ACCREDITED FIRESTOP SPECIALTY CONTRACTOR EXAMINATION

PLEASE PRINT

Key Responsible Contact Name: _____

Signature of Key Responsible Contact: _____

Company Name: _____

Address: _____

City: _____ State: _____ Zip Code: _____

Examination Date: _____ Grade: _____

Exam Proctor: _____

continued

Note to examination participants:

The examination should be completed in about 3 – 4 hours. You must answer 80% of the questions correctly to pass.

For questions which require multiple answers, answer as much as possible to receive partial credit for that question.

The HAFSC exam was designed to be taken by one Key Responsible Contact, and must be completed without help from others. In answering the examination questions, you may reference the *HILTI AFSC Resource Guide*, *HILTI AFSC Library Edition*, and the *HILTI Firestop Manual* and other materials as you see necessary.

The examination is broken down into 10 sections. Good luck.

I. General Firestopping Knowledge
II. Building Codes and Regulations
III. Testing Agency Knowledge
IV. UL and Related Bodies Nomenclature
V. Hilti Firestop Products, Applications, Uses
VI. Product Estimating
VII. Firestop System Application Interpretation and Engineering Judgments
VIII. Healthcare and Commercial Facilities Knowledge
IX. Specifications and Firestop Submittals
X. Hilti Accredited Firestop Specialty Program

I. General Firestopping Knowledge

1. Give brief examples (not UL systems) of both a “closed piping system” and an “open piping system”.

_____
_____
_____
_____

2. Define “T-Rating” and “L-Rating”.

_____
_____
_____

3. What does the term “percent fill” mean?

_____
_____

4. How is “annular space” determined?

_____
_____
_____
_____

continued

5. What is a “fire compartment”?

_____

_____

6. What hourly rating would be assigned to a standard wall assembly consisting of 3 layers of 5/8” gypsum on each side of a 2 ½” stud?

_____

7. Provide the name or the objective of the standards listed below:

ASTM E 814

_____

_____

ASTM E 1966

_____

_____

ASTM E 2174

_____

_____

ASTM E 119

_____

_____

8. What test (as part of ASTM E-814) is conducted to determine structural integrity of a firestop system?

_____

9. List the 3 types of fire protection that exist in construction today.

_____

_____

_____

10. What is the name of ASTM standard that defines and measures flame spread and smoke development?

_____

11. T or F (circle one) When firestopping a combustible penetrating item, such as a plastic pipe, an intumescent firestopping product is usually required.

12. T or F (circle one) Firestopping is considered passive fire protection?

13. List three benefits of compartmentalization.

_____

_____

_____

continued

14. What is an “Authority Having Jurisdiction”?

_____

_____

15. What is a membrane penetration?

_____

_____

16. T or F (circle one) The “F” rating of a firestop system refers to the time it prevents flame passage through an opening made for a penetration.

17. Besides mineral wool what is being referred to when a firestop system calls for “fill, void, or cavity material?

_____

18. T or F (circle one) Firestopping and Draftstopping are the same.

19. When installing firestop materials around an HVAC duct, what is the key consideration in selecting the type of firestop product to be used?

_____

_____

20. What does “dynamic” refer to when discussing firestopping systems for construction joints?

_____

II. Building Codes and Regulations

21. The word “approved” is used in all of the building codes, as in “through-penetrations shall be protected by an approved through-penetration firestop system…” What does the term “approved” mean?

Please select one:

a) Acceptable to the Authority Having Jurisdiction
b) The firestop product even if not tested by a third-party agency
c) The firestop product utilized in manufactured in the U.S.

22. To what ASTM test standard are <u>perimeter fire barrier systems (i.e. curtain wall firestop systems)</u> tested in order to determine their fire resistance rating (in hours)?

Please circle one:

a) ASTM E 84 b) ASTM E814 c) ASTM E1966 d) ASTM E119 e) none of these

23. Are there any explicit requirements in any of the model building codes that mandate that fire-rated walls need to have a fire-resistive joint system for the bottom-of-the wall joint?

Please circle one: Yes No

continued

24. Does Hilti have any fire-resistive joint systems that are specifically tested and classified for a bottom-of-wall application?

Please circle one: Yes No

25. According to the building code that you most often use, would a firestopped metal pipe through a floor, that is not within a wall cavity, need to always have F=T (fire rating equal to temperature rating)? Specify the building code you are referencing.

