

ANSWER SHEET • UPC Update • Course No. WA2023-328 • Washington

First Name: \_\_\_\_\_ Last Name: \_\_\_\_\_ Date: \_\_\_\_\_

Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ ZIP: \_\_\_\_\_

License #: \_\_\_\_\_ Phone: \_\_\_\_\_ Email: \_\_\_\_\_

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INSTRUCTIONS TO SUBMIT EXAM

Option 1:



- 1. Pay online at [pay.apiceu.com/WA](https://pay.apiceu.com/WA) (or scan QR code)
- 2. Email your answer sheet(s) to [exam@apiceu.com](mailto:exam@apiceu.com)

Option 2:

- 1. Mail your answer sheets\* and a check payable to  
**American Plumbing Institute to:**  
American Plumbing Institute  
PO Box 1445  
Queen Creek, AZ 85142  
*\*If you prefer, you may FAX your answer sheets to 888-246-9280.*

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### **2021 UPC Update** **Course No. WA2023-328 • 8 hours**

DISCLAIMER NOTE: This course is APPROVED by the Washington State Plumbing Board for continuing education to renew your plumbing license and is not intended to replace or supersede any state or local adopted codes.

# Washington 2021 UPC Update

**WAC 51-56-001 Authority.** These rules are adopted under the authority of chapter 19.27 RCW.

**WAC 51-56-002 Purpose.** The purpose of these rules is to implement the provisions of chapter 19.27 RCW, which provides that the state building code council shall maintain the State Building Code in a status which is consistent with the purpose as set forth in RCW 19.27.020. In maintaining the codes, the council shall regularly review updated versions of the codes adopted under the act, and other pertinent information, and shall amend the codes as deemed appropriate by the council.

**WAC 51-56-003 Uniform Plumbing Code.** The 2021 edition of the Uniform Plumbing Code, including Appendices A, B, I, and M, published by the International Association of Plumbing and Mechanical Officials, is hereby adopted by reference with the following additions, deletions and exceptions: Provided that chapters 12 and 14 of this code are not adopted. Provided further, that those requirements of the Uniform Plumbing Code relating to venting and combustion air of fuel fired appliances as found in chapter 5 and those portions of the code addressing building sewers are not adopted.



**WAC 51-56-004 Conflicts between Appendix I and the manufacturer's installation instructions.** Where a conflict exists between the provisions of Appendix I and the manufacturer's installation instructions, the conditions of the listing and the manufacturer's installation instructions shall apply.

**WAC 51-56-008 Implementation.** The Uniform Plumbing Code adopted by chapter 51-56 WAC shall become effective in all counties and cities of this state on July 1, 2023.

**101.1 Title.** This document shall be known as the "Uniform Plumbing Code," may be cited as such, and will be referred to herein as "this code."

**102.4.1 Building Sewers and Drains.** Existing building sewers and building drains shall be permitted to be used in connection with new buildings or new plumbing and drainage work where they are found on examination and test to be in accordance with the requirements governing new work, and the proper Authority Having Jurisdiction shall notify the owner to make changes necessary to be in accordance with this code. No building, or part thereof, shall be erected or placed over a part of a drainage system that is constructed of materials other than those approved elsewhere in this code for use under or within a building.

## **102.4 Additions, Alterations, Renovations, or Repairs.**

Additions, alterations, renovations, or repairs shall conform to that required for a new system without requiring the existing plumbing system to be in accordance with the requirements of this code. Additions, alterations, renovations, or repairs shall not cause an existing system to become unsafe, insanitary, or overloaded. Additions, alterations, renovations, or repairs to existing plumbing installations shall comply with the provisions for new construction unless such deviations are found to be necessary and are first approved by the Authority Having Jurisdiction.



**102.4.2 Openings.** Openings into a drainage or vent system, excepting those openings to which plumbing

fixtures are properly connected or which constitute vent terminals, shall be permanently plugged or capped in an approved manner, using the appropriate materials in accordance with this code.

**102.2 Existing Installation.** Plumbing systems lawfully in existence at the time of the adoption of this code shall be permitted to have their use, maintenance, or repair continued where the use maintenance or repair is in accordance with the original design and location and no hazard to life, health, or property has been created by such plumbing system.

**102.7 Moved Structures.** Parts of the plumbing system of a that are part of a building or part thereof that is moved from one foundation to another, or from one location to another, shall be in accordance with the provisions of this code for new installations and completely tested as prescribed elsewhere in this section for new work, except that walls or floors need not be removed during such test where other equivalent means of inspection acceptable to the Authority Having Jurisdiction are provided.

**103.2 Liability.** The Authority Having Jurisdiction charged with the enforcement of this code, acting in good faith and without malice in the discharge of the Authority Having Jurisdiction's duties, shall not thereby be rendered personally liable for damage that accrues to persons or property as a result of an act or by reason of an act or omission in the discharge of duties. A suit brought against the Authority Having Jurisdiction or employee because of such act or omission performed in the enforcement of provisions of this code shall be defended by legal counsel provided by this jurisdiction until final termination of such proceedings.



**WAC 51-56-103.3.1 Certification.** State rules and regulations concerning certification shall apply.

**106.3 Penalties.** A person, firm, or corporation violating a provision of this code shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be punishable by a fine, imprisonment, or both set forth by the governing laws of the jurisdiction. Each separate day or portion thereof, during which a violation of this code occurs or continues, shall be deemed to constitute a separate offense.

**106.5 Authority to Disconnect Utilities in Emergencies.** The Authority Having Jurisdiction shall have the authority to disconnect a plumbing system to a building, structure, or equipment regulated by this code in case of emergency where necessary to eliminate an immediate hazard to life or property.

**105.3.2 Retesting.** Where the Authority Having Jurisdiction finds that the work will not pass the test, necessary corrections shall be made, and the work shall be resubmitted for test or inspection.

## Exam Questions:

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|--|--|
| <p>1. What year did Washington State formally adopt the 2021 UPC?</p> <ul style="list-style-type: none"> <li>A. 2015</li> <li>B. 2011</li> <li>C. 2012</li> <li>D. 2023</li> </ul> | <p>2. What chapter(s) did NOT get adopted by Washington when enacting the 2021 UPC?</p> <ul style="list-style-type: none"> <li>A. All Chapters were adopted</li> <li>B. 3 and 6</li> <li>C. 5, 12, and 15</li> <li>D. 12 and 14</li> </ul> |
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3. **Any time a reference to “This Code” is made, what document are they referring?**
  - A. The Plumbing Code
  - B. The Specialty Plumbing Code
  - C. Uniform Plumbing Code
  - D. The building and trades Code
4. **What type of crime is a violation of this code considered?**
  - A. Felony
  - B. Property
  - C. Misdemeanor
  - D. Humanity
5. **What section allows existing building sewers and drains to be used for a new building?**
  - A. 102.2
  - B. 104.1.2
  - C. 103.2.1
  - D. 102.4.1
6. **Who enforces the decisions made by the state plumbing board?**
  - A. Plumbing Contractor
  - B. General Contractor
  - C. Authority Having Jurisdiction
  - D. Trades person
7. **When is existing plumbing work required to be redone to the most current code?**
  - A. When it becomes dated
  - B. In 15 years from installation
  - C. When it becomes a hazard
  - D. All listed answers
8. **What should additions, alterations, renovations, or repairs to an existing plumbing system not cause the system to become?**
  - A. Insanitary
  - B. Unsafe
  - C. Overloaded
  - D. All listed answers
9. **Each day a code violation continues is considered a new and \_\_\_\_\_ offense.**
  - A. Existing
  - B. Flagrant
  - C. Continuing
  - D. Separate
10. **If a lawsuit is filed against the AHJ, the governing jurisdiction shall \_\_\_\_\_ for all costs to defend them.**
  - A. Ask
  - B. Include
  - C. Petition
  - D. Pay
11. **What are you required to do with any unused openings into a drainage or vent system?**
  - A. Permanently plug or cap them
  - B. Bury them with gravel
  - C. Fill them with concrete
  - D. All listed answers
12. **What section of the code requires a re-test if the Authority Having Jurisdiction finds that the work will not pass the test?**
  - A. 106.3.2
  - B. 104.3.2
  - C. 105.3.2
  - D. 103.3.2
13. **The Washington State building code council meets regularly to review updated versions of the codes to implement the requirements of what chapter?**
  - A. RCW 19.27.020
  - B. 19.27 RCW
  - C. WAC 51-56-003
  - D. WAC 51-56-008



**104.1 Permits Required.** It shall be unlawful for a person, firm, or corporation to make an installation, alteration, repair, replacement, or remodel a plumbing system regulated by this code except as permitted in Section 104.2, or to cause the same to be done without first obtaining a separate plumbing permit for each separate building or structure.

**104.2 Exempt Work.** A permit shall not be required for the following:

- (1) The stopping of leaks in drains, soil, waste, or vent pipe, provided, however, that a trap, drainpipe, soil, waste, or vent pipe become defective, and it becomes necessary to remove and replace the same with new material, the same shall be considered as new work and a permit shall be procured and inspection made as provided in this code.
- (2) The clearing of stoppages, including the removal and reinstallation of water closets, or the repairing of repairs do not involve or require the replacement or rearrangement of valves, pipes, or fixtures. Exemption from the permit requirements of this code shall not be deemed to grant authorization for work to be done in violation of the provisions of the code or other laws or ordinances of this jurisdiction.

**104.4.3 Expiration.** A permit issued by the Authority Having Jurisdiction under the provisions of this code shall expire by limitation and become null and void where the work authorized by such permit is not commenced within 180 days from the date of such permit, or where the work authorized by such permit is suspended or abandoned at a time after the work is commenced for a period of 180 days. Before such work is recommenced, a new permit shall first be obtained to do so, and the fee therefore shall be one-half the amount required for a new permit for such work, provided no changes have been made or will be made in the original plans and specifications for such work, and provided further that such suspensions or abandonment has not exceeded 1 year.



**105.2 Required Inspections.** New plumbing work and such portions of existing systems as affected by new work, or changes, shall be inspected by the Authority Having Jurisdiction to ensure compliance with the requirements of this code and to ensure that the installation and construction of the plumbing system is in accordance with approved plans. The Authority Having Jurisdiction shall make the following inspections and other such inspections as necessary. The permittee or the permittee's authorized agent shall be responsible for the scheduling of such inspections as follows:

- (1) The underground inspection shall be made after trenches or ditches are excavated and bedded, piping installed, and before rockfill is put in place.
- (2) Rough-in inspection shall be made prior to the installation of wall or ceiling membranes.
- (3) Final inspection shall be made upon completion of the installation.

**105.2.3 Inspection Requests.** It shall be the duty of the person doing the work authorized by a permit to notify the Authority Having Jurisdiction that such work is ready for inspection. The Authority Having Jurisdiction shall be permitted to require that a request for inspection be filed not less than 1 working day before such inspection is desired. Such request shall be in writing or by telephone, at the option of the Authority Having Jurisdiction. It shall be the duty of



the person requesting inspections in accordance with this code to provide access to and means for inspection of such work.

**105.2.4 Advance Notice.** It shall be the duty of the person doing the work authorized by the permit to notify the Authority Having Jurisdiction, orally or in writing, that said work is ready for inspection. Such notification shall be given not less than 24 hours before the work is to be inspected.

**105.2.5 Responsibility.** It shall be the duty of the holder of a permit to make sure that the work will stand the test prescribed before giving the notification. The equipment, material, and labor necessary for inspection or tests shall be furnished by the person to whom the permit is issued or by whom inspection is requested.

**105.2.6 Reinspections.** A reinspection fee shall be permitted to be assessed for each inspection or reinspection where such portion of work for which inspection is called is not complete or where required corrections have not been made.



This provision is not to be interpreted as requiring reinspection fees the first time a job is rejected for failure to begin accordance with the requirements of this code, but as controlling the practice of calling for inspections before the job is ready for inspection or reinspection. Reinspection fees shall be permitted to be assessed where the approved plans are not readily available to the inspector, for failure to provide access on the date for which the inspection is requested, or for deviating from plans requiring the approval of the Authority Having Jurisdiction. To obtain reinspection, the applicant shall file an application therefore in writing upon a form furnished for that purpose and pay the reinspection fee in accordance with Table 104.5.

In instances where reinspection fees have been assessed, no additional inspection of the work will be performed until the required fees have been paid.

**106.2 Notices of Correction or Violation.** Notices of correction or violation shall be written by the Authority Having Jurisdiction and shall be permitted to be posted at the site of the work or mailed or delivered to the permittee or his authorized representative. Refusal, failure, or neglect to comply with such notice or order within 10 days of receipt thereof, shall be considered a violation of this code and shall be subject to the penalties set forth by the governing laws of the jurisdiction.

### Exam Questions:

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| <p><b>14. How much does a new permit cost after expiration when NOT starting work on a prior permit for the same job within the required time allotment?</b></p> <ul style="list-style-type: none"> <li>A. Two times the amount required for a new permit for such work</li> <li>B. Three times the amount required for a new permit for such work</li> <li>C. One-half the amount required for a new permit for such work</li> <li>D. A new permit is not required</li> </ul> | <p><b>15. True or False? If a plumbing permit is not required, then the work being done does NOT need to be completed as per the code.</b></p> <ul style="list-style-type: none"> <li>A. True</li> <li>B. False</li> </ul> |
|--|--|

16. Who is responsible for inspecting new plumbing work and affected portions of existing systems to ensure compliance with the code and approved plans?
  - A. The construction contractor
  - B. The property owner
  - C. The Authority Having Jurisdiction
  - D. The plumbing equipment manufacturer
17. How many hours' notice should be given when requesting an inspection?
  - A. 48
  - B. 72
  - C. 16
  - D. 24
18. If a violation is not corrected within the allotted time, additional \_\_\_\_\_ may be assessed.
  - A. Days
  - B. Fees
  - C. Times
  - D. Locations
19. Work being inspected should be \_\_\_\_\_ before scheduling an inspection.
  - A. Tested
  - B. Covered
  - C. Demoed
  - D. Gutted
20. Work must begin on a project within \_\_\_\_\_ days after a permit has been issued.
  - A. 180
  - B. 190
  - C. 200
  - D. 210
21. If an inspection fails, a reinspection \_\_\_\_\_ and form must be completed and turned in before anymore inspections will be done.
  - A. Counter
  - B. Time
  - C. Place
  - D. Fee
22. What section lists examples where a permit may NOT be required?
  - A. 102.4
  - B. 104.2
  - C. 103.2
  - D. 101.5
23. There are \_\_\_\_\_ basic types of inspections.
  - A. 2
  - B. 3
  - C. 4
  - D. 5
24. What is considered a violation of the code regarding compliance with a notice or order?
  - A. Complying with the notice or order within 5 days of receipt
  - B. Failing to comply with the notice or order within 10 days of receipt
  - C. Disagreeing with the notice or order in writing
  - D. Asking for an extension to comply with the notice or order within 20 days

## Definitions:

**Accepted Engineering Practice.** That which conforms to technical or scientific based principles, tests, or standards that are accepted by the engineering profession.

**Accessible.** Where applied to a fixture, connection, appliance, or equipment, "accessible" means having access thereto, but which first may require the removal of an access panel, door, or similar obstruction.



**Accessible, Readily.** Having a direct access without the necessity of removing a panel, door, or similar obstruction.

**Air Break.** A physical separation which may be a low inlet into the indirect waste receptor from the fixture, appliance, or device indirectly connected.

**Air Gap, Drainage.** The unobstructed vertical distance through the free atmosphere between the lowest opening from a pipe, plumbing fixture, appliance, or appurtenance conveying waste to the flood-level rim of the receptor.

**Air Gap, Water Distribution.** The unobstructed vertical distance through the free atmosphere between the lowest opening from a pipe or faucet conveying potable water to the flood-level rim of a tank, vat, or fixture.

**Alternate Water Source.** Nonpotable source of water that includes but not limited to gray water, on-site treated nonpotable water, rainwater, and reclaimed (recycled) water.

**Anchors.** See Supports.

**Approved.** Acceptable to the Authority Having Jurisdiction.

**Approved Testing Agency.** An organization primarily established for purposes of testing to approved standards and approved by the Authority Having Jurisdiction.

**Area Drain.** A receptor designed to collect surface or storm water from an open area.

**WAC 51-56-0205 Certified Backflow Assembly Tester.** A person certified by the Washington state department of health under chapter 246-292 WAC to inspect (for correct installation and approval status) and test (for proper operation), maintain and repair (in compliance with chapter 18.106 RCW) backflow prevention assemblies, devices and air gaps.

**WAC 51-56-0210.0 Hot Water** - Water at a temperature exceeding or equal to 100°F.

**WAC 51-56-0218.0 Plumbing System** - Includes all potable water, building supply and distribution pipes, all reclaimed or other alternate source water systems, all rainwater systems, all plumbing fixtures and traps, all drainage and vent pipe(s), and all building drains including their respective joints and connection, devices, receptors, and appurtenances within the property lines of the premises and shall include potable water piping, potable water treating or using equipment, medical gas and medical vacuum systems, and water heaters: Provided, That no certification shall be required for the installation of a plumbing system within the property lines and outside a building.



**WAC 51-56-0221.0 Spray Sprinkler Body** - The exterior case or shell of a sprinkler incorporating a means of connection to the piping system designed to convey water to a nozzle or orifice.

**WAC 51-56-0225.0 Water Heater (consumer electric storage)** - A consumer product that uses electricity as the energy source to heat domestic potable water, has a nameplate input rating of twelve kilowatts or less, contains nominally forty gallons but no more than one hundred twenty gallons of rated hot water storage volume, and supplies a maximum hot water delivery temperature less than one hundred eighty degrees Fahrenheit.

**WAC 51-56-0225.0 Water Heater (mini-tank electric)** - A small electric water heater that has a measured storage volume of more than one gallon and a rated storage volume of less than twenty gallons.

**WAC 51-56-0225.0 Water/Wastewater Utility** - A public or private entity, including a water purveyor as defined in chapter 246-290 WAC, which may treat, deliver, or do both functions to reclaimed (recycled) water, potable water, or both to wholesale or retail customers.

