

Time of Flight Diffraction (TOFD)

Training Course Outline- 40 hour course

SCOPE

This course prepares the candidate for Time of Flight Diffraction (TOFD) Inspections. Prerequisite for this Class is Level II Ultrasonics.

- Select Probes
- TOFD formulas
- Perform Specific Calibrations
- Specific TOFD scanning
- Collect and store data
- Interpret data
- Locate and Size flaws
- Record Results
- TOFD Codes and Standards

TRAINING

Training Material is presented in Module that are followed by Quizzes

MODULE 1: TOFD BACKGROUND

- Principles of TOFD
- Diffraction Process
- Basic TOFD Setup
- Advantages and Limitations of TOFD



Basic TOFD Setup on a Omniscan

MODULE 2: TOFD FORMULAS

- Basic Formulas
- Calculation of ID crack Depth
- Calculation of internal flaw height Depth
- Accounting for phase reversal

MODULE 3: HARDWARE

- Basic Hardware
- Advantages of digital Recording
- Sampling Rate
- Amount of Data Collected during B-scans
- Grey Scale vs Color Imaging
- Advantages and disadvantages of Signal Averaging

MODULE 4: TRANSDUCER SELECTION AND PROBE SETUP

- Transducer Size
- Transducer Refracted Angle
- Transducer Frequency
- Transducer Frequency – Fine grain and coarse grain materials
- Transducer damping
- Transducer frequency and sampling rate
- Probe separation
- Beam spread

MODULE 5: INSTRUMENT SETUP

- Entering UT Parameters
- Entering Part Thickness
- Entering Probe Separation
- Calibration settings as per ASTM 2373
- Calibration settings as per European TS 14751

MODULE 6: INSPECTION SCANNING

- Manual Scanning
- Mechanical Scanning
- Calibrating the Encoder
- Setting the Origin, Scan Area, Start, Stop
- Acquiring Data

MODULE 7: ANALYSIS SOFTWARE

- Saving Data
- Activating Cursors
- Linearization
- Measuring Flaw Height
- Accounting For Phase Reversal
- Measuring Flaw Length
- Creating a Data Table

MODULE 8: COMMON FAULTS

- No signals
- Gain - too Low
- Improper range
- Signal to Noise ratio problems
- Works well during calibration but not during inspection scanning
- Near Surface problems
- Loss of Couplant

MODULE 9: CODES AND STANDARDS

- British Standard 7706
- ASME Section V, Article 4 (2007)
- European TS 14751
- ASTM 2373

Birring NDE Center, Inc.

515 Tristar Drive, Webster, Texas, 77598

email: training@nde.com

832 533 8366

www.nde.com/training

