



# Department of Commerce

Division of Industrial Compliance

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At its meeting on September 30, 2016, the Ohio Board of Building Standards adopted the rule changes identified as Amendments Group 92. These rule amendments were adopted for an **effective date of October 10, 2016.**

Amendments Group 92 included the following amended Ohio Plumbing Code (OPC) rule. For your use, a summary of the changes is provided below and the text of the rule can be found immediately following this coversheet:

Rule Number	OPC Chapter	Chapter Title	Effective date
4101:3-3-01	3	General regulations.	October 10, 2016

**Reason for Amendments:** The Board proposes to amend the Ohio Administrative Code as follows: **4101:3-3-01** to clarify plumbing system testing requirements.

If you should have any questions regarding these rule changes, please call BBS staff at (614)644-2613.

**4101:3-3-01 General regulations.**

*[Comment: When a reference is made within this rule to a federal statutory provision, an industry consensus standard, or any other technical publication, the specific date and title of the publication as well as the name and address of the promulgating agency are listed in rule 4101:3-13-01 of the Administrative Code. The application of the referenced standards shall be limited and as prescribed in section 102.5 of rule 4101:1-1-01 of the Administrative Code.]*

**SECTION 301  
GENERAL**

**301.1 Scope.** The provisions of this chapter shall govern the general regulations regarding the *design and* installation of plumbing not specific to other chapters.

**301.2 System installation.** Plumbing shall be installed with due regard to preservation of the strength of structural members and prevention of damage to walls and other surfaces through fixture usage.

**301.3 Connections to the sanitary drainage system.** All plumbing fixtures, drains, appurtenances and appliances used to receive or discharge liquid wastes or sewage shall be directly connected to the sanitary drainage system of the building or premises, in accordance with the requirements of this code *and the requirements of the department of the city engineer, in cities having such departments, the boards of health of health districts, or the sewer purveyor, as appropriate (see division (D) of section 3781.03 of the Revised Code)*. This section shall not be construed to prevent the indirect waste systems required by Chapter 8.

***Exceptions:***

- 1. Bathtubs, showers, lavatories, clothes washers and laundry sinks shall not be required to discharge to the sanitary drainage system where such fixtures discharge to a gray water recycling system approved by the "Ohio Environmental Protection Agency" in accordance with Chapter 3745-42 of the Administrative Code.*
- 2. Wastes from dental or cuspidor fountains, drinking fountains, bar sinks, soda fountains, floor drains or shower drains may be indirectly connected by means of an air break to the sanitary drainage system. Each indirectly connected item listed above shall individually discharge to a directly connected floor drain, waste receptor or standpipe.*

**301.4 Connections to water supply.** Every plumbing fixture, device or appliance

requiring or using water for its proper operation shall be directly or indirectly connected to the water supply system in accordance with the provisions of this code.

**301.5 Pipe, tube and fitting sizes.** Unless otherwise specified, the pipe, tube and fitting sizes specified in this code are expressed in nominal or standard sizes as designated in the referenced material standards.

**301.6 Prohibited locations.** Plumbing systems shall not be located in an elevator shaft or in an elevator equipment room.

**Exception:** Floor drains, sumps and sump pumps shall be permitted at the base of the shaft, provided that they are indirectly connected to the plumbing system.

**301.7 Conflicts.** In instances where conflicts occur between this code and the manufacturer's installation instructions, the more restrictive provisions shall apply.

## SECTION 302

### EXCLUSION OF MATERIALS DETRIMENTAL TO THE SEWER SYSTEM

**302.1 Detrimental or dangerous materials.** Ashes, cinders or rags; flammable, poisonous or explosive liquids or gases; oil, grease or any other insoluble material capable of obstructing, damaging or overloading the building drainage or sewer system, or capable of interfering with the normal operation of the sewage treatment processes, shall not be deposited, by any means, into such systems.

**302.2 Industrial wastes.** Waste products from manufacturing or industrial operations shall not be introduced into the public sewer until it has been determined by the *building* official or other authority having jurisdiction that the introduction thereof will not damage the public sewer system or interfere with the functioning of the sewage treatment plant.

## SECTION 303

### MATERIALS

**303.1 Identification.** Each length of pipe and each pipe fitting, trap, fixture, material and device utilized in a plumbing system shall bear the identification of the manufacturer *and any markings required by the applicable referenced standards.*

**303.2 Installation of materials.** All materials used shall be installed in strict

accordance with the standards under which the materials are accepted and approved. In the absence of such installation procedures, the manufacturer's installation instructions shall be followed. Where the requirements of referenced standards or manufacturer's installation instructions do not conform to minimum provisions of this code, the provisions of this code shall apply.

**303.3 Plastic pipe, fittings and components.** All plastic pipe, fittings and components shall be *listed* as conforming to NSF 14.

**303.4 Approved agency testing and certification.** All plumbing products and materials shall *be listed by an approved agency as complying with the applicable referenced standards. Products and materials shall be identified in accordance with Section 303.1.*

## **SECTION 304 RODENTPROOFING**

**304.1 General.** Plumbing systems shall be designed and installed in accordance with Sections 304.2 through 304.4 to prevent rodents from entering structures.

