

THIRD
EDITION

ASNT
QUESTIONS & ANSWERS
BOOK

LIQUID PENETRANT TESTING METHOD

Levels I, II, and III Review Questions
Book D



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The American Society for Nondestructive Testing Inc.



Documents

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REFERENCES

Recommended References

The following references were used in formulating the questions in this book.

Reference A

ASNT, 2016, *Nondestructive Testing Handbook, Vol. 1: Liquid Penetrant Testing*, fourth edition, American Society for Nondestructive Testing, Columbus, OH.*

Reference B

ASNT, 2019, *Liquid Penetrant Testing Classroom Training Book*, American Society for Nondestructive Testing, Columbus, OH.*

Reference C

ASNT, 2019, *ASNT Level II Study Guide: Liquid Penetrant Testing Method*, American Society for Nondestructive Testing, Columbus, OH.*

Reference D

ASNT, 2003, *ASNT Level III Study Guide: Liquid Penetrant Testing Method*, American Society for Nondestructive Testing, Columbus, OH.*

Reference E

ASNT, 2020, *Principles and Applications of Liquid Penetrant Testing: A Classroom Training Text*, American Society for Nondestructive Testing, Columbus, OH.*

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Reference Codes

Each question found in this book is followed by letter(s) and page number(s) indicating the specific recommended reference where the answer may be found. For example:

18. The term used to define the period of time in which the test part is covered with penetrant is:
- a. waiting time.
 - b. soak time (drain time).
 - c. penetration time (dwell time).
 - d. bleed-in time.

A.47

In this example, the letter “A” refers to Reference A in the list (left) and “47” is the specific page in Reference A where the answer to the question is located.

Reference Usage

Reference A Total = 183

Level I 79
Level II 52
Level III 52

Reference B Total = 40

Level I 23
Level II 14
Level III 3

Reference C Total = 12

Level I 0
Level II 12
Level III 0

Reference D Total = 14

Level I 3
Level II 2
Level III 9

Reference E Total = 14

Level I 4
Level II 7
Level III 3

LEVEL I

Review Questions

1. Which one of the following conditions will affect the rate a liquid penetrant will enter cracks, fissures, and other small openings?
 - a. The hardness of the specimen being tested.
 - b. The viscosity of the penetrant.
 - c. The color of the penetrant.
 - d. The conductivity of the specimen being tested.

A.100
2. Which of the following is a commonly used classification for penetrant?
 - a. Postemulsifiable penetrant.
 - b. Nonferrous penetrant.
 - c. Chemical etch penetrant.
 - d. Nonaqueous penetrant.

A.50
3. A generally accepted technique for removing excess solvent-removable penetrant is:
 - a. repeatedly dipping the test specimen in a cleaner.
 - b. soaking the test specimen in hot detergent water.
 - c. blowing the excess penetrant off the surface of the part with compressed air.
 - d. wiping with clean dry cloth, then a clean cloth lightly dampened with cleaner remover.

A.50; B.16–17
4. Which of the following can be tested by the liquid penetrant testing (PT) method?
 - a. Iron castings, aluminum forgings, and a part made from a nonporous material.
 - b. Unglazed ceramics, iron castings, and aluminum forgings.
 - c. Iron castings, aluminum forgings, and oxidized fiberglass.
 - d. Concrete and clay structures.

A.11, 49
5. Which of the following discontinuities can be found by PT?
 - a. A surface crack.
 - b. A subsurface crack.
 - c. An internal inclusion.
 - d. A delamination.

A.48
6. Which of the following is generally the more acceptable technique for cleaning parts prior to penetrant testing?
 - a. Sandblasting.
 - b. Wire brushing.
 - c. Grinding.
 - d. Solvent cleaning.

A.187, 191
7. Which of the following techniques and materials are used to clean parts prior to penetrant testing?
 - a. Nonhalogenated solvents, aqueous alkaline washers, and vapor degreasing.
 - b. Detergents, wire brushing, and ultrasonic immersion.
 - c. Vapor degreasing, halogenated solvents, and soaps.
 - d. Light glass beading, passivation, and etching.

A.191, 194
8. Cutting oils may be effectively removed from parts before penetrant testing by:
 - a. preheating.
 - b. alkaline cleaner.
 - c. washing with water.
 - d. wire brushing.

A.200

9. Which of these is likely the most common cause of contamination in water-washable penetrant testing?
 - a. Metal filings.
 - b. Oil.
 - c. Detergents (from cleaning).
 - d. Presence of moisture.

A.120
10. Without a properly functioning filter in place on an ultraviolet lamp, ultraviolet light used for fluorescent penetrant inspection can cause permanent damage to:
 - a. human tissues.
 - b. human eyes.
 - c. human blood cells.
 - d. human reproductive organs.

