

API 570 Certification Prep

API 578 Study Questions

*This following study aid helps you learn the content of **API RP-578, Material Verification Program for New and Existing Alloy Piping Systems**. There will be about 5 questions from this document on the API 570 exam. We do not spend class time on this publication. So it is important that you become familiar with this content in your personal study sessions.*

The questions in this study aid are in the same order as API 578. An answer key will be provided in class. It is helpful to read through API 578 before working on this exercise!

1. API 578 provides guidelines for a quality assurance system to verify:
 - a. all materials.
 - b. all alloy materials.
 - c. only non-ferrous materials.
 - d. only high-alloy materials.
2. Usually substituting an alloy for carbon steel would not cause a problem. List 3 process services where substituting an alloy for carbon steel could result in a problem.
 - a. _____
 - b. _____
 - c. _____
3. An alloy material is any metallic material that contains alloying elements that are added:
 - a. only to improve mechanical properties.
 - b. only to improve corrosion resistance.
 - c. to improve either mechanical properties or improve corrosion resistance
4. Alloy components include, pipe, fittings, plate, flanges, and _____.
5. An inspection lot includes:
 - a. all materials from same supplier.
 - b. all materials included on the same purchase order.
 - c. all materials of the same material type (i.e. 316 SS)
 - d. all materials of the same material type from the same supplier and heat.

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6. A documented material verification program should be established by the:
 - a. Authorized inspector.
 - b. Owner/User.
 - c. Repair organization.
 - d. Engineering organization.

7. The material verification program should cover PMI testing of materials:
 - a. during construction of piping systems.
 - b. in existing piping systems.
 - c. during repairs and alterations of piping systems.
 - d. in existing piping systems and during construction, repairs and alterations of piping systems.

8. Random sampling is most appropriate for:
 - a. low-risk systems.
 - b. low alloy systems.
 - c. stainless steel systems.
 - d. ferritic steel systems.

9. Who has the responsibility to determine the extent of PMI performed?
 - a. Authorized inspector
 - b. Owner/User
 - c. Repair organization
 - d. Engineering organization.

10. Who has the responsibility to verify that the material verification program is properly implemented?
 - a. Authorized inspector
 - b. Owner/User
 - c. Repair organization
 - d. Engineering organization

11. Who has the responsibility to review and approve the adequacy of the PMI program used by fabricators and material suppliers?
 - a. Authorized inspector
 - b. Owner/User
 - c. Repair organization
 - d. Engineering organization

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12. A mill test report:
- a. eliminates the need for further material verification.
 - b. is a report showing material discrepancies.
 - c. is an important part of the material qualify assurance program.
 - d. is issued by the owner upon receipt of materials.
13. The material verification program specified by API 578 covers:
- a. only pressure-containing components
 - b. only pipe, and fittings.
 - c. only pipe, fittings, and welds.
 - d. pressure-containing and non-pressure containing components.
14. During alloy welding:
- a. one electrode from each box should be sampled.
 - b. two electrodes from each box should be sampled.
 - c. one electrode from each lot should be sampled.
 - d. two electrodes from each lot should be sampled.
15. If alloy element(s) are contained in the flux of a welding electrode, PMI testing:
- a. is not necessary.
 - b. is not necessary provided appropriate documentation is provided by the supplier.
 - c. could be conducted on any of the production welds.
 - d. could be conducted on a weld button prior to production welds.
16. New longitudinal welded alloyed pipe should:
- a. never be used.
 - b. be used only if the Quality Factor is 1.0.
 - c. receive random PMI testing of weld and base metal.
 - d. receive 100% PMI testing of weld and base metal.
17. Who has the responsibility to determine the extent of PMI testing required on existing piping systems?
- a. Authorized inspector
 - b. Owner/User
 - c. Repair organization
 - d. Engineering organization

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18. List 4 important factors to consider when prioritizing the need for PMI on existing piping systems.
- a. _____
 - b. _____
 - c. _____
 - d. _____
19. Incorrect substitution of carbon steel is most likely to be found in:
- a. chrome steels.
 - b. stainless steels.
 - c. any ferritic steel.
 - d. any non-ferrous.
20. Which of the following piping components is most likely to have a substitution with the wrong material?
- a. A 20' length of 6 NPS pipe
 - b. Weld-neck flange
 - c. Expansion joint
 - d. Bolting
21. Which of the following piping components is most likely to have a substitution with the wrong material?
- a. A 10' length of 6 NPS 316L SS pipe
 - b. 6 NPS Gate valve
 - c. 4 NPS Monel elbow
 - d. Slip-on flange
22. Who has the responsibility to determine the extent of PMI testing required during repairs and alterations of piping systems?
- a. Authorized inspector
 - b. Owner/User
 - c. Repair organization
 - d. Engineering organization

