

Liquid Penetrant Testing Method Questions & Answers Book

Second Edition

Supplement to
Recommended Practice No. SNT-TC-1A
Book D

Levels I, II and III
Review Questions



The American Society for
Nondestructive Testing, Inc.

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ASNT exists to create a safer world by promoting the profession and technologies of nondestructive testing.

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Recommended References

Liquid Penetrant Testing Method

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

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

- A.* Tracy, Noel A., technical editor, Patrick O. Moore, editor, *Nondestructive Testing Handbook*, third edition: Volume 2, *Liquid Penetrant Testing*, Columbus, OH, American Society for Nondestructive Testing, Inc., 1999.
- B.* Badger, Duane, *Liquid Penetrant Testing Classroom Training Book*, Columbus, OH, American Society for Nondestructive Testing, Inc. 2005.
- C.* *Metals Handbook*, ninth edition, *Nondestructive Evaluation and Quality Control*, Volume 17, Metals Park, OH, American Society for Metals. 1989.

* Available from The American Society for Nondestructive Testing, Inc.

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:

28. The term used to define the tendency of certain liquids to penetrate into small openings such as cracks or fissures is:

- a. saturation
- b. capillary action
- c. blotting
- d. wetting agent

C.21

In this example, the letter “C” refers to Reference C in the list above and “21” is the specific page in Reference C where the answer to the question is located.

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Reference Usage

Liquid Penetrant Testing Method

Reference A: Total = 207

Level I	93
Level II	60
Level III	54

Reference B: Total = 24

Level I	15
Level II	8
Level III	1

Reference C: Total = 1

Level I	1
Level II	0
Level III	0

Level I Questions

Liquid Penetrant Testing Method

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

A.162
2. Which of the following is a commonly used classification for penetrant?
 - a. post-emulsifiable penetrant
 - b. nonferrous penetrant
 - c. chemical etch penetrant
 - d. nonaqueous penetrant

A.43
3. A generally accepted method for removing excess nonwater-washable 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 and cautiously cleaning the test specimen with a cleaner-dampened cloth

A.45
4. All of the following parts can be tested by the liquid penetrant method except:
 - a. an iron casting
 - b. an aluminum forging
 - c. a part made from a porous plastic material
 - d. a part made from a nonporous material

A.35
5. Which of the following discontinuities can be found by the penetrant test method?
 - a. a surface crack
 - b. a subsurface crack
 - c. an internal inclusion
 - d. none of the above

A.35
6. Which of the following is generally the more acceptable method for cleaning parts prior to penetrant testing?
 - a. sand blasting
 - b. wire brushing
 - c. grinding
 - d. vapor degreasing

A.167
7. All of the following methods are commonly used to clean parts prior to penetrant testing except:
 - a. vapor degreasing
 - b. liquid solvent
 - c. power wire brushing
 - d. alkaline cleaner

A.170

8. Cutting oils may be effectively removed from parts before penetrant testing by:
- preheating
 - vapor degreasing
 - washing with water
 - all of the above
- A.170
9. The most common type of contaminant in fluorescent penetrant fluid is:
- metal filings
 - oil
 - detergents (from cleaning)
 - water
- A.103
10. Ultraviolet light, with a proper functioning filter in place, used for fluorescent penetrant inspection can cause permanent damage to:
- human tissues
 - human eyes
 - human blood cells
 - none of the above
- A.78
11. All of the following basic inspection principles apply to the visible penetrant methods except:
- the penetrant must enter the discontinuity in order to form an indication
 - indications glow when illuminated with an ultraviolet light
 - a longer penetration time is required for smaller discontinuities
 - if the penetrant is washed out of the discontinuity, an indication will not be formed by that discontinuity
- A.36
12. Subsurface discontinuities can be best detected by:
- the post-emulsification penetrant method
 - the visible dye penetrant method
 - the fluorescent, water-washable penetrant method
 - none of the above
- A.5
13. Water-washable penetrants may be applied by:
- brushing
 - spraying
 - dipping
 - all of the above
- B.14
14. The first step in conducting a liquid penetrant test on a surface that has been painted is to:
- carefully apply the penetrant over the surface
 - completely remove the paint
 - thoroughly wash the surface with a detergent
 - wire brush the surface to roughen the smooth surface coating of paint
- A.174
15. When using a post-emulsification penetrant, it is necessary to apply the emulsifier:
- before applying the penetrant
 - after the water-wash operation
 - after the dwell time has elapsed
 - after the development time has elapsed
- A.43