## Exam Questions:

25. That which conforms to technical or scientific based principles, tests, or standards that are accepted by the engineering profession best defines which listed term?
  - A. Standards
  - B. Conforming standards
  - C. Accepted practices
  - D. Accepted engineering practice
26. What best defines the exterior case or shell of a sprinkler incorporating a means of connection to the piping system designed to convey water to a nozzle or orifice?
  - A. Spray sprinkler body
  - B. Spray sprinkler enclosure
  - C. Spray sprinkler head
  - D. Nozzle
27. Where applied to a fixture, connection, appliance, or equipment, having access thereto, but which first may require the removal of an access panel, door, or similar obstruction would be defined as?
  - A. Accessible
  - B. Accessible, Readily
  - C. Guarded
  - D. Concealed
28. What best defines having direct access without the necessity of removing a panel, door, or similar obstruction?
  - A. Accessible
  - B. Accessible, Readily
  - C. Guarded
  - D. Concealed
29. This is best defined as a physical separation which may be a low inlet into the indirect waste receptor from the fixture, appliance, or device indirectly connected.
  - A. Air Gap
  - B. Gap Break
  - C. Air Break
  - D. Air Gap, Drainage
30. The unobstructed vertical distance through the free atmosphere between the lowest opening from a pipe, plumbing fixture, appliance, or appurtenance conveying waste to the flood-level rim of the receptor is defined as?
  - A. Air Space
  - B. Air Break
  - C. Air Gap, Drainage
  - D. Gap Break
31. Who would you need to get certified through to become a certified backflow assembly tester in Washington State?
  - A. Department of social services
  - B. Fire Department
  - C. Labor and Industries
  - D. Department of health
32. This is the unobstructed vertical distance through the free atmosphere between the lowest opening from a pipe or faucet conveying potable water to the flood-level rim of a tank, vat, or fixture.
  - A. Air Gap, Drainage
  - B. Air Gap, Water Distribution
  - C. Air Break
  - D. Air Space
33. What is an organization primarily established for purposes of testing to approved standards and approved by the Authority Having Jurisdiction?
  - A. Approved Testing Agency
  - B. Underwriter Laboratories
  - C. State Plumbing Enforcement agency
  - D. State Board
34. A nonpotable source of water that includes but not limited to gray water, on-site treated nonpotable water, rainwater, and reclaimed (recycled) water would be best defined as?
  - A. Non Potable Water
  - B. Alternate Water Source
  - C. Reclaimed Source
  - D. Recycled Water



35. **What WAC chapter can the description of a water purveyor be located?**
  - A. 246-190
  - B. 246-029
  - C. 246-902
  - D. 246-290
36. **Where does the 2021 UPC tell us to look for the definition of anchors?**
  - A. Supports
  - B. Devices
  - C. Anchors
  - D. Hardware 14-1
37. **Acceptable to the Authority Having Jurisdiction is also known as?**
  - A. Listed
  - B. Approved
  - C. Rated
  - D. Passed
38. **A receptor designed to collect surface or storm water from an open area is defined as a?**
  - A. Aspirator
  - B. Area Drain
  - C. Drain
  - D. Floor Drain
39. **At what temperature does Washington State consider water hot?**
  - A. 120°F
  - B. 134°F
  - C. 160°F
  - D. 100°F
40. **A \_\_\_\_\_ includes all potable water, building supply and distribution pipes, all reclaimed or other alternate source water systems, all rainwater systems, all plumbing fixtures and traps, all drainage and vent pipe(s), and all building drains including their respective joints and connection, devices, receptors, and appurtenances within the property lines of the premises and shall include potable water piping, potable water treating or using equipment, medical gas and medical vacuum systems, and water heaters.**
  - A. System loop
  - B. Closed loop
  - C. Plumbing System
  - D. Plumbing fixture
41. **What best defines a consumer product that uses electricity as the energy source to heat domestic potable water, has a nameplate input rating of twelve kilowatts or less, contains nominally forty gallons but no more than one hundred twenty gallons of rated hot water storage volume, and supplies a maximum hot water delivery temperature less than one hundred eighty degrees Fahrenheit?**
  - A. Water Heater (mini-tank electric)
  - B. Water Heater (consumer electric storage)
  - C. Water Heater (tankless)
  - D. Water Heater (storage)
42. **What is a small electric water heater that has a measured storage volume of more than one gallon and a rated storage volume of less than twenty gallons?**
  - A. Water Heater (mini-tank electric)
  - B. Water Heater (consumer electric storage)
  - C. Water Heater (tankless)
  - D. Water Heater (storage)

**301.2.3 Plastic Pipe, Plastic Fittings and Components.** Plastic Pipe, Plastic pipe fittings and Components other than those for gas shall comply with NSF 14.

**301.2.4 Cast-Iron Soil Pipe and Fittings.** Cast-iron soil pipe and hubless couplings shall be third party certified in accordance with ASTM C1277 and CISPI 310.

**301.4.1 Coastal High Hazard Areas.** Plumbing systems in buildings located in costal high hazard areas shall be in accordance with the requirements of Section 301.4, and plumbing systems, pipes, and fixtures shall not be mounted on or penetrate through walls that are intended to breakaway under flood loads as required by the Building Code.

**304.1 Connections to Plumbing System Required (General).** Plumbing fixtures, drains, appurtenances, and appliances, used to receive or discharge liquid wastes or sewage, shall be connected properly to the drainage system of the building or premises, in accordance with the requirements of this code.

**306.1 Detrimental Wastes.** Wastes detrimental to the public sewer system or detrimental to the functioning of the sewage treatment plant shall be treated and disposed of as found necessary and directed by the Authority Having Jurisdiction.

**306.2 Safe Discharge.** Sewage or other waste from a plumbing system that is capable of being deleterious to surface or subsurface waters shall not be discharged into the ground or into a waterway unless it has first been rendered safe by some acceptable form of treatment in accordance with the Authority Having Jurisdiction.

**307.1 System.** Except as otherwise provided in this code, no plumbing system, drainage system, building sewer, private sewage disposal system, or parts thereof shall be located in a lot other than the lot that is the site of the building, structure, or premises served by such facilities.

**308.1 Improper Location (General).** Piping, fixtures, or equipment shall not be so located as to interfere with the normal use thereof or with the normal operation and use of windows, doors, or other required facilities.

**309.1 Workmanship (Engineering Practices).** Design, construction, and workmanship shall be in accordance with accepted engineering practices and shall be of such character as to secure the results sought to be obtained by this code.

**309.2 Concealing Imperfections.** It is unlawful to conceal cracks, holes, or other imperfections in materials by welding, brazing, or soldering or by using therein or thereon paint, wax, tar, solvent cement, or other leak-sealing or repair agent.

**309.3 Burred Ends.** Burred ends of pipe and tubing shall be reamed to the full bore of the pipe or tube, and chips shall be removed.

**310.3 Waste Connection.** No waste connection shall be made to a closet bend or stub of a water closet or similar fixture.

**WAC 51-56-310.4 Use of Vent and Waste Pipes.** Except as hereinafter provided in Sections 908.0 through 911.0 and Appendix C, no vent pipe shall be used as a soil or waste pipe, nor shall any soil or waste pipe be used as a vent.

**310.7 Direction of Flow.** Valves, pipes, and fittings shall be installed in correct relationship to the direction of flow.





## Exam Questions:

43. \_\_\_\_\_ waste connection(s) shall be made to a closet bend or stub of a water closet or similar fixture.
- 3
  - 2
  - No
  - 1
44. What NSF are plastic pipe fittings and components required to comply with?
- NSF 301
  - NSF 14
  - ASTM 32- NSF 4
  - SFN 14
45. What are hubless couplings used with cast-iron soil pipe required to have done?
- Have a PVC coating applied
  - Be certified on site by the plumbing contractor
  - Be certified by a third party
  - Have a tracer wire attached for service and or replacement
46. Which of the following is required for connecting plumbing fixtures and appliances that handle liquid wastes or sewage?
- They must be properly connected to the drainage system of the building or premises in accordance with the requirements of the code
  - They should be connected to the drainage system using flexible hoses for easy adjustment
  - They can discharge liquid wastes directly onto the ground if properly filtered
  - They must all be individually connected to separate septic tanks
47. How should wastes that are detrimental to the public sewer system or sewage treatment plant be handled?
- They can be disposed of in the nearest body of water, provided it's done infrequently
  - They can be diluted with water before discharge to minimize impact
  - They should be mixed with regular household waste for easier disposal
  - They must be treated and disposed of as deemed necessary and directed by the Authority Having Jurisdiction
48. How should sewage or waste capable of harming surface or subsurface waters be handled before discharge?
- It can be discharged into a waterway as long as it is screened for solid waste
  - It can be released directly into the ground without treatment if the quantity is small
  - It should be mixed with chemicals to neutralize its effects before discharge
  - It must be rendered safe by an acceptable form of treatment according to the Authority Having Jurisdiction
49. According to the code, where should a plumbing system or related facilities be located?
- Anywhere within the neighborhood as long as it complies with local zoning laws
  - On any adjacent lot, provided it is within property boundaries
  - In a shared communal area for efficiency and convenience
  - On the same lot as the building, structure, or premises it serves, unless otherwise provided by the code
50. Where should piping, fixtures, or equipment be located?
- Near windows and doors to facilitate easy access
  - Anywhere as long as it is convenient for installation
  - In places where they do not interfere with the normal use or operation of windows, doors, or other required facilities
  - Centrally located for easy maintenance and inspection

51. In Costal High Hazard areas, plumbing systems are required to meet the requirements of Section \_\_\_\_\_.
- A. 301.4
  - B. 310.5
  - C. 301.3
  - D. 310.4
52. How are valves, pipes, and fittings required to be installed?
- A. In opposition to the direction of flow
  - B. In correct relationship to the direction of flow
  - C. In parallel with one another
  - D. Only by a qualified individual
53. According to the code, how should design, construction, and workmanship be conducted?
- A. In a manner that prioritizes cost-saving over functionality
  - B. Based on the preferences of the construction team for flexibility
  - C. In accordance with accepted engineering practices to achieve the results sought by the code
  - D. Following traditional methods, regardless of new engineering innovations
54. What ASTM are cast-iron soil pipe and hubless couplings required to be third party certified in accordance with?
- A. ASTM C1277
  - B. ASTM C310
  - C. ASTM C2177
  - D. ASTM C103
55. According to the code, under what conditions can a vent pipe be used as a soil or waste pipe, or vice versa?
- A. Only as provided in Sections 908.0 through 911.0 and Appendix C
  - B. When it is financially beneficial to do so
  - C. When the vent pipe is made from durable materials
  - D. Only if approved by the construction foreman on site

**WAC 51-56-0301.2.2 Standards.** Standards listed or referred to in this chapter or other chapters cover materials which will conform to the requirements of this code, when used in accordance with the limitations imposed in this or other chapters thereof and their listing. Where a standard covers materials of various grades, weights, quality, or configurations, the portion of the listed standard that is applicable shall be used. Design and materials for special conditions or materials not provided for herein shall be permitted to be used by special permission of the authority having jurisdiction after the authority having jurisdiction has been satisfied as to their adequacy in accordance with Section 301.2.

**310.8 Screwed Fittings.** Screwed fittings shall be ABS, cast-iron, copper, copper alloy, malleable iron, PVC, steel, or other approved materials. Threads shall be tapped out of solid metal or molded in solid ABS or PVC.

**311.0 Independent Systems (General).** The drainage system of each new building and new work installed in an existing building shall be separate and independant from that of any other building, and, where available, every building shall have an independent connection with a public or private sewer.

**Exception:** Where one building stands in the rear of another building on an interior lot, and no private sewer is available or can be constructed to the rear building through an adjoining court, yard, or driveway, the building drain from the front building shall be permitted to extend to the rear building.

**312.1 Protection of Piping, Materials, and Structures (General).** Piping passing under or through walls shall



be protected from breakage. Piping passing through or under cinders or other corrosive materials shall be protected from external corrosion in an approved manner. Approved provisions shall be made for expansion of hot water piping. Voids around piping passing through concrete floors on the ground shall be sealed.

**312.2 Installation.** Piping in connection with a plumbing system shall be so installed that piping or connections will not be subject to undue strain or stresses, and provisions shall be made for expansion, contraction, and structural settlement. No plumbing piping shall be directly embedded in concrete or masonry. No structural member shall be seriously weakened or impaired by cutting, notching, or otherwise, as defined in the building code.

**312.3 Building Sewer and Drainage Piping.** No building sewer or other drainage piping or part thereof, constructed of materials other than those approved for use under or within a building, shall be installed under or within 2 feet of a building or structure, or less than 1 foot below the surface of the ground.

**312.4 Corrosion, Erosion, and Mechanical Damage.** Piping subject to corrosion, erosion, or mechanical damage shall be protected in an approved manner.

**WAC 51-56-0312.7 Fire-Resistant Construction:** All pipe penetrating floor/ceiling assemblies and fire-resistance rated walls or partitions shall be protected in accordance with the requirements of the building code.

**WAC 51-56-0312.6 Freezing Protection.** No water, soil, or waste pipe shall be installed or permitted outside of a building, in attics or crawl spaces, or in an exterior wall unless, where necessary, adequate provision is made to protect such pipe from freezing. All hot and cold water pipes installed outside the conditioned space shall be insulated to meet the minimum requirements of the Washington State Energy Code.

**312.8 Water Proofing of Openings.** Joints at the roof around pipes, ducts, or other appurtenances shall be made watertight by use of lead, copper, galvanized iron, or other approved flashings or flashing material. Exterior wall openings shall be made watertight. Counterflashing shall not restrict the required internal cross-sectional area of the vent.

**312.9 Steel Nail Plates.** Plastic and copper or copper alloy piping penetrating framing members to within 1 inch of the exposed framing shall be protected by steel nail plates not less than No. 18 gauge in thickness. The steel nail plate shall extend along the framing member not less than 1 1/2 inches beyond the outside diameter of the pipe or tubing.

**312.11 Structural Members.** A structural member weakened or impaired by cutting, notching, or otherwise shall be reinforced, repaired, or replaced so as to be left in a safe structural condition in accordance with the requirements of the building code.

### Exam Questions:

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| <p>56. Materials not approved for use in buildings must be installed no less than _____ below finish grade.</p> <ul style="list-style-type: none"> <li>A. 1'</li> <li>B. 2'</li> <li>C. 3'</li> <li>D. 4'</li> </ul> | <p>57. The preferred method when connecting a buildings sewer system is to have it _____ with other buildings systems.</p> <ul style="list-style-type: none"> <li>A. Shared</li> <li>B. Common</li> <li>C. Independent</li> <li>D. Oversized</li> </ul> |
|--|---|

58. Which of the following materials is approved for use in screwed fittings according to the code?
- A. Wood
  - B. Aluminum
  - C. ABS
  - D. Glass
59. What materials are threads specified to be tapped or molded from according to the code?
- A. Solid metal, ABS, PVC
  - B. Solid metal, copper, wood
  - C. ABS, aluminum, acrylic
  - D. PVC, glass, rubber
60. In what situation is it permitted for the building drain from a front building to extend to a rear building on an interior lot?
- A. When the front building has larger plumbing pipes than the rear building
  - B. When there is sufficient space in the front building for additional drainage
  - C. When there are multiple buildings on the lot with different owners
  - D. When no private sewer is available or can be constructed to the rear building through an adjoining court, yard, or driveway
61. What measure should be taken for piping that passes under or through walls?
- A. It should be painted a bright color
  - B. It should be protected from breakage
  - C. It should be insulated to prevent heat loss
  - D. It should be made of flexible materials
62. What must be done to piping passing through or under cinders or other corrosive materials?
- A. It should be increased in diameter
  - B. It should be buried at a deeper level
  - C. It should be painted a different color
  - D. It should be protected from external corrosion in an approved manner
63. What must be done to accommodate the expansion of hot water piping?
- A. Approved provisions shall be made for expansion
  - B. The water temperature should be lowered
  - C. Insulation should be removed to allow for more flexibility
  - D. The piping should be replaced with a different material
64. Which of the following is required when installing piping in connection with a plumbing system?
- A. Piping must be painted to prevent corrosion
  - B. Piping should be installed at the highest point of the structure
  - C. Piping or connections must not be subject to undue strain or stresses
  - D. Piping should not exceed a length of 20 feet
65. What is a key restriction when installing plumbing piping in relation to concrete or masonry?
- A. Plumbing piping may only be directly embedded in concrete or masonry if insulated
  - B. Plumbing piping must be painted before installation in concrete or masonry
  - C. Plumbing piping should always be encased in plastic when near concrete or masonry
  - D. Plumbing piping shall not be directly embedded in concrete or masonry
66. What is the restriction regarding the installation of building sewers and drainage piping under or near a building?
- A. Only plastic drainage pipes can be used within 2 feet of a structure
  - B. All drainage piping must be at least 5 feet away from any building
  - C. Building sewers and drainage piping must be made of approved materials if installed within 2 feet of a building
  - D. Building sewers can be constructed using any materials if installed under a building

**67. How should piping that is subject to corrosion, erosion, or mechanical damage be handled?**

- A. It must be protected in an approved manner
- B. It should be painted regularly to prevent damage
- C. It needs to be replaced annually regardless of condition
- D. It can be left exposed as these conditions rarely cause issues

**68. How should all pipes that penetrate floor/ceiling assemblies and fire-resistance rated walls or partitions be protected?**

- A. By using metal sleeves regardless of their location
- B. By wrapping them with insulation material
- C. By painting them with fire-retardant paint
- D. In accordance with the requirements of the Building Code

**69. What is the requirement for insulating hot and cold water pipes installed outside the conditioned space?**

- A. They should not be insulated, as they are outside the conditioned space
- B. They must be insulated with at least 1-inch thick foam
- C. They must be insulated to meet the minimum requirements of the Washington State Energy Code
- D. They should be painted with thermal-resistant paint

**70. What is the requirement for protecting plastic and copper or copper alloy piping that penetrates framing members to within 1 inch of the exposed framing?**

- A. They need to be coated with rust-resistant paint
- B. They must be wrapped in insulation to prevent contact with nails
- C. They shall be protected by steel nail plates not less than No. 18 gauge in thickness
- D. They should be covered with aluminum foil tape for added protection

**313.1 General.** Piping, fixtures, appliances, and appurtenances shall be supported in accordance with this code, the manufacturers installation instructions, and in accordance with the Authority Having Jurisdiction.

**313.2 Material.** Hangars and anchors shall be of sufficient strength to support the weight of the pipe or tubing and its contents. Piping shall be isolated from incompatible materials.

**314.3 Open Trenches.** Excavations required to be made for the installation of a building drainage system or part thereof, within the walls of a building, shall be open trench work and shall be kept open until the piping has been inspected, tested, and accepted.

