How to take this course.

1. Download and Print the test questions.
2. Login to your account with your ID and password.
3. Viewing your status page, scroll down and click on “Click here to start this course”.
4. Begin viewing the web pages. Refer to your printed test to find the correct answers. The questions track the web pages.
5. As you find the answers, circle them on your printed copy.
6. At the end of each section, you’ll enter the quiz which is the same as your printed test. Refer to your circled answers when actually answering the quiz on the web.
7. Upon passing, you will proceed to the next section. If failed to pass, you will be moved to the beginning of that section for more review.

Mobile users – Many current mobile devices are compatible with AnytimeCE and will probably work. If not, use a desktop or laptop computer to complete your course.

Quiz 1

1. Hot flue gases have greater buoyancy than the cooler air around them. This is why they rise.
   - True
   - False

2. As water temperature increases, density decreases. This is why warm water rises and cold water sinks.
   - True
   - False

3. Cold air is less dense than warm air.
   - True
   - False

4. As the hot-line gas flows through the vent system, heat from the flue gas travels through the vent walls and cools down. The flue gas becomes less buoyant, resulting in lower lift or draft.
   - True
   - False

5. Double-wall metal vents or B vents are NOT preferred because of the insulating quality of the air space between the walls of the vent.
   - True
   - False

6. Increasing the vent height increases the draft. As the height of the stack is increased there is also an increase in the resistance, which reduces the flow of gas.
   - True
   - False
7. Doubling the Btu/h input of an appliance effectively doubles the amount of flue gas produced.
   - True
   - False

8. If the limit of the vent system has been exceeded, some of the flue gases will not be carried up the vent, but will spill out at the flue collar.
   - True
   - False

9. Increasing the number of 90-degree bends in the vent will NOT impede the flow of flue gases.
   - True
   - False

10. There are a number of things that restrict the flow of flue gas. Which of the following is NOT one of them?
   - Flue gas temperature loss through the vent pipe
   - Gas pressure from gas valve too low
   - Flue gas vent undersized for system
   - Restrictions to flow due to numerous bends and 90s

11. Water vapor is created when natural gas is burned.
    - True
    - False

12. Water in the flue gas is generally not a problem as long as it remains in vapor form.
    - True
    - False

13. A 40 M Btu/h water heater will produce 1/2 gallon of water per hour in the flue gas.
    - True
    - False

14. Natural draft appliances operate with high flue gas temperatures which results in the water remaining a vapor.
    - True
    - False

15. The dew point is the temperature at which a vapor condenses into a liquid.
    - True
    - False

16. Condensation may cause damage to flue material.
    - True
    - False

17. Most gas water heaters fall under ______.
    - Category I
    - Category II
    - Category III
    - Category IV

18. A category II appliance vents flue gases at a temperature ______ the dew point.
    - higher than
    - lower than
    - equal to

19. The type of vent material recommended for Type II is ______.
    - masonry
    - stainless steel
    - single Wall

20. A Category III appliance has ______ pressure in the vent.
    - positive
    - negative
    - neutral

21. A Category III appliance is very similar to a ______ appliance.
    - Category I
    - Category II
    - Category IV

22. A Category IV appliance vent has a ______ vent pressure.
    - positive
    - negative
    - neutral

23. ______ is the material that is used for a Category IV vent.
    - Masonry
    - Stainless steel
    - Plastic
Venting of Gas Fired Equipment

24. The major characteristics of Category IV gas appliances are:
   - negative pressure, non-condensing, natural draft
   - positive pressure, non-condensing, induced or forced draft
   - positive pressure, condensing, induced or forced draft
   - negative pressure, condensing, natural draft

25. The best way to determine the category of the appliance is to:
   - look at the appliance you are replacing
   - look at the appliance’s nameplate
   - ask a friend
   - guess

Quiz 2

1. Category I vented appliances shall be provided with combustion, ventilation, and dilution air in accordance with the equipment manufacturers instructions.
   - True
   - False