**304.2 Strainer plates.** All strainer plates on drain inlets shall be designed and installed so that all openings are not greater than 1/2 inch (12.7 mm) in least dimension.

**304.3 Meter boxes.** Meter boxes shall be constructed in such a manner that rodents are prevented from entering a structure by way of the water service pipes connecting the meter box and the structure.

**304.4 Openings for pipes.** In or on structures where openings have been made in walls, floors or ceilings for the passage of pipes, such openings shall be closed and protected by the installation of approved metal collars that are securely fastened to the adjoining structure.

## **SECTION 305 PROTECTION OF PIPES AND PLUMBING SYSTEM COMPONENTS**

**305.1 Corrosion.** Pipes passing through concrete or cinder walls and floors or other corrosive material shall be protected against external corrosion by a protective sheathing or wrapping or other means that will withstand any reaction from the lime and acid of concrete, cinder or other corrosive material. Sheathing or wrapping shall allow for movement including expansion and contraction of piping. Minimum wall thickness of material shall be 0.025 inch (0.64 mm).

**305.2 Breakage.** Pipes passing through or under walls shall be protected from

breakage.

**305.3 Stress and strain.** Piping in a plumbing system shall be installed so as to prevent strains and stresses that exceed the structural strength of the pipe. Where necessary, provisions shall be made to protect piping from damage resulting from expansion, contraction and structural settlement.

**305.4 Sleeves.** Annular spaces between sleeves and pipes shall be filled or tightly caulked in an approved manner. Annular spaces between sleeves and pipes in fire-resistance-rated assemblies shall be filled or tightly caulked in accordance with the *building code*.

**305.5 Pipes through or under footings or foundation walls.**

Any pipe that passes under a footing or through a foundation wall shall be provided with a relieving arch, or a pipe sleeve pipe shall be built into the foundation wall. The sleeve shall be two pipe sizes greater than the pipe passing through the wall.

**305.6 Freezing.** Water, soil and waste pipes shall not be installed outside of a building, in attics or crawl spaces, concealed in outside walls, or in any other place subjected to freezing temperatures unless adequate provision is made to protect such pipes from freezing by insulation or heat or both. Exterior water supply system piping shall be installed not less than 6 inches (152 mm) below the frost line and not less than 12 inches (305 mm) below grade.

**305.6.1 Sewer depth.** *Deleted.*

**305.7 Waterproofing of openings.** Joints at the roof and around vent pipes, shall be made water-tight by the use of lead, copper, galvanized steel, aluminum, plastic or other approved flashings or flashing material. Exterior wall openings shall be made water-tight.

**305.8 Protection against physical damage.** In concealed locations where piping, other than cast-iron or galvanized steel, is installed through holes or notches in studs, joists, rafters or similar members less than 1 ½ inches (38 mm) from the nearest edge of the member, the pipe shall be protected by steel shield plates. Such shield plates shall have a thickness of not less than 0.0575 inch (1.463 mm) (No. 16 gage). Such plates shall cover the area of the pipe where the member is notched or bored, and shall extend a minimum of 2 inches (51 mm) above sole plates and below top plates.

**305.9 Protection of components of plumbing system.** Components of a plumbing system installed along alleyways, driveways, parking garages or other locations exposed to damage shall be recessed into the wall or otherwise protected in an approved manner.

## **SECTION 306 TRENCHING, EXCAVATION AND BACKFILL**

**306.1 Support of piping.** Buried piping shall be supported throughout its entire length.

**306.2 Trenching and bedding.** Where trenches are excavated such that the bottom of the trench forms the bed for the pipe, solid and continuous load-bearing support shall be provided between joints. Bell holes, hub holes and coupling holes shall be provided at points where the pipe is joined. Such pipe shall not be supported on blocks to grade. In instances where the materials manufacturer's installation instructions are more restrictive than those prescribed by the code, the material shall be installed in accordance with the more restrictive requirement.

**306.2.1 Overexcavation.** Where trenches are excavated below the installation level of the pipe such that the bottom of the trench does not form the bed for the pipe, the trench shall be backfilled to the installation level of the bottom of the pipe with sand or fine gravel placed in layers of 6 inches (152 mm) maximum depth and such backfill shall be compacted after each placement.

**306.2.2 Rock removal.** Where rock is encountered in trenching, the rock shall be removed to a minimum of 3 inches (76 mm) below the installation level of the bottom of the pipe, and the trench shall be backfilled to the installation level of the bottom of the pipe with sand tamped in place so as to provide uniform load-bearing support for the pipe between joints. The pipe, including the joints, shall not rest on rock at any point.

**306.2.3 Soft load-bearing materials.** If soft materials of poor load-bearing quality are found at the bottom of the trench, stabilization shall be achieved by overexcavating a minimum of two pipe diameters and backfilling to the installation level of the bottom of the pipe with fine gravel, crushed stone or a concrete foundation. The concrete foundation shall be bedded with sand tamped into place so as to provide uniform load-bearing support for the pipe between joints.

