

# **Time of Flight Diffraction (TOFD)**

## **Training Course Outline**

Prerequisite for this Class is Level II Ultrasonics

### **SCOPE**

This course prepares the candidate for Time of Flight Diffraction (TOFD) Inspections.

- Select Probes
- 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
- Types of TOFD scans
- Advantages and Limitations of TOFD

#### **MODULE 2: HARDWARE**

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

#### **MODULE 3: TRANSDUCERS**

- Choice of Probe Angle
- Transducer Size
- Transducer Frequency – Fine grain and coarse grain materials
- Transducer damping
- Transducer frequency and sampling rate

- Probe separation
- Beam spread

#### MODULE 4: CALIBRATION

- Setting of range
- Setting of Gain
- Calibration settings as per ASTM 2373
- Calibration settings as per European TS 14751

#### MODULE 5: 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 6: INSPECTION SCANNING

- Manual Scanning
- Mechanical Scanning
- Settings of Encoder

#### MODULE 7: ANALYSIS SOFTWARE

- Linearization
- Flaw sizing
- Parabolic Cursor

#### MODULE 8: CODES AND STANDARDS

- British Standard 7706
- ASME Section V, Article 4 (2006), Appendix on TOFD – to be released
- European TS 14751
- ASTM 2373 (2004)

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