



**NPI-Quality Training Center**, 13339 NE Airport Way, Suite 100  
Portland, OR 97230  
Office (503) 287.5255 Fax (503) 287.5992

## **Level I & II Penetrant Testing**

### **Training Course – PT- 100**

**COURSE:** A 32 hour course intended to address the body of knowledge outlined in ASNT CP-105-2006.

#### **REFERENCE & TRAINING MATERIAL:**

1. ASNT PTP – Penetrant Testing Classroom Training Book
2. Nondestructive Testing Handbook, Third Edition: Volume 2, Liquid Penetrant Testing
3. Principles of Penetrants – C.E.Betz – Magnaflux Corporation
4. ASTM E-1417-05 - Standard Practice for Liquid Penetrant Testing
5. ASTM E-1220-10 - Standard Practice for Visible Penetrant Testing using the Solvent Removable Process
6. ASTM E-165-09 - Standard Practice for Liquid Penetrant Examination for General Industry
7. ASNT – Material and Processes for NDT Technology
8. NADCAP – AC7114/1S Survey Checklist

### **Level I Training**

#### **Section 1: (4 hours)**

##### **1.0 Introduction**

- A. Class rules and policies
  1. Comprehension Examinations
  2. Grading System
  3. Certificates of Training
- B. Procedure for Qualification and Certification of Penetrant Personnel
- C. Brief history of NDT and Penetrant Testing
- D. Purpose of Penetrant Testing
- E. Basic Principles of Penetrant Testing

##### **2.0 Liquid Penetrant Processing**

- A. Preparation of parts methods of pre-cleaning
- B. Adequate lighting
- C. Application of penetrant to parts
- D. Removal of surface penetrant
- E. Developer application and drying
- F. Inspection and evaluation
- G. Post-cleaning



## **Level I Training**

### **Section 1: (cont.)**

#### **3.0 Various Penetrant Testing Methods**

- A. Current standards ASTM, AMS, ASME
- B. Characteristics of each method
- C. General Applications of each method

#### **4.0 Liquid Penetrant Testing Equipment**

- A. Liquid penetrant testing units
- B. Lighting for liquid penetrant inspection and light meters
- C. Materials for liquid penetrant testing
- D. Precautions in penetrant inspection

#### **5.0 Section 1 through 4 review - Quiz**

### **Section 2: (6 hours)**

#### **1.0 Demonstration by Instructor**

- A. Penetrant Equipment
- B. Penetrant System Check
- C. Instructor Processing Demonstration – Type I Method A
- D. Instructor Processing Demonstration – Type I Method D
- E. Instructor Processing Demonstration – Type II Method A
- F. Instructor Processing Demonstration – Type II Method C

### **Section 3: (4 hours)**

#### **1.0 Material Processes**

- A. Steel
- B. Forgings
- C. Castings
- D. Welding

#### **2.0 Material Processes – Quiz**

#### **3.0 Safety, Health and Disposal**

- A. Penetrant material safety requirements (MSDS)
- B. Equipment safety, electrical and ultraviolet lighting
- C. Disposal of penetrant materials, federal, state and local

### **Level I Section 4: (2 hours)**

#### **1.0 Session 1, 2, and 3 Review – Level I Comprehension Examination**



## **Level II Training**

### **Section 1: (4 hours)**

- 1.0 Selection of Appropriate Penetrant Testing method**
  - A. Advantages of various methods
  - B. Disadvantages of various methods
  
- 2.0 Indications and Discontinuities**
  - A. Rounded Indications and Discontinuities
  - B. Linear Indications and Discontinuities
  - C. Relevant and Non-relevant Discontinuities
  - D. True and False Indications
  - E. Inherent, Processing and Service Discontinuities
  - F. Casting Discontinuities
  - G. Welding Discontinuities
  
- 3.0 Indications and Discontinuity - Quiz**

### **Section 2: (2 hours)**

- 1.0 General Penetrant System Requirements**
  - A. Materials
  - B. Equipment
  - C. Calibration
  - D. System Checks
  - E. Processing
  - F. Lighting

### **Section 3: (4 hours)**

- 2.0 Specific Penetrant System Requirements**
  - A. Type I, Method A – ASTM E-165
  - B. Type I, Method C – ASTM E-165
  - C. Type II, Method A – ASTM E-1417
  - D. Type II, Method C – ASTM E-1417
  - E. Type II, Method D – ASTM E-1417
  - F. NADCAP
  - G. Acceptance Standards



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## **Level II Training**

### **Section 4: (4 hours)**

#### **1.0 Penetrant Processing and Evaluation - Lab**

- A. Type I, Method A – Exercise
- B. Type I, Method D - Exercise
- C. Type II, Method C - Exercise

### **Section 5: (2 hours)**

#### **1.0 Level I and II Course Review and Final Comprehension Exam**