Ohio Board of Building Standards
Building on the Code Education Series

Residential Code of Ohio
Plumbing Requirements
September 27, 2013

Presentation Handout
2013 Residential Code of Ohio – Fundamentals: Plumbing

Based on the 2013 Ohio Residential Code, RCO

Presenter Instructions

- Some slides contain animation and hyperlinks.
- Review the presentation in “presentation mode” so that you are aware of the timing and appearance of graphic on the slides.
- On slides containing hyperlinks, you will see a star on the side of the slide.
- On slides containing a hyperlink, you will see a dot at the bottom of this slide.

Introduction

- This chapter regulates plumbing installation, testing and operations under the Residential Code of Ohio (RCO.)
- The RCO systems continues to emphasize both prescriptive and performance-related provisions.
Objectives

- Upon completion, you will be better able to:
  - Identify code enforcement issues and key code sections.
  - Describe the application of the code to inspection, plan review and code enforcement.

Chapter 1 - Administration

4101:8-1-01

- This entire chapter has been re-written by the State of Ohio. While the administrative chapter is not covered in this seminar understanding it's content is essential to proper code compliance.

SECTION 101 GENERAL

- The State of Ohio has adopted Chapters 2 thru 24, 29 & 44 of the 2009 edition of the "International Residential Code" as published by "The International Code Council, Inc." incorporated fully except as modified in italics or deleted.

Ohio Changes will be shown in italics to distinguish the Residential Code of Ohio from the Model Code.
Chapter 25 Plumbing systems. 4101:8-25-01

SECTION 2501 Plumbing systems.

- The provisions of the "Ohio Plumbing Code" as referenced in Chapter 44 shall be incorporated herein, except as modified in Section 2501.1.1, and shall govern the installation, testing and operation of the plumbing in buildings within the scope of this code.

Ohio Changes will be shown in italics to distinguish the Residential Code of Ohio from the Model Code.

Chapter 25 Plumbing systems. 4101:8-25-01

SECTION 2501.1.1 Modifications to the "Ohio Plumbing Code".

- The following sections of the "Ohio Plumbing Code" shall be deleted and replaced with the following language:

Chapter 25 Plumbing systems. 4101:8-25-01

- Section 312.9 Shower liner test.
  
  Deleted
Chapter 25 Plumbing systems.
4101:8-25-01

- Section 417.5.2 Shower lining requirements. Floors under shower compartments, except where prefabricated receptors have been provided, shall be lined and made water tight utilizing material complying with Sections 417.5.2.1 through 417.5.2.5. Such liners shall turn up on all sides at least 2 inches above the finished threshold level. Liners shall be recessed and fastened to an approved backing so as not to occupy the space required for wall covering, and shall not be nailed or perforated at any point less than 1 inch above the finished threshold. Liners shall be pitched 1/4 of unit vertical in 12 units horizontal (2-percent slope) and shall be securely fastened to the waste outlet at the seepage entrance, making a water-tight joint between the liner and the outlet.

Exceptions:
1. Floor surfaces under shower heads provided for rinsing laid directly on the ground are not required to comply with this section.
2. Where a sheet-applied, load-bearing, bonded, waterproof membrane is installed as the shower lining, the membrane shall not be required to be recessed.

Chapter 25 Plumbing systems.
4101:8-25-01

- Section 1002.4 Trap seals. Each fixture trap shall have a liquid seal of not less that 2 inches and not more than 4 inches, or deeper for special designs relating to accessible fixtures. Where a trap seal is subject to loss by evaporation, a trap seal primer valve shall be installed. Trap seal primer valves shall connect to the trap at a point above the level of the trap seal. A trap seal valve shall conform to ASSE 1018 or ASSE 1044.

Exceptions:
1. Where a trap is supplied with water on a regular basis, a trap seal primer valve shall not be required.
2. A trap seal primer valve is not required in garage floor drains in one-, two- and three-family dwellings.