**306.3 Backfilling.** Backfill shall be free from discarded construction material and debris. Loose earth free from rocks, broken concrete and frozen chunks shall be placed in the trench in 6-inch (152 mm) layers and tamped in place until the crown of the pipe is covered by 12 inches (305 mm) of tamped earth. The backfill under and beside the pipe shall be compacted for pipe support. Backfill shall be brought up evenly on both sides of the pipe so that the pipe remains aligned. In instances where the manufacturer's installation instructions for materials are more restrictive than those prescribed by the code, the material shall be installed in accordance with the more restrictive requirement.

**306.4 Tunneling.** Where pipe is to be installed by tunneling, jacking or a combination of both, the pipe shall be protected from damage during installation and from subsequent uneven loading. Where earth tunnels are used, adequate supporting structures shall be provided to prevent future settling or caving.

## **SECTION 307 STRUCTURAL SAFETY**

**307.1 General.** In the process of installing or repairing any part of a plumbing and drainage installation, the finished floors, walls, ceilings, tile work or any other part of the building or premises that must be changed or replaced shall be left in a safe structural condition in accordance with the requirements of the *building code*.

**307.2 Cutting, notching or bored holes.** A framing member shall not be cut, notched or bored in excess of limitations specified in the *building code*.

**307.3 Penetrations of floor/ceiling assemblies and fire-resistance-rated assemblies.** Penetrations of floor/ceiling assemblies and assemblies required to have a fire-resistance rating shall be protected in accordance with the *building code*.

**307.4 Alterations to trusses.** Truss members and components shall not be cut, drilled, notched, spliced or otherwise altered in any way without written concurrence and approval of a registered design professional. Alterations resulting in the addition of loads to any member (e.g., HVAC equipment, water heater) shall not be permitted without verification that the truss is capable of supporting such additional loading.

**307.5 Trench location.** Trenches installed parallel to footings shall not extend below the 45-degree (0.79 rad) bearing plane of the footing or wall.

**307.6 Piping materials exposed within plenums.** All piping materials exposed within plenums shall comply with the provisions of the *mechanical code*.

**307.7 Enforcement.** *Enforcement of the provisions of this section is the responsibility of the certified building official of the certified municipal, county, or township building department having jurisdiction or the superintendent of the division of industrial compliance.*

## **SECTION 308 PIPING SUPPORT**

**308.1 General.** All plumbing piping shall be supported in accordance with this

section.

**308.2 Piping seismic supports.** Where earthquake loads are applicable in accordance with the building code, plumbing piping supports shall be designed and installed for the seismic forces in accordance with the *building code*.

**308.3 Materials.** Hangers, anchors and supports shall support the piping and the contents of the piping. Hangers and strapping material shall be of approved material that will not promote galvanic action.

**308.4 Structural attachment.** Hangers and anchors shall be attached to the building construction in an approved manner.

**308.5 Interval of support.** Pipe shall be supported in accordance with Table 308.5.

**Exception:** The interval of support for piping systems designed to provide for expansion/contraction shall conform to the engineered design in accordance with Section

106.5 of the building code.

**308.6 Sway bracing.** Rigid support sway bracing shall be provided at changes in direction greater than 45 degrees (0.79 rad) for pipe sizes 4 inches (102 mm) and larger.

**308.7 Anchorage.** Anchorage shall be provided to restrain drainage piping from axial movement.

**308.7.1 Location.** For pipe sizes greater than 4 inches (102 mm), restraints shall be provided for drain pipes at all changes in direction and at all changes in diameter greater than two pipe sizes. Braces, blocks, rodding and other suitable methods as specified by the coupling manufacturer shall be utilized.

**308.8 Expansion joint fittings.** Expansion joint fittings shall be used only where necessary to provide for expansion and contraction of the pipes. Expansion joint fittings shall be of the typical material suitable for use with the type of piping in which such fittings are installed.

**308.9 Parallel water distribution systems.** Piping bundles for manifold systems shall be supported in accordance with Table 308.5. Support at changes in direction shall be in accordance with the manufacturer's installation instructions. *Where hot water piping is bundled, each hot water pipe shall be insulated.*

**TABLE 308.5  
HANGER SPACING**

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (feet)	MAXIMUM VERTICAL SPACING (feet)
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ABS pipe	4	10 <sup>b</sup>
Aluminum tubing	10	15
Brass pipe	10	10
Cast-iron pipe	5 <sup>a</sup>	15
Copper or copper-alloy pipe	12	10
Copper or copper-alloy tubing, 1 ¼ -inch diameter and smaller	6	10
Copper or copper-alloy tubing, 1 ½ -inch diameter and larger	10	10
Cross-linked polyethylene (PEX) pipe	2.67 (32 inches)	10 <sup>b</sup>
Cross-linked polyethylene/ aluminum/cross-linked polyethylene (PEX-AL-PEX) pipe	2.67 (32 inches)	4
CPVC pipe or tubing, 1 inch and smaller	3	10 <sup>b</sup>
CPVC pipe or tubing, 1 ¼ inches and larger	4	10 <sup>b</sup>
Steel pipe	12	15
Lead pipe	Continuous	4
Polyethylene/aluminum/ polyethylene (PE-AL-PE) pipe	2.67 (32 inches)	4
Polypropylene (PP) pipe or tubing 1 inch and smaller	2.67 (32 inches)	10 <sup>b</sup>
Polypropylene (PP) pipe or tubing, 1 ¼ inches and larger	4	10 <sup>b</sup>
PVC pipe	4	10 <sup>b</sup>
Stainless steel drainage systems	10	10 <sup>b</sup>

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

- a. The maximum horizontal spacing of cast-iron pipe hangers shall be increased to 10 feet where 10-foot lengths of pipe are installed.
- b. Midstory guide for sizes 2 inches and smaller.

