



Quality Training Center - 13339 NE Airport Way, Suite 100
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Level I - Ultrasonic Testing

Course: A 40 hour course intended to address the body of knowledge outlined in ASNT CP-105.

Instructor: John R. Clark
ASNT Level III

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REFERENCE & TRAINING MATERIAL:

1. ASNT UT Level I/II Powerpoint Presentation
2. ASNT – Ultrasonic Testing Student Guide (2009 edition)
3. ASNT PTP Ultrasonic Testing Classroom Training Book (2007 edition)
4. AWS D1.5 Part C. Ultrasonic Testing of Groove Welds
5. ASTM E 114 (2005)

UT Level I Lesson Plan Outline

Day 1

Introduction: Brief History of Ultrasonic Testing
Classroom Rules
Basic Math for Ultrasound
Reading Assignments

Lesson 1 Qualification and Certification

- A. Industry Standards
- B. Written Practice
- C. Qualification Requirements
- D. Quiz



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Lesson 2 Basic Principles of Acoustics

- A. Sound and Ultrasound
- B. The Generation of Ultrasound
- C. Wavelength, Material Velocity and Frequency
- D. Wave Modes
- E. Quiz (UT Lesson 2)
- F. Math Work Sheets
 - 1) Metric Conversions
 - 2) Wave Length
 - 3) Snell's Law
 - 4) Acoustic Impedance

Reading Assignment: Chapters 1, 2, and 3 of The Ultrasonic Training Classroom Training Book

Day 2

Lesson 3 Ultrasonic Equipment

- A. Ultrasonic Instrument Circuitry and Controls
- B. Instrument Calibration
- C. Instrument Standardizing
- D. Reference Standards
- E. Digital Thickness Gages
- F. Cables
- G. Quiz (UT Lesson 3)
- H. Lab Exercise 1 (UT Lesson 3)
- I. Lab Exercise 2 (UT Lesson 3)

Reading Assignment: Chapter 4 of The Ultrasonic Training Classroom Training Book

Day 3

Lesson 4 Transducers

- A. Operation and Theory
- B. Piezoelectric Principle Transducer



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- C. Transducer Elements
- D. Near and Far Fields
- E. Beam Spread
- F. Types of Transducers
- G. Sensitivity, Resolution and Damping
- H. Couplants
- I. Quiz (Lesson 4) Lab Exercise 3 (UT Lesson 4)
- J. Lab Exercise 4 (UT Lesson 4)
- K. Lab Exercise 5 (UT Lesson 4)
- L. Math Work Sheets
 - 1) Beam Divergence
 - 2) Near Field Measurement

Reading Assignment: Chapter 5 of The Ultrasonic Training Classroom Training Book

Day 4

Lesson 5 Basic Ultrasonic Testing Methods

- A. Contact Testing
- B. Pulse-Echo Techniques
- C. Through Transmission
- D. Angle Beam Technique
- E. Surface Wave Technique
- F. Lamb Wave Technique
- G. Immersion Testing
- H. Non-Contacting Ultrasonic Techniques
- I. Quiz (UT Lesson 5)
- J. Lab Exercise (UT Lesson 5)

Day 5

Review of Level I Ultrasonic Testing

- A. Lab Exercise
- B. Review of Level I Ultrasonic Testing
- C. Final Examination