Ultrasonic Testing II

Level II – 40 hours

Training Course Outline

Prerequisite for this Class is Level I Ultrasonics

SCOPE

This course introduces prepares the candidate for flaw detection and angle beam inspections of welds.

This course prepares a candidate to

- Select equipment to conduct test
- Setup test equipment
- Steps to conduct weld inspections, plotting and locating flaws
- Range and sensitivity calibration for weld inspections, DAC
- Familiarize with codes and standards
- Interpret results with respect to applicable codes and standards
- Understand limitation of the test method
- Write test reports.

UT Equipment and welded test samples available for the UT II class.

- Epoch 650, Epoch 600, USN 36 and USN Go
- practicals on welded test samples with embedded flaws

TRAINING

Training material is presented in modules that are followed by quizzes

Modules Covered in UT Level I

Module 1: Contents and Personnel Certification
Module 2: Wave Modes
Module 3A: Ultrasonic Transducer
Module 3B: Sound Field from ultrasonic transducer
Module 4: Thickness Measurement
Module 4A: Epoch 600, 650 and USM 36Thickness measurement
Module 5: Equipment
Module 6: Sound Loss – Attenuation
Module 7: Acoustic Impedance
Module 8: Refraction and reflection
Module 9A: Flaw Detection - 0 Degree
Module 9B: Cladding Inspection

UT II MODULES

MODULE 10: UT TEST MODES

- Pulse-echo mode
- Pitch-catch mode

- Thru-transmission mode
- Scan Plans and weld volume coverage

MODULE 11: IMMERSION TESTING

- Normal beam
- Angle Beam
- Focused Immersion Probes
- Immersion Tanks

MODULE 12: CALIBRATION BLOCKS

- IIW Blocks Type I and II
- Miniature Angle Beam / Rompass Block
- DSC Block
- AWS Resolution Block
- Step Wedge
- Area Amplitude Block
- Distance Amplitude Block

MODULE 13A: ANGLE BEAM INSPECTIONS - BASICS

- Selection of Screen Range
- Measurement of Beam Exit Point
- Measurement of Refracted Angle
- Range Calibration using IIW, Rompass and DSC Block
- Angle Selection for Weld inspection
- Surface Distance, Skip Distance, Depth, ½ vee and full V Path
- Weld Inspection and plotting discontinuities like crack, lack of fusion, lack of penetration, slag, porosity in welds

MODULE 13B: ANGLE BEAM INSPECTIONS- SENTIVITY AND DAC

- Sensitivity Calibration: Piping and non-piping calibrations
- Distance Amplitude Correction (DAC) Curve
- Time Corrected Gain (TCG)
- Weld volume coverage and scan plan
- High Temp Angle Beam Inspections
- Discontinuity Length Sizing using 6 dB and 20 dB drop method
- Worksheet: Plotting of discontinuities for butt welds

MODULE 14: WRITING UT PROCEDURE

MODULE 15: ASME V, ARTICLE 4, UT OF WELDS

- Probe
- Calibration reflectors– notches and side drilled holes
- Reference Level - DAC

- Scan Plan

MODULE 16: AWS D1.1 AND API RP 2X

- Establishing reference level - b
- indication level – a , attenuation factor c = 2 (mp-1)
- Indication rating d = a-b-c

PRACTICALS

Shear Wave Testing on Pipe Samples with embedded weld defects – ID Cracks, OD Cracks, Slag, Porosity, Lack of Fusion, Lack of Penetration

EXAMINATIONS

- General
- Specific
- Practical
- Candidates must score a minimum of 70 % in written tests, 80% in practical test and a minimum average of 80% in all three tests.

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