**314.4 Excavations.** Excavations shall be completely backfilled as soon after inspection as practicable. Precaution shall be taken to ensure compactness of backfill around piping without damage to such piping. Trenches shall be backfilled in thin layers to 12 inches (305 mm) above the top of the piping with clean earth, which shall not contain stones, boulders, cinderfill, frozen earth, construction debris, or other materials that will damage or break the piping or cause corrosive action. Mechanical devices such as bulldozers, graders, etc., shall be permitted to then be used to complete backfill to grade. Fill



shall be properly compacted.

Precautions shall be taken to ensure permanent stability for pipe laid in filled or made ground. Underground thermoplastic pipe and fittings for sewers and other gravity flow applications shall be installed in accordance with this code and Section 314.4.1.

**315.1 Unions.** Approved unions shall be permitted to be used in drainage piping where accessibly located in the trap seal or between a fixture and its trap; in the vent system, except underground or in wet vents; at any point in the water supply system; and in gas piping as permitted by Section 1212.6.

**315.2 Prohibited Joints and Connections.** A fitting or connection that has an enlargement, chamber, or recess with a ledge, shoulder, or reduction of pipe area that offers an obstruction to flow through the drain shall be prohibited.

**316.1 Increasers and Reducers (General).** Where different sizes of pipes and fittings are to be connected, the proper size increasers or reducers or reducing fittings shall be used between the two sizes. Copper alloy or cast-iron body cleanouts shall not be used as a reducer or adapter from cast-iron drainage pipe to iron pipe size (IPS) pipe.



**317.1 Food Handling Establishments (General).** Food or drink shall not be stored, prepared, or displayed beneath soil or drain pipes unless those areas are protected against leakage or condensation from such pipes reaching the food or drink as described below. Where building design requires that soil or drain pipes be located over such areas, the installation shall be made with the least possible number of joints and shall be installed to connect to the nearest adequately sized vertical stack with the provisions as follows:

- (1) Openings through floors over such areas shall be sealed watertight to the floor construction.
- (2) Floor and shower drains installed above such areas shall be equipped with integral seepage pans.
- (3) Soil or drain pipes shall be of an approved material as listed in Chapter 17 and Section 701.2. Materials shall comply with established standards. Cleanouts shall be extended through the floor construction above.
- (4) Piping subject to operation at temperatures that will form condensation on the exterior of the pipe shall be thermally insulated.
- (5) Where pipes are installed in ceilings above such areas, the ceiling shall be of the removable type, or shall be provided with access panels in order to form a ready access for inspection of piping

## Exam Questions:

**71. What are the requirements for supporting piping, fixtures, appliances, and appurtenances?**

- A. They can be supported by wooden braces as a universal solution
- B. They must be supported by concrete blocks to prevent movement
- C. They should be supported only by the manufacturer's installation instructions, ignoring the code
- D. They shall be supported in accordance with this code, the manufacturers' installation instructions, and the Authority Having Jurisdiction

**72. What is the requirement for hangars and anchors used to support pipes or tubing?**

- A. They should be installed every 15 feet regardless of pipe size or weight
- B. They must be of sufficient strength to support the weight of the pipe or tubing and its contents
- C. They can be made of any material, as long as installation is quick and easy
- D. They must be installed only at the beginning and end of the pipe or tubing



**73. What is the guideline for ensuring the durability and safety of piping systems?**

- A. Piping must be insulated to maintain temperature regularly
- B. Piping should always be painted to prevent rusting
- C. Piping shall be isolated from incompatible materials
- D. Piping should be buried underground whenever possible

**74. What is the requirement for excavations made for the installation of a building drainage system within the walls of a building?**

- A. Excavations need to be covered with temporary flooring during installation
- B. Excavations should be filled immediately after pipe placement to prevent collapse
- C. Excavations can be closed before inspection as long as there are photographic records
- D. Excavations must be open trench work and kept open until the piping has been inspected, tested, and accepted

**75. When should excavations be backfilled after they have been inspected?**

- A. Excavations should never be backfilled to allow for future inspections
- B. Excavations should be completely backfilled as soon after inspection as practicable
- C. Excavations should only be backfilled after a second confirmation inspection
- D. Excavations should be backfilled after one year to allow for settling

**76. What precaution should be taken when backfilling around piping?**

- A. Ensure compactness of backfill around piping without causing damage to the piping
- B. Avoid compacting the backfill to protect the piping from pressure
- C. Use heavy machinery to compact backfill directly on top of the piping
- D. Allow the backfill to settle naturally without any compaction

**77. What is the correct method for backfilling trenches around piping according to the code?**

- A. Fill the trench with any available material as long as it completely covers the piping
- B. Backfill with a mixture of stones, debris, and earth, ensuring that the trench is filled swiftly
- C. Compact large stones and boulders over the piping to secure it in place within the trench
- D. Backfill in thin layers up to 12 inches above the piping with clean earth that is free of stones, boulders, cinderfill, frozen earth, construction debris, or other damaging materials

**78. What is the correct approach to handling fill material according to the code?**

- A. Ensure that the fill is properly compacted
- B. Leave the fill loose and uncompressed for natural settling
- C. Use fill without any need for compaction or settling
- D. Distribute the fill haphazardly without regard to compaction

**79. In which of the following locations are approved unions permitted to be used in drainage piping?**

- A. In any location within a structure without restrictions
- B. Only underground or in wet vents
- C. Where accessibly located in the trap seal or between a fixture and its trap; in the vent system, except underground or in wet vents; at any point in the water supply system; and in gas piping as permitted by Section 1212.6
- D. Exclusively in the water supply system, with no exceptions for other systems

**80. Which of the following fittings or connections is prohibited in drain systems?**

- A. A fitting or connection that is designed to streamline water flow with minimal resistance
- B. A fitting or connection that allows free, unobstructed flow through the drain
- C. A fitting or connection that has an enlargement, chamber, or recess with a ledge, shoulder, or reduction of pipe area that offers an obstruction to flow through the drain
- D. A fitting or connection that meets all safety standards and regulations and does not inhibit flow in any way



**81. What is required when connecting different sizes of pipes and fittings?**

- A. Pipes of different sizes should be directly welded together without any adapter
- B. The larger pipe should always be inserted into the smaller pipe without any additional fittings
- C. Regular pipe clips should be used to secure the connection between different pipe sizes
- D. The proper size increasers or reducers or reducing fittings shall be used between the two sizes

**82. Which of the following should not be used as a reducer or adapter from cast-iron drainage pipe to iron pipe size (IPS) pipe?**

- A. PVC couplings
- B. Copper alloy or cast-iron body cleanouts
- C. Flexible rubber adapters
- D. Stainless steel connectors

**83. Under what condition can food or drink be stored, prepared, or displayed beneath soil or drain pipes?**

- A. When the pipes are clearly labeled
- B. When the areas are protected against leakage or condensation from the pipes
- C. When the food or drink is in sealed containers
- D. When the temperature is monitored regularly

**403.2 Fixtures and Fixture fittings for persons with disabilities.** Plumbing Fixtures and fixture fittings for persons with disabilities shall comply with ICC A117.1 and the applicable standards referenced in Chapter 4.

**403.3 Exposed Pipes and Surfaces.** Water supply and drainpipes under accessible lavatories and sinks shall be insulated or otherwise be configured to protect against contact. Protectors, insulators, or both shall comply with A112.18.9 or ASTM C1822.

**WAC 51-56-0407.2 Water Consumption.** The maximum water flow rate of faucets shall comply with Section 407.2.1 through 407.2.2.

**WAC 51-56-0407.2.1 Maximum Flow Rate.** The maximum flow rate for public lavatory faucets shall not exceed 0.5 gpm at 60 psi (1.9 L/m at 414 kPa).

**WAC 51-56-0407.2.1.1 Residential Lavatory Faucets.** The maximum flow rate of residential lavatory faucets shall not exceed 1.2 gallons (4.54 L) per minute at 60 psi. The minimum flow rate of residential lavatory faucets shall not be less than 0.8 gallons (3.03 L) per minute at 20 psi.

**WAC 51-56-0407.2.1.2 Lavatory Faucets in Common and Public Use Areas.** The maximum flow rate of lavatory faucets, installed in common and public use areas (outside of dwellings or sleeping units) in residential buildings, shall not exceed 0.5 gallons (1.89 L) per minute at 60 psi.

**WAC 51-56-0407.2.2 Metering Faucets.** Metered faucets shall deliver a maximum of 0.25 gallons (1.0 L) per metering cycle in accordance with ASME A112.18.1/CSA B125.1.

**WAC 51-56-0407.4 Metering Valves.** Lavatory faucets located in restrooms intended for use by the general public shall be equipped with a metering valve designed to close by spring or water pressure when left unattended (self-closing).

**EXCEPTIONS:**

1. Where designed and installed for use by persons with a disability.
2. Where installed in day care centers, for use primarily by children under 6 years of age.



**WAC 51-56-0411.2 Water Consumption.** The effective flush volume of all water closets shall not exceed 1.28 gallons (4.8 L) per flush when tested in accordance with ASME A112.19.2/CSA B45.1.

**EXCEPTIONS:**

1. Water closets located in day care centers, intended for use by young children may have a maximum water use of 3.5 gallons per flush or 13.25 liters per flush.
2. Water closets with bed pan washers may have a maximum water use of 3.5 gallons per flush or 13.25 liters per flush.
3. Blow out bowls, as defined in ANSI/ASME A112.19.2M, Section 5.1.2.3 may have a maximum water use of 3.5 gallons per flush or 13.25 liters per flush.

**WAC 51-56-0412.1 Application.** Urinals shall comply with ASME A112.19.2/CSA B45.1, ASME A112.19.19, or CSA B45.5/IAPMO Z124. Wall-mounted urinals shall have an average water consumption not to exceed 0.125 gallons (0.47 L) per flush. Other urinals shall have an average water consumption not to exceed 0.5 gallons (1.89 L) per flush.

**408.7.3 Sheet Lead.** Sheet lead shall weigh not less than 4 lb/ft<sup>2</sup> (19.5 kg/m<sup>2</sup>) and shall be coated with an asphalt paint or other approved coating. The lead sheet shall be insulated from conducting substances, other than the connecting drain, by 15 pound (6.8 kg) asphalt felt or an equivalent. Sheet lead shall be joined by burning.

**WAC 51-56-420.3 Prerinse Spray Valve.** Commercial food service prerinse spray valves shall have a maximum flow rate of 1.6 gallons per minute (gpm) at 60 pounds-force per square inch (psi) (6.0 L/m at 414 kPa) in accordance with ASME A112.18.1/CSA B125.1 and shall be equipped with an integral automatic shutoff.

**WAC 51-56-422.0 Minimum Number of Required Fixtures.** For minimum number of plumbing fixtures required, see Building Code chapter 29 and Table 2902.1.



## Exam Questions:

- |   |  |
|---|--|
| <p>84. What is the maximum effective flush volume allowed for water closets when tested according to ASME A112.19.2/CSA B45.1?</p> <ul style="list-style-type: none"> <li>A. 2.0 gallons (7.5 L) per flush</li> <li>B. 1.6 gallons (6.0 L) per flush</li> <li>C. 1.0 gallon (3.8 L) per flush</li> <li>D. 1.28 gallons (4.8 L) per flush</li> </ul> | <p>86. What is the maximum allowable gallon per minute that a public lavatory faucet is allowed to use?</p> <ul style="list-style-type: none"> <li>A. .5 gpm</li> <li>B. .25 gpm</li> <li>C. 3.5 gpm</li> <li>D. 1.6 gpm</li> </ul>  |
| <p>85. What is the maximum allowable gallon per flush that a blow out bowl is allowed to use?</p> <ul style="list-style-type: none"> <li>A. .5 gpf</li> <li>B. .25 gpf</li> <li>C. 3.5gpf</li> <li>D. 1.6 gpf</li> </ul>  | <p>87. Washington State requires all lavatory faucets located in restrooms intended for use by the general public to be equipped with what type of valve?</p> <ul style="list-style-type: none"> <li>A. Electronic</li> <li>B. Metering</li> <li>C. Solenoid</li> <li>D. No Requirement</li> </ul> |

88. How many exceptions are listed for section 407.4?
- A. 8
  - B. 4
  - C. 6
  - D. 2
89. What ICC are plumbing fixtures and fixture fittings for persons with disabilities required to comply with?
- A. ICC 112.18.9
  - B. A112.18.9
  - C. A18.106
  - D. A117.1
90. Wall-mounted urinals shall have an average water consumption not to exceed \_\_\_\_\_ gallons per flush.
- A. 0.128
  - B. 0.215
  - C. 0.125
  - D. 0.152
91. Commercial food service prerinse spray valves shall have a maximum flow rate of \_\_\_\_\_ per minute at 60 pounds-force per square inch (psi).
- A. 1.6 liters
  - B. 1.26 gallons
  - C. 1.6 gallons
  - D. 1.26 liters
92. How are the water supply and drain pipes under accessible lavatories used for persons with disabilities required to be installed?
- A. To protect against contact
  - B. Oversized
  - C. In a chase
  - D. Exposed
93. What is a commercial food service prerinse spray valve(s) required to be equipped with?
- A. An integral automatic shutoff
  - B. A flexible hose
  - C. A pressure relief fitting
  - D. All listed answers
94. What is the minimum weight requirement for sheet lead, which must also be coated with an asphalt paint or other approved coating?
- A. 3 lb/ft<sup>2</sup> (14.6 kg/m<sup>2</sup>)
  - B. 4 lb/ft<sup>2</sup> (19.5 kg/m<sup>2</sup>)
  - C. 5 lb/ft<sup>2</sup> (24.4 kg/m<sup>2</sup>)
  - D. 6 lb/ft<sup>2</sup> (29.3 kg/m<sup>2</sup>)
95. What is the specified method for joining sheet lead?
- A. Burning
  - B. Soldering
  - C. Welding
  - D. Riveting
96. Where does Washington direct one to look for the minimum number of plumbing fixtures required?
- A. Table 1401.01
  - B. Table 14.01
  - C. IMC Chapter 22
  - D. Building Code chapter 29
97. The maximum flow rate of residential lavatory faucets shall not exceed \_\_\_\_\_ per minute at 60 psi.
- A. 2.1 gallons
  - B. 1.2 gallons
  - C. 1.4 gallons
  - D. 1.1 gallons
98. A metered faucet allows \_\_\_\_\_ gallons to flow before it shuts off.
- A. 0.25
  - B. 0.23
  - C. 0.27
  - D. 25

**416.4 Location.** Emergency eyewash and shower equipment shall be located on the same level as the hazard and accessible for immediate use. The path of travel shall be free of obstructions and shall be clearly identified with signage.

**404.2 Overflows.** Where a fixture is provided with an overflow, the waste shall be so arranged that the standing water in the fixture cannot rise in the overflow when the stopper is closed or remain in the overflow when the fixture is empty. The overflow pipe from a fixture shall be connected on the house or inlet side of the fixture trap, except that overflow on flush tanks shall be permitted to discharge into the water closets or urinals served by them, but it shall be unlawful to connect such overflows with any other part of the drainage system.

**418.2 Strainer.** Floor drains shall be considered plumbing fixtures, and each such drain shall be provided with an approved-type strainer having a waterway equivalent to the area of the tailpiece. Floor drains, floor receptors, and shower drains shall be of an approved type, suitably flanged to provide a water-tight joint in the floor.

**402.10 Slip Joint Connections.** Fixtures having concealed slip joint connections shall be provided with an access panel or utility space not less than 12 inches (305 mm) in its least dimension and so arranged without obstructions as to make such connections accessible for inspection and repair.

**405.1 Prohibited Water Closets.** Water closets having an invisible seal or an unventilated space or having walls which are not thoroughly washed at each discharge shall be prohibited. A water closet that might permit siphonage of the contents of the bowl back into the tank shall be prohibited.

**405.2 Prohibited Urinals.** Trough urinals and urinals with an invisible seal shall be prohibited.

**WAC 51-56-414.3 Drainage Connection.** Domestic dishwashing machines shall discharge indirectly through an air gap fitting in accordance with Section 807.3 into a waste receptor, a wye branch fitting on the tailpiece of a kitchen sink, or dishwasher connection of a food waste disposer. Commercial dishwashing machines shall discharge indirectly through an air gap.

**404.1 Waste fittings.** Waste fittings shall comply with ASME A112.18.2/ CSA B125.2, ASTM F409 or Table 701.2 for above ground drainage piping and fittings.



### Exam Questions:

99. Where should emergency eyewash and shower equipment be located in relation to a hazard?

- A. In a separate building for safety reasons
- B. On the same level as the hazard and accessible for immediate use
- C. In a designated safety room one floor above
- D. At least 50 feet away from the hazard to ensure clear access

100. What is required for the path of travel to an emergency shower?

- A. It must be free of obstructions and clearly identified with signage
- B. It needs to be secured with a lock and key for safety reasons
- C. It should be blocked by caution tape to prevent accidental use
- D. It has to be at least 50 feet long to ensure facility security

**101. How should the waste be arranged in a fixture with an overflow?**

- A. It should permit standing water to rise in the overflow when the stopper is closed
- B. It should allow water to continuously flow into the overflow regardless of the stopper position
- C. It needs to be arranged so that standing water is always present in the overflow
- D. It should prevent standing water from rising in the overflow when the stopper is closed or remaining in the overflow when empty

**102. Where should the overflow pipe from a fixture be connected?**

- A. It must be connected directly to the main drainage system
- B. It should be connected on the house or inlet side of the fixture trap
- C. It should connect to any convenient part of the drainage system
- D. It should always discharge directly into the environment

**103. How should floor drains be classified according to the code?**

- A. Floor drains do not require any type of strainer
- B. Floor drains shall be considered electrical fixtures
- C. Floor drains shall not be considered plumbing fixtures
- D. Floor drains shall be considered plumbing fixtures

**104. What is a requirement for floor drains, floor receptors, and shower drains according to the code?**

- A. They must be installed without any flanges or seals
- B. They shall be of an approved type and suitably flanged to provide a water-tight joint in the floor
- C. They are not required to be water-tight
- D. They should be installed above the floor level without a flange

**105. Which type of water closets are prohibited according to the code?**

- A. Water closets equipped with automatic air fresheners and illuminated interiors
- B. Water closets with a visible seal and vented space, having walls thoroughly washed at each discharge
- C. Water closets with an invisible seal or unventilated space, or with walls not thoroughly washed at each discharge
- D. Water closets designed with dual-flush mechanisms and heated seats

**106. Which feature makes a water closet prohibited according to the code?**

- A. A design with an integrated bidet and heated seat
- B. A mechanism that uses a dual flush system for water conservation
- C. A tankless design that directly connects to the water supply
- D. A design that might permit siphonage of the contents of the bowl back into the tank

**107. What type of urinals are prohibited based on the code?**

- A. Water-efficient urinals with automatic flushing
- B. Trough urinals and urinals with an invisible seal
- C. Wall-mounted urinals with visible plumbing
- D. Porcelain urinals with manual flush handles

**108. How must commercial dishwashing machines discharge according to the WAC?**

- A. Indirectly through an air vent
- B. Directly into the drainage system
- C. Through a recirculating water system
- D. Indirectly through an air gap

**109. What must be provided for fixtures with concealed slip joint connections to ensure accessibility for inspection and repair?**

- A. A removable floor panel installed directly below the fixture
- B. An access panel or utility space not less than 12 inches (305 mm) in its least dimension, free of obstructions
- C. A certification tag indicating the construction date of the connections
- D. A visual indicator light showing the status of the connections



**402.6.1 Closet Rings (Closet Flanges).** Closet rings (closet flanges) for water closets or similar fixtures shall be of an approved type and shall be bronze, copper, hard lead, cast-iron, galvanized malleable iron, ABS, PVC, or other approved materials. Each such closet ring (closet flange) shall be approximately 7 inches (178 mm) in diameter and, where installed, shall, together with the soil pipe, present a 1 1/2 inch (38 mm) wide flange or face to receive the fixture gasket or closet seal.