## SECTION 309 FLOOD HAZARD RESISTANCE

**309.1 General.** *All buildings and structures which have been determined to require flood resistant construction by the local flood plain administrator, as a*

*participant in the "National Flood Insurance Program", shall be constructed as required by the provisions of section 1612 of the building code for approval under the "Regulations for Floodplain Management and Flood Hazard Identification" of the "National Flood Insurance Program" pursuant to 44 "CFR parts 59-77" and the authority's "Flood Damage Prevention Ordinance."*

**309.2 Flood hazard.** *Deleted.*

**309.3 Flood hazard areas subject to high-velocity wave action.** *Deleted.*

## SECTION 310

### WASHROOM AND TOILET ROOM REQUIREMENTS

**310.1 Light and ventilation.** Washrooms and toilet rooms shall be illuminated and ventilated in accordance with the *building code* and *mechanical code*.

**310.2 Location of fixtures and piping.** Piping, fixtures or equipment shall not be located in such a manner as to interfere with the normal operation of windows, doors or other means of egress openings.

**310.3 Interior finish.** Interior finish surfaces of toilet rooms shall comply with the *building code*.

**310.4 Water closet compartment.** Each water closet utilized by the public or employees shall occupy a separate compartment with walls or partitions and a door enclosing the fixtures to ensure privacy.

#### **Exceptions:**

1. Water closet compartments shall not be required in a single-occupant toilet room with a lockable door.
2. Toilet rooms located in day care and child-care facilities and containing two or more water closets shall be permitted to have one water closet without an enclosing compartment.
3. This provision is not applicable to toilet areas located within Group I-3 housing areas.

**310.5 Urinal partitions.** *Deleted.*

**310.6 Enforcement.** *Enforcement of the provisions of this section is the responsibility of the certified building official of the certified municipal, county, or township building department having jurisdiction or the superintendent of the division of industrial compliance.*

## SECTION 311 TOILET FACILITIES FOR WORKERS

**311.1 General.** *Deleted.*

## SECTION 312 TESTS AND INSPECTIONS

**312.1 Required tests.** *The owner or owner's representative shall cause the applicable tests prescribed in Sections 312.2 through 312.11 to be made to determine compliance with the provisions of this code. Reasonable advance notice shall be given to the building official when the plumbing work is ready for tests. The owner or owner's representative shall keep records of the tests and shall submit such records to the building official upon request.*

**312.1.1 Test gauges.** *Gauges used for testing shall be as follows:-*

- 1.** *Tests requiring a pressure of 10 pounds per square inch (psi) (69 kPa) or less shall utilize a testing gauge having increments of 0.10 psi (0.69 kPa) or less.*
- 2.** *Tests requiring a pressure of greater than 10 psi (69 kPa) but less than or equal to 100 psi (689 kPa) shall utilize a testing gauge having increments of 1 psi (6.9 kPa) or less.*
- 3.** *Tests requiring a pressure of greater than 100 psi (689 kPa) shall utilize a testing gauge having increments of 2 psi (14 kPa) or less.*

**312.1.2 Test media.** *All plumbing system piping shall be tested with water.*

*Exception: Plumbing system piping is permitted to be tested with air or another compressed gas only when specifically allowed by the manufacturer of the proposed piping and when tested in accordance with the pressure limitations and conditions prescribed by that manufacturer.*

**312.2 Drainage and vent water test.** *A water test shall be applied to the drainage system either in its entirety or in sections. If applied to the entire system, all openings in the piping shall be tightly closed, except the highest opening, and the system shall be filled with water to the point of overflow. If the system is tested in sections, each opening shall be tightly plugged except the highest openings 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, at least 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. This pressure shall be held for at least 15 minutes. The system shall then be tight at all points.~~

~~**312.3 Drainage and vent air test.** An air test shall be made by forcing air into the system until there is a uniform gauge pressure of 5 psi (34.5 kPa) or sufficient to balance a 10-inch (254 mm) column of mercury. This pressure shall be held for a test period of at least 15 minutes. Any adjustments to the test pressure required because of changes in ambient temperature or the seating of gaskets shall be made prior to the beginning of the test period.~~

~~**312.4 Drainage and vent final test.** The final test of the completed drainage and vent systems shall be *made by air test after the fixtures are connected, with or without smoke or peppermint as follows:*~~

- ~~1. *Close all stack openings;*~~
- ~~2. *Apply air pressure to the entire drainage and vent system or to sections thereof equivalent to at least 1 in. water column (248.8 Pa);*~~
- ~~3. *Maintain this pressure starting fifteen (15) minutes before beginning inspection;*~~
- ~~4. *Indicate the system to be air tight at all points.*~~