Chapter 29 Water Supply and Distribution. 4101:8-29-01

- All of the Sections of Chapter 29 are deleted and referenced to the comparable section in the Ohio Plumbing Code (2011), except that — Section 2904 Dwelling Unit Fire Sprinkler Systems is retained including its referenced tables for use as an acceptable equivalent to the NFPA 13D standard for Dwelling Sprinkler Systems under the 2013 RCO.

- This section is available for those homeowners who choose to voluntarily install a sprinkler system in dwellings under the Residential Code of Ohio.
This diagram is not intended to show a complete plumbing system. It is intended to depict the various components using the defined terms.

Air Admittance Valve

- A one-way valve designed to allow air into the plumbing drainage system when a negative pressure develops in the piping. This device shall close by gravity and seal the terminal under conditions of zero differential pressure (no flow conditions) and under positive internal pressure. The purpose of an air admittance valve is to provide a method of allowing air to enter the plumbing drainage system without the use of a vent extended to open air and to prevent sewer gases from escaping into a building.
Air Admittance Valve

Open

Air Admittance Valve

Closed

Air Break (Drainage System)

- A piping arrangement in which a drain from a fixture, appliance or device discharges indirectly into another fixture, receptacle or interceptor at a point below the flood level rim and above the trap seal.
Air Gap (Drainage System)

- The unobstructed vertical distance through the free atmosphere between the outlet of the waste pipe and the flood level rim of the receptacle into which the waste pipe is discharging.

Bathroom Group

- A group of fixtures consisting of a water closet, lavatory, bathtub or shower, including or excluding a bidet, an emergency floor drain or both. Such fixtures are located together on the same floor level.

Branch Intervals
**Branch Intervals**

**Building Drain**

That part of the lowest piping of a drainage system that receives the discharge from soil, waste and other drainage pipes inside and that extends 30 inches (762 mm) in developed length of pipe beyond the exterior walls of the building and conveys the drainage to the building sewer.

**Building Service Piping**

- All piping systems and their component parts that are part of a building system and that promote the safe, sanitary, and energy efficient occupancy of a building. Building services piping includes, but is not limited to, cold and hot potable water distribution for plumbing fixtures; sanitary lines from plumbing fixtures; nonflammable medical gas systems; medical oxygen systems; medical vacuum systems; fire protection piping systems and compressed air in dry systems; refrigeration, chilled water, condenser and cooling tower water, brine, and water/antifreeze systems; steam, steam condensate, and hot water piping systems; and fuel oil piping and fuel gas piping for heating, cooling, and cooking applications. See division (A) of Section 4104.41 of the Revised Code.
**Building Sewer**

- That part of the drainage system that extends from the end of the building drain and conveys the discharge to a public sewer, private sewer, individual sewage disposal system or other point of disposal.
  - **Combined.** A building sewer that conveys both sewage and storm water or other drainage.
  - **Sanitary.** A building sewer that conveys sewage only.
  - **Storm.** A building sewer that conveys storm water or other drainage, but not sewage.

**Depth of Trap Seal**

- Change from depth of water seal
- Allows other liquids to maintain the seal, such as in a waterless urinal

**Drainage System Components**

- Piping within a public or private premise that conveys sewage, rainwater or other liquid wastes to a point of disposal. A drainage system does not include the mains of a public sewer system or a private or public sewage treatment or disposal plant.
  - **Building gravity.** A drainage system that drains by gravity into the building sewer.
  - **Sanitary.** A drainage system that carries sewage and excludes storm, surface and ground water.
  - **Storm.** A drainage system that carries rainwater, surface water, subsurface water and similar liquid wastes.
Drainage System Components

Fixture Branch
A drain serving two or more fixtures that discharges to another drain or to a stack.

Fixture Drain
The drain from the trap of a fixture to a junction with any other drain pipe.
**Horizontal Branch Drain**

- A drainage branch pipe extending laterally from a soil or waste stack or building drain, with or without vertical sections or branches, that receives the discharge from two or more fixture drains or branches and conducts the discharge to the soil or waste stack or to the building drain.