A.21, 268, 280
11. Which of the following basic inspection principles applies to the visible penetrant techniques?
 - a. It is not necessary for the penetrant to enter the discontinuity in order to form an indication.
 - b. Indications glow when illuminated with visible light.
 - c. A sufficient penetrant dwell time is important to enter and fill discontinuities.
 - d. The excess penetrant removal process is not that critical.

A.47–49
12. Subsurface discontinuities can be best detected by:
 - a. postemulsification penetrant.
 - b. visible dye penetrant.
 - c. fluorescent, water-washable penetrant.
 - d. another NDT method.

A.11
13. The first step in conducting a liquid penetrant test on a surface that has been painted is to:
 - a. carefully apply the penetrant over the surface.
 - b. completely remove the paint.
 - c. thoroughly wash the surface with a detergent.
 - d. wire brush the surface to roughen the smooth surface coating of paint.

A.49, 187
14. When using a Method B, postemulsifiable penetrant, it is necessary to apply the emulsifier:
 - a. before applying the penetrant.
 - b. after the water-wash operation.
 - c. after the dwell time has elapsed.
 - d. after the development time has elapsed.

A.50, 57
15. When conducting water-washable PT, the wet developer is applied:
 - a. immediately after the penetrant has been applied.
 - b. immediately before the penetrant is applied.
 - c. after removal of the penetrant.
 - d. after removal of the emulsifier.

A.56
16. The term used to describe the action of a particular developer in soaking up the penetrant in a discontinuity, so as to cause the maximum bleedout of the liquid penetrant for increased contrast and sensitivity, is known as:
 - a. blotting.
 - b. capillary action.
 - c. concentration.
 - d. attraction.

A.51
17. Using an ultraviolet lamp with a cracked filter or without the filter in place can cause damage to human eyes because the lamp emits:
 - a. blue light radiation.
 - b. UA-A radiation.
 - c. UV-B radiation.
 - d. infrared radiation.

A.22, 283
18. The term used to define the period of time in which the test part is covered with penetrant is:
 - a. waiting time.
 - b. soak time (drain time).
 - c. penetration time (dwell time).
 - d. bleed-in time.

A.47

19. Usually, the most desirable technique of removing excess water-washable penetrant after the dwell time is by using:
- a low-pressure coarse water spray.
 - water and brush.
 - a solid stream of water.
 - water and clean rags.
- A.56, 65
20. In order to prevent streaking of indications when conducting PT using a postemulsifiable penetrant, wet developers should be applied:
- by manually brushing.
 - in high concentrations for maximum resolution.
 - by dipping, flowing, or spraying to form a smooth, even coating.
 - in low concentrations to prevent pooling.
- A.72, B.18
21. PT is limited in which of the following capabilities?
- Accurately measuring the depth of a crack or discontinuity.
 - Usability for on-site testing of large parts.
 - Finding shallow surface discontinuities.
 - Increasing or decreasing sensitivity by using different penetrant materials.
- B.24
22. Which of the following discontinuities is most likely to be missed due to improper rinse techniques?
- A forging lap.
 - Deep pitting.
 - Shallow and broad discontinuities.
 - The rinse technique will not affect the detection of discontinuities.
- A.66
23. In PT, which surface condition can create the most detrimental effect?
- Pressure-washed.
 - Ultrasonic immersion.
 - Abrasive-blasted.
 - Etched aluminum.
- A.186, 194, 209; B.14
24. PT is capable of detecting:
- subsurface intergranular stress-corrosion cracking discontinuities.
 - discontinuities open to the surface.
 - subsurface discontinuities.
 - porosity.
- A.11, 48
25. Ultraviolet equipment is required when performing PT using:
- fluorescent penetrants.
 - visible dye penetrants.
 - nonfluorescent penetrants.
 - pressure leak testing.
- A.49, 75
26. The term used to define the tendency of certain liquids to penetrate into small openings such as cracks or fissures is:
- saturation.
 - capillary action.
 - blotting.
 - wetting agent.
- A.11, 59, 98–99, 492
27. Excess penetrant (all penetrant except that which is in discontinuities) is removed from the specimen:
- after the required penetrant dwell time has elapsed.
 - before the application of an emulsifier if a postemulsifiable penetrant is used.
 - by means of a steam cleaner.
 - only when water-washable penetrants are used.
- A.50, 56
28. When using a postemulsifiable penetrant, the emulsification time should be:
- as long as the penetrant dwell time.
 - half the penetrant dwell time.
 - the same as the developer time.
 - controlled to prevent the emulsification of the penetrant in the discontinuity.
- A.51, 58

