted	—
D797	U8450016	2.0	90°	22.90 (0.900)	3.80 to 635.00 (0.150 to 25.000)	–20 to 400 (–5 to 752)	Potted	—
D797-SM	U8450017		Straight				LCMD-316-5D	U8800355
D7226	U8454013	7.5	90°	8.90 (0.350)	0.71 to 100.00 (0.028 to 4.000)	–20 to 150 (–5 to 300)	Potted	—
D798-LF	U8450019							
D798	U8450018	7.5	90°	7.20 (0.283)	0.71 to 100.00 (0.028 to 4.000)	–20 to 150 (–5 to 300)	Potted	—
D798-SM	U8450020		Straight				LCMD-316-5J	U8800357
D799	U8450021	5.0	90°	11.00 (0.434)	1.00 to 500.00 (0.040 to 20.000)	–20 to 150 (–5 to 300)	Potted	—
MTD705	U8620225	5.0	90°	5.10 (0.200)	1.00 to 19.00 (0.040 to 0.750)	0 to 50 (32 to 122)	LCLPD-78-5	U8800332
D7906-SM††	U8450005	5.0	Straight	11.00 (0.434)	1.00 to 50.00 (0.040 to 2.000)	0 to 50 (32 to 122)	LCMD-316-5L	U8800358
D7906-RM††	U8450025		90°				LCMD-316-5N	U8800647
D7908††	U8450006	7.5	90°	7.20 (0.283)	1.00 to 37.00 (0.040 to 1.500)	0 to 50 (32 to 122)	Potted	—

Single Element Transducers for Corrosion Gaging Applications

For a complete list of single element transducers, please consult your local representative or consult our web site www.olympus-ims.com.

Transducer	Item Number	Freq. (MHz)	Connector	Tip Dia. mm (in.)	Range (Steel)* mm (in.)	Temp. Range** °C (°F)	Cable	Item Number
V260-SM	U8411019	15	Straight	2.00 (0.080)	0.50 to 10.00 (0.020 to 0.400)	0 to 50 (32 to 122)	LCM-74-4	U8800348
V260-RM	U8411018		90°				LCM-74-4	U8800348
V260-45	U8411017		45°				LCM-74-4	U8800348
M2017	U8415002	20	90°	6.35 (0.250)	Steel 0.50 to 12.00 (0.020 to 0.500) Oxide 0.25 to 1.25 (0.010 to 0.050)	0 to 50 (32 to 122)	LCM-74-4	U8800348
M2091	U8415018	20	90°	6.35 (0.250)	Steel 0.50 to 12.00 (0.020 to 0.500) Oxide 0.15 to 1.25 (0.006 to 0.050)	0 to 50 (32 to 122)	LCM-74-4	U8800348
E110-SB	U8471001	—	Straight	28.50 (1.250)	2.00 to 125.00 (0.080 to 5.000)	0 to 80 (32 to 176)	LCB-74-4 and 1/2XA/E110	U8800320 U8767104

* Dependent on material, transducer type, surface conditions, and temperature. Full range may require Gain Adjust.
** Maximum temperature with intermittent contact only
† Stainless steel cable available; consult Olympus NDT for details.
†† Transducers used with THRU-COAT® technology

Thickness Measurements on Plastics, Metals, Composites, Glass, Rubber, Ceramics

When using single element transducers, you can make accurate thickness measurements on metals, plastics, composites, glass, ceramics, and other materials. These transducers are available in a wide range of frequencies, diameters, and connector styles. The High Resolution software option allows you to make very precise measurements at a resolution of 0.0001 in. or 0.001 mm.

