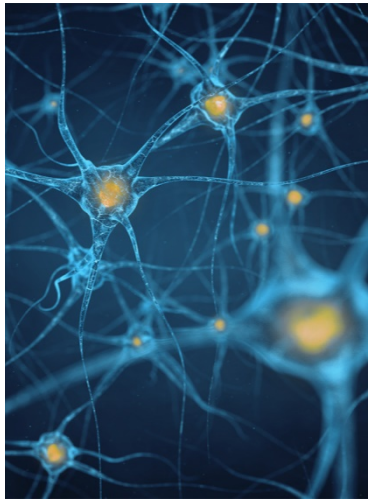
Enhanced Corrosion Monitoring with the EPOCH™ 6LT Flaw Detector



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Agenda

1	EPOCH 6LT Flaw Detector Introduction
2	Corrosion Challenges
3	Corrosion Monitoring with the EPOCH 6LT Flaw Detector
4	Speed, Accuracy, and Reliability (Repeatability)

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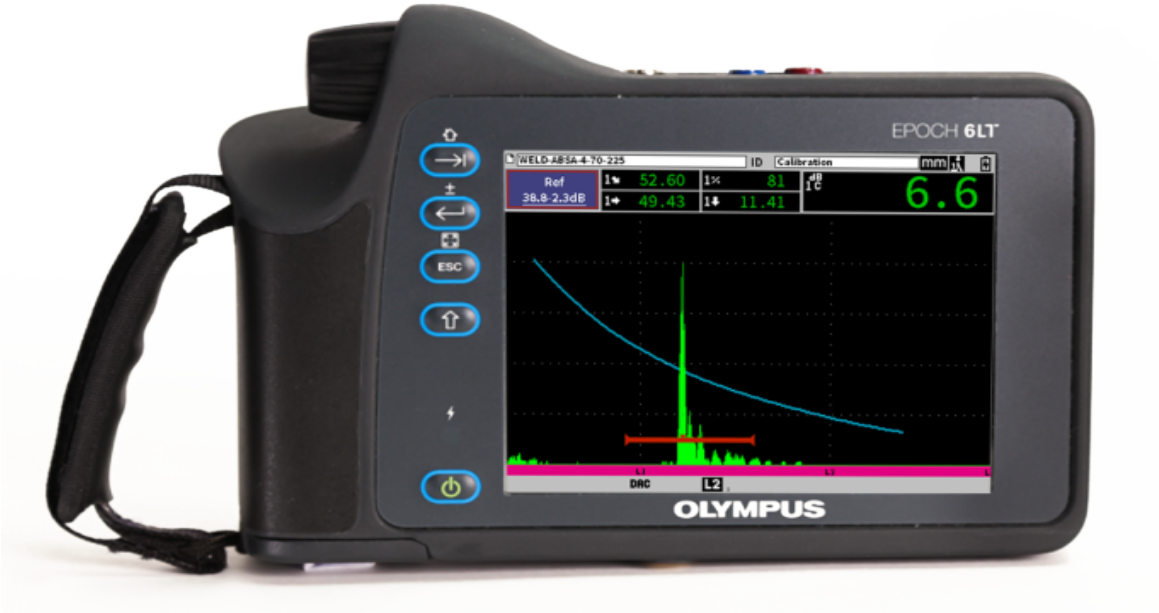
01

EPOCH 6LT Flaw Detector Introduction



EPOCH® 6LT

Portable Flaw Detector

EPOCH 6LT Overview

Clear, Bright Screen:
Vivid **5.7 in. (14.5 cm) full VGA** screen/screen rotation

Compliant:
EN12668-1:2010 compliant design with EPOCH 100% digital filter sets

Easy to Use:
Rotary knob, simple button design, and UI optimized for **one-handed operation**

Capable:
All the core functionality of the **EPOCH 650**

Corrosion-Ready:
Featuring improved corrosion module software

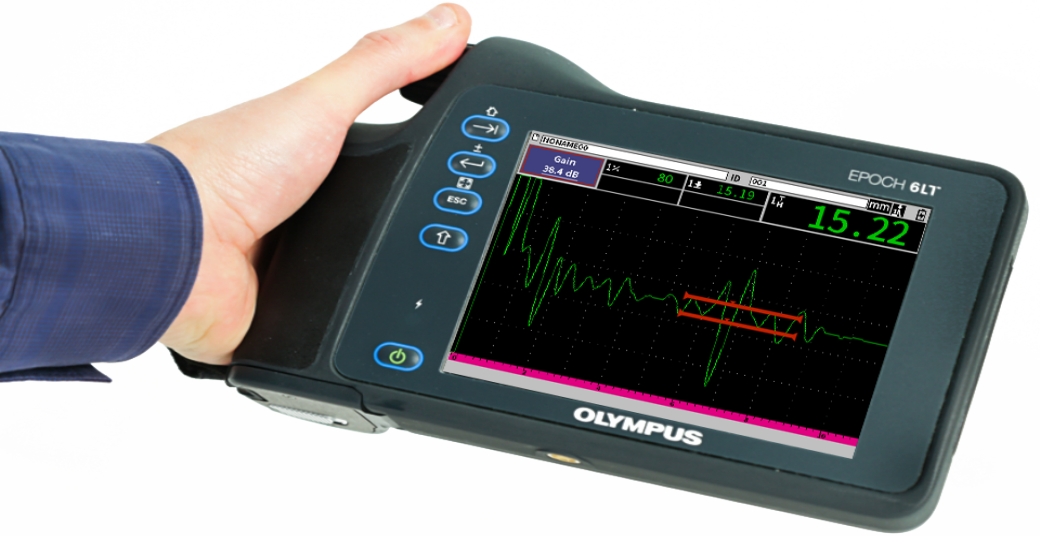
Comfortable:
Weighs **1.95 lb** (890 g) with a grip-oriented weight distribution