**Gray Water**

- Waste discharged from lavatories, bathtubs, showers, clothes washers and laundry trays.

**Hot Water**

- Water at a temperature greater than or equal to 110°F (43°C).

- **Tempered Water**
  - Water having a temperature range between 85°F (29°C) and 110°F (43°C).
Hub Drain

- A drain whose inlet terminates not less than one inch (25.4 mm) above the finished floor.

LABEL

- An identification applied on a product by the manufacturer that contains the name of the manufacturer, the function and performance characteristics of the product or material, and the name and identification of an approved agency and that indicates that the representative sample of the product or material has been tested and evaluated by an approved agency (see building code Section 1703.5 and building code definitions "Inspection Certificate," "Manufacturer's Designation," and "Mark").

Leader

- An exterior drainage pipe for conveying storm water from roof or gutter drains to an approved means of disposal.
Quick-Closing Valve

A valve or faucet that closes automatically when released manually or that is controlled by a mechanical means for fast-action closing.

Service Sink

Any designated sink so approved for liquid discharge, liquid filling, cleaning, and washing in a facility, and installed in a dedicated area or space.

WASTE RECEPTOR

A device for receiving the discharge of a waste pipe or pipes and discharges them by gravity into the sanitary drainage system. Waste receptors include, but are not limited to, floor drains, floor sinks, trench drains, hub drains, standpipes, mop basins, service sinks, and laundry trays.
Section 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.

### Products and Materials Requiring Third-Party Testing and Third-Party Certification

<table>
<thead>
<tr>
<th>PRODUCT OR MATERIAL</th>
<th>THIRD-PARTY CERTIFIED</th>
<th>THIRD-PARTY TESTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portable water supply system components</td>
<td>Required</td>
<td></td>
</tr>
<tr>
<td>Sanitary drainage and vent system components</td>
<td>Plastic pipe, fittings and pipe-related components</td>
<td>All others</td>
</tr>
<tr>
<td>Waste fixture fittings</td>
<td>Plastic pipe, fittings and pipe-related components</td>
<td>All others</td>
</tr>
<tr>
<td>Storm drainage system components</td>
<td>Plastic pipe, fittings and pipe-related components</td>
<td>All others</td>
</tr>
<tr>
<td>Plumbing fixtures</td>
<td>Required</td>
<td></td>
</tr>
<tr>
<td>Plumbing appliances</td>
<td>Required</td>
<td></td>
</tr>
<tr>
<td>Backflow prevention devices</td>
<td>Required</td>
<td></td>
</tr>
<tr>
<td>Water distribution system safety devices</td>
<td>Required</td>
<td></td>
</tr>
<tr>
<td>Special waste system components</td>
<td>—</td>
<td>Required</td>
</tr>
<tr>
<td>Subsoil drainage system components</td>
<td>—</td>
<td>Required</td>
</tr>
</tbody>
</table>

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Sections 305.2/305.5 Pipe Protection

Section 305.8 Pipe Protection

Section 305.9 Protection of Plumbing System Components

NOTE: OTHER METHODS OF PROTECTION OF PLUMBING COMPONENTS ARE POSSIBLE, SUBJECT TO APPROVAL BY THE CODE OFFICIAL.
Section 306.2.1 Overexcavated Trench

GRADE

BEDDING SHALL BE TAMPED IN 6" MAX. LAYERS

Section 308.3 Materials

Hanger Spacing Table 308.5

- The spacing of supports, listed in Table 308.5, is based on reducing the sag of the piping system
Section 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.
- Reasonable advance notice shall be given to the building official when the plumbing work is ready.
- The owner or owner’s representative shall keep records of the tests and shall submit such records to the building official upon request.
- Sec. 108.1 – Access to and means for inspection shall be provided for any inspections that are required.
Section 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 sections – at least 1 inch water column
  3. Maintain this pressure starting 15 minutes before beginning inspection
  4. Indicate the system to be air-tight at all points

Section 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, for piping systems other than plastic, 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.