Building Code _____

Answer _____

26. NFPA 101 is a: (Please circle one of the below answers)

a) Building Code b) Fire Prevention Code c) Life Safety Code d) None of these
e) All of These

27. Can the walls between typical hotel rooms ever have a 0-hour rating?

Please circle one: Yes No

28. Two electrical boxes are on opposite sides of a 1-hour fire-rated gypsum wall that uses metal studs. The boxes have not been specially tested and listed for use in fire-resistance rated assemblies. The boxes are at the same height, within 2 separate stud cavities. The measured (horizontal) distance between the 2 boxes is 21 inches. The wall does not contain any insulation; it is hollow. In order to maintain integrity of the fire-rated wall, which of the following should be done?

Please circle one:

a) a putty pad should be applied to one of the boxes
b) a putty pad should be applied to both of the boxes
c) nothing needs to be done since the boxes are in separate stud cavities and are separated by a stud

29. A new hospital is being built and has been fully sprinklered. What must be done to the corridor walls in the patient treatment areas to provide the level of fire safety required by code? Specify which code you are applying to the situation.

Answer

_____

_____

Code

_____

30. Explain the key differences between the terms fireblocking and firestopping.

_____

_____

_____

_____

continued

31. When fire-rated walls are needed between apartments, those walls _____ need to have top-of-wall firestopping (i.e. a fire-resistive joint system).

Fill in the blank above by circling one: a) always b) sometimes c) never

32. According to NFPA 101; In a hospital (new construction), what is a “smoke barrier’?

Please circle one:

a) a zero-rated wall that only needs a smoke seal
b) a 1-hour rated wall that should be smoke resisting
c) a 2-hour rated wall that should be smoke resisting
d) can be any of the above

III. Testing Agency Knowledge

Questions 28 – 33 are True / False. Please circle either T or F.

33. T or F – All Hilti Firestop products are UL classified.

34. T or F – Test Standard UL 1479 is equivalent to Test Standard ASTM E-814.

35. The best place to check for current UL system updates is: (Please circle one)

a) UL Directory b) UL Web Site c) Your Library Edition of Drawings

36. T or F – Any UL System designated as C-AJ-XXXX can be used in a 2-hour gypsum wall assembly.

37. T or F – A “Firestop System” consists of a fire-rated assembly, penetrating item, and the materials designed to prevent the spread of fire.

38. T or F – In addition to fire testing all Hilti products have been tested for explosion risks.

39. The hose stream-stream part of a UL firestop system test , is utilized to determine:

Please circle one:

a) how long it will take a fireman to extinguish a fire
b) what gases and other contaminants are given off by certain penetrating items under fire conditions
c) whether or not water or a fire extinguishing agent, such as halon, should be utilized to help extinguish a fire
d) none of the above

40. T or F - One key difference between UL 2079 and UL 1479 tests is the cycling test.

continued

41. To achieve an "F" Rating the firestop system must prohibit flame from getting through the _____ of the test assembly.

Fill in the blank by circling one: a) fireside b) non-fireside

IV. UL and Related Bodies Nomenclature

Match the UL Directory abbreviation below to the corresponding description on questions 42 – 47.

CAJ WL FA HWD FWD WJ

42. _____ Framed walls – gypsum wall board assemblies.

43. _____ Head-of-Wall – Allows movement

44. _____ Floor-to-Wall – Allows movement

45. _____ Concrete Floor or Wall, 5" thick or less and concrete or masonry walls 8" thick or less

46. _____ Concrete or masonry wall 8" thick or less

47. _____ Concrete floors 5" thick or less

48. In the system, C-AJ-2392, what does the first numeral 2 indicate?

_____

49. In UL nomenclature for through-penetration systems, (CBJ) what does the "B" indicate? What does the "J" indicate?

_____

50. If there are 3 steel pipes, 2 low-voltage cables, 1 cable tray, and an insulated pipe going through a single opening in a gypsum wall (multiple penetrations), what <u>series</u> UL System would you look to as a solution?

_____

V. Hilti Firestop Products, Applications and Uses

For each of the following Hilti firestop products please check ALL of the statements that are true.

51. FS-One Intumescent Firestop Sealant

_____ can be used to firestop high movement expansion joints.
_____ is designed only for insulated steel pipes in sleeves.
_____ when uncured can be cleaned up with warm water and soap.
_____ has several UL systems which allow for a continuous point of contact between a penetrants and a wall or floor.

continued

52. FS 657 Fire Block

_____ is a flexible, intumescent block made from a two-component polyurethane foam.
_____ is available in 2 sizes
_____ can be used with cables, cable trays, combustible and non-combustible pipes.
_____ can be used to firestop wall openings up to 52” X 48”.