Fast Reporting:
Multiple common report file formats and **optional wireless LAN** connectivity for wireless data storage

Tough and Reliable:
Engineered to **IP65 & IP67** for dust/water resistance; tested using procedures from **MIL-STD-810G**

Innovative, User-Friendly Design

- Extreme **Portability**
- **Less Risk** of Instrument Damage
- Able to Use **Indoors** & **Outdoors**
- Easy to Use with **Gloves**
- Less Wrist Fatigue
- Able to Carry Multiple Instruments

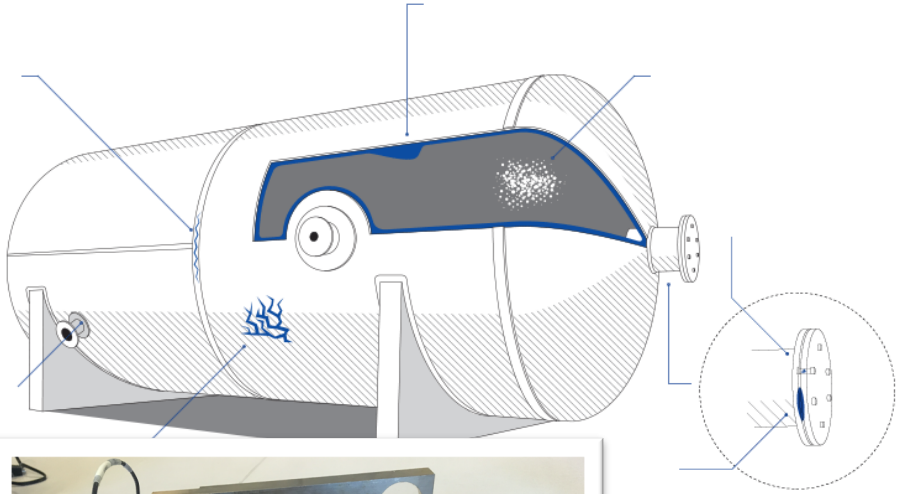


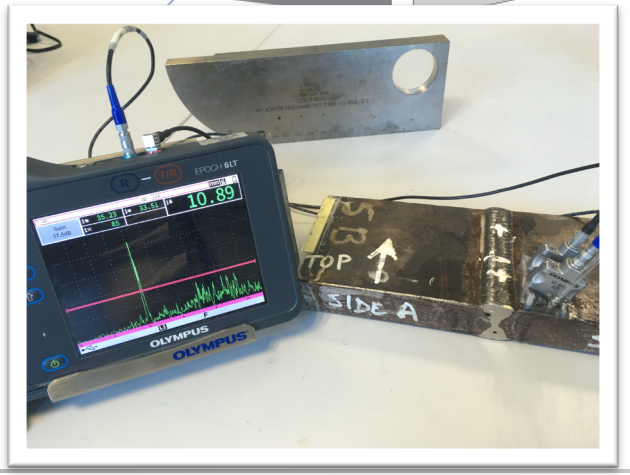
The EPOCH 6LT Flaw Detector

- A powerful flaw detector in the palm of your hand.
- Core ultrasonic capabilities of the EPOCH 650—pulser performance, digital filters, SNR, large screen, and sizing algorithms: DAC/TCG, DGS, AWS—all in less than 1 kg (2 lb).
- Perform weld inspection in tough environments with more comfort and the same data quality.

The EPOCH 6LT Flaw Detector—Versatile

- The vessel is one of the most complex plant components to be (fully) inspected: welds, bolts, cracking, corrosion, supports, etc.
- Often, an entire toolkit is necessary, even for manual inspection
- One flaw detector: EPOCH 6LT
  - Weld inspection in all situations (even cladded vessels or dissimilar welds)
  - Detection of delaminations
  - Corrosion thickness gaging (no need for additional thickness gage)
- With no compromise on precision measurement and data quality