2. Venting combustion gases through a chimney without a proper liner can result in the collapse of the chimney, since acidic condensate can dissolve the mortar between bricks.
   - True
   - False

3. If a tile liner is observed protruding from the top of a chimney, it is always correct to assume that the liner extends along the entire length of the chimney.
   - True
   - False

4. When providing combustion air from the interior of a building, the total required volume of the space in the building shall be the sum of the required volume calculated for ALL appliances located within the space.
   - True
   - False

5. When providing combustion air from the interior of a building, rooms considered a part of the required volume are those communicating directly with the space through openings furnished with doors and through combustion air openings.
   - True
   - False

6. The minimum required volume shall be 100 cubic feet per 1000 Btu/h.
   - True
   - False

7. When combining spaces on the same story, each opening shall have a minimum free area of 1 sq. in. per 1000 Btu/h of the total input rating of all gas utilization equipment in the space, but not less than 100 sq. inches.
   - True
   - False

8. When combining spaces in different stories, the volumes of spaces shall be considered as communicating spaces when they are connected by one or more openings in doors or floors having a total minimum free area of 2 square inches per 1000 Btu/h.
   - True
   - False

9. Using the two permanent openings method, one opening shall commence within 12 in. of the top of the enclosure.
   - True
   - False

10. When using the two permanent openings method, one opening must commence within 12 in. of the bottom of the enclosure.
    - True
    - False

11. When using the two permanent openings method, where communication with the outdoors is through horizontal ducts, each opening shall have a minimum free area of 1 square in. per 4000 Btu/h of total input rating of all equipment in the enclosure.
    - True
    - False
12. When using the one permanent opening method, the equipment shall have clearances of at least 1 inch from the side of the appliance.
   - True
   - False

13. Using the one permanent opening method, the permanent opening should commence within 12 inches of the top of the enclosure.
   - True
   - False

14. Using the one permanent opening method, the equipment shall have clearances of at least 6 inches from the front of the appliance.
   - True
   - False

15. Using the one permanent opening method, the opening shall directly communicate with the outdoors through a vertical or horizontal duct.
   - True
   - False

16. To quickly find the area in square inches of a vent pipe, first determine the O.D. of the pipe, and then use the appropriate conversion table.
   - True
   - False

17. The required size of grille openings for combustion, ventilation, and dilution air is based on the net free area of each opening.
   - True
   - False

18. Combustion air ducts shall terminate in an unobstructed space allowing free movement of combustion air to the appliances.
   - True
   - False

19. A combustion air duct shall NOT service BOTH the upper and the lower combustion air openings where both such openings are used.
   - True
   - False

20. The horizontal upper combustion air duct shall slope downward toward the source of combustion air.
   - True
   - False

21. The space around a chimney liner installed within a masonry chimney flue can be used to supply combustion air.
   - True
   - False

Quiz 3
1. Listed direct-vent gas utilization equipment shall be considered properly vented where installed in accordance with the terms of its listing, the installer's instructions, and Section 510.8(3) of this code.
   - True
   - False

2. A venting system shall be designed and constructed to develop a flow adequate to remove vent gases to the outside atmosphere.
   - True
   - False

3. A chimney for residential equipment shall extend at least 3 ft. above the highest point where it passes through a roof of a building and at least 2 ft. higher than any portion of a building within a horizontal distance of 10 feet.
   - True
   - False

4. A chimney for medium-heat equipment shall extend at least 10 ft. higher than any portion of any building within 25 feet.
   - True
   - False

5. A chimney shall extend at least 20 ft. above the highest connected equipment draft hood outlet or flue collar.
   - True
   - False
6. When sizing an individual chimney venting system for a single appliance with a draft hood, the effective areas of the vent connector and chimney flue shall NOT be greater than the area of the appliance flue collar or draft hood outlet.
- True
- False