29. When inspectors are working in a darkened area, they should become adjusted to the dark before inspecting parts. What is the generally accepted minimum time period for becoming accustomed to the dark?
- 5 min.
 - 5 to 10 min.
 - 10 to 15 min.
 - No waiting period is necessary.
- A.23, 267
30. PT cannot find:
- surface porosity.
 - surface cracks.
 - an internal cavity.
 - a surface forging lap.
- B.4
31. Which of the following material surface conditions will create excessive background in the formation of penetrant indications?
- Porous ceramic.
 - Titanium.
 - High alloy steel.
 - Cast iron.
- A.48–49
32. Which of the following are acceptable ways of applying penetrant to the inspection area?
- Dipping, flowing, spraying, brushing.
 - Ultrasonic immersion, spraying, brushing.
 - Vacuum, dipping, spraying.
 - Electrostatic spray, dipping, cloth application.
- B.15
33. Solvents used for cleaning the surface of a test specimen must:
- have the ability to dissolve oils and greases commonly found on the surface.
 - not be flammable.
 - contain no halogens or sulfur.
 - remain in minimal amounts on the surface after cleaning.
- A.195–199
34. Which of the statements below best states the danger of sandblasting (without subsequent chemical etching) for cleaning surfaces to be tested using PT?
- The discontinuities may be peened over and closed.
 - Oil contaminants might be sealed in the discontinuities.
 - The sand used in the sandblasting operation may be forced into the discontinuity.
 - The sandblasting operation may introduce discontinuities.
- A.194
35. The penetrant applied to the surface of a test specimen:
- seeps into discontinuities.
 - is absorbed by discontinuities.
 - is drawn into discontinuities by capillary action.
 - is drawn into discontinuities by gravity.
- A.11, 59, 98
36. Which of the following statements concerning PT is correct?
- Fluorescent penetrants will produce red against white discontinuity indications.
 - Nonfluorescent penetrants require the use of ultraviolet radiation.
 - Fluorescent indications will be seen when exposed to ultraviolet radiation.
 - Nonfluorescent discontinuities glow in the dark for easy viewing and interpretation.
- A.49
37. When removing excess penetrant from the surface of a test specimen:
- the penetrant removal operation must remove the penetrant from discontinuities.
 - sufficient excess penetrant must be removed to eliminate an interfering background.
 - the surface must be immersed in water, allowing the penetrant to dilute from the surface.
 - excess penetrant is not a problem.
- A.171

38. The final inspection of a test specimen for discontinuities should take place:
- immediately after the developer has been applied.
 - any time after the developer has been applied.
 - after the developer has been on the test specimen for the proper development time.
 - immediately after the rinse operation.
- B.20
39. Which of the following is an advantage of visible dye penetrants over fluorescent penetrants?
- Visible dye penetrants do not require ultraviolet light.
 - Visible dye penetrants are more sensitive than fluorescent penetrants.
 - Visible dye penetrants are superior in penetrating characteristics.
 - Visible dye penetrants are not toxic while fluorescent penetrants are toxic.
- A.83
40. The terms dry, aqueous wet, and nonaqueous wet are used to describe three different types of:
- emulsifiers.
 - cleaners.
 - developers.
 - penetrants.
- A.51–52
41. Which of the following is the most commonly used technique for removing non-water-washable visible dye penetrant from the surface of a test specimen?
- Dipping in a solvent.
 - Spraying.
 - Hand wiping.
 - Blowing.
- B.16
42. Which of the following is an acceptable technique for applying wet developers?
- Application with a soft brush.
 - Application with a hand powder bulb.
 - Rubbing with a saturated cloth.
 - Spraying or dipping.
- B.18
43. The inspection is a Type I, Method A, Level 3, Form d penetrant process. Which of these would be the proper personal protective equipment for inspectors?
- UV-blocking glasses, rubber gloves, and respirator filter.
 - UV-blocking glasses, rubber gloves, and dosimeter.
 - UV-blocking glasses, rubber gloves, and hard hat.
 - UV-blocking glasses, rubber gloves, flame-resistant clothing.
- B.6, 8–9
44. Which of the following surface contaminants can be removed by cleaning parts in an alkaline parts washer?
- Plating.
 - Heavy oils.
 - Rust.
 - Paint.
- A.187, 195
45. Which of the following does an NDT inspector need to be aware of for precleaning of parts?
- Contaminants do not cause adverse issues with penetrant inspections.
 - The potential consequences of the precleaning technique on penetrant inspections.
 - The inspector does not need to know anything about the precleaning process.
 - The inspector shall always be the person cleaning the part.
- A.185
46. Which of the following is the most likely result of an excessive emulsification time when performing PT with postemulsifiable penetrants?
- A large number of nonrelevant indications could appear on the part.
 - Shallow discontinuity indications could be lost.
 - Excess penetrant could remain after the wash operation.
 - The emulsifier could harden, preventing the developer from blotting the penetrant in discontinuities.
- A.63–64, 67