Cladded and/or dissimilar weld inspection with TRL probes

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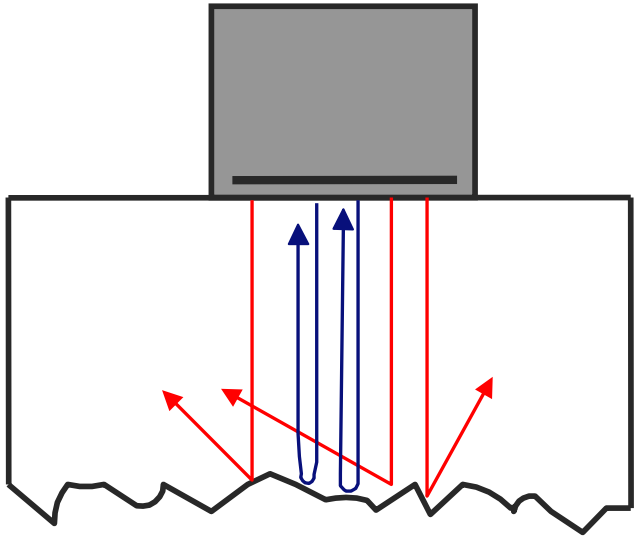
02 Corrosion Challenges

Corrosion Problem

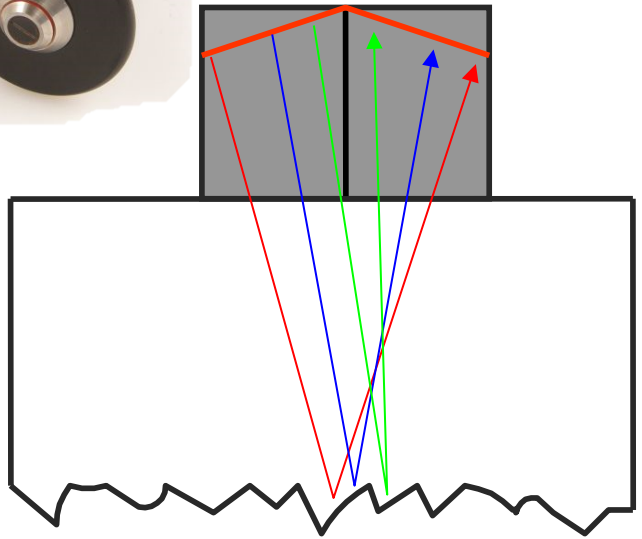
When corrosion is present

Single crystal



Much of the sound is scattered away from the transducer

Twin crystal



Roof angle and V-path focus sound at the base of pits

- Need correction for V-path
- High-amplitude and zero-crossing measurement improve precision

Different Techniques to Measure Remaining Wall Thickness

- Thickness measurement for corroded components is usually performed with a **thickness gage** for better measurement precision achieved by:
  - Use of dual transducers
  - Specific algorithm, including auto gain control, V-path correction, and zero crossing detection

- A **flaw detector** offers more flexibility:
  - Manually control the gain
  - Set the gates and alarms
  - Large screen for wave-form evaluation

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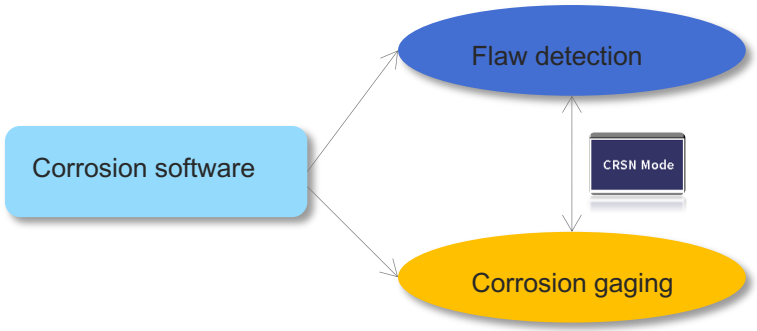
03 Corrosion Monitoring Using the EPOCH 6LT Flaw Detector

Corrosion Monitoring Using the EPOCH 6LT Flaw Detector

– *The EPOCH 6LT provides **"dual mode" capability** while the corrosion software is activated*

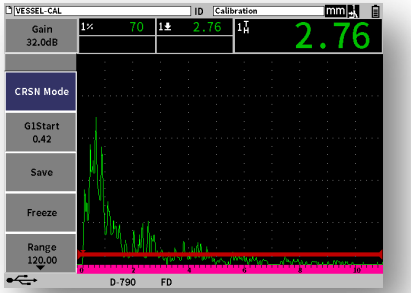


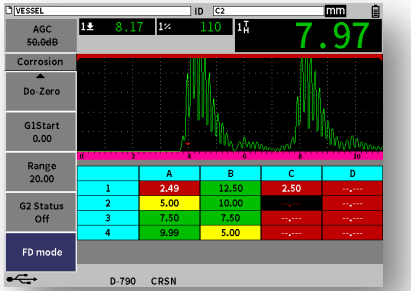
- Control over gates
- Control gain
- Set alarms

Fast screening, detection, and alarm!