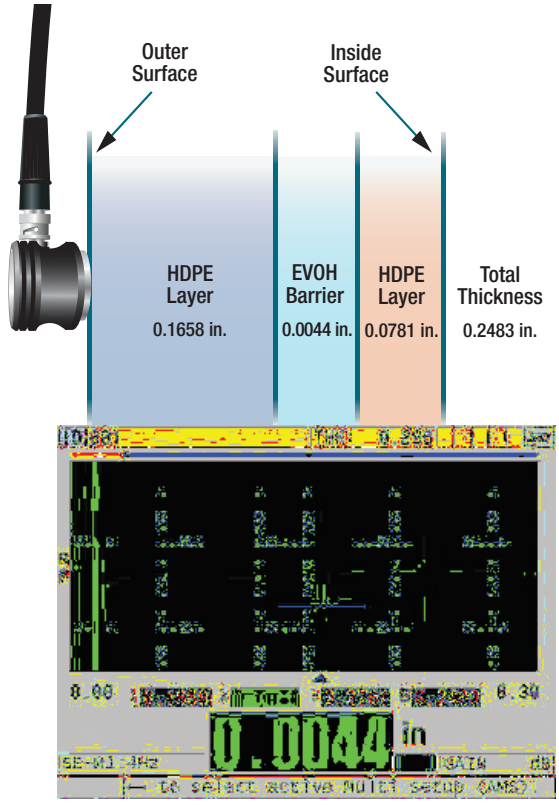
- Standard resolution of 0.01 mm (0.001 in.) for all transducers
- High Resolution software option can display measurements up to 0.001 mm (0.0001 in.) for single element transducers from 2.25 MHz to 30 MHz
- High Penetration software option for measurements on attenuating materials such as fiberglass, rubber, and thick castings
- Multilayer software option for individual thickness measurements of up to four layers simultaneously
- Thickness, Velocity, or time-of-flight measurements
- Application Auto-Recall with default and custom setups to simplify thickness measurements

High Penetration Software Option

This option allows you to use low frequency single element transducers (as low as 0.5 MHz) to measure thick or sound attenuating materials such as rubber, fiberglass, castings, and composites.

Multilayer Software Option

This software option calculates and simultaneously displays thickness measurements of up to four individual layers. It also displays total thickness of selected layers. Typical applications include thickness of barrier layers in plastic fuel tanks, bottle preforms, and soft contact lenses.



The 38DL PLUS can make accurate measurements of up to four individual layers simultaneously.

Measure the thickness of many materials including plastic, metal, rubber, glass, ceramic, and composites.

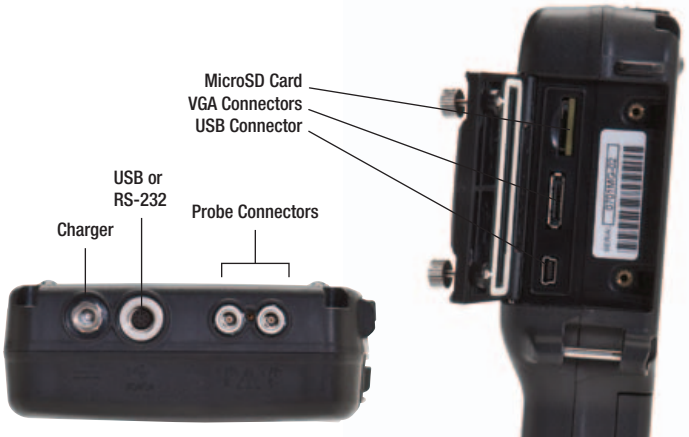
Many cast metal parts or sound-attenuating materials can be measured with the High Penetration software option.

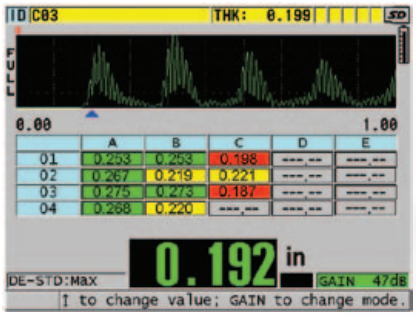
The High Resolution software option allows thickness measurements of up to 0.001 mm (0.0001 in.) resolution.

Data Logger and PC Interface

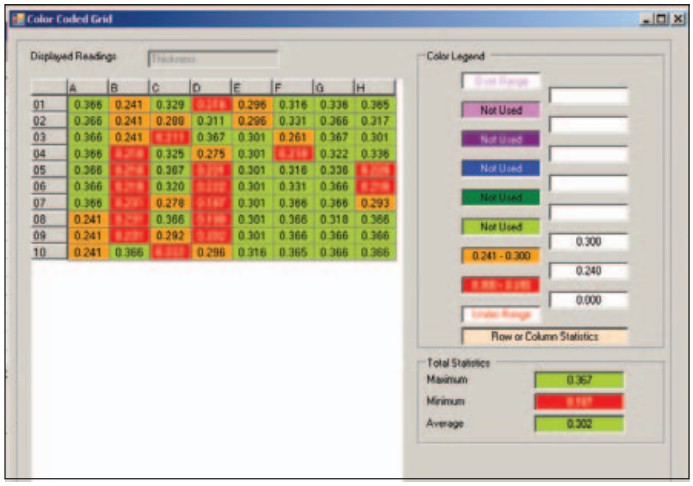
The 38DL PLUS has a full-featured internal bidirectional alpha-numeric data logger that is designed to easily collect and transfer thickness readings and waveform data.