7. When sizing a chimney venting system connected to two appliances with draft hoods, the effective area of the chimney flue shall be not less than the area of the larger draft hood outlet, plus 50 percent of the area of the smaller draft hood outlet.
- True
- False

8. Gas utilization equipment is allowed to connect to a chimney serving a separate solid fuel appliance.
- Yes
- No

9. A gas vent passing through a roof shall extend through the entire roof flashing, and can be terminated with a NON-LISTED termination cap.
- True
- False

10. A Type B vent installed at an angle greater than 45 degrees from the vertical is considered horizontal.
- True
- False

11. The total horizontal distance of a vent, including the horizontal vent connector serving appliances equipped with a draft hood, shall not be greater than 75% of the vertical height of the vent.
- True
- False

12. Gas vents installed within masonry chimneys are required to be identified with a permanent label installed at the point where the vent enters the chimney.
- True
- False

13. Gas vent termination locations for listed caps 12 inches in diameter or smaller shall be at least 5 ft. from an outside vertical wall.
- True
- False

14. Gas vents shall terminate not less than 2 feet above the highest point where they pass through the roof, and at least 2 feet higher than any portion of a building within 10 feet.
- True
- False

15. A Type B or a Type L gas vent shall terminate at least 20 ft. in vertical height above the highest connected equipment draft hood or flue collar.
- True
- False

16. A Type B gas vent shall terminate at least 12 feet vertically above the bottom of a wall furnace.
- True
- False

17. A gas vent extending through an exterior wall is NOT permitted to terminate below eaves or parapets.
- True
- False

18. A single vent serving a single appliance installed on a single story of a building, shall be not less than the area of the appliance draft hood outlet.
- True
- False

19. A flue vent can be any size as long as it is not smaller than the appliance draft hood outlet.
- True
- False

20. For sizing a gas vent connected to two appliances with draft hoods, the effective area of the vent shall be not less than the area of the larger draft hood outlet, plus 50 percent of the area of the smaller draft hood outlet.
- True
- False
Venting of Gas Fired Equipment

Quiz 4

1. It is permitted to vent Category I gas utilization equipment on a multistory installation using a single or common gas vent.
   - Yes
   - No

2. On a multistory installation using a common gas vent, it is permitted to obtain dilution, combustion and ventilation air from the habitable space.
   - Yes
   - No

3. The total available height for each segment of a multistory venting system is the vertical distance between the level of the highest draft hood outlet on that floor and the centerline of the next highest interconnection tee.
   - True
   - False

4. The size of the connector for a segment is determined from: 1) equipment heat input and 2) available connector rise. It shall not be smaller than the draft hood outlet or flue collar size.
   - True
   - False

5. The size of the common vent is determined from the Btu/h rating of the largest rated equipment.
   - True
   - False

6. Gas vents must be supported and spaced in accordance with their listings and the manufacturer's instructions.
   - True
   - False

7. Single-wall metal pipe shall be constructed of cold rolled sheet steel at LEAST 0.0304 inches thick.
   - True
   - False

8. Single-wall metal pipe may be used outdoors in cold climates for venting gas utilization equipment.
   - True
   - False

9. Single-wall metal pipe shall terminate at least 5 feet in vertical height above the highest connected equipment draft hood outlet or flue collar.
   - True
   - False

10. Single-wall metal pipe shall extend at least 4 ft. above the highest point where it passes through the roof of a building.
    - True
    - False

11. Single-wall metal pipe shall extend at least 2 ft. higher than any portion of a building within a horizontal distance of 20 feet.
    - True
    - False

12. Single-wall metal pipe shall be used only for runs directly from the space in which the gas utilization equipment is located, extending through the roof or exterior wall to the outer air.
    - True
    - False

13. Single wall pipe shall NOT originate in any unoccupied attic.
    - True
    - False

14. Single-wall metal pipe is permitted to pass through any attic and inside a wall.
    - True
    - False

15. In a venting system for a single appliance with a draft hood, the areas of the connector and the pipe shall each be equal to or larger than either the appliance flue collar or draft hood outlet, whichever is smaller.
    - True
    - False