- Auto gain control
- V-path correction
- Zero-crossing detection

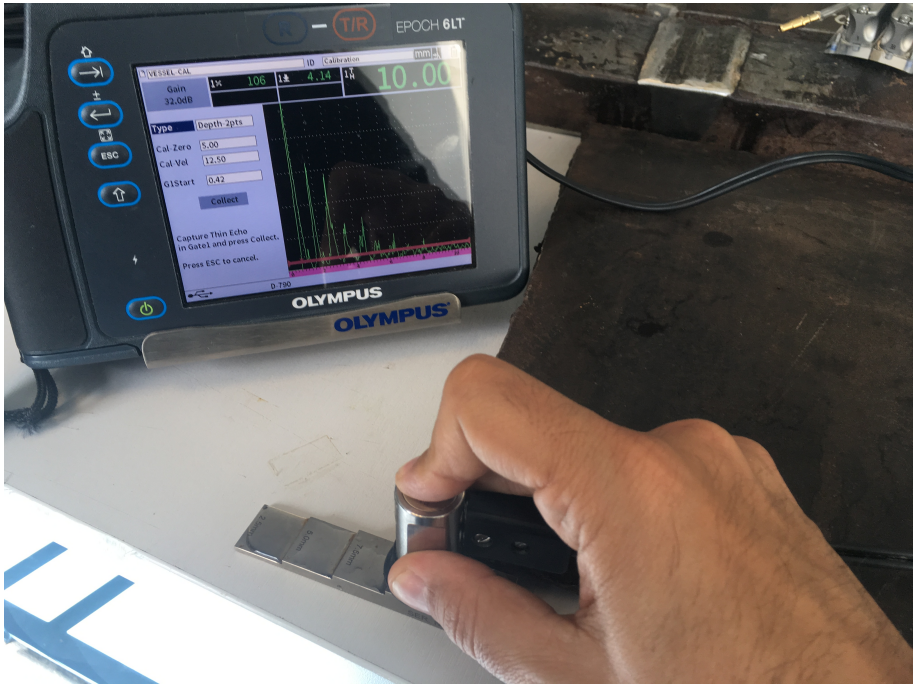
High accuracy: ±0.01 mm

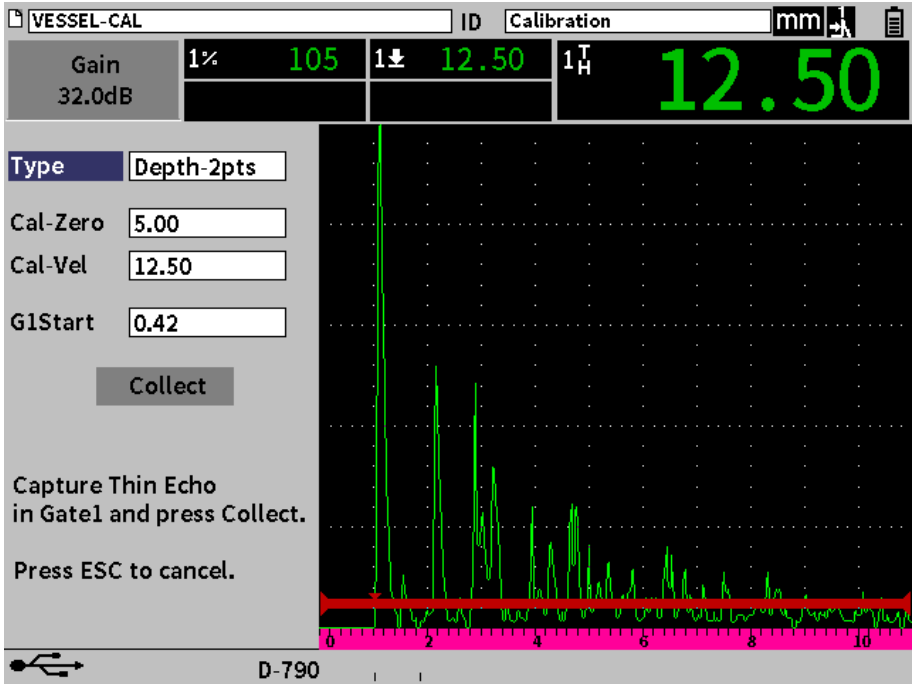




Corrosion Monitoring Using the EPOCH 6LT Flaw Detector—Calibration

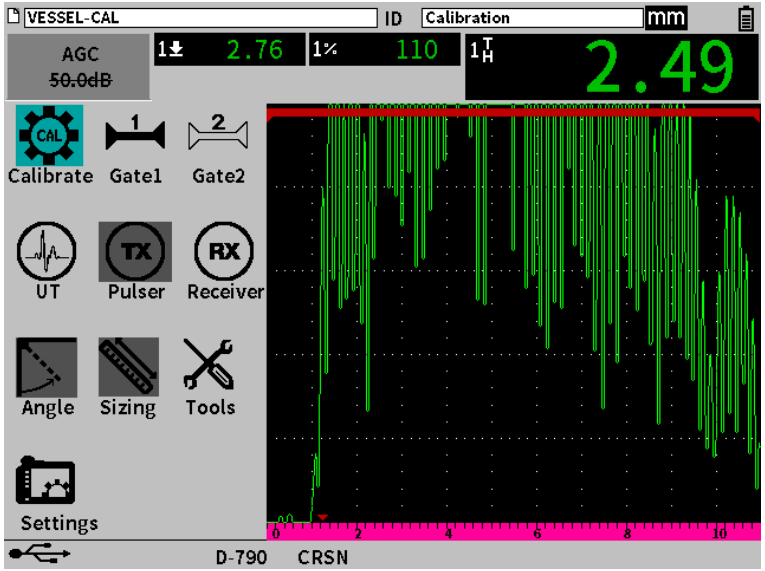
- Calibrate while in FD mode

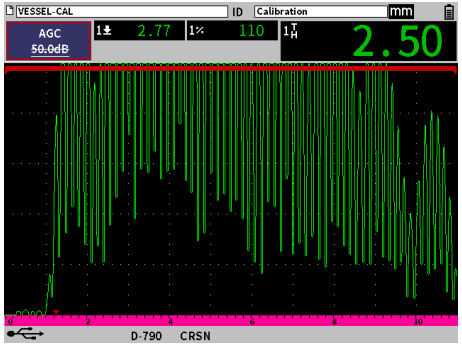


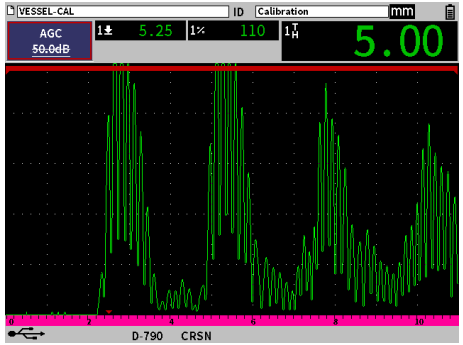


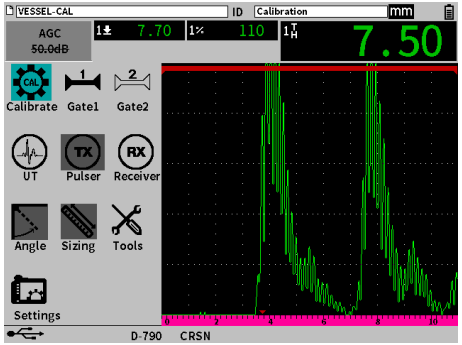
Corrosion Monitoring Using the EPOCH 6LT Flaw Detector—Calibration