~~**312.5 Water supply system test.** Upon completion of a section of or the entire water supply system, the system, or portion completed, shall be tested and proved tight under a water pressure not less than *10 percent in excess of* the working pressure *under which the system is to be used;* or by an air test of not less than 50 psi (344 kPa). This pressure shall be held for at least 15 minutes. The water utilized for tests shall be obtained from a potable source of supply. The required tests shall be performed in accordance with this section and Section *108.8 of the building code.*~~

~~**312.6 Gravity sewer test.** Deleted.~~

~~**312.7 Forced sewer test.** Deleted.~~

~~**312.8 Storm drainage system test.** Storm drain systems within a building shall be tested by water or air in accordance with Section 312.2 or 312.3.~~

~~**312.9 Shower liner test.** Where shower floors and receptors are made water tight by the application of materials required by Section 417.5.2, the completed liner installation shall be tested. The pipe from the shower drain shall be plugged water tight for the test. The floor and receptor area shall be filled with potable water to a~~

depth of not less than 2 inches (51 mm) measured at the threshold. Where a threshold of at least 2 inches (51 mm) high does not exist, a temporary threshold shall be constructed to retain the test water in the lined floor or receptor area to a level not less than 2 inches (51 mm) deep measured at the threshold. The water shall be retained for a test period of not less than 15 minutes, and there shall not be evidence of leakage.

*Exception: The shower liner test is not required for one, two, or three family dwellings unless required by the shower liner manufacturer's installation instructions.*

~~**312.10 Inspection and testing of isolation backflow prevention devices required by this code.** Inspection and testing shall comply with Sections 312.10.1 and 312.10.2. *Inspection and testing requirements for containment backflow prevention devices required by the water supplier shall be in accordance with rule 3745-95-06 of the Administrative Code and enforced by the water supplier.*~~

~~**312.10.1 Inspections.** Annual inspections shall be made of all backflow prevention assemblies and air gaps to determine whether they are operable.~~

~~**312.10.2 Testing.** Reduced pressure principle backflow preventer assemblies, double check valve assemblies, pressure vacuum breaker assemblies, reduced pressure detector fire protection backflow prevention assemblies, double check detector fire protection backflow prevention assemblies, hose connection backflow preventers, and spillproof vacuum breakers shall be tested at the time of installation, immediately after repairs or relocation and at least annually. The testing procedure shall be performed in accordance with one of the following standards:-~~

~~ASSE 5013, ASSE 5015, ASSE 5020, ASSE 5047, ASSE 5048, ASSE 5052, ASSE 5056, CSA B64.10 or CSA B64.10.1.~~

~~**312.11 Operational testing of low pressure cut-off device, low suction throttling valves, and variable speed suction limiting controls.** *Although enforcement of this section is outside the scope of the plumbing code, it is important for owners to note that rule 3745-95-07 of the Administrative Code requires that the owner certify to the supplier of water that their low pressure cut-off devices, low suction throttling valves, and variable speed suction limiting controls are maintained in proper working order. Enforcement of this requirement and the referenced rule is the responsibility of the water supplier. See Section 606.5.5 of this code for additional information.*~~

~~**312.12 Inspections.** No part of any plumbing or drainage system shall be covered until it has been inspected, tested, and approved, except as provided in this section.~~

~~Failure of the inspector to inspect the work within four days, exclusive of Saturdays, Sundays, and legal holidays, after the work is ready for inspection, allows the work to proceed.~~

**312.1 Required tests.** The owner or owner's representative shall cause the applicable tests and inspections prescribed in Sections 312.2 through 312.11 to be performed to determine that the work will withstand the prescribed test without leakage and to demonstrate the integrity of the device or assembly. In accordance with OBC Section 108.8, reasonable advanced notice shall be given to the building official when the plumbing work is ready for tests. The building official may require that the tests be conducted in the presence of the building official or certified plumbing inspector. The owner or owner's representative shall keep records of the tests and inspections and shall submit such records to the building official upon request.

**312.1.1 New, altered, extended or repaired systems.** New plumbing systems and parts of existing systems that have been altered, extended, or repaired shall be tested as prescribed herein to disclose leaks and defects, except that testing is not required in the following cases:

1. In any case that does not include addition to, replacement, alteration or relocation of any water supply, drainage or vent piping.
2. In any case where plumbing equipment is set up temporarily for exhibition purposes.

**312.1.2 Equipment, material, power and labor for tests.** Equipment, material, power and labor necessary for testing a plumbing system or part thereof shall be furnished by the owner or the owner's representative. Required tests shall be conducted by and at the expense of the owner or the owner's representative.

**312.1.3 Test gauges.** Gauges used for testing shall be as follows:

1. Tests requiring a pressure of 10 pounds per square inch (psi) (69 kPa) or less shall utilize a testing gauge having increments of 0.10 psi (0.69 kPa) or less.
2. Tests requiring a pressure of greater than 10 psi (69 kPa) but less than or equal to 100 psi (689 kPa) shall utilize a testing gauge having increments of 1 psi (6.9 kPa) or less.
3. Tests requiring a pressure of greater than 100 psi (689 kPa) shall utilize a

testing gauge having increments of 2 psi (14 kPa) or less.