Caulked-on closet rings (closet flanges) shall be not less than 1/4 of an inch (6.4 mm) thick and not less than 2 inches (51 mm) in overall depth.

Closet rings (closet flanges) shall be burned or soldered to lead bends or stubs, shall be caulked to cast-iron soil pipe, shall be solvent cemented to ABS and PVC, and shall be screwed or fastened in an approved manner to other materials.

Closet bends or stubs shall be cut off so as to present a smooth surface even with the top of the closet ring before rough inspection is called.

Closet rings (closet flanges) shall be adequately designed and secured to support fixtures connected thereto.

**402.1 Cleaning.** Plumbing fixtures shall be installed in a manner to afford easy access for repairs and cleaning. Pipes from fixtures shall be run to the nearest wall.

**402.4 Wall Hung Fixtures.** Wall-hung fixtures shall be rigidly supported by metal supporting members so that no strain is transmitted to the connections. Floor affixed for off-the-floor plumbing fixtures for public use shall comply with ASME A112.6.1M. Framing affixed supports for off the floor water closets with concealed tanks shall comply with ASME A112.6.2. Flush tanks and similar appurtenances shall be secured by approved non-corrosive screws or bolts.

**402.7 Supply Fittings.** The supply lines and fittings for every plumbing fixtures shall be so installed as to prevent backflow in accordance with chapter 6.



**405.3 Miscellaneous Fixtures.** Fixed wooden, or tile wash trays for domestic use shall not be installed in a building designed or used for human habitation. No sheet metal-lined wooden bathtub shall be installed or reconnected. No dry or chemical closet (toilet) shall be installed in a building used for a human habitation, unless first approved by the Health Officer.

**406.2 Special Use Sinks.** Restaurant kitchen and other special use sinks shall be permitted to be made of approved type bonderized and galvanized sheet steel of not less than an No. 16 U. S. gauge (0.0635 inches) (1.6 mm). Sheet-metal plumbing fixtures shall be adequately designed, constructed, and braced in an approved manner to accomplish their intended purpose.

**411.1 Application.** Water closets shall comply with a ASME A112.19.2/CSA B45.1, ASME A112.1 9.3/CSA B45.4, or CSA B45.5/IAMPO Z124. Water closet bowls for public use shall be of the elongated type. In nurseries, schools, and other similar places where plumbing fixtures are provided for the use of children less than 6 years of age, water closets shall be of a size and height suitable for children's use.

**411.3 Water Closet Seats.** Water closet seats shall be properly sized for the water closet bowl type, and shall be of smooth, non-absorbent materials. Seats, for public use, shall be of the elongated type and either of the open front type or have an automatic seat cover dispenser. Plastic seats shall comply with a IAPMO/ANSI Z124.5.

**407.3 Limitation of Hot Water Temperature for Public Lavatories.** Hot water delivered from public use lavatories shall be limited to a maximum temperature of 120°F (49°C). The maximum temperature shall be regulated by one of the following means:

- (1) A limiting device conforming to either ASSE 1070/ASME A 112.1070/CSA B125.70, or
- (2) A water heater conforming to ASSE 1084

**409.6 Bathtubs and Whirlpool Bathtubs:** A removable panel shall be provided to access and remove the pump. Whirlpool pump access located in the crawl space shall be located no more than twenty (20) feet (6,096 mm) from an access door, trap door, or crawl hole. The circulation pump shall be located above the crown weir of the trap. The pump and the circulation piping shall be self-draining to minimize water retention. Suction fittings on whirlpool bathtubs shall comply with ASME A112.19.7/CSA B45.10.

### Exam Questions:

**110. What type of water closet bowls are required for public use?**

- A. Square type
- B. Round type
- C. Compact type
- D. Elongated type

**111. Where are pipes from fixtures required to be run?**

- A. Perpendicular to the floor
- B. No special requirement
- C. Adjacent to the fixture
- D. To the nearest wall

**112. How should wall-hung fixtures be supported to prevent strain on the connections?**

- A. By using adhesive strips
- B. By attaching them directly to drywall
- C. By rigidly supporting them with metal supporting members
- D. By securing them with plastic hooks

**113. How should plumbing fixtures be installed to ensure proper access for maintenance?**

- A. In a manner to afford easy access for repairs and cleaning
- B. Directly against walls to maximize space utilization
- C. Below floor level to prevent interference with room aesthetics
- D. Encased in a sealed enclosure to minimize exposure to external elements

**114. The use of a dry or chemical type toilet is acceptable if approved by a \_\_\_\_\_.**

- A. Plumber
- B. BCD
- C. General Contractor
- D. Health officer

**115. What is the minimum gauge of metal that a specialized sink used for a restaurant is required to be made of?**

- A. 12
- B. 16
- C. 18
- D. 20

**116. What are the size and function of a closet ring (closet flange) in relation to the soil pipe and fixture gasket?**

- A. The closet ring should be approximately 7 inches in diameter and, with the soil pipe, present a 1½ inch wide flange to receive the fixture gasket or closet seal
- B. The closet ring should be approximately 5 inches in diameter and feature a 2 inch wide flange to support the fixture base
- C. The closet ring should be approximately 8 inches in diameter and sit flush with the floor for stability
- D. The closet ring should be approximately 6 inches in diameter and extend 3 inches above the floor level

**117. A Whirlpool pump located in a crawl space can be located no more than \_\_\_\_\_ from an access door.**

- A. 20
- B. 15
- C. 25
- D. 18



118. A flush tank is required to be connected using \_\_\_\_\_ resistant bolts or screws.

- A. Torque
- B. Strip
- C. Corrosion
- D. Moisture

119. The hot water in public use lavatories is required to be set to a maximum temperature of \_\_\_\_\_°F

- A. 120
- B. 134
- C. 160
- D. 100

120. All plumbing fixture supply lines must be installed to prevent \_\_\_\_\_.

- A. Air gaps
- B. Back wash
- C. Backflow
- D. All listed answers

121. What chapter of this code requires how fittings and supply lines are to be installed?

- A. 6
- B. 5
- C. 6
- D. 7

**402.6.3 Securing Floor-Mounted, Back-Outlet Water Closet Bowls.** Floor-mounted, back-outlet water closet bowls shall be set level with an angle of ninety (90) degrees (1.57 rad) between the floor and wall at the centerline of the fixture outlet. The floor and wall shall have a flat mounting surface not less than five (5) inches (127 mm) to the right and left of the fixture outlet centerline. The fixture shall be secured to the wall outlet flange or drainage connection and to the floor by corrosion-resistant screws or bolts. The closet flange shall be secured to a firm base. Where floor-mounted, back-outlet water closets are used, the soil pipe shall be not less than three (3) inches (80 mm) in diameter. Offset, eccentric, or reducing floor flanges shall not be used.

**WAC 51-56-0402.5 Setting.** Fixtures shall be set level and in proper alignment with reference to adjacent walls. No water closet or bidet shall be set closer than fifteen (15) inches (381 mm) from its center to any side wall or obstruction nor closer than thirty (30) inches (762 mm) center to center to any similar fixture. The clear space in front of any water closet or bidet shall be not less than twenty-four (24) inches (610 mm). No urinal shall be set closer than twelve (12) inches (305 mm) from its center to any side wall or partition nor closer than twenty-four (24) inches (610 mm) center to center.

#### EXCEPTIONS:

1. The clear space in front of a water closet, lavatory or bidet in dwelling units and sleeping units shall be not less than 21 inches (533mm).
2. The installation of paper dispensers or accessibility grab bars shall not be considered obstructions.

**402.8 Installation.** Fixtures shall be installed in accordance with the manufacturer's installation instructions.

#### 408.3 Individual Shower and Tub-Shower Combination

**Control Valves.** Showers and tub-shower combinations in buildings shall be provided with individual control valves of the pressure balance, thermostatic, or combination pressure balance/thermostatic mixing valve type that provide scald and thermal shock protection. These valves shall be installed at the point of use and comply with ASSE 1016/ASME A112 1016/CSA B125.16, or ASME A112.18.1/CSA B125.1.

**408.3.1 Gang Showers** Where gang showers are supplied with a single temperature-controlled water supply pipe, it shall be controlled by a mixing valve that conforms to ASSE 1069.

**412.2 Backflow Protection.** A water supply to a urinal shall be protected by an approved-type vacuum breaker or other approved backflow prevention device in accordance with Section 603.5.



**WAC 51-56-0408.2 Water Consumption.** Showerheads shall meet the maximum flow rate of 1.8 gallons (6.81 L) per minute measured at 80 psi. Showerheads shall be certified to the performance criteria of the U.S. EPA Water-Sense Specification for Showerheads.

**EXCEPTION:** Emergency use showers shall be exempt from the maximum water usage rates.

**WAC 51-56-0408.4 Waste Outlet.** Showers shall have a waste outlet and fixture tailpiece not less than two (2) inches (50 mm) in diameter. Fixture tailpieces shall be constructed from the materials specified in Section 701.2 for drainage piping. Strainers serving shower drains shall have a waterway at least equivalent to the area of the tailpiece.

**EXCEPTION:** In a residential dwelling unit where a 2 inch waste is not readily available and approval of the AHJ has been granted, the waste outlet, fixture tailpiece, trap and trap arm may be 1-1/2 inch when an existing tub is being replaced by a shower sized per Section 408.2. This exception only applies where one shower head rated at 1.8 gpm is installed.

**WAC 51-56-0418.3 Location of Floor Drains.** Floor drains shall be installed in the following areas:

1. Toilet rooms containing two (2) or more water closets or a combination of one (1) water closet and one (1) urinal, except in a dwelling unit. The floor shall slope toward the floor drains.
2. Laundry rooms in commercial buildings and common laundry facilities in multifamily dwelling buildings.

**418.5 Floor Slope.** Floors shall be sloped to floor drains.

**408.10 Water Supply Riser.** A water supply riser from the shower valve to the showerhead outlet, whether exposed or not, shall be securely attached to the structure.



### Exam Questions:

122. A floor mounted back-outlet water closet bowl is required to be set \_\_\_\_\_ degrees between the wall and floor at the centerline of the fixture outlet.
  - A. 45
  - B. 22.5
  - C. 30
  - D. 90
123. What type of bolts are required to be used when securing a floor-mounted, back-outlet water closet?
  - A. Grade 5
  - B. Stainless
  - C. Corrosion-resistant
  - D. All listed answers
124. The soil pipe for a floor mounted back outlet water closet cannot be less than \_\_\_\_\_ in diameter.
  - A. 1.5"
  - B. 2"
  - C. 2.5"
  - D. 3"
125. Showers and tub-shower scald and thermal shock protection valves that have a single temperature-controlled water supply pipe are required be controlled by a mixing valve that conforms to what ASSE?
  - A. 1069
  - B. 1065
  - C. 1067
  - D. 1697

126. When setting a water closet or bidet, it can be set no closer than \_\_\_\_\_ center to any side wall.
- A. 12 inches
  - B. 15 inches
  - C. 18 inches
  - D. 20 inches
127. If installing 3 water closets in parallel for a public restroom, they can be set no closer than \_\_\_\_\_ center to center.
- A. 18 inches
  - B. 24 inches
  - C. 25 inches
  - D. 30 inches
128. If installing multiple urinals on the same wall, they can be set no closer than \_\_\_\_\_ center to center.
- A. 18 inches
  - B. 16 inches
  - C. 24 inches
  - D. 20 inches
129. Vacuum breaks and Back flow descriptions can be found in section \_\_\_\_\_ of this code.
- A. 603.3
  - B. 602.4
  - C. 603.5
  - D. 306.3
130. In terms of installation, how should paper dispensers or accessibility grab bars be classified?
- A. They must be classified as potential hazards
  - B. They should be treated as temporary obstacles
  - C. They are to be considered permanent structural changes
  - D. They should not be considered obstructions
131. Showerheads are required to have a maximum flow rate of not more than \_\_\_\_\_ at 80 psi.
- A. 2 gpm
  - B. 1.8 gpm
  - C. 3 gpm
  - D. 1.5 gpm
132. Fixture tailpieces for drainage piping are required to be constructed from the materials specified in what section?
- A. 701.1
  - B. 710.2
  - C. 702.1
  - D. 711.2
133. A floor that contains a drain is required to be \_\_\_\_\_.
- A. Sloped
  - B. Level
  - C. Angled
  - D. Perpendicular
134. What is the minimum diameter for a shower waste outlet and fixture tailpiece?
- A. 2 mm
  - B. 2 inches
  - C. 2.5 inches
  - D. 3 mm

**WAC 51-56-0501.1 Applicability.** The regulations of this chapter shall govern the construction, location, and installation of fuel burning and other types of water heaters heating potable water. The minimum capacity for water heaters shall be in accordance with the first hour rating listed in Table 501.1(2). See the Mechanical Code for combustion air and installation of all vents and their connectors. No water heater shall be hereinafter installed that does not comply with the manufacturer's installation instructions and the type and model of each size thereof approved by the authority having jurisdiction. A list of accepted water heater appliance standards is referenced in Table 501(2). Listed appliances shall be installed in accordance with the manufacturer's installation instructions. Unlisted water heaters shall be permitted in accordance with Section 504.3.2.

**TABLE 501.11,3**

Number of Bathrooms	1 to 1.5			2 to 2.5				3 to 3.5			
Number of Bedrooms	1	2	3	2	3	4	5	3	4	5	6
First Hour Rating <sup>2</sup> , Gallons	38	49	49	49	62	62	74	62	74	74	74

**Notes:** 1) The first hour rating is found on the "Energy Guide" label.

2) Nonstorage and solar water heaters shall be sized to meet the appropriate first hour rating as shown in the table, and shall be capable of delivering hot water at the maximum system demand flow, as calculated in Section 610.0 or Appendix A, as applicable.

3) For replacement water heaters, see Section 102.4.

**WAC 51-56-0504.1 Location.** Water heater installation in bedrooms and bathrooms shall comply with one of the following:

- (1) Fuel-burning water heaters may be installed in a closet located in the bedroom or bathroom provided the closet is equipped with a listed, gasketed door assembly and a listed self-closing device. The self-closing door assembly shall meet the requirements of Section 504.1.1. The door assembly shall be installed with a threshold and bottom door seal and shall meet the requirements of Section 504.1.2. All combustion air for such installations shall be obtained from the outdoors in accordance with the International Mechanical Code. The closet shall be for the exclusive use of the water heater.
- (2) Water heater shall be of the direct vent type.

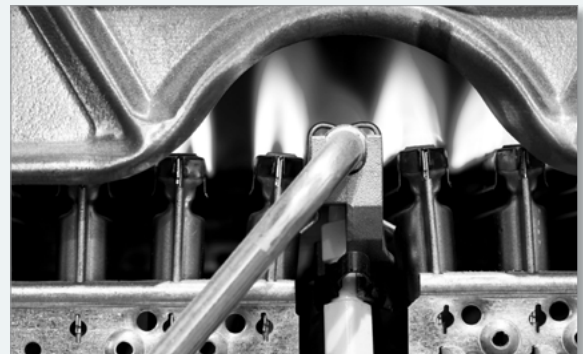
**WAC 51-56-0505.2 Safety Devices.** All storage-type water heaters deriving heat from fuels or types of energy other than gas, shall be provided with, in addition to the primary temperature controls, an over-temperature safety protection device constructed, listed, and installed in accordance with nationally recognized applicable standards for such devices and a combination temperature and pressure relief valve.

**WAC 51-56-0506.0 Combustion Air.** For issues relating to combustion air, see the Mechanical Code.

Sections 506.1 through 506.9 are not adopted.

Sections 507.6 through 507.9 are not adopted.

**WAC 51-56-0507.2 Seismic Provisions.** Water heaters shall be anchored or strapped to resist horizontal displacement due to earthquake motion. Strappings shall be at points within the upper one-third and lower one-third of its vertical



dimensions. At the lower point, a distance of not less than four (4) inches (102 mm) shall be maintained from the controls to the strapping.

**WAC 51-56-0507.13 Installation in Garages.** Appliances in garages and in adjacent spaces that open to the garage and are not part of the living space of a dwelling unit shall be installed so that burners, burner-ignition devices and ignition sources are located not less than eighteen (18) inches above the floor unless listed as flammable vapor ignition resistant.