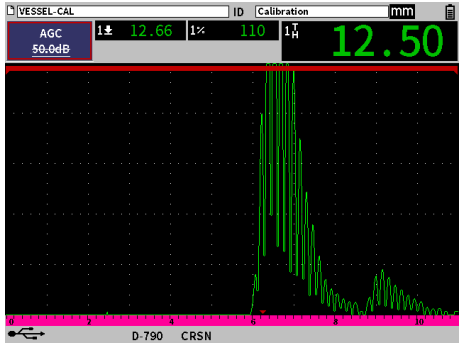
- Switch to **Crsn** (thickness gage) mode
- Calibrate











Corrosion Monitoring Using the EPOCH 6LT Flaw Detector

- **You now have two different calibrations in the same setup!**

- **READY for the inspection!**

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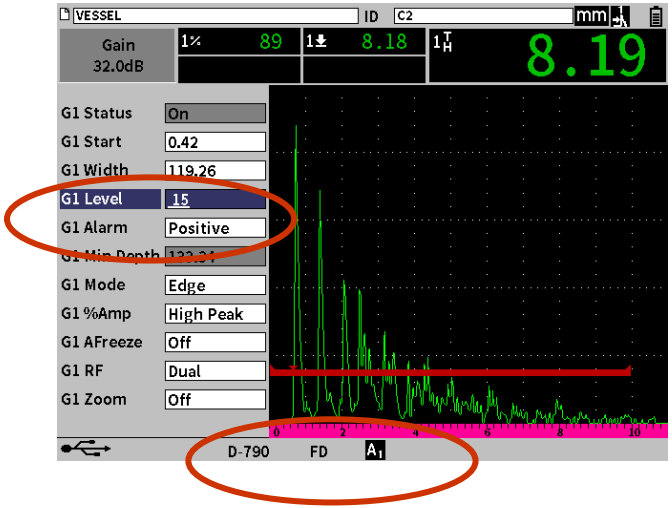
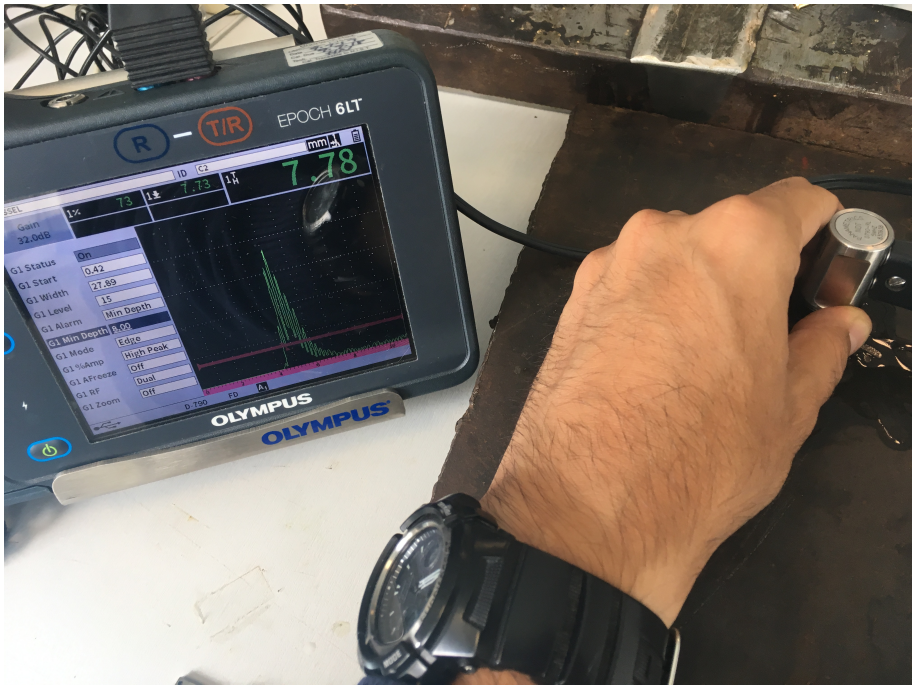
04 Speed, Accuracy, and Reliability (Repeatability)