53. CP 601S Elastomeric Firestop Sealant

_____ when cured, has movement capability of up to 50%.
_____ can be applied to a variety of base materials such as concrete, masonry, metal, and glass, but not gypsum.
_____ can be used for through penetrations and joint applications.
_____ when uncured, can be cleaned up easily with warm water and soap.

54. CP 648 S Wrap Strips (Single Wraps)

_____ are used for firestopping plastic pipe applications.
_____ are available for 1.5”, 2”, 3”, 4” and 6” plastic pipes.
_____ require only 1 wrap per pipe.
_____ must be used on both sides of walls for wall applications.

55. CP 648 E Wrap Strip (Endless Wrap)

_____ may be used in both concrete and gypsum applications.
_____ must always be used with a retaining collar.
_____ may be used on the outside surface of the substrate.
_____ is available in several thicknesses.

56. CP 637 Firestop Mortar

_____ can be used to firestop cable trays in floor applications.
_____ when mixing, first add water to a clean container, then add CP 637 to the water.
_____ can be used to seal blank openings in floors and wall.
_____ must be installed a minimum depth of 2-1/2” for a 3-hr rating (C-AJ-1140)

57. CP 643N and CP 644 Firestop Collars

_____ must always be attached to the substrate with fasteners as designated in the UL system details.
_____ are pre-assembled for quick and easy installation.
_____ can only be used with PVC plastic pipe.
_____ are available in a 1.5”, 2”, 3”, 4”, 6” sizes (CP 643N)

continued

58. CP 672 Speed Spray

_____ can be applied by brush and “painted” onto a joint application.
_____ is a very rigid material when cured and cannot except any movement.
_____ can be used for top-of-wall as well as floor-to-floor joints.
_____ always requires application on both sides of a wall.

59. CP 604 Self-Leveling Silicone Firestop Sealant

_____ can be used in both through penetration and construction joint applications.
_____ is self-leveling and required no tooling.
_____ is ideal for block wall applications due to its gray color.
_____ is both water and smoke resistant once cured.

60. CP 620 Fire Foam

_____ can be used for combustible pipes in conjunction with Hilti wrap strip.
_____ cures in 1 minute or less.
_____ may be trimmed once cured for a more pleasing appearance.
_____ allows for excess pieces to be used in future applications.

61. CP 606 Flexible Firestop Sealant

_____ provides Class II movement capability in fire rated joint applications.
_____ is fully cured in 24 hours (5/8” depth).
_____ is available in two colors, red and white.
_____ can be cleaned up with warm water and soap.

62. CP 675T Firestop Board

_____ is available in standard sizes 26” X 28” and 26” X 39”.
_____ is ideal for use in telecom applications.
_____ can be used in surface mounted and frame mounted configurations.
_____ requires special tools for cutting to shape.

63. CP 136 Fire Blocker

_____ is primarily used to seal penetrations in fire-rated floors and walls.
_____ is tested to the ASTM E136 standard.
_____ use requires a “tested system” just like any firestop system.
_____ is light blue in color.

64. CP 617 Putty Pads

_____ are primarily designed to protect electrical boxes.
_____ are tested in accordance with UL 263.
_____ are available in 3 sizes.
_____ are UL classified and FM approved

continued

65. CP 618 Firestop Putty Stick

_____ may be used in concrete applications but not gypsum applications.
_____ are ideal for use in systems protecting telecommunication and data lines.
_____ hardens over time and must be removed and re-installed every 3 years.
_____ can be used with mineral wool to firestop blank openings up to 6” in diameter.

66. ALL Hilti Firestop Products

_____ require cleaned openings for proper installation.
_____ may be painted with latex based coatings.
_____ are approved for use in nuclear facilities.
_____ have a minimum of a 2-hour fire rating.

67. ALL Hilti Firestop Products

_____ may be used for wall and floor applications.
_____ may be used for through penetrations.
_____ must be installed according to the proper UL or OPL tested system or EJ.
_____ are waterproof.

68. Where can Hilti firestop product data such as ingredients, exposure limits, reactivity data and health hazard information be found?

_____
_____

69. Where, in the Hilti Firestop Systems Guide (the firestop manual), can Hilti firestop product information such as color, movement capability, expansion rates and agency approvals be found?