**312.1.4 Test media.** *All plumbing system piping, fittings, and shower liners shall be tested with water.*

**Exception:** *Plumbing system piping and fittings are permitted to be tested as prescribed in Sections 312.2 to 312.8 with air, another compressed gas, vacuum, or other media or method only when the manufacturer of the proposed piping, fittings and solvent cement (if applicable) allows the alternative method of testing. Where this code does not address or prescribe an alternative test method, an alternative test method prescribed by the manufacturer of the piping, fittings, or solvent cement in the published manufacturer's installation instructions will be acceptable as meeting the requirements of this code.*

**312.1.5 Reinspection and testing.** *Where any work or installation does not pass any initial test or inspection, the necessary corrections shall be made to comply with this code.*

**312.2 Drainage and vent rough-in test.** *Drainage and vent piping and fittings shall be tested prior to the installation of the plumbing fixtures and prior to the installation of wall and ceiling coverings to verify the integrity of the system in accordance with one of the following methods prescribed in Section 312.2.1, 312.2.2, or 312.2.3:*

**312.2.1 Drainage and vent rough-in water test.** *A water test shall be applied to the drainage system either in its entirety or in sections. If applied to the entire system, all openings in the piping shall be tightly closed, except the highest opening, and the system shall be filled with water to the point of overflow. If the system is tested in sections, each opening shall be tightly plugged except the highest openings 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, at least 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. This pressure shall be held for at least 15 minutes. The system shall then be tight at all points.*

**312.2.2 Drainage and vent rough-in air test.** *When permitted by the manufacturer of the piping, fittings, and solvent cement (if part of the plumbing system), an air test shall be made by forcing air into the system until there is a*

uniform gauge pressure of 5 psi (34.5 kPa) or sufficient to balance a 10-inch (254 mm) column of mercury. This pressure shall be held for a test period of at least 15 minutes. Any adjustments to the test pressure required because of changes in ambient temperature or the seating of gaskets shall be made prior to the beginning of the test period. Testing shall be done with a dual pressure relief valve rated for 7.5 psig.

**312.2.3 Alternative drainage and vent rough-in test.** When permitted by the manufacturer of the piping, fittings, and solvent cement (if part of the plumbing system), an alternative method of testing the drainage and vent system, such as compressed gas or vacuum, may be permitted to meet the drainage and vent rough-in test requirements of this code as long as the test is conducted strictly in accordance with the requirements published in the manufacturer's installation instructions.

**312.3 Not used.**

**312.4 Drainage and vent final test.** After the plumbing fixtures have been set and their traps filled with water, the entire drainage system shall be subjected to one of the following final tests as prescribed by the building official:

**312.4.1 Visual and operational final test.** All plumbing fixtures shall be operated and a visual inspection of accessible piping and joints shall be performed to determine that there are no visible leaks.

**312.4.2 Drainage and vent final test.** The final test of the completed drainage and vent systems shall be made, after the fixtures are connected, as follows:

1. Close all stack openings;
2. A manometer tube shall be placed through a trap seal to the system side and water shall be added to a fixture until an equivalent of at least 1 in. water column (248.8 Pa) is read on the manometer gauge or water-can. Water may be added to a water closet bowl or trap tailpiece extension until the water level is at least one inch higher than the original trap seal;
3. Maintain the initial water column for fifteen (15) minutes;
4. The system shall then be separated at a trap seal, AAV, or other means as directed by the plumbing inspector for verification that the entire system is interconnected.



**312.4.3 Alternative drainage and vent final test.** Any other testing method equal to the 1 in. water column. Except as provided for in Section 312.4.2, compressed or stored air may not be used unless otherwise permitted by the manufacturer of piping, fittings, and solvent cement (if part of the plumbing system).

**312.5 Water supply system test.** Upon completion of a section of or the entire water supply system, the system, or portion completed, shall be tested to verify the integrity of the system in accordance with one of the following methods prescribed in Sections 312.5.1 or 312.5.2:

**312.5.1 Water supply working pressure test.** A water pressure test at not less than the working pressure under which the system is to be used shall be performed to prove the system watertight. This pressure shall be held for at least 15 minutes. The water utilized for tests shall be obtained from a potable source of supply.

**312.5.2 Water supply air test.** When permitted by the manufacturer of the piping, fittings, and solvent cement (if part of the plumbing system), an air test of not less than 50 psi (344 kPa) shall be performed to prove the system air-tight. This pressure shall be held for at least 15 minutes.

**312.6 Gravity sewer test.** Deleted.

**312.7 Forced sewer test.** Deleted.

**312.8 Storm drainage system test.** Storm drain systems within a building shall be tested in accordance with Section 312.2.

**312.9 Shower liner test.** Where shower floors and receptors are made water-tight by the application of materials required by Section 417.5.2, the completed liner installation shall be tested. The pipe from the shower drain shall be plugged water tight for the test. The floor and receptor area shall be filled with potable water to a depth of not less than 2 inches (51 mm) measured at the threshold. Where a threshold of at least 2 inches (51 mm) high does not exist, a temporary threshold shall be constructed to retain the test water in the lined floor or receptor area to a level not less than 2 inches (51 mm) deep measured at the threshold. The water shall be retained for a test period of not less than 15 minutes, and there shall not be evidence of leakage.