Corrosion Monitoring Using the EPOCH 6LT Flaw Detector—Inspection

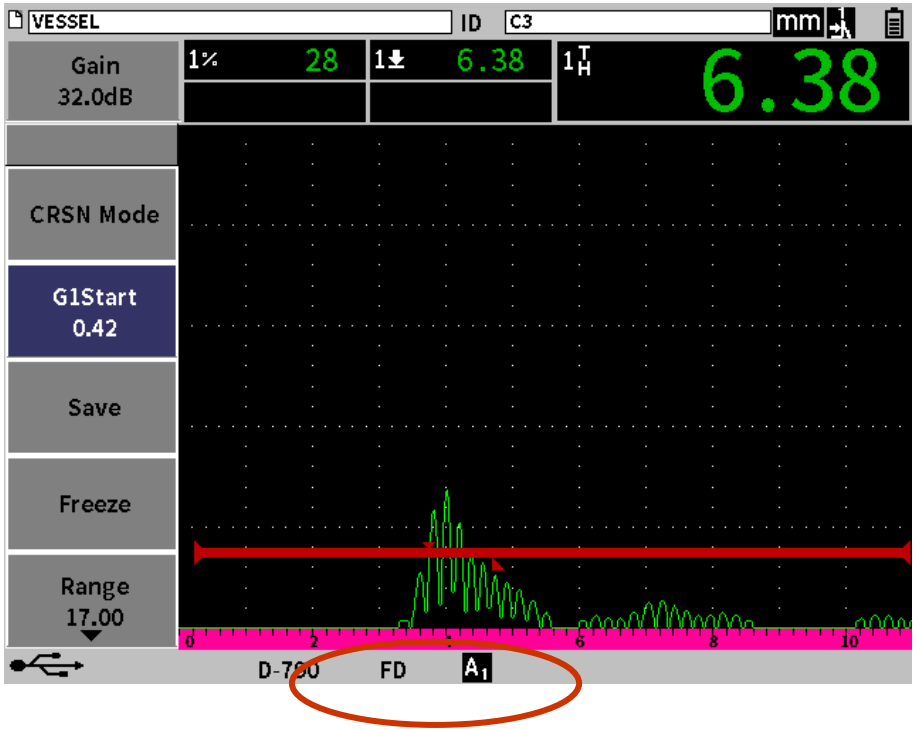
1. Switch to FD mode, and set an alarm for low thickness
2. Screen the suspected area





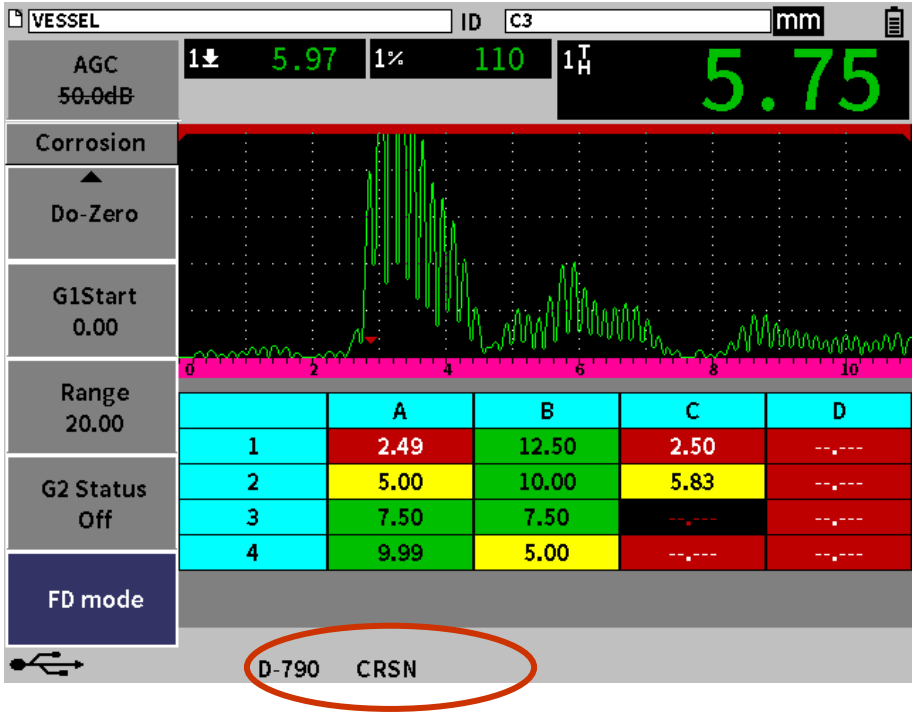
Corrosion Monitoring Using the EPOCH 6LT Flaw Detector—Inspection