### Exam Questions:

135. How far off the ground does a water heater installed in a garage have to be if not listed as flammable vapor ignition resistant?
- A. 24 inches
  - B. 20 inches
  - C. 16 inches
  - D. 18 inches
136. What code does Washington defer for issues relating to combustion air?
- A. The UPC
  - B. Washington Building Code
  - C. The Mechanical Code
  - D. The Residential code
137. What section should be referenced for the replacement of water heaters?
- A. 501.1
  - B. 505.1.2
  - C. 104.2
  - D. 102.4
138. Why does Washington state require water heaters to be anchored or strapped?
- A. To resist horizontal displacement
  - B. Prevent a tipping hazard
  - C. Thermal transfer
  - D. All listed answers
139. What section are self-closing door assemblies required to meet that contain a water heater?
- A. 505.1.1
  - B. 505.1.2
  - C. 104.2
  - D. 102.4
140. What table shows the minimum capacity for a water heater first hour rating?
- A. 14-1
  - B. 501.1
  - C. 511.1
  - D. 14-3
141. What are all storage-type water heaters deriving heat from fuels or types of energy other than gas required to have in addition to the primary temperature controls?
- A. A restrictor plate to regulate flow
  - B. An over-temperature safety protection device
  - C. Manual override
  - D. An electronic overload relay
142. Unlisted water heaters are permitted if installed in accordance to what section?
- A. 14-1
  - B. 505.1.2
  - C. 504.3.2
  - D. 14-3
143. What type of vent is a water heater installed in a closet required to have?
- A. Combination vent
  - B. Indirect vent
  - C. Direct vent
  - D. No such requirement



**WAC 51-56-0601.1 Applicability.** This chapter shall govern the materials, design and installation of water supply systems, including backflow prevention devices, assemblies and methods used for backflow prevention.

**WAC 51-56-0603.1 General.** Cross-connection control shall be provided in accordance with the provisions of this chapter. Devices or assemblies for protection of the public water system must be models approved by the department of health under WAC 246-290-490. The authority having jurisdiction shall coordinate with the local water purveyor where applicable in all matters concerning cross-connection control within the property lines of the premises. No person shall install any water operated equipment or mechanism, or use any water treating chemical or substance, if it is found that such equipment, mechanism, chemical or substance may cause pollution or contamination of the domestic water supply. Such equipment or mechanism may be permitted only when equipped with an approved backflow prevention device or assembly.



**WAC 51-56-0603.2 Approval of Devices or Assemblies.** Before any device or assembly is installed for the prevention of backflow, it shall have first been approved by the authority having jurisdiction. Devices or assemblies shall be tested for conformity with recognized standards or other standards acceptable to the authority having jurisdiction. Backflow prevention devices and assemblies shall comply with Table 603.2, except for specific applications and provisions as stated in Section 603.5.1 through 603.5.21. All devices or assemblies installed in a potable water supply system for protection against backflow shall be maintained in good working condition by the person or persons having control of such devices or assemblies. Such devices or assemblies shall be tested in accordance with Section 603.4.2 and WAC 246-290-490. If found to be defective or inoperative, the device or assembly shall be replaced or repaired. No device or assembly shall be removed from use or relocated or other device or assembly substituted, without the approval of the authority having jurisdiction. Testing shall be performed by a Washington state department of health certified backflow assembly tester.

**WAC 51-56-0603.4.2 Testing.** For devices and assemblies other than those regulated by the Washington department of health in conjunction with the local water purveyor for the protection of public water systems, the authority having jurisdiction shall ensure that the premise owner or responsible person shall have the backflow prevention assembly tested by a Washington state department of health certified backflow assembly tester:

- (1) At the time of installation, repair or relocation; and
- (2) At least on an annual schedule thereafter, unless more frequent testing is required by the authority having jurisdiction.



**WAC 51-56-0603.5.6 Protection from Lawn Sprinklers and Irrigation Systems.** Potable water supplies to systems having no pumps or connections for pumping equipment, and no chemical injection or provisions for chemical injection, shall be protected from backflow by one of the following:

- (1) Atmospheric vacuum breaker (AVB).
- (2) Pressure vacuum breaker backflow prevention assembly (PVB).
- (3) Spill-resistant pressure vacuum breaker (SVB).
- (4) Reduced pressure principle backflow prevention assembly (RP).

- (5) A double check valve backflow prevention assembly (DC) may be allowed when approved by the water purveyor and the authority having jurisdiction.

**WAC 51-56-0603.5.10 Steam or Hot Water Boilers.** Potable water connections to steam or hot water boilers shall be protected by an air gap or a reduced pressure principle backflow preventer.

**WAC 51-56-0603.5.12 Beverage Dispensers.** Potable water supply to carbonators shall be protected by a listed reduced pressure principle backflow preventer as approved by the authority having jurisdiction for the specific use. The backflow preventer shall be located in accordance with Section 603.4.3. The piping downstream of the backflow preventer shall not be of copper, copper alloy, or other material that is affected by carbon dioxide.

**WAC 51-56-0608.5 Discharge Piping.** The discharge piping serving a temperature relief valve, pressure relief valve or combination of both shall have no valves, obstructions or means of isolation and be provided with the following:

- (1) Not less than the size of the valve outlet and shall discharge full size to the flood level of the area receiving the discharge and pointing down.
- (2) Materials shall be rated at not less than the operating temperature of the system and approved for such use or shall comply with ASME A112.4.1. Materials shall be straight, rigid lengths only, without coils or flexes.
- (3) Discharge pipe shall discharge independently by gravity through an air gap into the drainage system or outside of the building with the end of the pipe not exceeding 2 feet (610 mm) and not less than 6 inches (152 mm) above the ground pointing downwards.
- (4) Discharge in such a manner that does not cause personal injury or structural damage.
- (5) No part of such discharge pipe shall be trapped or subject to freezing.
- (6) The terminal end of the pipe shall not be threaded.
- (7) Discharge from a relief valve into a water heater pan shall be prohibited.
- (8) The discharge termination point shall be readily observable.

**EXCEPTION:** Where no drainage was provided, replacement water heating equipment shall only be required to provide a drain pointing downward from the relief valve to extend between two (2) feet (610 mm) and six (6) inches (152 mm) from the floor. No additional floor drain need be provided.



### Exam Questions:

144. What chapter should be referenced for information regarding methods used for backflow prevention?

- A. 8
- B. 9
- C. 6
- D. 7

145. What Washington State entity approves devices or assemblies for the protection of public water systems?

- A. Labor and Industries
- B. Department of Health
- D. Washington State Plumbing Board
- D. Washington State Building Code Council

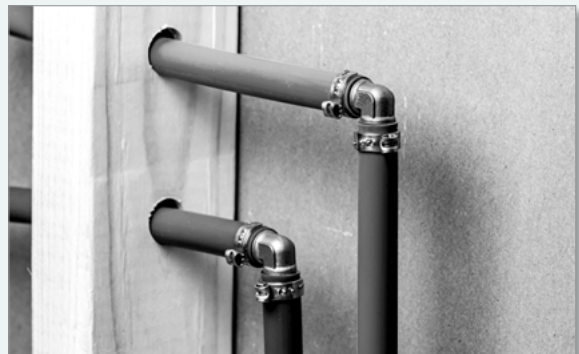


146. What needs to be used if contamination of the domestic water supply might occur?
- A. Backflow retarder
  - B. Check Valve
  - C. Ball Valve
  - D. Backflow prevention device
147. In Washington State, who tests devices or assemblies installed in the potable water supply system for protection against backflow?
- A. Washington State Building Code Council
  - B. Labor and Industries
  - C. Certified backflow assembly tester
  - D. Washington State Plumbing Board
148. True or False? No devices or assemblies other than those regulated by the Washington department of health in conjunction with the local water purveyor for the protection of public water systems shall be used.
- A. True
  - B. False
149. Where are backflow prevention devices with atmospheric ports NOT allowed to be installed?
- A. Submerged locations
  - B. Underground
  - C. Pits
  - D. All Listed answers
150. How many different methods of back flow prevention are listed when installing lawn sprinkler and Irrigation Systems?
- A. 1
  - B. 5
  - C. 4
  - D. 3
151. What type of backflow preventer does Washington State allow to be connected to a steam boiler?
- A. Pressure vacuum breaker backflow prevention
  - B. Spill-resistant pressure vacuum breaker
  - C. A double check valve backflow prevention assembly
  - D. A reduced pressure principle
152. Where is the backflow preventer that protects the potable water supply to carbonators required to be located?
- A. In accordance with Section 603.4.3
  - B. In an accessible location
  - C. In a readily accessible location
  - D. Backflow preventers are not required with carbonators
153. The discharge termination point shall be readily\_\_\_\_\_.
- A. Accessible
  - B. Movable
  - C. Observable
  - D. All listed answers

**WAC 51-56-0604.14 Plastic Pipe Termination.** Plastic water service piping may terminate within a building, provided the connection to the potable water distribution system shall be made as near as is practical to the point of entry and shall be accessible. Barbed insert fittings with hose clamps are prohibited as a transition fitting within the building.

**WAC 51-56-0609.11 Insulation of Potable Water Piping.** Domestic water piping within commercial buildings shall be insulated in accordance with Section C403.2.8 and Table C403.2.8 or Section C404.6 of the Washington State Energy Code, as applicable.

**WAC 51-56-0610.4 Sizing Water Supply and Distribution Systems.** Systems within the range of Table 610.4 may be sized from that table or by the method set forth in Section 610.5. Listed parallel water distribution systems shall be installed in accordance with their listing.



**WAC 51-56-0611.1 Application.** Drinking water treatment units shall comply with NSF 42 or NSF 53. Water softeners shall comply with NSF 44. Ultraviolet water treatment systems shall comply with NSF 55. Reverse osmosis drinking water treatment systems shall comply with NSF 58. Drinking water distillation systems shall comply with NSF 62. The owner of a building that serves potable water to twenty-five or more people at least sixty or more days per year and that installs drinking water treatment units including, but not limited to, the treatment units in Section 611.1, may be regulated (as a Group A public water system) by the Washington state department of health under chapter 246-290 WAC. See Washington state department of health publication 331-488 for guidance.

**WAC 51-56-0612.1 General.** Where residential fire sprinkler systems are installed, they shall be installed in accordance with the International Building Code or International Residential Code.

### Exam Questions:

154. Where is the connection of plastic water service piping within a building to the potable water distribution system required to be made?
  - A. Made at the farthest connection point.
  - B. In an accessible location
  - C. In a vault
  - D. At the street
155. Barbed insert fittings with hose clamps are \_\_\_\_\_ as a transition fitting within the building.
  - A. Prohibited
  - B. Allowed
  - C. Encouraged
  - D. Used
156. What NSF are water softener systems required to comply with?
  - A. 55
  - B. 44
  - C. 62
  - D. 58
157. What NSF are ultraviolet water treatment systems required to comply with?
  - A. 58
  - B. 44
  - C. 62
  - D. 55
158. What NSF are drinking water distillation systems required to comply with?
  - A. 62
  - B. 44
  - C. 68
  - D. 55
159. What NSF are drinking water treatment units required to comply with?
  - A. 68 or 44
  - B. 42 or 53
  - C. 55
  - D. 58
160. What code should be referenced when insulating domestic water piping within commercial buildings?
  - A. 2015 UPC
  - B. WAC 51-56-0403.2.8
  - C. Amended Chapters of the 2015 Building Code
  - D. Washington State Energy Code
161. True or False? Listed parallel water distribution systems shall be installed in accordance with their internal flow rates.
  - A. True
  - B. False

162. What NSF are reverse osmosis drinking water treatment systems required to comply with?

- A. 44
- B. 55
- C. 62
- D. 58

163. How many different codes can be followed when installing residential fire sprinkler systems in Washington State?

- A. 1
- B. 3
- C. 2
- D. There are no requirements

**WAC 51-56-0701.2 Drainage Piping.** Materials for drainage piping shall be in accordance with one of the referenced standards in Table 701.1 except that:

- (1) No galvanized wrought-iron or galvanized steel pipe shall be used underground and shall be kept not less than 6 inches (152 mm) aboveground.
- (2) ABS and PVC DWV piping installations shall be installed in accordance with applicable standards in Table 1701.1. Except for individual single family dwelling units, materials exposed within ducts or plenums shall have a maximum flame-spread index of 25 and a maximum smoke developed index of 50, when tested in accordance with ASTM E-84 and UL 723.
- (3) No vitrified clay pipe or fittings shall be used aboveground or where pressurized by a pump or ejector. They shall be kept not less than 12 inches (305 mm) belowground.
- (4) Copper tube for drainage and vent piping shall have a weight of not less than that of copper drainage tube type DWV.
- (5) Stainless steel 304 pipe and fittings shall not be installed underground and shall be kept not less than 6 inches (152 mm) aboveground.
- (6) Cast-iron soil pipe and fittings shall be listed and tested in accordance with standards referenced in Table 1701.1. Such pipe and fittings shall be marked with country of origin and identification of the original manufacturer in addition to markings required by referenced standards.



**701.3.1 Screwed Pipe.** Fittings on screwed pipe shall be of the recessed drainage type. Burred ends shall be reamed to the full bore of the pipe.

**701.3.2 Threads.** The threads of drainage fittings shall be tapped so as to allow 1/4 inch per foot (20.8 mm/m) grade.

**701.3.3 Type.** Fittings used for drainage shall be of the drainage type, have a smooth interior water-way, and be constructed so as to allow 1/4 inch per foot (20.8 mm/m) grade.

**701.5 Lead.** (See Chapter 17) Sheet lead shall comply with the following:

- (1) For safe pans – not less than 4 pounds per square foot lb/ft<sup>2</sup> (19 kg/m<sup>2</sup>) or 1/16 of an inch (1.6 mm) thick.
- (2) For flashings or vent terminals – not less than 3 lb/ft<sup>2</sup> (15 kg/m<sup>2</sup>) or 0.0472 of an inch (1.1989 mm) thick.
- (3) Lead bends and lead traps shall be not less than 1/8 of an



inch (3.2 mm) wall thickness.

**703.2 Maximum number of fixture units.** Table 703.2 shows the maximum number of fixture units allowed on a vertical or horizontal drainage pipe, building drain, or building sewer of a given size; the maximum number of fixture units allowed on a branch interval of a given; and the maximum length (in feet and meters) of a vertical drainage pipe of a given size.

### Exam Questions:

**164. What is the minimum height Galvanized steel pipe can be installed above ground?**

- A. 4 inches
- B. 12 inches
- C. 6 inches
- D. 7 inches

**165. In a single-family dwelling, PVC pipe exposed in a duct is required to have a maximum flame-spread index of?**

- A. 35
- B. 50
- C. 20
- D. 25

**166. What is the minimum depth vitrified clay pipe is to be buried when connected to a pump?**

- A. 14 inches
- B. 12 inches
- C. 10 inches
- D. No Requirement

**167. What is the minimum height Stainless steel 304 pipe can be installed above ground?**

- A. 7 inches
- B. 12 inches
- C. 4 inches
- D. 6 inches

**168. What table in the UPC are Cast-iron soil pipe and fittings required to be listed?**

- A. 701.5
- B. 701.4
- C. 1701.1
- D. 702.1

**169. The fittings on screwed drainage pipe are required to be of the \_\_\_\_\_.**

- A. Recessed drainage type
- B. Smooth Bore type
- C. Corrosion resistant type
- D. Fiberglass reinforced type

**170. Threaded Drainage fittings are required to be tapped to allow \_\_\_\_\_ per foot grade.**

- A. 5/8"
- B. 1/4 "
- C. 1/8"
- D. No Requirement

**171. What is the minimum thickness the lead for making a safe pan can be?**

- A. 1/4 "
- B. 1/8 "
- C. 1/32 "
- D. 1/16"

**172. Table 703.2 shows the maximum number of fixture units allowed on a vertical or horizontal \_\_\_\_\_.**

- A. All listed answers
- B. Drainage pipe
- C. Building drain
- D. Building sewer

**WAC 51-56-0704.3 Commercial Sinks.** Except where specifically required to be connected indirectly to the drainage system, or when first approved by the authority having jurisdiction, all plumbing fixtures, drains, appurtenances, and appliances shall be directly connected to the drainage system of the building or premises.

**705.1.2 Solvent Cement Joints.** Solvent cement joints for ABS pipe and fittings shall be clean from dirt and moisture. Pipe shall be cut square and shall be deburred. Where surfaces to be joined are cleaned and free of dirt, moisture, oil, and other foreign material, solvent cement in accordance with ASTM D 2235 shall be applied to all joint surfaces. Joints shall be made while both the inside socket surface and outside surface of pipe are wet with solvent cement. Hold joint in place and undisturbed for 1 minute after assembly.



**705.1.3 Threaded Joints.** Threads shall comply with ASME B1.20.1. A minimum of Schedule 80 shall be permitted to be threaded. Molded threads on adapter fittings for transition to threaded joints shall be permitted. Thread sealant compound shall be applied to male threads, insoluble in water, and nontoxic. The joint between the pipe and transition fitting shall be of the solvent cement type. Caution shall be used during assembly to prevent over tightening of the ABS components once the thread sealant compound has been applied.

**705.3.1 Brazed Joints.** Brazed joints between brass pipe and fittings shall be made with brazing alloys having a liquid temperature above 1000°F (538°C). The joint surfaces to be brazed shall be cleaned bright by either manual or mechanical means. Pipe shall be cut square and reamed to full inside diameter. Brazing flux shall be applied to the joint surfaces where required by manufacturer's recommendation. Brazing filler metal in accordance with AWS A5.8 shall be applied at the point where the pipe or tubing enters the socket of the fitting.

**705.3.2 Mechanical Joints.** Mechanical joints in copper or copper alloy piping shall be made with a mechanical coupling with grooved end piping or approved joint designed for the specific application .

**705.3.4 Threaded Joints.** Threaded joints shall be made with pipe threads in accordance with ASME B1.20.1. Thread sealant tape or compound shall be applied only on male threads, and such material shall be of approved types, insoluble in water, and nontoxic.

**705.3.1 Brazed Joints.** Brazed joints between copper or copper alloy pipe and fittings shall be made with brazing alloys having a liquid temperature above 1000°F (538°C). The joint surfaces to be brazed shall be cleaned bright by either manual or mechanical means. Piping shall be cut square and reamed to full inside diameter. Brazing flux shall be applied to the joint surfaces where required by manufacturer's recommendation. Brazing filler metal in accordance with AWS A5.8 shall be applied at the point where the pipe or tubing enters the socket of the fitting.

**705.3.3 Soldered Joints.** Soldered joints between copper pipe and fittings shall be made in accordance with ASTM B 828 with the following sequence of joint preparation and operation as follows: measuring and cutting, reaming, cleaning, fluxing, assembly and support, heating, applying the solder, cooling, and cleaning. Pipe shall be cut square and reamed to the full inside diameter including the removal of burrs on the outside of the pipe. Surfaces to be joined shall be cleaned bright by manual or mechanical means. Flux shall be applied to pipe and fittings and shall be in accordance with ASTM B 813, and shall become noncorrosive and nontoxic after soldering. Insert pipe into the base of the fitting and remove excess flux. Pipe and fitting shall be supported to ensure a uniform capillary space around the joint. Heat shall be applied using an air or fuel torch with the flame perpendicular





to the pipe using acetylene or an LP gas. Preheating shall depend on the size of the joint. The flame shall be moved to the fitting cup and alternate between the pipe and fitting. Solder in accordance with ASTM B 32 shall be applied to the joint surfaces until capillary action draws the molten solder into the cup. Joint surfaces shall not be disturbed until cool and any remaining flux residue shall be cleaned.