Section 312.11
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 405.3.1 Fixture Clearances

- Note: Where a connection is made to a fixture branch, horizontal branch drain or drainage stack, the minimum required size is 3 inches.

Section 406.3 Automatic Clothes Washer Waste Connections

- Note: Where a connection is made to a fixture branch, horizontal branch drain or drainage stack, the minimum required size is 3 inches.
Section 412.2 Floor Drains

- Floor drains shall have removable strainers. The floor drain shall be constructed so that the drain is capable of being cleaned. Access shall be provided to the drain inlet. Ready access shall be provided to floor drains.

Section 412.3 Size of Floor Drains

Section 417.2 Shower Water Supply Riser

Shower water supply riser must be fastened to the structure using fittings with screws or by devices specifically designed for such purpose.
Section 417.4 Shower Compartments

- Minimum 900 square inches of interior cross-sectional area
- 30 inches minimum dimensions (exception – 25”)
- Measured from finished interior surfaces at the top of threshold and at a point tangent to its centerline and continued to a height at least 70 inches above the shower drain outlet.

Section 417.4.2 Access

- The shower compartment access and egress opening shall have a minimum clear and unobstructed finished width of 22 inches.
- Shower compartments required to be designed in conformance to accessibility provisions shall comply with Section 404.1.

417.5.2 Shower Lining

- Floors under shower compartments, except where prefabricated receptors have been provided, shall be lined and made water tight utilizing material complying with Sections 417.5.2.1 through 417.5.2.5.
- Exceptions:
  - Floor surfaces under shower heads for rinsing directly on the ground.
  - When a sheet-applied, load-bearing, bonded, waterproof membrane is installed.
417.5.2 Shower Lining – cont’d

- 417.5.2.1 PVC sheets – ASTM D 4551
- 417.5.2.2 Chlorinated polyethylene (CPE) sheets – ASTM D 4068
- 417.5.2.3 Sheet lead
- 417.5.2.4 Sheet copper – ASTM B 152
- 417.5.2.5 Sheet-applied, load-bearing, bonded, waterproof membranes – ANSI A118.10

Section 419.1 Approval

- Urinals shall conform to ANSI Z124.9, ASME A112.19.2M, CSA B45.1 or CSA B45.5. Urinals shall conform to the water consumption requirements of Section 604.4. Water-supplied urinals shall conform to the hydraulic performance requirements of ASME A112.19.6, CSA B45.1 or CSA B45.5.
Section 421.4 Suction Fittings

- Suction fittings for whirlpool bathtubs shall comply with ASME A112.19.8M.

Section 421.5 Access to Pump

- Access shall be provided to circulation pumps in accordance with the fixture or pump manufacturer’s installation instructions.
- Where the manufacturer’s instructions do not specify the location and minimum-size of field-fabricated access openings, a 12-inch by 12-inch minimum-sized opening shall be installed to provide access to the circulation pump.

Section 421.5 Access to Pump (cont.)

- Where pumps are located more than 2 feet from the access opening, an 18-inch by 18-inch minimum-sized opening shall be installed. A door or panel shall be permitted to close the opening.
- In all cases, the access opening shall be unobstructed and of the size necessary to permit the removal and replacement of the circulation pump.
Table 424.4 Maximum Temperatures Allowed At Use Locations

The following water outlets must be equipped with temperature limiting devices.