16. In a venting system for a single appliance with a draft hood, the areas of the connector and the pipe shall each NOT be greater than SEVEN times the draft hood outlet area.
    - True
    - False
Venting of Gas Fired Equipment

17. Category II and Category IV gas utilization equipment and non-categorized condensing appliances require a provision to collect and dispose of condensate from venting systems serving them.
   - True
   - False

18. A vent connector shall be made of NON-combustible material capable of withstanding the vent gas temperatures.
   - True
   - False

19. When the vent connector used on a Category I appliance is located in an unconditioned area, that portion of the vent connector may be single-wall pipe.
   - True
   - False

20. When the vent connector used for a Category I appliance is located in a crawl space, that portion of the vent connector shall be Type B.
   - True
   - False

21. Where two or more gas appliances are vented through a common vent manifold, the manifold shall be located at the highest level consistent with available headroom and clearance to combustible material.
   - True
   - False

22. Where two or more vent connectors enter a common chimney, the smaller connector shall enter at the lowest level consistent with the available headroom or clearance to combustible material.
   - True
   - False

23. Vent connectors serving Category I appliances are permitted to be connected to any portion of a mechanical draft system which operates under positive static pressure.
   - True
   - False

24. A vent connector shall be installed so as to avoid turns that create excessive resistance to the flow of vent gases.
   - True
   - False

25. Joints between sections of connector piping and connections to flue collars or draft hood outlets shall be fastened using only LISTED duct tape.
   - True
   - False

26. A vent connector shall be installed without any dips or sags, and shall slope upward toward the vent or chimney at least 1/4 inch per foot.
   - True
   - False

27. A vent connector shall be as short as practical, and the gas utilization equipment shall be located as close as practical to the chimney or vent.
   - True
   - False

28. For a vent serving multiple appliances, the maximum length of an individual connector from the appliance outlet to the junction with the common vent can be up to 150 percent of the height of the common vent.
   - True
   - False

29. A vent connector shall not be connected to a chimney flue serving a fireplace unless the fireplace flue opening is permanently sealed.
   - True
   - False

Quiz 5
1. For listed appliances equipped with draft hoods and appliances listed for use with Type B gas vents, the thimble shall be a minimum of _______ larger in diameter than the vent connector.
   - 4 inches
   - 6 inches
   - 12 inches
   - no thimble or gap required
2. Single Wall: For unlisted appliances having draft hoods, the thimble shall be a minimum of ______ larger in diameter than the vent connector.
   - 4 inches
   - 6 inches
   - 12 inches
   - no thimble or gap required

3. Single Wall: For residential and low-heat appliances, the thimble shall be a minimum of ______ larger in diameter than the vent connector.
   - 4 inches
   - 6 inches
   - 12 inches
   - no thimble or gap required

4. Which factor does NOT affect the required vent size?
   - ambient air temperature
   - vent connector type
   - appliance input Btu/h rating
   - number of elbows
   - all of the answers provided affect the required vent size

5. Corrugated vent connectors shall not be smaller than the listed appliance categorized vent diameter, flue collar diameter, or draft hood outlet diameter.
   - True
   - False

6. Where the vertical vent has a larger diameter than the vent connector, the vertical vent diameter shall be used to determine the maximum vent capacity, and the connector diameter shall be used to determine the minimum vent capacity.
   - True
   - False

7. Vent connectors shall not be upsized more than two sizes greater than the listed appliance categorized vent diameter, flue collar diameter, or draft hood outlet diameter.
   - True
   - False

8. The most common types of venting problems faced by plumbers and by mechanical and HVAC contractors are with the Category I type gas appliances.
   - True
   - False

9. The most common factors that a contractor can adjust in his vent design are the selection of the vent and connector types and their sizes.
   - True
   - False

10. Single-wall metal vent connectors are generally lower in initial cost than Type B connectors.
    - True
    - False

11. Single-wall metal vent connectors operate at much higher surface temperatures than do Type B connectors.
    - True
    - False

12. Single-wall metal connectors cannot be used in attics due to the fire hazard, and they must have greater clearances on all structural components than Type B connectors.
    - True
    - False

Quiz 6
Refer to table 5-9 located at the end of the quiz to help answer questions 1 – 8.