### Exam Questions:

- 173. How are commercial sinks in Washington required to be connected to the drainage system of a building or premises?**
- A. Indirectly
  - B. Directly
  - C. With an air gap
  - D. No requirement
- 174. What are the mechanical joints in copper alloy piping required to be made with?**
- A. Mechanical Coupling
  - B. Solid Rubber gasket
  - C. Expandable Coupling
  - D. Irreversible Threads
- 175. How long are you required to leave ABS joints undisturbed after they are glued?**
- A. 1 Minute
  - B. 20 Minutes
  - C. 5 Minutes
  - D. There are no time requirements
- 176. What is the minimum schedule that ABS threaded fittings can be made from?**
- A. 40
  - B. 80
  - C. 60
  - D. 20
- 177. What is the minimum listed temperature for liquid brazing alloys?**
- A. 900°C
  - B. 538°F
  - C. 1000°F
  - D. 500-550°F
- 178. If using thread sealant compound for brass fittings, the compound can only be placed on the \_\_\_\_\_.**
- A. Sealant compound cannot be used for brass fittings
  - B. Female End
  - C. Coupling
  - D. Male threads
- 179. Brazing filler metal should be applied where the pipe enters the \_\_\_\_\_.**
- A. Socket of the fitting
  - B. Valve Body
  - C. Fixture
  - D. Hand Valve
- 180. What ASTM B are you required to reference for soldered joints between copper pipe and fittings?**
- A. 728
  - B. 813
  - C. 32
  - D. 828
- 181. What ASTM B are you required to reference for Flux applied to pipe and fittings?**
- A. 813
  - B. 828
  - C. 32
  - D. 728
- 182. What ASTM B are you required to reference for solder used with copper pipe and fittings?**
- A. 828
  - B. 32
  - C. 813
  - D. 728



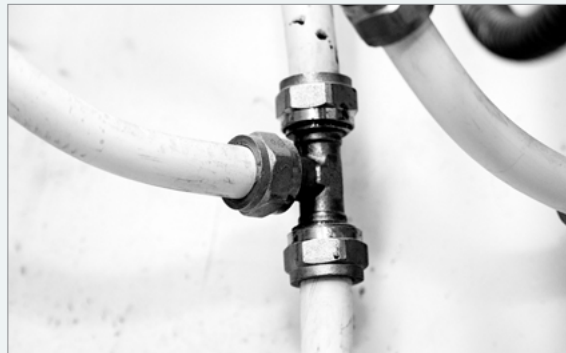
**705.4 Galvanized Steel Pipe and Joints.** Joining methods for galvanized steel pipe and fittings shall be installed in accordance with the manufacturer's installation instructions and shall comply with Section 705.6.1 and Section 705.6.3.

**705.4.1 Mechanical Joints.** Mechanical joints shall be made with an elastomeric gasket.

**705.4.2 Threaded Joints.** Threaded joints shall be made with pipe threads in accordance with ASME B1.20.1. Thread sealant tape or compound shall be applied only on male threads, and such material shall be of approved types, insoluble in water, and nontoxic.

**705.6.1 Mechanical Joints.** Mechanical joints shall be designed to provide a permanent seal and shall be of the mechanical or push-on joint type. The push-on joint shall include an elastomeric gasket in accordance with ASTM D 3212 and shall provide a compressive force against the spigot and socket after assembly to provide a permanent seal.

**705.6.2 Solvent Cement Joints.** Solvent cement joints for PVC pipe and fittings shall be clean from dirt and moisture. Pipe shall be cut square and pipe shall be deburred. Where surfaces to be joined are cleaned and free of dirt, moisture, oil, and other foreign material, apply primer purple in color in accordance with ASTM F 656. Primer shall be applied until the surface of the pipe and fitting is softened. Solvent cements in accordance with ASTM D 2564 shall be applied to all joint surfaces. Joints shall be made while both the inside socket surface and outside surface of pipe are wet with solvent cement. Hold joint in place and undisturbed for 1 minute after assembly.



**705.10.2 Copper or Copper Alloy Pipe to Threaded Pipe Joints.** Joints from copper or copper alloy pipe or tubing to threaded pipe shall be made by the use of a listed copper alloy adapter or dielectric fitting. The joint between the copper or copper alloy pipe and the fitting shall be a soldered or brazed, and the connection between the threaded and the fittings shall be made with a standard pipe size threaded joint.

## **706.0 Changes in Direction of Drainage Flow.**

**706.1 Approved Fittings.** Changes in direction of drainage piping shall be made by the appropriate use of approved fittings and shall be of the angles presented by a one-sixteenth bend, one-eighth bend, or one-sixth bend, or other approved fittings of equivalent sweep.

**706.2 Horizontal to Vertical.** Horizontal drainage lines, connecting with a vertical stack, shall enter through 45 degree (0.79 rad) wye branches, 60 degree (1.05 rad) wye branches, combination wye and one-eighth bend branches, sanitary tee or sanitary tapped tee branches, or other approved fittings of equivalent sweep. No fitting having more than one inlet at the same level shall be used unless such fitting is constructed so that the discharge from one inlet cannot readily enter any other inlet. Double sanitary tees shall be permitted to be used where the barrel of the fitting is not less than two pipe sizes larger than the largest inlet, (pipe sizes recognized for this purpose are 2 inches, 2 1/2 inches, 3 inches, 3 1/2 inches, 4 inches, 4 1/2 inches, 5 inches, 6 inches, etc.) (50, 65, 80, 90, 100, 115, 125, 150 mm, etc.).

## **707.0 Cleanouts.**

**707.1 Plug.** Each cleanout fitting for cast-iron pipe shall consist of a cast-iron or brass body and an approved plug. Each cleanout for galvanized wrought-iron, galvanized steel, copper, or brass pipe shall consist of a brass plug as specified in Table 707.1, or a standard weight brass cap, or an approved ABS or PVC plastic plug, or an approved stainless steel cleanout or plug. Plugs shall have raised square heads or approved countersunk rectangular slots.

**707.3 Watertight and Gastight.** Cleanouts shall be designed to be watertight and gastight.

**WAC 51-56-0707.4 Location.** Each horizontal drainage pipe shall be provided with a cleanout at its upper terminal, and each run of piping, that is more than 100 feet (30 480 mm) in total developed length, shall be provided with a cleanout for each 100 feet (30 480 mm), or fraction thereof, in length of such piping. An additional cleanout shall be provided in a drainage line for each aggregate horizontal change of direction exceeding 135 degrees (2.36 rad).

**EXCEPTIONS:**

1. Cleanouts shall be permitted to be omitted on a horizontal drain line less than 5 feet (1,524 mm) in length unless such line is serving sinks or urinals.
2. Cleanouts shall be permitted to be omitted on a horizontal drainage pipe installed on a slope of 72 degrees (1.26 rad) or less from the vertical angle (one-fifth bend).
3. Except for the building drain, its horizontal branches, and urinals, a cleanout shall not be required on a pipe or piping that is above the floor level of the lowest floor of the building.
4. An approved type of two-way cleanout fitting, installed inside the building wall near the connection between the building drain and the building sewer or installed outside of a building at the lower end of a building drain and extended to grade, shall be permitted to be substituted for an upper terminal cleanout.



### Exam Questions:

**183. Galvanized Steel Pipe and Joints are required to be joined by \_\_\_\_\_.**

- A. 705.6.3
- B. 705.6.1
- C. The Manufacturer's instructions
- D. All listed answers

**184. What ASTM are you required to reference for pipe threads and fittings used with galvanized steel pipe?**

- A. 32
- B. 813
- C. B1.20.1
- D. 728

**185. A push-on joint for PVC pipe should provide \_\_\_\_\_.**

- A. Easy Access
- B. A permanent seal
- C. An attachment point
- D. All listed answers

**186. PVC joint primer is required to comply with \_\_\_\_\_.**

- A. ASTM F 656
- B. ASME B1.20.1
- C. ASTM B 813
- D. ASTM D 3212

**187. What type of fitting should be used to join copper pipe to threaded pipe joints?**

- A. Dielectric
- B. Expansion
- C. Push on
- D. All listed answers

**188. If changing the direction of drainage piping, the fittings are required to be of what listed standard bend angles?**

- A. One-sixth
- B. One-sixteenth
- C. One-eighth
- D. All Listed answers

189. When connecting a horizontal drainage line to a vertical stack, a double sanitary tee can be used where the barrel of the fitting is not less than \_\_\_\_\_ pipe size(s) larger than the largest inlet.

- A. One
- B. Two
- C. Three
- D. No such Requirement

190. What table should you reference to determine the plug needed for a galvanized wrought-iron cleanout?

- A. 707.4
- B. 607.1
- C. 707.1
- D. 706.1

191. Cleanouts are required to be?

- A. B and C
- B. Gas Tight
- C. Watertight
- D. Pressure activated

192. A horizontal drainage pipe is required to have a cleanout at its upper terminal, and each run of piping, that is more than \_\_\_\_\_ feet.

- A. 25
- B. 50
- C. 135
- D. 100

**707.5 Cleaning.** Each cleanout shall be installed so that it opens to allow cleaning in the direction of flow of the soil or waste or at right angles thereto and, except in the case of wye branch and end-of-line cleanouts, shall be installed vertically above the flow line of the pipe.

**WAC 51-56-0707.9 Clearance.** Each cleanout in piping 2 inches (50 mm) or less in size shall be so installed that there is a clearance of not less than 12 inches (457 mm) in front of the cleanout. Cleanouts in piping exceeding 2 inches (50 mm) shall have a clearance of not less than 18 inches (610 mm) in front of the cleanout. Cleanouts in under-floor piping shall be extended to or above the finished floor or shall be extended outside the building where there is less than 18 inches (457 mm) vertical overall, allowing for obstructions such as ducts, beams, and piping, and 30 inches of (762 mm) horizontal clearance from the means of access to such cleanout. No under-floor cleanout shall be located exceeding 20 feet (1,524 mm) from an access door, trap door, or crawl hole.

### 708.0 Grade of Horizontal Drainage Piping.

**708.1 General.** Horizontal drainage piping shall be run in practical alignment and a uniform slope of not less than 1/4 inch per foot (20.8 mm/m) or 2 percent toward the point of disposal provided that, where it is impractical due to the depth of the street sewer, to the structural features, or to the arrangement of a building or structure to obtain a slope of 1/4 inch per foot (20.8 mm/m) or 2 percent, such pipe or piping 4 inches (100 mm) or larger in diameter shall be permitted to have a slope of not less than 1/8 inch per foot (10.4 mm/m) or 1 percent, where first approved by the Authority Having Jurisdiction.



**710.1 Backflow Protection.** Fixtures installed on a floor level that is lower than the next upstream manhole cover of the public or private sewer shall be protected from back-flow of sewage by installing an approved type of backwater valve. Fixtures on such floor level that are not below the next upstream manhole cover shall not be required to be protected by a backwater valve. Fixtures on floor levels above such elevation shall not discharge through the backwater valve. Cleanouts for drains that pass through a backwater valve shall be clearly identified with a permanent label stating "backwater valve downstream".

**710.4 Discharge line.** The discharge line from such ejector, pump, or other mechanical device shall be of an approved pressure rated material and be provided with an accessible backwater or swing check valve and gate

or ball valve. Where the gravity drainage line to which such discharge line connects is horizontal, the method of connection shall be from the top through a wye branch fitting. The gate or ball valve shall be located on the discharge side of the backwater or check valve.

### Exam Questions:

- 193. True or False? A cleanout shall be installed so that it opens to allow cleaning in the direction of flow.**
- A. True
  - B. False
- 194. What is the minimum clearance a cleanout in piping of 2 inches or less can have in front of the cleanout for access?**
- A. 12 inches
  - B. 18 inches
  - C. 24 inches
  - D. No such Requirement
- 195. What is the minimum clearance a cleanout in piping exceeding 2 inches can have in front of the cleanout for access?**
- A. 2 inches
  - B. 18 inches
  - C. 24 inches
  - D. 12 inches
- 196. What is the maximum distance from an access hole that an under-floor cleanout can be located?**
- A. 15 feet
  - B. 10 feet
  - C. 30 feet
  - D. 20 feet
- 197. What is the minimum size required for a discharge pipe from a sump with a water closet connected?**
- A. 1 ¼ inches
  - B. 1 ½ inches
  - C. 2 inches
  - D. 2 ½ inches
- 198. What is the minimum uniform slope per foot for horizontal drainage piping to be run?**
- A. 1/8 inch
  - B. 1/4 inch
  - C. 3/16 inch
  - D. 3/8 inch
- 199. Fixtures that are installed on a floor level that is lower than the next upstream manhole cover of the public or private sewer are required be protected from?**
- A. Flow Rate
  - B. Siphonage
  - C. Pressure
  - D. Back-flow of sewage
- 200. What is the minimum vertical overall distance where cleanouts in under-floor piping are required to be extended to or above the finished floor?**
- A. 12 inches
  - B. 18 inches
  - C. 24 inches
  - D. 17 inches
- 201. The discharge line from a sewage pump needs to have a backwater or swing check valve and gate or ball valve that is?**
- A. Readily Accessible
  - B. Accessible
  - C. Schedule 40 PVC
  - D. Schedule 80 PVC

**710.10 Sump and Receiving Tank Covers and Vents.** Sumps and receiving tanks shall be provided with substantial covers having a bolt-and-gasket-type manhole or equivalent opening to permit access for inspection, repairs, and cleaning. The top shall be provided with a vent pipe that shall extend separately through the roof or, where permitted, be combined with other vent pipes. Such vent shall be large enough to maintain atmospheric pressure within the sump under normal operating conditions and, in no case, shall be less in size than that required by Table 703.2 for the number and type of fixtures discharging into the sump, nor less than 1 1/2 inches (40 mm) in diameter. Where the foregoing requirements are met and the vent, after leaving the sump, is combined with vents from fixtures discharging into the sump, the size of the combined vent need not exceed that required for the total number of fixtures discharging into the sump. No vent from an air operating sewage ejector shall combine with other vents.

**710.11 Air Tanks.** Air tanks shall be so proportioned as to be of equal cubical capacity to the ejectors connected there with in which there shall be maintained an air pressure of not less than 2 pounds per foot (lb/ft) (3 kg/m) of height the sewage is to be raised. No water-operated ejectors shall be permitted.

**710.12 Grinder Pump Ejector.** Grinder pumps shall be permitted to be used.

**710.12.1 Discharge Piping.** The discharge piping shall be sized in accordance with the manufacturer's installation instructions and shall be not less than 1 1/4 inches (32 mm) in diameter. A check valve and full way type shutoff valve shall be located within the discharge line.

**712.1 Media.** The piping of the plumbing, drainage, and venting systems shall be tested with water or air except that plastic pipe shall not be tested with air. The Authority Having Jurisdiction shall be permitted to require the removal of cleanouts, etc., to ascertain whether the pressure has reached all parts of the system. After the plumbing fixtures have been set and their traps filled with water, they shall be submitted to a final test.

**712.2 Water Test.** The water test shall be applied to the drainage and vent systems either in its entirety or in sections. Where the test is applied to the entire system, openings in the piping shall be tightly closed, except the highest opening, and the system filled with water to point of overflow. Where the system is tested in sections, each opening shall be tightly plugged, except the highest opening of the section under test, and each section shall be filled with water, but no section shall be tested with less than a 10 foot (3048 mm) head of water. In testing successive sections, not less than the upper 10 feet (3048 mm) of the next preceding section shall be tested, so that no joint or pipe in the building (except the uppermost 10 feet (3048 mm) of the system) shall have been submitted to a test of less than a 10 foot (3048 mm) head of water. The water shall be kept in the system, or in the portion under test, for not less than 15 minutes before inspection starts. The system shall then be tight at points.

**712.3 Air Test.** The air test shall be made by attaching an air compressor testing apparatus to a suitable opening and, after closing all other inlets and outlets to the system, forcing air into the system until there is a uniform gauge pressure of 5 pounds-force per square inch (psi) (34 kPa) or sufficient to balance a column of mercury 10 inches (34 kPa) in height. The pressure shall be held without introduction of additional air for a period of not less than 15 minutes.

**801.2 Air Gap or Air Break Required.** Indirect waste piping shall discharge into the building drainage system through an air gap or air break as set forth in this code. Where a drainage





air gap is required by this code, the minimum vertical distance as measured from the lowest point of the indirect waste pipe or the fixture outlet to the flood-level rim of the receptor shall be not less than 1 inch (25.4 mm).

**801.3.1 Size of Indirect Waste Pipes.** Except for refrigeration coils and ice-making machines, the size of the indirect waste pipe shall be not smaller than the drain on the unit, but shall be not smaller than 1 inch (25 mm), and the maximum developed length shall not exceed 15 feet (4572 mm). Indirect waste pipe for ice making machines shall be not less than the drain on the unit, and in no case less than 3/4 of an inch (20 mm).

### Exam Questions:

202. True or False? The vent from an air operating sewage ejector is required to combine with other vents.
- A. True
  - B. False
203. Air tanks are required to be proportioned so they can be of equal \_\_\_\_\_ capacity to any ejectors connected.
- A. External
  - B. Cubical
  - C. Storage
  - D. Overage
204. What is the minimum size discharge pipe that can be used for a grinder pump ejector?
- A. 1 1/4 inches
  - B. 1 1/2 inches
  - C. 2 inches
  - D. 3/4 inches
205. True or False? Plastic pipe is required to be tested with air before final inspection will pass.
- A. True
  - B. False
206. What is the minimum head of water required for a drainage and vent system water test?
- A. 5 foot
  - B. 15 foot
  - C. 10 foot
  - D. No Such requirement
207. How long is a drainage system required to have water in it before an inspection can start?
- A. 35 minutes
  - B. 15 minutes
  - C. 25 minutes
  - D. 30 minutes
208. How long is an air test required to be held without adding additional air?
- A. 15 minutes
  - B. 35 minutes
  - C. 25 minutes
  - D. 30 minutes
209. Indirect waste piping is required to discharge into the building drainage system through what listed term(s)?
- A. B and C
  - B. Air gap
  - C. Air break
  - D. No Requirement
210. What is the minimum size that an indirect waste pipe must be?
- A. 1 1/4 inch
  - B. 3/4 inch
  - C. 1/2 inch
  - D. 1 inch
211. What is the minimum size that an indirect waste pipe must be for an ice making machine?
- A. 1 inch
  - B. 3/4 inch
  - C. 1/2 inch
  - D. 1 1/4 inch



**801.3.2 Walk-In Coolers.** For walk-in coolers, floor drains shall be permitted to be connected to a separate drainage line discharging into an outside receptor. The flood-level rim of the receptor shall be not less than 6 inches (152 mm) lower than the lowest floor drain.