<table>
<thead>
<tr>
<th>Plumbing Fixture</th>
<th>Maximum Discharge Temperature</th>
<th>Reference Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Bidet</td>
<td>≤110°F (43.33°C)</td>
<td>ASSE 1070</td>
</tr>
<tr>
<td>2. Individual shower valve</td>
<td>≤120°F (48.89°C)</td>
<td>ASSE 1016 or ASME A112.18.1 / CSA B125 except as allowed by Section 424.3.</td>
</tr>
<tr>
<td>3. Bathtub/whirlpool bathtubs</td>
<td>≤120°F (48.89°C)</td>
<td>ASSE 1070 or CSA B125.3 except as allowed by Section 424.3.</td>
</tr>
</tbody>
</table>

Standards Related To Fixture Applications

Figure 424.4

≤120°F (48.89°C)

>85°F (29.44°C) and

<110°F (43.33°C)
Section 501.1 Scope

- The provisions of this chapter shall govern . . . water heaters
- Exception: Water heaters shall comply with the "Ohio Boiler and Pressure Vessel rules" when any of the following are exceeded:
  1. Heat input of 200,000 BTU/hr
  2. Water temperature of 210 degrees F.
  3. Nominal water capacity of 120 gallons.

Section 502.1.1 Elevation and Protection

- Elevation of water heater ignition sources and mechanical damage protection requirements for water heaters shall be in accordance with the mechanical code and the International Fuel Gas Code.
- Exception: Elevation of the ignition source is not required for appliances that are listed as flammable vapor ignition resistant.

Section 502.3 Water Heaters Installed in Attics

- Access large enough to remove water heater
- Passageway not less than 30 inches high & 22 inches wide
- Passageway not more than 20 feet in length when measured along the centerline of the passageway from the opening to the water heater
- Minimum 24 inches wide continuous solid flooring
- Level service space
  - 30’ deep, 30’ wide
  - Present at the front of service
    + Access opening 20’ x 30’ minimum
Section 502.5 Clearance for Maintenance and Replacement

- Appliances shall be provided with access for inspection, service, repair and replacement without disabling the function of a fire-resistance-rated assembly or removing permanent construction, other appliances or any other piping or ducts not connected to the appliance being inspected, serviced, repaired or replaced. A level working space at least 30 inches deep and 30 inches wide (762 mm by 762 mm) shall be provided in front of the control side to service an appliance.

Section 503.1 Cold Water Line Valve

Diagram showing the cold water line valve connections.
Section 504.6 Requirements for Discharge Piping item 5

- Temperature and pressure relief valve pipe is allowed to terminate in a water heater pan.

Section 504.6 Relief Valve Discharge Piping

1. Not be directly connected to the drainage system.
2. Discharge through an air gap located in the same room.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the air gap.
4. Serve a single relief device and shall not connect to piping serving any other relief device or equipment.
5. Discharge to the floor, to the pan serving the water heater or storage tank, to a waste receptor or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
7. Discharge to a termination point that is readily observable by the building occupants.
8. Not be trapped.
9. Be installed so as to flow by gravity.
10. Not terminate more than 6 inches (152 mm) above the floor or waste receptor.
11. Not have a threaded connection at the end of such piping.
12. Not have valves or tee fittings.
13. Be constructed of those materials listed in Section 605.4 or materials tested, rated and approved for such use in accordance with ASME A112.4.1.

Section 504.6 Requirement For Discharge Piping

- Prohibited Installation
  - Relief valve without discharge piping connected to waste in the immediate area.
  - Discharge piping terminated in a floor drain.
  - Relief valve must be piped to the drainage system or safe location.
Chapter Six

Water Supply and Distribution

Section 602.2 Potable Water Required

- Only potable water shall be supplied to plumbing fixtures that provide water for drinking, bathing or culinary purposes, or for the processing of food, medical or pharmaceutical products. Unless otherwise provided in this code, potable water shall be supplied to all plumbing fixtures.

Section 603.1 Size of Water Service Pipe

- The water service pipe shall be sized to supply water to the structure in the quantities and at the pressures required in this code. The minimum diameter of water service pipe shall be 3/4 inch (19.1 mm).
Section 603.2 Separation of Water Supply and Building Sewer