1. What is the minimum sized B vent for the following NAT draft appliances with no laterals?
   Height – 20 feet, 40 M Btu/h input.
   - 3 inches
   - 4 inches
   - 5 inches
   - 6 inches
   - 7 inches
Venting of Gas Fired Equipment

2. What is the minimum sized B vent for the following NAT draft appliances with no laterals?
   Height – 15 feet, 75 M Btu/h input.
   • 3 inches
   • 4 inches
   • 5 inches
   • 6 inches
   • 7 inches

3. What is the minimum sized B vent for the following NAT draft appliances with no laterals?
   Height – 30 feet, 200 M Btu/h input.
   • 3 inches
   • 4 inches
   • 5 inches
   • 6 inches
   • 7 inches

4. What is the minimum sized B vent for the following NAT draft appliances with no laterals?
   Height – 10 feet, 200 M Btu/h input.
   • 3 inches
   • 4 inches
   • 5 inches
   • 6 inches
   • 7 inches

5. What is the minimum sized B vent for the following NAT draft appliances?
   Height – 20 feet, Lateral – 20 feet, 100 M Btu/h input.
   • 3 inches
   • 4 inches
   • 5 inches
   • 6 inches
   • 7 inches

6. What is the minimum sized B vent for the following NAT draft appliances?
   Height – 15 feet, Lateral – 10 feet, 75 M Btu/h input.
   • 3 inches
   • 4 inches
   • 5 inches
   • 6 inches
   • 7 inches

7. What is the minimum sized B vent for the following NAT draft appliances?
   Height – 30 feet, Lateral – 5 feet, 200 M Btu/h input.
   • 3 inches
   • 4 inches
   • 5 inches
   • 6 inches
   • 7 inches

8. What is the minimum sized B vent for the following NAT draft appliances?
   Height – 10 feet, Lateral 10 feet, 150 M Btu/h input.
   • 3 inches
   • 4 inches
   • 5 inches
   • 6 inches
   • 7 inches
Venting of Gas Fired Equipment

Using the picture on the right to size the following equipment for installation for questions 9, 10, and 11. Refer to table 5-14 located at the end of the quiz.

9. Water heater connector min. size ______.
   - 3 inches
   - 4 inches
   - 5 inches
   - 6 inches
   - 7 inches

10. FAN-assisted furnace connector size ______.
    - 3 inches
    - 4 inches
    - 5 inches
    - 6 inches
    - 7 inches

11. Common vent size ______.
    - 4 inches
    - 5 inches
    - 6 inches
    - 7 inches

Using the picture on the right to size the following equipment for installation for questions 12, 13, and 14. Refer to table 5-14 located at the end of the quiz.

12. Water heater connector min. size ______.
    - 3 inches
    - 4 inches
    - 5 inches
    - 6 inches
    - 7 inches

13. FAN-assisted furnace connector size ______.
    - 3 inches
    - 4 inches
    - 5 inches
    - 6 inches
    - 7 inches

14. Common vent size ______.
    - 4 inches
    - 5 inches
    - 6 inches
    - 7 inches
# Venting of Gas Fired Equipment

**Table 5-9. Type B Double-Wall Vent**

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## Venting of Gas Fired Equipment

**Table 5-14. Type B Double-Wall Vent**

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### Vent Connector Capacity

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<th>Connecotor Rise R (ft.)</th>
<th>Type B Double-Wall Vent and Connector Diameter – D (in.)</th>
<th>Appliance Input Rating Limits in Thousands of Btu per Hour</th>
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### Common Vent Capacity

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