- **When the alarm beeps, a critical area is found**
  - Amplitude is lost likely due to pitting geometry
  - Precision is lost



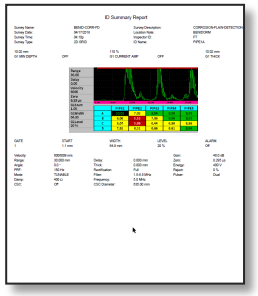
Corrosion Monitoring Using the EPOCH 6LT Flaw Detector—Inspection

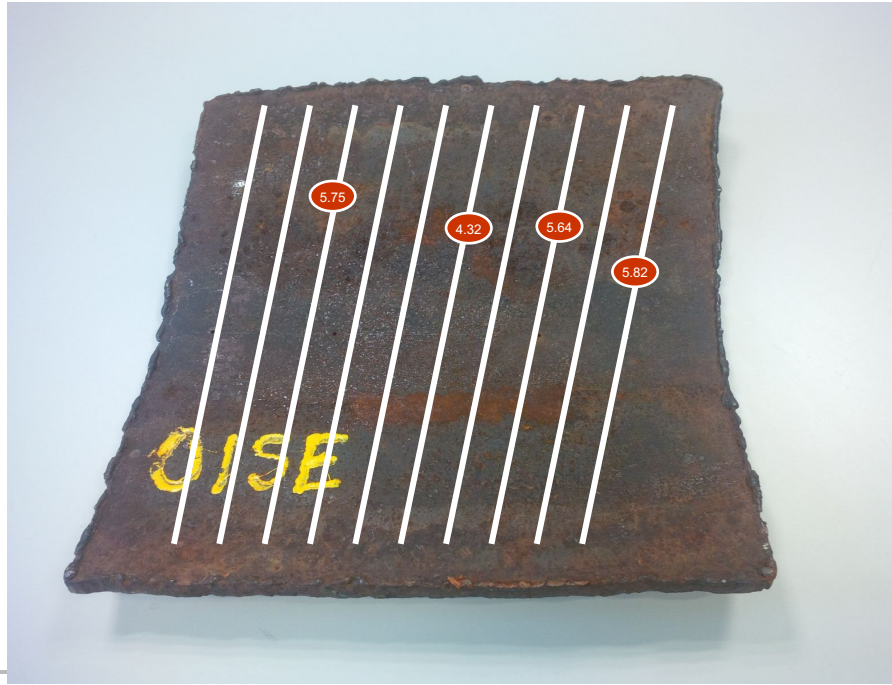
1. Switch to corrosion (thickness gage) mode by pressing the **Crsn** button
2. Read the precise measurement and save the data
3. **Export data to the cloud**



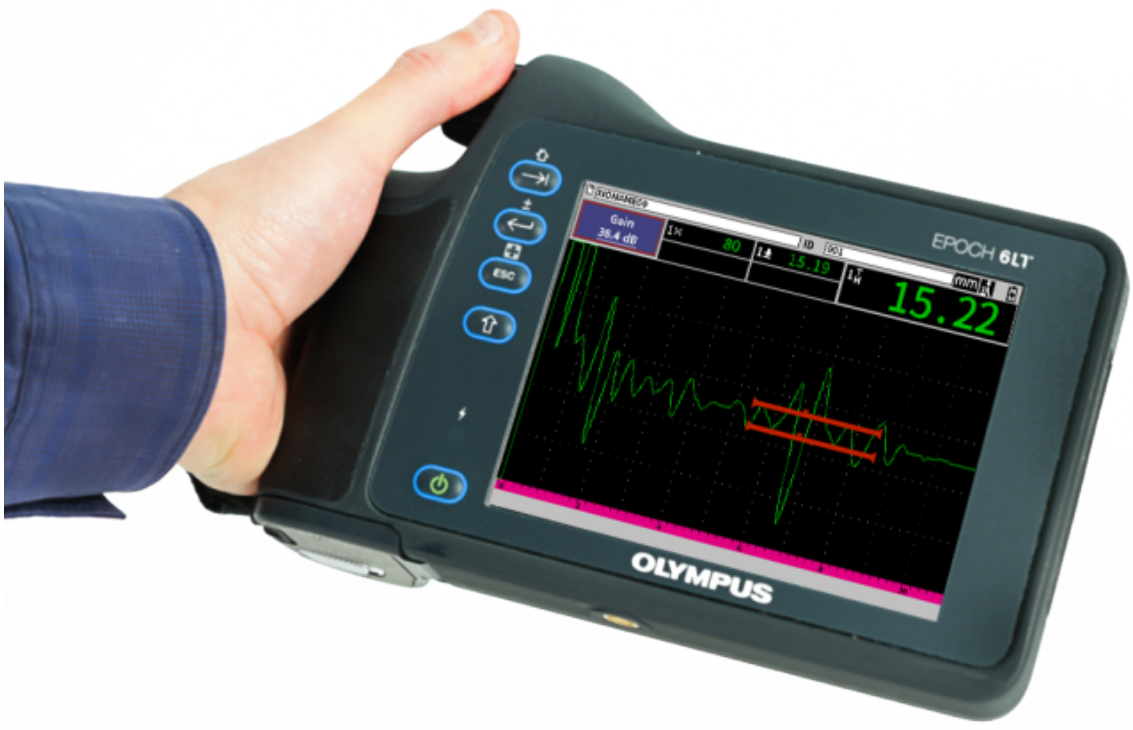
Corrosion Monitoring Using the EPOCH 6LT Flaw Detector—Results