- Internal memory of 475,000 thickness readings or 20,000 waveforms with thickness readings
- 32 Character File name
- 20 Character ID# (TML#)
- 9 file formats:
  Incremental, Sequential, Sequential with custom point, 2-D Grid, 2-D Grid with custom point, 3-D Grid, 3-D custom, Boiler, and Manual
- The ability to store up to 4 comments (notes) per ID# (TML)
- Stores comments (notes) at an ID# or to a Range of ID#'s
- Internal and External MicroSD memory cards
- File copy with the ability to copy files between Internal/ External MicroSD memory cards
- Standard USB and RS-232 communication
- Two-way transfer of both single and dual element transducer setups
- Onboard statistical report
- Onboard DB Grid View with three programmable colors
- GageView™ interface program can communicate with the 38DL PLUS using the USB, RS-232 ports, and can read and write to a MicroSD memory card.
- Direct export of internal files to MicroSD memory card in Excel compatible CSV (comma-separated values) format





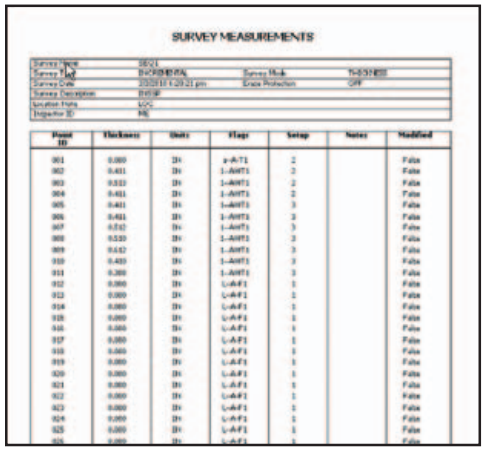
Onboard DB Grid View with three programmable colors



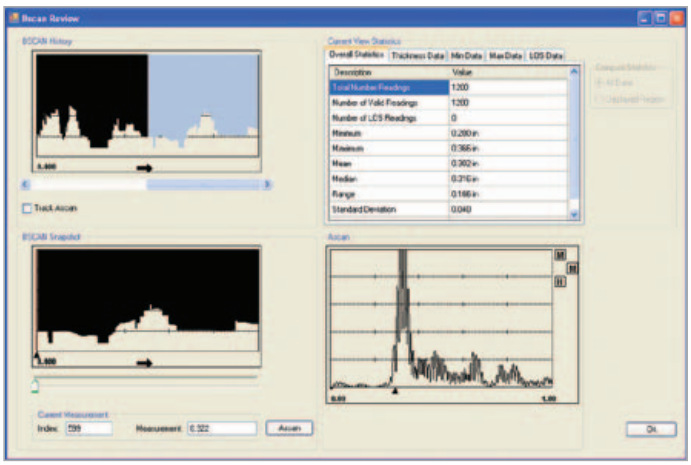
When viewed on your PC a color coded grid easily flags out-of-tolerance thickness conditions.

GageView™

- The GageView interface program, a Windows-based application, collects, creates, prints, and manages data from the 38DL PLUS.
- Creates datasets and surveys
- Stored data editing
- View dataset and survey files; including thickness readings, gage setup values, and transducer setup values
- Download and upload thickness surveys to and from the gages
- Export surveys to spreadsheets and other programs
- Collecting snapshot screens
- Printing reports such as Thickness, Setup Table, Statistics, and Color Grid
- Upgrading operating software
- Download and upload single and dual element transducer setup files
- B-scan review



Measurement reports can easily be generated and printed containing measurements, ID, and other parameters.