*Exception: The shower liner test is not required for one-, two-, or three-family dwellings unless required by the shower liner manufacturer's installation instructions.*

**312.10 Inspection and testing of isolation backflow prevention devices required by this code.** *Inspection and testing of isolation backflow prevention devices shall comply with Sections 312.10.1 and 312.10.2. Inspection and testing requirements for containment backflow prevention devices required by the water supplier shall be in accordance with rule 3745-95-06 of the Administrative Code and enforced by the water supplier.*

**312.10.1 Inspections.** *The owner shall maintain all backflow prevention assemblies and air gaps in good working condition. Annual inspections shall be made of all backflow prevention assemblies and air gaps to determine whether they are operable.*

**312.10.2 Testing.** *Reduced pressure principle, double check, pressure vacuum breaker, reduced pressure detector fire protection, double check detector fire protection, and spill-resistant vacuum breaker backflow prevention assemblies and hose connection backflow preventers shall be tested at the time of installation, immediately after repairs or relocation and at least annually. The testing procedure shall be performed in accordance with one of the following standards:*

*ASSE 5013 for reduced pressure principle and reduced pressure principle fire protection backflow prevention assemblies, ASSE 5015 for double check and double check fire protection backflow prevention assemblies, ASSE 5020 for pressure vacuum breaker assemblies, ASSE 5047 for reduced pressure detector fire protection backflow prevention assemblies, ASSE 5048 for double check detector fire protection backflow prevention assemblies, ASSE 5052 for hose connection backflow preventers, ASSE 5056 for spill resistant vacuum breaker assemblies, CSA B64.10 or CSA B64.10.1.*

**312.11 Operational testing of low pressure cut-off device, low suction throttling valves, and variable speed suction limiting controls.** *Although enforcement of this section is outside the scope of the plumbing code, it is important for owners to note that rule 3745-95-07 of the Administrative Code requires that the owner certify to the supplier of water that their low pressure cut-off devices, low suction throttling valves, and variable speed suction limiting controls are maintained in proper working order. Enforcement of this requirement and the referenced rule is the responsibility of the water supplier. See Section 606.5.5 of this code for additional information.*

**312.12 Inspections.** *No part of any plumbing or drainage system shall be covered until it has been inspected, tested, and approved, except as provided in this section.*

*Failure of the inspector to inspect the work within four days, exclusive of Saturdays, Sundays, and legal holidays, after the work is ready for inspection, allows the work to proceed.*

### **SECTION 313 EQUIPMENT EFFICIENCIES**

**313.1 General.** Equipment efficiencies shall be in accordance with the *the applicable standard referenced in Chapter 13 of the building code or Chapter 11 of the “Residential Code of Ohio”*.

### **SECTION 314 CONDENSATE DISPOSAL**

**314.1 Fuel-burning appliances.** Liquid combustion by-products of condensing appliances shall be collected and discharged to an approved plumbing fixture or disposal area in accordance with the manufacturer’s installation instructions. Condensate piping shall be of approved corrosion-resistant material and shall not be smaller than the drain connection on the appliance. Such piping shall maintain a minimum horizontal slope in the direction of discharge of not less than one-eighth unit vertical in 12 units horizontal (1-percent slope).

**314.2 Evaporators and cooling coils.** Condensate drain systems shall be provided for equipment and appliances containing evaporators or cooling coils. Condensate drain systems shall be designed, constructed and installed in accordance with Sections 314.2.1 through 314.2.4.

**314.2.1 Condensate disposal.** Condensate from all cooling coils and evaporators shall be conveyed from the drain pan outlet to an approved place of disposal. Such piping shall maintain a minimum horizontal slope in the direction of discharge of not less than one-eighth unit vertical in 12 units horizontal (1-percent slope). Condensate shall not discharge into a street, alley or other areas so as to cause a nuisance.

**314.2.2 Drain pipe materials and sizes.** Components of the condensate disposal system shall be cast iron, galvanized steel, copper, cross-linked polyethylene, polybutylene, polyethylene, ABS, CPVC or PVC pipe or tubing. All components shall be selected for the pressure and temperature

rating of the installation. Joints and connections shall be made in accordance with the applicable provisions of Chapter 7 relative to the material type. Condensate waste and drain line size shall be not less than  $\frac{3}{4}$ -inch (19 mm) internal diameter and shall not decrease in size from the drain pan connection to the place of condensate disposal. Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with Table 314.2.2.