16. When conducting a water-washable liquid penetrant test, the wet developer is applied:
- immediately after the penetrant has been applied
 - immediately before the penetrant is applied
 - after removal of the penetrant
 - after removal of the emulsifier
- A.34
17. 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:
- blotting
 - capillary action
 - concentration
 - attraction
- A.38
18. Using an ultraviolet light lamp with a cracked filter or without the filter in place can cause damage to human eyes because the lamp emits:
- black light
 - ultraviolet light
 - infrared light
 - none of the above
- A.77
19. The term used to define the period of time in which the test part is covered with penetrant is:
- waiting time
 - soak time (drain time)
 - penetration time (dwell time)
 - bleed in time
- A.34
20. Usually, the most desirable method 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.49
21. When conducting a liquid penetrant test using a post-emulsifiable visible dye penetrant, the generally accepted method for applying the wet developer is by:
- brushing
 - swabbing
 - dipping
 - spraying
- B.18
22. Which of the following characteristics does not apply to liquid penetrant testing?
- this method can accurately measure the depth of a crack or discontinuity
 - this method can be used for on-site testing of large parts
 - this method can be used to find shallow surface discontinuities
 - this method can be made more or less sensitive by using different penetrant materials
- B.24
23. 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.50

24. Which of the following surface conditions could have a detrimental effect on a liquid penetrant test?
- a wet surface
 - a rough weld
 - an oily surface
 - all of the above
- A.163
25. Liquid penetrant testing is capable of detecting:
- subsurface intergranular stress corrosion cracking discontinuities
 - discontinuities open to the surface
 - subsurface discontinuities
 - lack of fusion (subsurface)
- A.34
26. Ultraviolet light equipment is required when penetrant testing by:
- the fluorescent penetrant method
 - the visible dye penetrant method
 - the nonfluorescent penetrant method
 - all of the above
- A.45
27. 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.84
28. 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 post-emulsifier penetrant is used
 - by means of a steam cleaner
 - only when water-washable penetrants are used
- A.49
29. When using a post-emulsifiable penetrant, the emulsifier time should be:
- as long as the penetrant dwell time
 - half the penetrant dwell time
 - the same as the developer time
 - only as long as necessary to remove the interfering background
- A.51-52
30. When an inspector is working in a darkened area, he/she should become adjusted to the dark before inspecting parts. The generally accepted minimum time period for becoming accustomed to the dark is:
- 1 min to 5 min
 - 5 min to 10 min
 - 10 min to 15 min
 - no waiting period is necessary
- A.14
31. Liquid penetrant inspection cannot find:
- surface porosity
 - surface cracks
 - an internal cavity
 - a surface forging lap
- B.3

32. All of the following materials can be tested by the usual liquid penetrant tests except:
- unglazed porous ceramic
 - titanium
 - high alloy steel
 - cast iron
- A.34,35
33. Liquid penetrant testing can be used to detect:
- discontinuities 1.6 mm (0.06 in.) below the surface
 - internal discontinuities
 - discontinuities open to the surface
 - all discontinuities
- A.34
34. Which of the following are commonly accepted methods for applying penetrant?
- dipping the part in penetrant (dipping)
 - pouring the penetrant over the test specimen (flowing)
 - spraying the penetrant on the test specimen (spraying)
 - all of the above
- B.14
35. A solvent used to clean the surface of a test specimen must possess all of the following characteristics except that the:
- cleaner must be capable of dissolving oils and greases commonly found on the surface
 - cleaner must not be flammable
 - cleaner must be free of excessive contaminants
 - cleaner must leave a minimal residue on the surface
- C.171-172
36. Which of the statements below best states the danger of sandblasting (without subsequent chemical etching) for cleaning surfaces to be penetrant tested?
- 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.171-172
37. 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.84
38. Which of the following statements concerning liquid penetrant testing is correct?
- fluorescent penetrants will produce red against white discontinuity indications
 - nonfluorescent penetrants require the use of ultraviolet lights
 - fluorescent indications will be seen when exposed to ultraviolet light
 - nonfluorescent discontinuities glow in the dark for easy viewing and interpretation
- A.45

39. When removing excess penetrant from the surface of a test specimen:
- the penetrant removal operation must not remove the penetrant from discontinuities
 - sufficient excess penetrant must be removed to eliminate an interfering background
 - the use of a solvent-dampened cloth is a common method of penetrant removal
 - all of the above
- B.33
- A.87
40. The most widely accepted method for removing excessive water-washable penetrant from the surface of a test specimen is by:
- using a wet rag
 - using a water spray rinse
 - washing the part directly under water running from a tap
 - immersing the part in water
- B.15
41. 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.18
42. 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
- B.33
43. The terms dry, aqueous wet and nonaqueous wet are used to describe three different types of:
- emulsifiers
 - cleaners
 - developers
 - penetrants
- A.38
44. Which of the following is not a generally accepted method for applying penetrants?
- rubbing the penetrant over the surface
 - brushing the penetrant on the part
 - spraying the penetrant on the part
 - dipping the part in the penetrant
- B.14
45. Which of the following is the most commonly used method for removing nonwater-washable visible dye penetrant from the surface of a test specimen?
- dipping in a solvent
 - spraying
 - hand wiping
 - blowing
- B.16