

Liquid Penetrant Testing

Level I and II – 16 hours

Training Course Outline

SCOPE

This course covers the principles of Liquid Penetrant Testing and prepares a candidate to

- Select equipment to conduct test
- Setup test equipment
- Steps to conduct test
- Familiarize with codes and standards
- Interpret results with respect to applicable codes and standards
- Understand limitation of the test method
- Write test reports.

TRAINING

Training material is presented in modules that are followed by quizzes

PERSONNEL CERTIFICATION

ASNT SNT-TC-1A

NAS 410

Training, experience and examination requirements

Training Requirements

- Recommended Course Outline

- Training Hours

- Practicals

- Quizzes and examinations

MODULE 1: INTRODUCTION

MODULE 2: PRINCIPLES

- Purpose of Liquid Penetrant Testing

- Physical Principles

- Wetting Ability and Contact Angle

- Surface Tension

- Capillary Action

- Viscosity

- Reversed Capillary Action

- Visibility of Indication

- Categories of Test Processes

- Types of Dye: Type I (Fluorescent) and Type II (Visible)

- Methods of Removal of excess Penetrant including Water Washable,

- Emulsifiers and Solvent Removable

- Sensitivity Levels - ½, 1, 2, 3, 4

- Selection of Process

Limitations of Penetrant Testing

MODULE 3: BASIC STEPS

This module covers the basic steps involved in the following processes

Method A - Water Washable

Method B - Lipophilic Emulsifier

Method C - Solvent Removable

Method D - Hydrophilic Emulsifier

MODULE 4: SURFACE PREPARATION AND PRECLEANING

Choice of Cleaning Method

Different Cleaning Methods including Detergent, Solvent, Alkaline, Steam, Ultrasonic cleaning, Vapor Degreasing

MODULE 5: APPLICATION AND REMOVAL OF PENETRANTS

Selection of Penetrant Materials

- Cleaners
- Penetrant
- Developer
- Selection based on family

Application of Penetrant

Standard Temperature Limits

Dwell time

Drying

Drying Parameters

Drying Time Limits

Application of Developers

Types of Developers

- Aqueous
- Non-Aqueous

Developing Time

Fluorescent Inspection

- Black Light Warm Up Time
- Minimum intensity and light meter
- Visual Adaptation

Visual Inspection

- Minimum light intensity and light meter

Post Cleaning

Limitation of Penetrant Testing

MODULE 6: INTERPRETATION

Interpretation of Test Results

Flow Chart for Interpretation

True, False, Relevant and Non Relevant indications

Categories of Indications: - Rounded and Linear

Evaluation of Indications
ASTM E-433 Reference Photographs of Indications types

MODULE 7: CODES & STANDARDS (Specific Training)

Codes

ASME Section V, Article 6

ASME Section VIII, Appendix 8 (Accept/Reject Criteria)

Standards

ASTM E-165 Standard Practice for Liquid Penetrant Examination

ASTM E-1209 Fluorescent Water Washable Liquid Penetrant Testing

Other codes and standards can be discussed at the request of the students.

Please make such requests at time of registration

PRACTICAL TRAINING

Test on Flawed Samples

Visible

Solvent Removable

Fluorescent

Water Washable

Solvent Removable

EXAMINATIONS

General

Specific

Practical Tests

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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