**314.2.3 Auxiliary and secondary drain systems.** In addition to the requirements of Section 314.2.1, where damage to any building components could occur as a result of overflow from the equipment primary condensate removal system, one of the following auxiliary protection methods shall be provided for each cooling coil or fuel-fired appliance that produces condensate:

1. An auxiliary drain pan with a separate drain shall be provided under the coils on which condensation will occur. The auxiliary pan drain shall discharge to a conspicuous point of disposal to alert occupants in the event of a stoppage of the primary drain. The pan shall have a minimum depth of 1  $\frac{1}{2}$  inches (38 mm), shall not be less than 3 inches (76 mm) larger than the unit or the coil dimensions in width and length and shall be constructed of corrosion-resistant material. Galvanized sheet metal pans shall have a minimum thickness of not less than 0.0236-inch (0.6010 mm) (No. 24 gage) galvanized sheet metal. Nonmetallic pans shall have a minimum thickness of not less than 0.0625 inch (1.6 mm).
2. A separate overflow drain line shall be connected to the drain pan provided with the equipment. Such overflow drain shall discharge to a conspicuous point of disposal to alert occupants in the event of a stoppage of the primary drain. The overflow drain line shall connect to the drain pan at a higher level than the primary drain connection.
3. An auxiliary drain pan without a separate drain line shall be provided under the coils on which condensate will occur. Such pan shall be equipped with a water-level detection device conforming to UL 508 that will shut off the equipment served prior to overflow of the pan. The auxiliary drain pan shall be constructed in accordance with Item 1 of this section.
4. A water-level detection device conforming to UL 508 shall be provided that will shut off the equipment served in the event that the primary drain is blocked. The device shall be installed in the primary drain line, the overflow drain line, or in the equipment-supplied drain pan, located at a point higher than the primary drain line connection and below the overflow rim of such pan.

**Exception:** Fuel-fired appliances that automatically shut down operation

in the event of a stoppage in the condensate drainage system.

**TABLE 314.2.2  
CONDENSATE DRAIN SIZING**

<b>EQUIPMENT CAPACITY</b>	<b>MINIMUM CONDENSATE PIPE DIAMETER</b>
Up to 20 tons of refrigeration	3/4 inch
Over 20 tons to 40 tons of refrigeration	1 inch
Over 40 tons to 90 tons of refrigeration	1 1/4 inch
Over 90 tons to 125 tons of refrigeration	1 1/2 inch
Over 125 tons to 250 tons of refrigeration	2 inch

For SI: 1 inch = 25.4 mm, 1 ton of capacity = 3.517 kW.

**314.2.3.1 Water-level monitoring devices.** On down-flow units and all other coils that do not have a secondary drain or provisions to install a secondary or auxiliary drain pan, a water-level monitoring device shall be installed inside the primary drain pan. This device shall shut off the equipment served in the event that the primary drain becomes restricted. Devices installed in the drain line shall not be permitted.

**314.2.3.2 Appliance, equipment and insulation in pans.** Where appliances, equipment or insulation are subject to water damage when auxiliary drain pans fill such portions of the appliances, equipment and insulation shall be installed above the flood level rim of the pan. Supports located inside of the pan to support the appliance or equipment shall be water resistant and approved.

**314.2.4 Traps.** Condensate drains shall be trapped as required by the equipment or appliance manufacturer.

**314.3 Enforcement.** *Enforcement of the provisions of this section is the responsibility of the certified building official of the certified municipal, county, or township building department having jurisdiction or the superintendent of the division of industrial compliance.*

## **SECTION 315 WELDING AND BRAZING**

**315.1 Scope.** *This section, consistent with section 4104.44 of the Revised Code, governs the requirements for welding and brazing of metallic building services (including medical gas) piping systems referenced by this code.*

**315.2 Procedure specification.** *Each manufacturer or contractor of metallic building services piping systems is responsible for the welding and brazing done by his company or organization and shall specify and certify, in writing, a welding or brazing procedure that provides specific direction to the welder or brazer and complies with section IX of the ASME Boiler and Pressure Vessel Code.*

**315.3 Procedure qualification records.** *Each manufacturer or contractor is responsible for getting each procedure described in section 315.2 qualified by an independent testing laboratory that has, on staff, a welding inspector certified by the “American Welding Society (AWS).” Qualification testing determines that the specified joint construction is capable of providing the required properties for its intended application. The procedure qualification record (PQR) documents what occurred during the welding or brazing of the test coupon, identifies all essential variables, and documents the test results. The manufacturer or contractor shall certify on the record that the tests were conducted in accordance with section IX of the ASME Boiler and Pressure Vessel Code.*

**315.4 Performance qualification testing.** *Each welder and brazer that performs a welding or brazing procedure as described in section 315.2 shall be tested and qualified on that procedure as required in section IX of the ASME Boiler and Pressure Vessel Code. The manufacturer or contractor, shall certify on the performance qualification record that the welder or brazer prepared and welded or brazed the test coupons in accordance with section IX and that the test coupons were tested by an independent testing laboratory that has, on staff, a welding inspector certified by the “American Welding Society (AWS).”*

**315.5 Submission of welding and brazing forms to the division of industrial compliance (DIC).** *Each manufacturer or contractor of metallic building services piping systems referenced by this code who causes welding or brazing to be performed shall file with the superintendent of the division of industrial compliance in the department of commerce, or the superintendent’s designee, certified copies of the welding and brazing procedure specifications, the procedure qualification records, and the welder and brazer performance qualifications of the welders and brazers used in the proposed construction of a new or altered piping system. The required documentation shall be submitted in accordance with rules adopted by the superintendent.*

Effective: 10/10/2016

Five Year Review (FYR) Dates: 11/01/2016

CERTIFIED ELECTRONICALLY

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Certification

09/30/2016

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Date

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