



NAS 410 COURSE OUTLINES FOR PENETRANT TESTING (32 hrs)

Objective:

- To provide the training necessary to meet the NAS-410 Revision 3 requirements of 32 hours training for each method.
- The training will discuss the codes, standards and specifications used by the attendees. These may include ASTM standards, Boeing specifications, Honeywell specifications, etc.
- Prior to the course, information will be obtained from the attendees regarding applicable codes, these codes will be available during the training.
- The training will consist of both theory and practical hands-on and will focus on performing the process control requirements associated with each code, etc.
- Attendees will also prepare written practice techniques and will write inspection reports of inspections performed.
- Techniques and reports generated by students will be in accordance with the individual's specification requirements, and will then be assessed by the Instructor.

Introduction

- a. Brief history of nondestructive testing and liquid penetrant testing
- b. Purpose of liquid penetrant testing
- c. Basic principles of liquid penetrant testing
- d. Types of liquid penetrants commercially available

Liquid Penetrant Processing

- a. Preparation of parts
- 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

Various Penetrant Testing Methods

- a. Characteristics of each method
- b. General applications of each method

Liquid Penetrant Testing Equipment

- a. Liquid penetrant testing units
- b. Lighting for liquid penetrant inspection
- c. Materials for liquid penetrant testing
- d. Precautions in liquid penetrant inspection

Review

- a. Basic Principles
- b. Process of various methods
- c. Equipment

Selection of Appropriate Penetrant Testing Method

- a. Advantages of various methods
- b. Disadvantages of various methods

Inspection and Evaluation of Indications

- a. General
 - (1) Discontinuities inherent in various materials
 - (2) Reasons for indications
 - (3) Appearance of indications
 - (4) Time for indications to appear
 - (5) Persistence of indications
- b. Factors affecting indications
 - (1) Penetrant used
 - (2) Prior processing
 - (3) Technique used
- c. Indications from cracks
 - (1) Cracks occurring during solidification
 - (2) Cracks occurring during processing
 - (3) Cracks occurring during service
- d. Indications from porosity
- e. Indications from specific material forms
 - (1) Forgings
 - (2) Castings
 - (3) Plate
 - (4) Welds
 - (5) Extrusions
- f. Evaluation of indications
 - (1) True indications
 - (2) False indications
 - (3) Relevant indications
 - (4) Nonrelevant indications

Inspection Procedures and Standards

- a. Inspection procedures
- b. Standards/Codes
 - ASTM E 1417,AMS 2644,
 - BSS 7039,BAC 5423

Practical demonstrations and structured daily exercises

Summary / Final review

End of Course Test and review

Material Reference:



Process control checks covered will include:

- Processing TAM panels through WW and PE process.
- Checking black light intensity
- Ambient white light checks
- Condition of Penetrant
- Construct Post Emulsified Hydrophilic concentration graph and use it to check in-use concentration.
- Document water pressure and temperature checks
- Drying oven temperature checks
- Calibration status on all equipment – make list
- Dry powder contamination and condition

During the Penetrant course, strict attention to the dwell times and emulsifier times should be made as per the specifications.

TEST NDT does not have any pre-requisites for attending any of our courses, it is entirely up to the attendee to determine whether the course is suitable for their needs and whether they are capable of achieving the standards. Please study the applicable course outline and decide if the course is suitable for your needs before enrolling, if in doubt, please contact us to discuss. For employer funded attendees, please discuss the suitability of any of the courses with your employers responsible NDT level 3 before enrolling.