Such floor drains shall be trapped and individually vented. Cleanouts shall be provided at 90 degree (1.57 rad) turns and shall be accessibly located. Such waste shall discharge through an air gap or air break into a trapped and vented receptor, except that a full-size air gap is required where the indirect waste pipe is under vacuum.

**801.3.3 Food-Handling Fixtures.** Food-preparation sinks, steam kettles, potato peelers, ice cream dipper wells, and similar equipment shall be indirectly connected to the drainage system by means of an air gap. Bins, sinks, and other equipment having drainage connections and used for the storage of unpackaged ice used for human ingestion, or used in direct contact with ready-to-eat food, shall be indirectly connected to the drainage system by means of an air gap. Each indirect waste pipe from food-handling fixtures or equipment shall be separately piped to the indirect waste receptor and shall not combine with other indirect waste pipes. The piping from the equipment to the receptor shall be not less than the drain on the unit, and in no case less than 1/2 of an inch (15 mm).



**801.4 Bar and Fountain Sink Traps.** Where the sink in a bar, soda fountain, or counter is so located that the trap serving the sink cannot be vented, the sink drain shall discharge through an air gap or air break (see Section 801.2.3) into an approved receptor that is vented. The developed length from the fixture outlet to the receptor shall not exceed 5 feet (1524 mm).

**801.6 Sterilizers.** Lines, devices, or apparatus such as stills, sterilizers, and similar equipment requiring waste connections and used for sterile materials shall be indirectly connected by means of an air gap. Each such indirect waste pipe shall be separately piped to the receptor and shall not exceed 15 feet (4572 mm). Such receptors shall be located in the same room.

### 803.0 Indirect Waste Piping.

**803.3 Pipe Size and Length.** Except as hereinafter provided, the size and construction of indirect waste piping shall be in accordance with other sections of this code applicable to drainage and vent piping. No vent from indirect waste piping shall combine with a sewer-connected vent, but shall extend separately to the outside air. Indirect waste pipes exceeding 5 feet (1524 mm), but less than 15 feet (4572 mm) in length shall be directly trapped, but such traps need not be vented.

Indirect waste pipes less than 15 feet (4572 mm) in length shall be not less than the diameter of the drain outlet or tailpiece of the fixture, appliance, or equipment served, and in no case less than 1/2 of an inch (15 mm). Angles and changes of direction in such indirect waste pipes shall be provided with cleanouts so as to permit flushing and cleaning.



### 804.0 Indirect Waste Receptors.

**804.1 Standpipe Receptors.** Plumbing fixtures or other receptors receiving the discharge of indirect waste pipes shall be approved for the use proposed and shall be of such shape and capacity as to prevent splashing

or flooding and shall be located where they are readily accessible for inspection and cleaning. No standpipe receptor for a clothes washer shall extend more than 30 inches (762 mm), or not less than 18 inches (457 mm) above its trap weir. No trap for a clothes washer standpipe receptor shall be installed below the floor, but shall be roughed in not less than 6 inches (152 mm) and not more than 18 inches (457 mm) above the floor. No indirect waste receptor shall be installed in a toilet room, closet, cupboard, or storeroom, nor in a portion of a building not in general use by the occupants thereof; except standpipes for clothes washers shall be permitted to be installed in toilet and bathroom areas where the clothes washer is installed in the same room.

### Exam Questions:

212. The flood-level rim of a receptor cannot be installed less than \_\_\_\_\_ lower than the lowest floor drain.
- 2 inches
  - 4 inches
  - 8 inches
  - 6 inches
213. Would it be considered acceptable or a violation of this code to combine the indirect waste pipes of equipment used for the storage of unpackaged ice used for human ingestion?
- Acceptable
  - Violation
214. What is the maximum developed length for a fixture outlet to a receptor being used for a bar sink vent if the trap serving the sink cannot be vented?
- 8 feet
  - 4 feet
  - 5 feet
  - 2 feet
215. A still that requires a waste connection used for sterile materials must have its waste pipe connected to a receptor at a maximum of \_\_\_\_\_.
- 20 feet
  - 10 feet
  - 5 feet
  - 15 feet
216. Would it be considered acceptable or a violation of this code to combine the vent from an indirect waste pipe with a sewer-connected vent?
- Acceptable
  - Violation
217. An indirect waste pipe that exceeds \_\_\_\_\_, but less than \_\_\_\_\_ in length is required to be directly trapped.
- 5 feet, 15 feet
  - 10 feet, 25 feet
  - 7 feet, 18 feet
  - 12 feet, 25 feet
218. What is the maximum distance a standpipe receptor for a clothes washer can extend from its trap weir?
- 6 inches
  - 18 inches
  - 24 inches
  - 30 inches
219. What is the minimum distance a standpipe receptor for a clothes washer can extend above its trap weir?
- 30 inches
  - 18 inches
  - 24 inches
  - 6 inches
220. What is the minimum distance the trap for a clothes washer standpipe receptor can be roughed in above finish floor?
- 30 inches
  - 18 inches
  - 24 inches
  - 6 inches

**221. What is the maximum distance the trap for a clothes washer standpipe receptor can be roughed in above finish floor?**

- A. 30 inches
- B. 18 inches
- C. 24 inches
- D. 6 inches

### **806.0 Sterile Equipment.**

**806.1 General.** Appliances, devices, or apparatus such as stills, sterilizers, and similar equipment requiring water and waste and used for sterile materials shall be drained through an air gap.

**807.1 Non-Classified Apparatus.** Commercial dishwashing machines and other appliances, devices, equipment, or other apparatus not regularly classed as plumbing fixtures, which are equipped with pumps, drips, or drainage outlets, shall be permitted to be drained by indirect waste pipes discharging into an approved type of open receptor.

**807.2 Undiluted Condensate Waste.** Where undiluted condensate waste from a fuel-burning condensing appliance is discharged into the drainage system, the material in the drainage system shall be cast-iron, galvanized iron, plastic, or other materials approved for this use.

#### **Exceptions:**

- (1) Where the above condensate is discharged to an exposed fixture tailpiece and trap, such tailpiece and trap shall be permitted to be brass.
- (2) Materials approved in Section 701.0 shall be permitted to be used where data is provided that the condensate waste is adequately diluted.

**807.3 Domestic Dishwashing Machine.** No domestic dishwashing machine shall be directly connected to a drainage system or food waste disposer without the use of an approved dishwasher air gap fitting on the discharge side of the dishwashing machine. Listed air gaps shall be installed with the flood-level (FL) marking at or above the flood level of the sink or drainboard, whichever is higher.



### **808.0 Cooling Water.**

**808.1 General.** Where permitted by the Authority Having Jurisdiction, clean running water used exclusively as a cooling medium in an appliance, device, or apparatus shall be permitted to discharge into the drainage system through the inlet side of a fixture trap in the event that a suitable fixture is not available to receive such discharge. Such trap connection shall be by means of a pipe connected to the inlet side of an approved fixture trap, the upper end terminating in a funnel-shaped receptacle set adjacent, and not less than 6 inches (152 mm) above the overflow rim of the fixture.

### **809.0 Drinking Fountains.**

**809.1 General.** Drinking fountains shall be permitted to be installed with indirect wastes.

### **810.0 Steam and Hot Water Drainage Condensers and Sumps.**

**810.1 High Temperature Discharge.** No steam pipe shall be directly connected to a plumbing or drainage

system, nor shall water having a temperature above 140°F (60°C) be discharged under pressure directly into a drainage system. Pipes from boilers shall discharge by means of indirect waste piping, as determined by the Authority Having Jurisdiction or the boiler manufacturer's recommendations. Such pipes shall be permitted to be indirectly connected by discharging into an open or closed condenser or an intercepting sump of an approved type that will prevent the entrance of steam or such water under pressure into the drainage system. Closed condensers or sumps shall be provided with a vent that shall be taken off the top and extended separately, full size above the roof. Condensers and sumps shall be properly trapped at the outlet with a deep seal trap extending to within 6 inches (152 mm) of the bottom of the tank. The top of the deep seal trap shall have a 3/4 of an inch (19.1 mm) opening located at the highest point of the trap to serve as a siphon breaker. Outlets shall be taken off from the side in such a manner as to allow a waterline to be maintained that will permanently occupy not less than one-half the capacity of the condenser or sump. Inlets shall enter above the waterline.

Wearing plates or baffles shall be installed in the tank to protect the shell. The sizes of the blowoff line inlet, the water outlets, and the vent shall be as shown in Table 810.1. The contents of condensers receiving steam or hot water under pressure shall pass through an open sump before entering the drainage system.

### Exam Questions:

**222. A sterilizer requiring water and waste and used for sterile materials is required to drain through a (an)\_\_\_\_\_?**

- A. Air Gap
- B. Closed System
- C. Pressurized System
- D. Back Flow Preventer

**223. An appliance with a pump not regularly classed as plumbing fixture can be drained by an indirect waste pipe into an approved?**

- A. Open Receptor
- B. Floor Drain
- C. Lead Pan
- D. Filter

**224. The drainage system material used for undiluted condensate waste from a fuel-burning condensing appliance must be made out of \_\_\_\_\_.**

- A. Plastic
- B. Cast-iron
- C. Galvanized iron
- D. All Listed Answers

**225. Where are you required to install the air gap fitting on a domestic dishwashing machine?**

- A. Garbage Disposal Side
- B. Inlet Side
- C. Discharge side
- D. No Such Requirement

**226. Where clean running water is used exclusively as a cooling medium for an appliance, the apparatus can be discharged into the drainage system through the \_\_\_\_\_ of a fixture trap.**

- A. Discharge side
- B. Inlet Side
- C. Garbage Disposal Side
- D. No Such Requirement

**227. Would it be considered acceptable or a violation of this code for a drinking fountain to be installed with indirect wastes?**

- A. Acceptable
- B. Violation

**228. What is the maximum temperature water can be discharged under pressure directly into a drainage system?**

- A. 90°F
- B. 60°F
- C. 130°F
- D. 140°F

229. A steam pipe can be connected indirectly to a drainage system by discharging into a (an) \_\_\_\_\_.

- A. Intercepting sump
- B. Closed condenser
- C. Open condenser
- D. All Listed Answers

230. The traps for condensers or sumps used with steam lines are required to extend to within \_\_\_\_\_ of the bottom of the tank.

- A. 8 inches
- B. 6 inches
- C. 4 inches
- D. 3 inches

231. What size opening is required for a siphon breaker located at the top of a deep seal trap?

- A. 1 inch
- B. 1/2 inch
- C. 3/4 inch
- D. 1/4 inch

**810.2 Sumps, Condensers, and Intercepting Tanks.** Sumps, condensers, or intercepting tanks that are constructed of concrete shall have walls and bottom not less than 4 inches (102 mm) in thickness, and the inside shall be cement plastered not less than 1/2 of an inch (12.7 mm) in thickness. Condensers constructed of metal shall be not less than No. 12 U.S. standard gauge (0.109 inch) (2.77 mm), and such metal condensers shall be protected from external corrosion by an approved bituminous coating.

**810.4 Strainers.** An indirect waste interceptor receiving discharge-containing particles that would clog the receptor drain shall have a readily removable beehive strainer.

#### 811.0 Chemical Wastes.

**811.1 Pretreatment.** Chemical or industrial liquid wastes that are likely to damage or increase maintenance costs on the sanitary sewer system, detrimentally affect sewage treatment, or contaminate surface or subsurface waters shall be pretreated to render them innocuous prior to discharge into a drainage system. Detailed plans and specifications of the pretreatment facilities shall be required by the Authority Having Jurisdiction. Piping conveying industrial, chemical, or process wastes from their point of origin to sewer-connected pretreatment facilities shall be of such material and design as to adequately perform its intended function to the satisfaction of the Authority Having Jurisdiction. Drainage discharge piping from pretreatment facilities or interceptors shall be in accordance with standard drainage installation procedures. Copper tube shall not be used for chemical or industrial wastes as defined in this section.

**811.2 Waste and Vent Pipes.** Each waste pipe receiving or intended to receive the discharge of a fixture into which acid or corrosive chemical is placed, and each vent pipe connected thereto, shall be constructed of Chlorinated Poly(vinyl-chloride) (CPVC), Polypropylene (PP), Polyvinylidene Fluoride (PVDF), chemical-resistant glass, high-silicon iron pipe, or lead pipe with a wall thickness of not less than 1/8 of an inch (3.2 mm); an approved type of ceramic glazed or unglazed vitrified clay; or other approved corrosion-resistant materials. PP pipe and fittings shall comply with ASTM F1412 or CSA B181.3. Chemical-resistant glass pipe and fittings shall comply with ASTM C1053. High-silicon iron pipe and fittings shall comply with ASTM A861.

**811.8 Diluted Chemicals.** The provisions in this section relative to materials and methods of construction shall not apply to installations such as photographic or x-ray dark rooms or research or control laboratories where minor amounts of adequately diluted chemicals are discharged.





**812.0 Clear Water Wastes.**

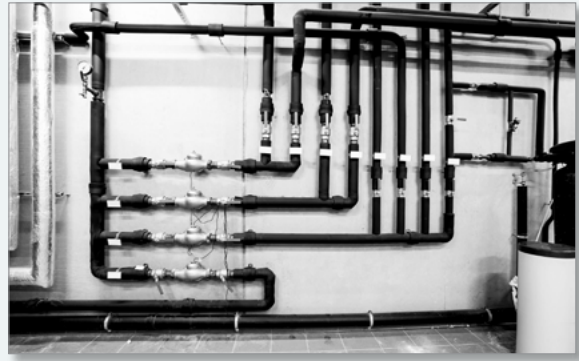
**812.1 General.** Water lifts, expansion tanks, cooling jackets, sprinkler systems, drip or overflow pans, or similar devices that discharge clear wastewater into the building drainage system shall discharge through an indirect waste.

**813.0 Swimming Pools.**

**813.1 General.** Pipes carrying wastewater from swimming or wading pools, including pool drainage and backwash from filters, shall be installed as an indirect waste. Where a pump is used to discharge waste pool water to the drainage system, the pump discharge shall be installed as an indirect waste.

**814.0 Condensate Wastes and Control.**

**814.1 Condensate Disposal.** Condensate from air washers, air-cooling coils, fuel-burning condensing appliances, the overflow from evaporative coolers, and similar water-supplied equipment or similar air-conditioning equipment shall be collected and discharged to an approved plumbing fixture or disposal area. Where discharged into the drainage system, equipment shall drain by means of an indirect waste pipe. The waste pipe shall have a slope of not less than 1/8 inch per foot (10.4 mm/m) or 1 percent slope and shall be of approved corrosion-resistant material not smaller than the outlet size in accordance with Section 814.3 or Section 814.4 for air cooling coils or condensing appliances, respectively. Condensate or wastewater shall not drain over a public way.



### Exam Questions:

**232. What is the minimum required thickness of an intercepting tanks sidewalls and bottom constructed of concrete?**

- A. 6 inches
- B. 8 inches
- C. 4 inches
- D. 3 inches

**233. What type of coating is required for a condenser constructed of metal?**

- A. Bituminous
- B. Charcoal
- C. Ceramic
- D. Substantive

**234. What type of strainer is required for an indirect waste interceptor receiving discharge-containing particles that would clog the receptor drain?**

- A. Beehive
- B. Clear
- C. Elongated
- D. Compact

**235. Would it be considered acceptable or a violation of this code to run copper tube that contains industrial waste?**

- A. Acceptable
- B. Violation

**236. What is the minimum required wall thickness for lead pipe venting chemical waste?**

- A. 3/16 inch
- B. 1/16 inch
- C. 1/4 inch
- D. 1/8 inch

**237. Would it be considered acceptable or a violation of this code to discharge diluted x-ray darkroom chemicals into the common drainage system?**

- A. Acceptable
- B. Violation



238. An expansion tank can discharge its clear water waste through a (an) \_\_\_\_\_ waste pipe to the drainage system.

- A. Direct Connected
- B. Indirect
- C. Treated
- D. All listed answers

239. Would it be considered acceptable or a violation of this code to discharge waste pool water to the drainage system using an indirect waste?

- A. Acceptable
- B. Violation

240. What is the minimum slope per foot that an indirect waste pipe for air-conditioning equipment is required to have?

- A. 1/16
- B. 1/8
- C. 3/8
- D. 1/4

241. Condensate is never allowed to drain \_\_\_\_\_.

- A. By means of a direct waste pipe
- B. By means of an indirect waste pipe
- C. Over a public way
- D. No Special Requirement

### 901.0 General.

**901.2 Vents Required.** Each plumbing fixture trap, except as otherwise provided in this code, shall be protected against siphonage and backpressure, and air circulation shall be ensured throughout all parts of the drainage system by means of vent pipes installed in accordance with the requirements of this chapter and as otherwise required by this code.

**901.3 Trap Seal Protection.** The vent system shall be designed to prevent a trap seal from being exposed to a pressure differential that exceeds 1 inch water column (0.24 kPa) on the outlet side of the trap.

### 902.0 Vents Not Required.

**902.1 Interceptor.** Vent piping shall be permitted to be omitted on an interceptor where such interceptor acts as a primary settling tank and discharges through a horizontal indirect waste pipe into a secondary interceptor. The second interceptor shall be properly trapped and vented.

**902.2 Bars, Soda Fountains, and Counter.** Traps serving sinks that are part of the equipment of bars, soda fountains, and counters need not be vented where the location and construction of such bars, soda fountains, and counters is such as to make it impossible to do so. Where such conditions exist, said sinks shall discharge by means of approved indirect waste pipes into a floor sink or other approved type of receptor.

**903.2.3 Marking.** Copper or copper alloy tubing, in addition to the required incised marking, shall be marked in accordance with either ASTM B 306 or ASTM B 88 as listed in Table 1701.1. The colors shall be: Type K, green; Type L, blue; Type M, red; and Type DWV, yellow.

