

Acoustic Emission Testing Method Questions & Answers Book

Second Edition

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

Levels I, II and III
Review Questions



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Recommended References

Acoustic Emission Testing Method

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

- A. ASME, *ASME Boiler and Pressure Vessel Code, Section V, Article 11*, "Acoustic Emission Examination of Fiber Reinforced Plastic Vessels." New York, NY: American Society for Mechanical Engineers. Latest edition.
- B. ASME, *ASME Boiler and Pressure Vessel Code, Section V, Article 12*, "Acoustic Emission Examination of Metallic Vessels during Pressure Testing." New York, NY: American Society for Mechanical Engineers. Latest edition.
- C.* Miller, Ronnie K. and Paul McIntire, ed. *Nondestructive Testing Handbook*, second edition: Volume 5, *Acoustic Emission Testing*. Columbus, OH: The American Society for Nondestructive Testing, Inc. (1987).
- D.* *Nondestructive Evaluation and Quality Control: ASM Handbook*, Volume 17, ninth edition. Metals Park, OH: ASM International (1989).
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- G. ASTM E 569-07, *Standard Practice for Acoustic Emission Monitoring of Structures During Controlled Stimulation*. West Conshohocken, PA: ASTM International (2007).
- H. ASTM E 750-04, *Standard Practice for Characterizing Acoustic Emission Instrumentation*. West Conshohocken, PA: ASTM International (2007).
- I. ASTM E 976-05, *Standard Guide for Determining the Reproducibility of Acoustic Emission Sensor Response*. West Conshohocken, PA: ASTM International (2007).
- J. ASTM E 1067-89, *Standard Practice for Acoustic Emission Examination of Fiberglass Reinforced Plastic Resin (FRP) Tanks/Vessels*. West Conshohocken, PA: ASTM International (2007).
- K. ASTM E 1106-07, *Standard Method for Primary Calibration of Acoustic Emission Sensors*. West Conshohocken, PA: ASTM International (2007).
- L. ASTM E 1139-02, *Standard Practice for Continuous Monitoring of Acoustic Emission from Metal Pressure Boundaries*. West Conshohocken, PA: ASTM International (2007).
- M. ASTM E 1781-98, *Standard Practice for Secondary Calibration of Acoustic Emission Sensors*. West Conshohocken, PA: ASTM International (2007).
- N. ASTM E 1932-97, *Standard Guide for Acoustic Emission Examination of Small Parts*. West Conshohocken, PA: ASTM International (2007).
- O.* Miller, Ronnie K., Eric v.K. Hill and Patrick O. Moore, ed. *Nondestructive Testing Handbook*, third edition: Volume 6, *Acoustic Emission Testing*. Columbus, OH: The American Society for Nondestructive Testing, Inc. (2005).

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Each question found in this book contains letter(s) and page number(s), paragraphs or sections in bold type immediately following the answers. For example,

2. In acoustic emission testing per ASME Section V, Article 11, sensor spacing on fiberglass-reinforced pressure (FRP) pressure vessels is governed by:
 - a. the test article temperature
 - b. sensor diameter
 - c. attenuation
 - d. the type of couplant

A.90.15

In this example, the letter "A" refers to Reference A in the list provided above, and "90.15" is the specific page in Reference A where the answer to the question can be found. References may also indicate specific chapters, paragraphs and sections, and are indicated as such.

Reference Usage Acoustic Emission Testing Method

Reference A: Total = 7
Level I 3
Level II 4
Level III 0

Reference B: Total = 5
Level I 2
Level II 3
Level III 0

Reference C: Total = 19
Level I 7
Level II 9
Level III 3

Reference D: Total = 1
Level I 1
Level II 0
Level III 0

Reference E: Total = 0
Level I 0
Level II 0
Level III 0

Reference F: Total = 3
Level I 0
Level II 2
Level III 1

Reference G: Total = 6
Level I 0
Level II 6
Level III 0

Reference H: Total = 3
Level I 0
Level II 0
Level III 3

Reference I: Total = 3
Level I 0
Level II 1
Level III 2

Reference J: Total = 0
Level I 0
Level II 0
Level III 0

Reference K: Total = 4
Level I 0
Level II 0
Level III 4

Reference L: Total = 12
Level I 2
Level II 8
Level III 2

Reference M: Total = 2
Level I 0
Level II 0
Level III 2

Reference N: Total = 3
Level I 1
Level II 2
Level III 0

Reference O: Total = 28
Level I 12
Level II 15
Level III 1

Level I Questions

Acoustic Emission Testing Method

1. Hold periods at high loads during fiberglass-reinforced pressure (FRP) vessel examinations using ASME Article 11 are necessary to:
 - a. calculate the felicity ratio
 - b. check for leaks
 - c. monitor continuing damage
 - d. measure the kaiser ratio

A.90.16
2. In acoustic emission testing per ASME Section V, Article 11, sensor spacing on fiberglass-reinforced pressure (FRP) vessels is governed by:
 - a. attenuation
 - b. the test article temperature
 - c. sensor diameter
 - d. the type of couplant

A.90.15
3. How can an examiner be assured that proper contact has been made between the sensor and the vessel?
 - a. apply extra couplant around the sensor
 - b. use heavy-duty fasteners on sensors and cables
 - c. measure the peak amplitude response from a simulated acoustic emission source
 - d. use acoustic waveguides

A.90.14-15
4. The source of the energy of the acoustic emission wave during crack growth is the:
 - a. acoustic emission sensor
 - b. surface energy of the new crack
 - c. elastic stress field in the structure
 - d. power supply from the mainframe to the preamplifier

C.64
5. Which of the following can be a significant source of background noise?
 - a. in-rushing fluid
 - b. wind
 - c. radio transmissions
 - d. all of the above

B.179
6. The elastic energy that is released by materials when they undergo deformation is called:
 - a. transformation
 - b. acoustic emission
 - c. brittle fracture
 - d. isotrophy

C.12; 0.32
7. During loading, a metallic structure emits throughout the test period. When the load is reduced and then reapplied, no emissions are noted until the previous stress level was exceeded. This phenomenon is an example of:
 - a. the dunegan corollary
 - b. the kaiser effect
 - c. the felicity ratio
 - d. a hsu-nielsen source

C.16; 0.37
8. The founder of modern acoustic emission technology was:
 - a. Conrad Earl Krieder
 - b. Professor Firestone
 - c. James C. Bolling
 - d. Josef Kaiser

C.17; 0.37