_____
_____

VI. Product Estimating

70. When spraying CP 672 Speed Spray on a top-of-wall joint with a gypsum wall and 2” fluted metal deck (joint width is 1”); approximately how may gallons of spray do you need to cover 1000 lineal feet?

_____

71. At ¼” depth, how much FS-One would be required (in cubic inches) to firestop a schedule 40 2” pipe through a 3” floor opening?

_____

72. How many FS 657 Fire Blocks are required to fill a 12” X 30” opening if the blocks are installed 5” deep?

_____

73. For the above: How may blocks if they we installed 8” deep?

_____

continued

74. When using CP 606 to firestop a 200 lineal foot top-of-wall joint where the gypsum has been cut to fit the profile of 3" metal deck flutes, leaving a ½" joint width, approximately how many foil packs (600 ml each) of sealant would you need to have 1¼" product depth on both sides?

_____

VII. Firestop System Application Interpretation

Please refer to your copy of the Hilti Firestop Library Edition for the following 2 questions 75 and 76.

You need a 2 hour system for a 4" PVC pipe penetrating a 5" concrete floor. The pipe is part of a vented piping system. The slab has already been poured. The diameter of the opening is 10 inches and there is 5 inches of annular space.

75. What Hilti UL system(s) can be used for this application?

_____

76. What products are required for this application?

_____

Refer to the drawing marked "UL System No. C-AJ-5091" in the Hilti Firestop Library Edition and answer the following 2 questions with "yes" or "no". Give a brief explanation for each choice.

77. Could this system be used to firestop a 6" copper pipe with ¾" glass fiber insulation passing through a 2" concrete slab without a metal sleeve?

Please circle one: Yes No

Explain:

_____

_____

78. If the pipe was perfectly centered, could this system be used to firestop a 4" schedule 10 steel pipe with 2" of glass fiber insulation passing through a 12" opening in a 6" concrete block wall?

Please circle one: Yes No

79. In UL HW-D 0042, what factor determines whether the system has a 1-hour or 2-hour rating?

_____

_____

_____

80. T or F - 5000 series UL listings refer to only AB/PVC insulation. Glass fiber insulation is never allowed.

81. T or F - According to UL 2079, all dynamic joint application testing requires that the cycling portion of the test be conducted.

continued

82. T or F – The cycling portion of UL 2079 is equivalent to ASTM E 1966?

83. You are firestopping the partition walls in a one-story strip shopping center. The roof assembly is not rated. Your application is the head-of-wall joint. The wall is rated at 2-hours. What should you do before proceeding with the installation of firestopping products?

_____
_____
_____

84. T or F – At Hilti, only the Fire Protection Engineering Team is allowed to create Engineering Judgments?

85. Why are Engineering Judgments created?

_____
_____
_____

86. What is required in order to request and Engineering Judgment from Hilti?

_____

VIII. Healthcare and Commercial Facilities

87. What does JCAHO stand for?

_____

88. What code does JCAHO reference in a hospital?

_____

89. T or F - The Environment of Care section of the JCAHO survey process addresses firestop?

90. What document is used by hospitals to show compliance with the Life Safety Code?

_____

91. What government agency oversees the activities of the Joint Commission?

Please circle one:

a) The Center for Disease Control
b) The local Authority Having Jurisdiction
c) The Centers for Medicare and Medicaid Services

92. T or F - Local codes are usually referenced by fire marshals reference when inspecting an existing office building.

93. What does BOMA stand for?

_____

continued

IX. Specifications and Firestop Submittals

94. What section of a job site specifications manual will firestopping information be found in?

_____

95. What typical documents are found in a firestop submittal package?

_____

96. Is it permissible to use an Engineering Judgment created for Job A on Job B as long as the General Contractor is the same for both Jobs A and B?

_____

97. Occasionally firestopping details for mechanical applications may be found in which section of the specifications manual?

_____

98. According to many firestopping specifications, who is responsible for reviewing any Engineering Judgments rendered by a manufacturer for a specific application?

_____

X. Hilti Accredited Firestop Specialty Contractor Program

99. What is the overall mission statement of the Hilti Firestop Specialty Contractor Program?

_____

100. What are the 4 major requirements for a Firestop Specialty Contractor must complete in order to be considered a Hilti Accredited Firestop Specialty Contractor?

_____
_____
_____
_____

continued