

Ultrasonic Testing

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. (a) Epoch 4, USN 60, USN 58, USN Go, Epoch 600 (b) 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

CP: Personnel Certification Module 1:

Manufacturing Discontinuities Module 2:

Wave Modes

Module 3: Ultrasonic Transducer and Sound Field

Module 4: UT Equipment

Module 5: Thickness Measurement

Module 6: Attenuation and dB
Module 7: Acoustic Impedance
Module 8: Refraction and reflection
Module 9: Flaw Detection - 0 Degree

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- DAC AND OTHER ISSUES

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: ASME V, ARTICLE 4, WRITING AN ULTRASONIC PROCEDURE

ASME Section V
Essential Variables
Non Essential Variables

MODULE 15: ASME V CODES AND STANDARDS

ASME Section V, Article 4 Weld Examination
SA 388 Heavy Steel Forging
Additional Codes Standards as per student's requirements (please discuss this at the time of registration)

MODULE 16: ASME V CLADDING INSPECTION TECHNIQUES

Detection of disbond and cladding flaws
Techniques: One and Two
Calibration Blocks

MODULE 17: AWS D1.1 AND API RP 2X

Establishing reference level (b)
Indication rating (d) , indication level (a), attenuation factor (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 each test and a minimum of 80% average for all the three tests.

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