

ISO 9001:2008 Certified

# Penetrant Testing (PT) Level I/II Training

Dye Penetrant Inspection (DPI), also called Liquid Penetrant Inspection (LPI) or Penetrant Testing (PT), is a widely applied and low-cost inspection method used to locate surface-breaking defects in all non-porous materials (metals, plastics, or ceramics).

The effectiveness of this method relies on the training/skill level of the technician, how clean the part is, and the procedure being used to perform test.

There are many questions to consider in this type of test: type of penetrant, method of excess removal, sensitivity of the material and the penetrant and etc.

ECE Global's team of experienced technicians and staff NDE Level III provides the best solutions to this important questions.

Let us earn your trust.  
Thank you!

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# ECE Global

Your Global Partner in Engineering, Quality and Safety Compliance  
Design - Fabrication - Inspection - Certification

The ECE Level I and II training course covers the theoretical aspects of this non-destructive testing method as well as providing practical demonstrations and hands-on experience time for our students. ECE's Penetrant Testing training courses satisfy the training hours needed for both Level I and II certification in accordance with SNT-TC-1A and ANSI/ASNT CP-189.

## Level I

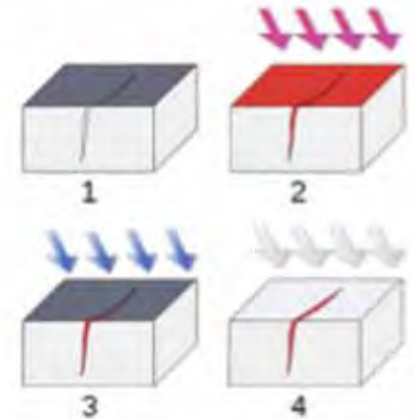
- The principles and theory of performing liquid penetrant examinations
- The nature of capillary action
- Operations and descriptions of portable and stationary equipment
- Review of Penetrant Testing indications
- ASNT Level III Instructor (4) hour class



Level I



Certification Exam



Level I

## Level II

- Review of basic principles, methods and equipment
- Describe alternative Penetrant Testing methods
- Selection of appropriate Penetrant Testing methods
- Inspection and evaluation of Penetrant Testing indications and discontinuities
- Inspection procedures and standards
- ASNT Level III Instructor (8) hour class

## Certification Exam

- On the job hours log sheet
- ASNT Level III written and proctored exam
- (4) hour exam
  - General knowledge exam (closed book)
  - Code specific exam (open book)
  - Practical exam
- ASNT Level III procedure writing services available

**ECE understands what you expect - flexibility and customized solutions!**  
We can change and adapt with your evolving needs because of the knowledge, experience, and passion of our staff.

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## Dye Penetrant Testing

Commonly, DPI is used to detect casting, forging and welding surface defects such as cracks, surface porosities, lack of penetration in welds or defects as a result of in-service conditions (e.g. fatigue cracks of components or welds).

The effectiveness of this method relies on many factors including training/skill of the technician, how clean the part is, and the procedure that is being used to perform the test. DPI is a relatively cost effective method, considering the amount of training required, and the cost of materials used. PT can be used in both manufacturing and in-service inspections.

Like with other inspection methods, it is required that a known defect standard has been defined for the DPI, using standard parameters. Thus indications can be compared with defined allowable limits.

The basic steps are: 1) Clean the part 2) Apply the Penetrant and allow dwelling 3) Remove excess Penetrant. 4) Apply a developer and allow developing 5) Read the part for indications. 6) Clean the part.

This may sound easy, BUT, here comes the tricky part. There are several variations to every step - i.e. what type of Penetrant? What method (of excess Penetrant removal) of Penetrant? What sensitivity of Penetrant? What form of developer? What class of solvent (to remove excess Penetrant)?

## Our Services:

ECE Global Inspection Services offer a complete line of surface examination techniques including Liquid Penetrant and Magnetic Particle NDT applications and techniques. We have been providing this service for many years and have proven to give reliable information as to the shape and length of different defects that are open to surface.

This can be very important when indications are noted and additional resources and techniques are needed to assess the overall condition of your component (e.g. Phased Array Ultrasonic Inspection).

Many of the technicians employed by ECE Global are multi-disciplined and able to apply the other NDT disciplines that may be necessary to fully determine the suitability of the component for service.

## Often Referenced Standards:

### European Committee for Standardization (CEN)

- EN 571-1, Non-destructive testing - Penetrant testing - Part 1: General principles
- EN 1371-1, Founding - Liquid penetrant inspection - Part 1: Sand, gravity die and low pressure die castings
- EN 1371-2, Founding - Liquid penetrant inspection - Part 2: Investment castings
- EN 2002-16, Aerospace series - Metallic materials; test methods - Part 16: Non-destructive testing, penetrant testing
- EN 10228-2, Non-destructive testing of steel forgings - Part 2: Penetrant testing
- EN 10246-11, Non-destructive testing of steel tubes - Part 11: Liquid penetrant testing of seamless and welded steel tubes for the detection of surface imperfections

### ASTM International (ASTM)

- ASTM E 165, Standard Practice for Liquid Penetrant Examination for General Industry
- ASTM E 1417, Standard Practice for Liquid Penetrant Testing

### American Society of Mechanical Engineers (ASME)

- ASME Boiler and Pressure Vessel Code, Section V, Art. 6, Liquid Penetrant Examination
- ASME Boiler and Pressure Vessel Code, Section V, Art. 24 Standard Test Method for Liquid Penetrant Examination SE-165 (identical with ASTM E-165)