**903.3 Changes in Direction.** Changes in direction of vent piping shall be made by the appropriate use of approved fittings, and no such pipe shall be strained or bent. Burred ends shall be reamed to the full bore of the pipe.

**WAC 51-56-0911.1 Circuit Vent Permitted.** A maximum of eight fixtures connected to a horizontal branch drain shall be permitted to be circuit vented. Each fixture drain shall connect horizontally to the horizontal branch being circuit vented. The horizontal branch drain shall be classified as a vent from the most downstream fixture drain connection to the most upstream fixture drain connection to the horizontal branch. Given its grease-producing potential, restaurant kitchen equipment shall not be connected to a circuit vented system. Each trap



arm shall connect horizontal to the horizontal branch being circuit vented in accordance with Table 1002.2.

**EXCEPTION:** Back-outlet and wall-hung water closets shall be permitted to be circuit vented provided that no floor-outlet fixtures are connected to the same horizontal branch.

### Exam Questions:

242. All plumbing fixture traps are required to be protected from?

- A. Poor air circulation
- B. Siphonage
- C. Backpressure
- D. All listed answers

243. What is the maximum pressure differential that a trap seal should be exposed to?

- A. 1/3 inch water column
- B. 1/2 inch water column
- C. 1 inch water column
- D. 3/4 inch water column

244. Would it be considered acceptable or a violation of this code to not vent an interceptor that acts as a primary settling tank without having a secondary interceptor to discharge into?

- A. Acceptable
- B. Violation

245. True or False? Traps serving sinks that are part of bar equipment are not required to be vented if construction of the bar make it impossible to do so.

- A. True
- B. False

246. A maximum of \_\_\_\_\_ fixtures connected to a horizontal branch drain shall be permitted to be circuit vented.

- A. Four
- B. Five
- C. Six
- D. Eight

247. Each trap arm shall connect horizontal to the horizontal branch being circuit vented in accordance with Table\_\_\_\_\_.

- A. 701.1
- B. 1002.2
- C. 702.1
- D. 1010.2

248. What color is type K hard-drawn copper tubing required to be?

- A. Green
- B. Blue
- C. Red
- D. Yellow

249. What color is type L hard-drawn copper tubing required to be?

- A. Green
- B. Blue
- C. Red
- D. Yellow

250. What color is type M hard-drawn copper tubing required to be?

- A. Green
- B. Blue
- C. Red
- D. Yellow

251. What color is type DWV copper drainage tube required to be?

- A. Green
- B. Blue
- C. Red
- D. Yellow

252. Vent pipe is required to be \_\_\_\_\_.

- A. Strained
- B. Bent
- C. De-Burred
- D. All listed answers

### 904.0 Size of Vents.

**904.1 Size.** The size of vent piping shall be determined from its length and the total number of fixture units connected thereto, in accordance with Table 703.2. The diameter of an individual vent shall be not less than 1¼ inches (32 mm) nor less than one-half the diameter of the drain to which it is connected. In addition, the drainage piping of each building and each connection to a public sewer or a private sewage disposal system shall be vented by means of one or more vent pipes, the aggregate cross sectional area of which shall be not less than that of the largest required building sewer, as determined from Table 703.2. Vent pipes from fixtures located upstream from pumps, ejectors, backwater valves, or other devices that obstruct the free flow of air and other gases between the building sewer and the outside atmosphere shall not be used for meeting the cross-sectional area venting requirements of this section.

### 905.0 Vent Pipe Grades and Connections.

**905.1 Grade.** Vent and branch vent pipes shall be free from drops or sags, and each such vent shall be level or shall be so graded and connected as to drip back by gravity to the drainage pipe it serves.

**905.2 Horizontal Drainage Pipe.** Where vents connect to a horizontal drainage pipe, each vent pipe shall have its invert taken off above the drainage centerline of such pipe downstream of the trap being served.

**905.3 Vent Pipe Rise.** Unless prohibited by structural conditions, each vent shall rise vertically to a point not less than 6 inches (152 mm) above the flood-level rim of the fixture served before offsetting horizontally, and where two or more vent pipes converge, each such vent pipe shall rise to a point not less than 6 inches (152 mm) in height above the flood-level rim of the plumbing fixture it serves before being connected to any other vent. Vents less than 6 inches (152 mm) above the flood-level rim of the fixture shall be installed with approved drainage fittings, material, and grade to the drain.



**905.4 Roof Termination.** Vent pipes shall extend undiminished in size above the roof, or shall be reconnected with a soil or waste vent of proper size.

### 906.0 Vent Termination.

**906.1 Roof Termination.** Each vent pipe or stack shall extend through its flashing and shall terminate vertically not less than 6 inches (152 mm) above the roof nor less than 1 foot (305 mm) from a vertical surface.

**906.2 Clearance.** Each vent shall terminate not less than 10 feet (3048 mm) from, or not less than 3 feet (914 mm) above, an openable window, door, opening, air intake, or vent shaft, or not less than 3 feet (914 mm) in every direction from a lot line, alley and street excepted.

## Exam Questions:

**253. How do you determine the size of vent piping?**

- A. Total length
- B. Table 703.2
- C. Total number of fixtures connected
- D. All listed answers

**254. What is the minimum diameter allowed by this code for an individual vent pipe?**

- A. 1 inch
- B. 1 1/4 inches
- C. 1 1/2 inches
- D. 2 inch

**255. True or False? Vent pipes from fixtures located upstream from devices that obstruct the free flow of air and other gases between the building sewer and the outside atmosphere are required be used for meeting the cross-sectional area venting requirements of this code.**

- A. True
- B. False

**256. Vent and branch vent pipes are required to be free from \_\_\_\_\_.**

- A. Drops
- B. Sags
- C. Bows
- D. All listed answers

**257. Each vent pipe that connects to a horizontal drainage pipe is required to have its \_\_\_\_\_ taken off above the drainage centerline of such pipes downstream of the trap being served.**

- A. Ejector
- B. Offset
- C. Invert
- D. Connection

**258. As a general rule, each vent is required to rise vertically to a minimum point no less than \_\_\_\_\_ above the flood-level rim of the fixture served before offsetting horizontally.**

- A. 5 inches
- B. 6 inches
- C. 3 inches
- D. 2 inches

**259. Vents less than \_\_\_\_\_ above the flood-level rim of a fixture are required to be installed with approved drainage fittings, material, and grade to the drain.**

- A. 6 inches
- B. 4 inches
- C. 2 inches
- D. All listed answers

**260. Vent pipes are required to extend undiminished in size above the \_\_\_\_\_.**

- A. Receptor
- B. Trap
- C. Roof
- D. Horizontal plane

**261. A vent pipe is required to extend through its flashing and terminate vertically at a minimum of \_\_\_\_\_ above the roof.**

- A. 3 inches
- B. 5 inches
- C. 6 inches
- D. 2 inches

**262. What is the minimum distance a vent can terminate in every direction from a lot line, alley and street excepted?**

- A. 3 feet
- B. 10 feet
- C. 5 feet
- D. 6 feet

**906.3 Use of Roof.** Vent pipes shall be extended separately or combined, of full required size, not less than 6 inches (152 mm) above the roof or fire wall. Flagpoling of vents shall be prohibited except where the roof is used for assembly purposes or parking. Vents within 10 feet (3048 mm) of a part of the roof that is used for such other purposes shall extend not less than 7 feet (2134 mm) above such roof and shall be securely stayed.

**906.4 Outdoor Installations.** Vent pipes for outdoor installations shall extend not less than 10 feet (3048 mm) above the surrounding ground and shall be securely supported.

**906.6 Lead. (See Chapter 17)** Sheet lead shall be not less than the following:

- (1) For safe pans – not less than 4 pounds per square foot (lb/ft<sup>2</sup>) (19 kg/m<sup>2</sup>) or 1/16 of an inch (1.6 mm) thick.
- (2) For flashings or vent terminals – not less than 3 lb/ft<sup>2</sup> (15 kg/m<sup>2</sup>).
- (3) Lead bends and lead traps shall be not less than 1/8 of an inch (3.2 mm) wall thickness.

**906.7 Frost or Snow Closure.** Where frost or snow closure is likely to occur in locations having minimum design temperature below 0°F (-17.8°C), vent terminals shall be not less than 2 inches (50 mm) in diameter, but in no event smaller than the required vent pipe. The change in diameter shall be made inside the building not less than 1 foot (305 mm) below the roof in an insulated space and terminate not less than 10 inches (254 mm) above the roof, or in accordance with the Authority Having Jurisdiction.

## **907.0 Vent Stacks and Relief Vents.**

**907.1 Drainage Stack.** Each drainage stack that extends 10 or more stories shall be served by a parallel vent stack, which shall extend undiminished in size from its upper terminal and connect to the drainage stack at or immediately below the lowest fixture drain. Each such vent stack shall also be connected to the drainage stack at each fifth floor, counting down from the uppermost fixture drain, by means of a yoke vent, the size of which shall be not less in diameter than either the drainage or the vent stack, whichever is smaller.

**907.2 Yoke Vent.** The yoke vent connection to the vent stack shall be placed not less than 42 inches (1067 mm) above the floor level, and the yoke vent connection to the drainage stack shall be by means of a wye-branch fitting placed below the lowest drainage branch connection serving that floor.



## **908.0 Wet Venting.**

**908.1 Vertical Wet Venting.** Wet venting is limited to vertical drainage piping receiving the discharge from the trap arm of one and two fixture unit fixtures that also serves as a vent not exceeding four fixtures. Wet-vented fixtures shall be within the same story; provided, further, that fixtures with a continuous vent discharging into a wet vent shall be within the same story as the wet-vented fixtures. No wet vent shall exceed 6 feet (1829 mm) in developed length.

**908.1.1 Size.** The vertical piping between two consecutive inlet levels shall be considered a wet-vented section. Each wet-vented section shall be not less than one pipe size exceeding the required minimum waste pipe size of the upper fixture or shall be one pipe size exceeding the required minimum pipe size for the sum of the fixture units served by such wet-vented section, whichever is larger, but in no case less than 2 inches (50 mm).

## Exam Questions:

- 263. What is the minimum height vent pipes are required to extend above a fire wall?**
- A. 6 inches
  - B. 5 inches
  - C. 3 inches
  - D. 2 inches
- 264. A vent pipe used for outdoor installations is required to extend to a minimum height of \_\_\_\_\_ above the surrounding ground.**
- A. 3 feet
  - B. 10 feet
  - C. 5 feet
  - D. 6 feet
- 265. What is the minimum required thickness for a lead safe pan?**
- A. 1/4 of an inch
  - B. 1/8 of an inch
  - C. 1/16 of an inch
  - D. 3/16 of an inch
- 266. What is the minimum required wall thickness for a lead trap?**
- A. 1/16 of an inch
  - B. 1/8 of an inch
  - C. 1/4 of an inch
  - D. 3/16 of an inch
- 267. What is the minimum size vent terminal required where frost or snow closure is likely to occur?**
- A. 1 1/4 inches
  - B. 1 inch
  - C. 1 1/2 inches
  - D. 2 inch
- 268. If a vent stack extends 10 or more stories above a building drain, it is required to be served by a \_\_\_\_\_.**
- A. Parallel vent stack
  - B. Guide Wire system
  - C. Horizontal support system
  - D. Lateral movement damper
- 269. The yoke vent connection to the drainage stack is required to be made by means of a \_\_\_\_\_ fitting placed below the lowest drainage branch connection serving that floor.**
- A. Sanitary Cross
  - B. Closet Bend
  - C. Cap Reducer
  - D. Wye-branch
- 270. What is the allowable maximum developed length for a wet vent?**
- A. 3 feet
  - B. 10 feet
  - C. 5 feet
  - D. 6 feet
- 271. What best defines the vertical piping between two consecutive inlet levels?**
- A. Wet-vented section
  - B. Yoke Vent
  - C. Drainage Stack
  - D. Parallel vent stack



**908.2 Horizontal Wet Venting for A Bathroom Group.** A bathroom group located on the same floor level shall be permitted to be vented by a Horizontal wet vent where all the conditions of section 908.21 through Section 908.2.5 are met. **\*NOTE:** Washington did not adopt section 908.2.4 (Water Closet) for the 2021 cycle.

**908.2.1 Vent Connection.** The dry vent connection to the wet vent shall be an individual vent for the bidet, shower, or bathtub. One or two vented lavatory(s) shall be permitted to serve as a wet vent for a bathroom group. Only one wet-vented fixture drain or trap arm shall discharge upstream of the dry-vented fixture drain connection. Dry vent connections to the horizontal wet vent shall be in accordance with section 905.2 and section 905.3.

**908.2.2 Size.** The wet vent shall be sized based on the fixture unit discharge into the wet vent. The wet vent shall be not less than 2 inches (50 mm) in diameter for 4 drainage fixture units (dfu) or less, and not less than 3 inches (80 mm) in diameter for 5 dfu or more. The dry vent shall be sized in accordance with Table 702.1 and Table 703.2 based on the total fixture units discharging into the wet vent.

**908.2.3 Trap Arm.** The length of the trap arm shall not exceed the limits in Table 1002.2. The trap size shall be in accordance with section 1003.3. The vent pipe opening from the horizontal wet vent, except for water closets and similar fixtures, shall not be below the weir of the trap.

**908.2.5 Additional Fixtures.** Additional fixtures shall discharge downstream of the wet vent system and be conventionally vented. Only the fixtures within the bathroom group shall connect to the wet vented horizontal branch.



## **909.0 Special Venting for Island Fixtures.**

**909.1 General.** Traps for island sinks and similar equipment shall be roughed in above the floor and shall be permitted to be vented by extending the vent as high as possible, but not less than the drain-board height and then returning it downward and connecting it to the horizontal sink drain immediately downstream from the vertical fixture drain. The return vent shall be connected to the horizontal drain through a wye-branch fitting and shall, in addition, be provided with a foot vent taken off the vertical fixture vent by means of a wye branch immediately below the floor and extending to the nearest partition and then through the roof to the open air, or shall be permitted to be connected to other vents at a point not less than 6 inches (152 mm) above the flood-level rim of the fixtures served. Drainage fittings shall be used on the vent below the floor level, and a slope of not less than 1/4 inch per foot (20.8 mm/m) back to the drain shall be maintained. The return bend used under the drain-board shall be a one piece fitting or an assembly of a 45 degree (0.79 rad), a 90 degree (1.57 rad), and a 45 degree (0.79 rad) elbow in the order named. Pipe sizing shall be as elsewhere required in this code. The island sink drain, upstream of the returned vent, shall serve no other fixtures. An accessible cleanout shall be installed in the vertical portion of the foot vent.

## **910.0 Combination Waste and Vent Systems.**

**910.1 Where Permitted.** Combination waste and vent systems shall be permitted where structural conditions preclude the installation of conventional systems as otherwise prescribed by this code.

**910.2 Approval.** Plans and specifications for each combination waste and vent system shall first be approved by the Authority Having Jurisdiction before a portion of such system is installed.

**910.3 Vents.** Each combination waste and vent system, as defined in Chapter 2, shall be provided with a vent or vents adequate to ensure free circulation of air. A branch exceeding 15 feet (4572 mm) in length shall be separately vented in an approved manner. The area of a vent installed in a combination waste and vent system shall be not less than one-half the inside cross-sectional area of the drain pipe served. The vent connection

shall be downstream of the uppermost fixture.

**910.5 Vertical Waste Pipe.** No vertical waste pipe shall be used in such a system, except the tailpiece or connection between the outlet of a plumbing fixture and the trap. Such tailpieces or connections shall be as short as possible, and in no case shall exceed 2 feet (610 mm).

**Exception:** Branch lines shall be permitted to have 45 degree (0.79 rad) vertical offsets.

**910.4 Size.** Each waste pipe and each trap in a combination system shall be not less than two pipe sizes exceeding the sizes required by Chapter 7 of this code, and not less than two pipe sizes exceeding a fixture tailpiece or connection.

**910.6 Cleanouts.** An accessible cleanout shall be installed in each vent for the combination waste and vent system. Cleanouts shall not be required on a wet-vented branch serving a single trap where the fixture tailpiece or connection is not less than 2 inches (50 mm) in diameter and provides ready access for cleaning through the trap.

**WAC-911.1 Circuit Vent Permitted.** A maximum of eight fixtures connected to a horizontal branch drain shall be permitted to be circuit vented. Each fixture drain shall connect horizontally to the horizontal branch being circuit vented. The horizontal branch drain shall be classified as a vent from the most downstream fixture drain connection to the most upstream fixture drain connection to the horizontal branch. Given its grease-producing potential, restaurant kitchen equipment shall not be connected to a circuit vented system. Each trap arm shall connect horizontal to the horizontal branch being circuit vented in accordance with Table 1002.2.

**EXCEPTION:** Back-outlet and wall-hung water closets shall be permitted to be circuit vented provided that no floor-outlet fixtures are connected to the same horizontal branch.



## Exam Questions:

272. In Washington, how many conditions must be met to use horizontal wet venting for a bathroom group?

- A. 4
- B. 3
- C. 5
- D. No requirements

273. A dry vent connection to the wet vent is required to be an individual vent for which listed fixture(s)?

- A. Bathtub
- B. Bidet
- C. Shower
- D. All listed answers

274. What can one or two vented lavatory(s) serve as for a bathroom group?

- A. A Common Vent
- B. A trap
- C. A wet vent
- D. All listed answers

275. How many wet-vented fixture trap arms can discharge upstream of a dry-vented fixture drain connection?

- A. 1
- B. 2
- C. Unlimited
- D. This type of connection is not allowed

**276. What is the minimum size required diameter wet vent for 5 drainage fixture units?**

- A. 1 1/4 inches
- B. 3 inch
- C. 1 1/2 inches
- D. 2 inch

**277. A dry vent is required to be sized in accordance with what listed table(s)?**

- A. 701.2
- B. 702.1
- C. B and D
- D. 703.2

**278. Drainage fittings used with island fixtures are required to maintain a minimum slope of \_\_\_\_\_ per foot back to its drain.**

- A. 5/16 inch
- B. 1/8 inch
- C. 1/16 inch
- D. 1/4 inch

**279. An island sink drain upstream of the returned vent can serve how many additional fixtures?**

- A. 1
- B. 0
- C. 4
- D. 2

**280. A combination branch exceeding \_\_\_\_\_ is required to be separately vented in an approved manner.**

- A. 15 feet
- B. 20 feet
- C. 50 feet
- D. 10 feet