- You **rapidly** screened an area of concern
- **Reliably** found the critical points of pitting
- Measured the remaining wall with an **accuracy** of 0.01 mm
- Generated a report that is already available for review in the remote office—very **efficient**!





The EPOCH 6LT Flaw Detector Can Do All This

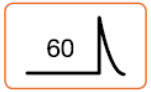


Summary

- Two modes, one instrument
- Features of a flaw detector and thickness gage in one portable, ergonomic instrument

Flaw Detection Mode

Scan for corrosion and detect and size defects, such as pitting

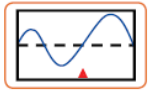


- 60 Hz screen update rate: don't miss defects when scanning for flaws

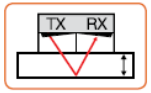
- When you've detected a defect, switch to Corrosion Mode with the press of a button

Corrosion Mode

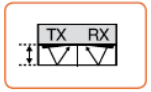
Record precise measurements of remaining wall thickness



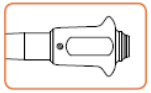
- Thickness gage measurement algorithm for greater precision



- V-path correction for improved accuracy with dual element transducers



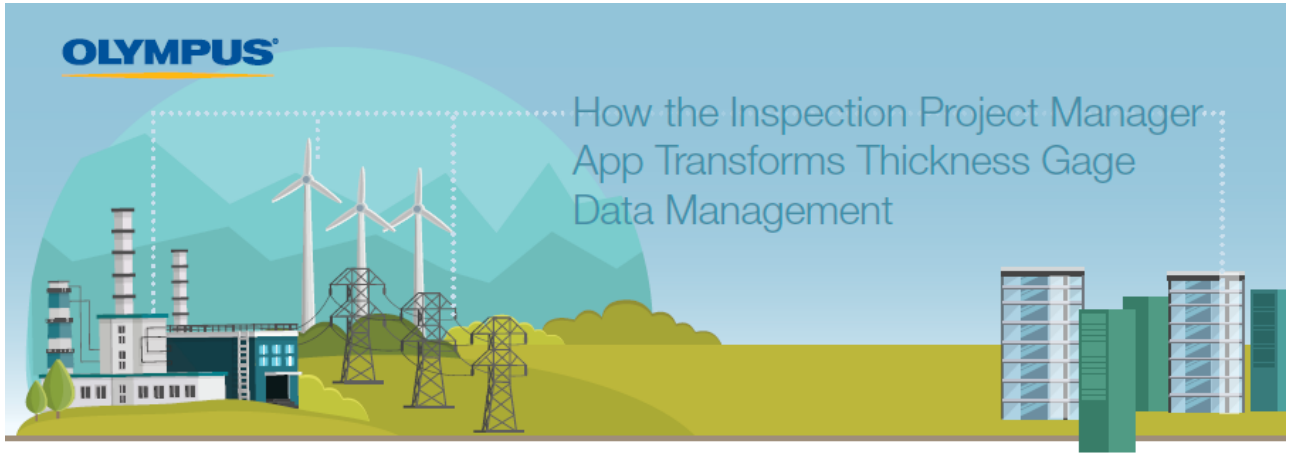
- True do-zero for fast, accurate wear compensation



- Automatic probe recognition for instant pulser and receiver configuration

- Grid view for organized inspections and easy reporting

The Olympus Scientific Cloud™ (OSC)



The Current Process

Step 1
Manager: Load survey files.
Inspector: Pick up equipment.

Step 2
Inspector: Go to inspection site.

Step 3
Inspector: Locate CMLs and acquire data.

Step 4
Inspector: Return to the office.

Step 5
Manager: Upload data to IDMS.

Need a retest?

If there's a problem, part of the inspection may need to be repeated.

Step 6
Manager: Reload survey files.
Inspector: Pick up equipment.

Step 7
Inspector: Return to inspection site.

Step 8
Inspector: Find the right CML and retest.

Step 9
Inspector: Return to office.

Step 10
Manager: Reupload data to IDMS.

The OSC

Using the Inspection Project Manager

Saving time is as easy as 1, 2, 3!

Step 1

Manager: Build the project and deploy setup files wirelessly.

Inspector: Go directly to inspection site.

Step 2

Inspector: Connect to a wireless network or hotspot and download the files.

Step 3

Inspector: Collect data and upload it to the Cloud.

Need a retest?

Inspectors can be notified of a retest before they leave the job site.

Inspector: Download files and retest the CML.

Inspector: Reupload the data to the Cloud.

Visit Olympus-IMS.com to learn more.

www.olympus-ims.com

Thank You for Your Attention

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