38DL PLUS Specifications*

Measurements	
Dual element transducer measurement mode	Time interval from a precision delay after the excitation pulse to the first echo
THRU-COAT® measurement	Measurement of true metal and coating thicknesses with a single back-wall echo (with D7906-SM and D7908 transducers)
Thru-Paint Echo-to-Echo	Time interval between two successive back-wall echoes to eliminate paint or coating thickness
Single element transducer measurement modes	Mode 1: Time interval between the excitation pulse and the first back-wall echo Mode 2: Time interval between the delay line echo and the first back-wall echo (with delay or immersion transducers) Mode 3: Time interval between successive back-wall echoes following the first interface echo after the excitation pulse (with delay line or immersion transducers) Oxide: optional Multilayer mode: optional
Thickness range	0.080 mm to 635.00 mm (0.003 in. to 25.000 in.) depending on material, transducer surface conditions, temperature, and selected configuration
Material velocity range	0.508 mm/µs to 13.998 mm/µs (0.020 in./µs to 0.551 in./µs)
Resolution (selectable)	Low: 0.1 mm (0.01 in.) Standard: 0.01 mm (0.001 in.) High Resolution (optional): 0.001 mm (0.0001 in.)
Transducer frequency range	Standard: 2.0 MHz to 30 MHz (–3 dB) High Penetration (optional): 0.50 MHz to 30 MHz (–3 dB)
General	
Operating temperature range	–10 °C to 50 °C (14 °F to 122 °F)
Keypad	Sealed, color-coded keypad with tactile and audible feedback
Case	Impact-resistant and water-resistant, gasketed case with sealed connectors. Designed for IP67.
Dimensions (W x H x D)	Overall: 125 mm x 211 mm x 46 mm (4.92 in. x 8.31 in. x 1.82 in.)
Weight	0.814 kg (1.80 lb)
Power supply	AC/DC adaptor, 24 V; lithium-ion battery 23.760 Wh; or 4 AA auxiliary batteries
Battery life, lithium-ion	Operating time: minimum 12.6 h, 14 h typical, 14.7 h maximum Fast charge: 2 h to 3 h
Standards	Designed for EN15317
Display	
Color transflective VGA display	Liquid crystal display, display area 56.16 mm x 74.88 mm (2.2 in. x 2.95 in.)
Rectification	Full wave, RF, half-wave positive, or half-wave negative
Inputs/Outputs	
USB	1.0 client
RS-232	Yes
Memory card	Maximum capacity: 2 GB External MicroSD memory card
Video output	VGA output standard
Internal Data logger	
Data logger	The 38DL PLUS identifies, stores, recalls, clears, and transmits thickness readings, waveform images, and gage configuration information through the standard RS-232 serial port or USB port.
Capacity	475,000 thickness measurements or 20,000 waveforms with thickness measurements
File names, IDs, and comments	32-character file names and 20-character alphanumeric location codes with four comments per location
File structures	Nine standard or custom application-specific file structures
Reports	On-gage reporting of summary with statistics, Min./Max. with locations, Min. review, file comparison, and alarm report

Standard Package

- 38DL PLUS digital ultrasonic thickness gage, AC or battery operation, 50 Hz to 60 Hz
- Kits available with standard dual element transducers
- Charger/AC adaptor (100 VAC, 115 VAC, 230 VAC)
- Internal data logger
- GageView interface program
- Test block and couplant
- USB cable
- Rubber protective boot with gage stand and neck strap
- User's manual
- Two-year limited warranty
- **Measurement features:** THRU-COAT®, Thru-Paint Echo-to-Echo, EMAT compatibility, Min./Max. mode, two alarm modes, differential mode, B-scan, Application Auto-Recall, temperature compensation, Average/Min. mode

Software Options

38DLP-OXIDE (U8147014): Code-activated Internal Oxide measurement software

38DLP-HR (U8147015): Code-activated High Resolution measurement software

38DLP-MM (U8147016): Code-activated Multilayer measurement software

38DLP-HP (U8147017): Code-activated High Penetration (low frequency) measurement software

Optional Accessories

38DLP/EW (U8778348): Three-year warranty

1/2XA/E110 (U8767104): Filter adaptor for E110-SB EMAT transducer

38-9F6 (U8840167): RS-232 cable

38-C-USB-IP67 (U8800998): USB cable for IP67 sealed operation

38DLP/RFS (U8780288): Foot switch, factory installed

HPV/C (U8780124): Digital caliper for thickness input for velocity measurements

38DLP-V-CC (U8840172): Cable for digital caliper

38DLP/BCW/NC (U8780289): Bar code reader

EPLTC-C-VGA-6 (U8840035): VGA output cable

MICROSD-ADP-2GB (U8779307): 2 GB External MicroSD memory card

OLYMPUS NDT INC. is ISO 9001 certified.

OLYMPUS®

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