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23. PMI testing at the warehouse is:
- a. done by only checking material stampings.
 - b. accomplished by the Authorized Inspector.
 - c. not important since materials will be checked during fabrication.
 - d. not an important part of the material verification program.
 - e. not a substitute for PMI testing required during fabrication.
24. Identification of materials by visual stamps or markings:
- a. is not an important part of the material verification program.
 - b. is not a substitute for PMI testing.
 - c. is important only on high alloy materials.
 - d. should only be done by inspectors.
25. PMI tools that use X-Ray fluorescence can not detect:
- a. carbon content.
 - b. chrome content.
 - c. iron content.
 - d. molybdenum content.
26. How does Portable Optical Emission Spectrometry determine the elements in a material?
- a. An electric arc causes a spectrum of light to be emitted from the tested material. The light is analyzed.
 - b. X-rays striking the material cause a spectrum of x-rays to be emitted from the tested material. The x-rays are analyzed.
 - c. Specific chemicals deposited on the tested material cause a spectrum of colors to be emitted. The colors are analyzed.
 - d. The surface is polished and etched. A replication is preformed and is analyzed with a microscope.
27. PMI testing equipment should be:
- a. calibrated every 4 hrs.
 - b. calibrated as specified by the manufacturer.
 - c. used only by the manufacturer's personnel.
 - d. used by owner/user personnel.

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28. All personnel performing PMI tests should be:
- a. qualified by national exam.
 - b. qualified by the owner/user.
 - c. knowledgeable about the operation of the PMI test equipment.
 - d. knowledgeable about the operation of the plant where the PMI is conducted.
29. An alloy weld overlay is applied to carbon steel base metal. Who has the responsibility to establish the minimum alloy requirements of the as-deposited weld metal?
- a. Authorized inspector
 - b. Owner/User
 - c. Repair organization
 - d. Engineering organization
30. What is the appropriate action to take when an incorrect material is located during a PMI sampling of new materials.
- a. Inspect 2 more items from the inspection lot.
 - b. Inspect 50% of the items from the inspection lot.
 - c. Inspect 100% of the items from the inspection lot.
 - d. Inspection all items supplied by that manufacturer.
31. Marking pens should **not** contain chlorides or:
- a. Carbon.
 - b. Chrome.
 - c. Oxides.
 - d. Sulfur.

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Study Guide Answers:

1. b. all alloy materials.
2. a. hydrogen sulfide (H₂S)
b. hydrofluoric acid (HF)
c. sulfuric acid (H₂SO₄)
3. c. to improve either mechanical properties or improve corrosion resistance
4. welds
5. d. all materials of the same material type from the same supplier and heat
6. b. Owner/User
7. d. in existing piping systems and during construction, repairs and alterations of piping systems
8. a. low-risk systems
9. b. Owner/User
10. b. Owner/User
11. b. Owner/User
12. c. is an important part of the material qualify assurance program
13. a. only pressure-containing components
14. c. on electrode from each lot should be sampled
15. d. could be conducted on a weld button prior to production welds
16. c. receive random PMI testing of weld and base metal
17. b. Owner/User
18. a. likelihood of material mix-up
b. consequences of failure
c. reason for alloy specification
d. historical data relating to inadvertent material substitution
19. a. chrome steel
20. d. bolting
21. b. Valve

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- 22. b. Owner/User
- 23. e. **not** a substitute for PMI testing required during fabrication.
- 24. b. is **not** a substitute for PMI testing
- 25. a. carbon content
- 26. a. an electrode arc causes a spectrum of light to be emitted from the tested material. The light is analyzed.
- 27. b. calibrated as specified by the manufacturer
- 28. c. knowledgeable about the operation of the PMI test equipment
- 29. b. Owner/User
- 30. c. inspect 100% of the items from the inspection lot
- 31. d. sulfur

This Study Guide is also posted on the MSTS website.