**Note:** Trench Separation distance in Ohio is 10-feet minimum

**Exception 1**

12" MIN. WATER SERVICE ON SHELF

BUILDING SEWER IN SEPARATE TRENCH

WATER SERVICE IN SEPARATE TRENCH

Exception 1

BUILDING SEWER IN SEPARATE TRENCH

WATER SERVICE IN SEPARATE TRENCH

Section 603.2 Separation of Water Service and Building Sewer

Sewer pipe not listed in Table 702.2

Section 603.2.1 Water Service Near Sources of Pollution

- Potable water service pipes shall not be located in, under or above:
  - Cesspools
  - Septic tanks
  - Septic tank drainage fields or seepage pits

- The provisions of Section 603 are enforced by the certified building official of the jurisdiction
Section 604 Design of Building Water Distribution System

- Shall conform to accepted engineering practice.
- **NOTE:** Ohio has not adopted Appendix E. Appendix E is a resource. Appendix E is not enforceable.
- Appendix E describes two methods of sizing a water supply system.
  - Section E103.3 (Segmented loss method)
  - Section E 201.1 (Based on water fixture units or old method)

Example of E201.1 (Residential Method)

- The following example utilizes Appendix E (Residential Method).
- A building with 15’ elevation difference to the highest water supply outlet.
- Available Pressure = 65 psi low, 70 psi high.
- Developed length of 40’.
- Combined fixture unit value of 27.5.

**NOTE:** Ohio has not adopted Appendix E. Appendix E is a resource. Appendix E is not enforceable.

Example of E201.1 (Residential Method) cont.

<table>
<thead>
<tr>
<th>Step</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Obtain the minimum service pressure (psig) available from the local water authority.</td>
</tr>
<tr>
<td>2</td>
<td>Adjust for elevation conditions (subtract 0.5 psi for each foot of height. If the highest water supply outlet is below the meter, add 0.5 psi for each foot of difference. Take in consideration the pressure reducing valve.</td>
</tr>
<tr>
<td>3</td>
<td>Deduct for all pressure losses caused by special equipment, such as backflow preventers, water softeners, filters, etc. The loss is determined in accordance with the manufacturer’s specifications.</td>
</tr>
<tr>
<td>4</td>
<td>Determine fixture water controls require more than 8 psig minimum to operate. (Note the resulting figure). Temperature-controlled shower valve deduct in excess of 8 psi (12).</td>
</tr>
<tr>
<td>5</td>
<td>Note the resulting figure.</td>
</tr>
<tr>
<td>6</td>
<td>Determine the approximate length of piping from the water main to the most remote fixture in house. (The hot water circuit may be the longest length.)</td>
</tr>
<tr>
<td>7</td>
<td>Using the “Combined” column of Table E103.3(2) and the water system fixture units (wsfu) of all fixtures that are a part of the system, and note the resulting figure.</td>
</tr>
<tr>
<td>8</td>
<td>In the approximate pressure range from step 6 of the Table E201.1 , find the maximum developed length through water heater or cold water branches and multiply by 1.2 to account for fittings. Read down this column until you find the (wsfu) that is equal to or greater than the total (wsfu) obtained in step 7.</td>
</tr>
<tr>
<td>9</td>
<td>Read across this row to obtain the minimum meter and service pipe size from column one.</td>
</tr>
<tr>
<td>10</td>
<td>Continue this row to obtain the maximum branch and supply pipe sizes from column one.</td>
</tr>
</tbody>
</table>
Example of E201.1 (Residential Method) cont.

### Steps

<table>
<thead>
<tr>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1. 65</td>
</tr>
<tr>
<td>Step 2. 15' x 0.5</td>
</tr>
<tr>
<td>Step 3. 3 psi</td>
</tr>
<tr>
<td>Step 4. Temperature-controlled showers deduct in excess of 8 psi</td>
</tr>
<tr>
<td>Step 5. Resulting pressure</td>
</tr>
<tr>
<td>Step 6. 48' = (40' x 1.2)</td>
</tr>
<tr>
<td>Step 7. 1 bathroom group = 2 x 3.6 (private use)</td>
</tr>
<tr>
<td>Kitchen sink = 1 x 1.4</td>
</tr>
<tr>
<td>Dishwasher = 1 x 1.4</td>
</tr>
<tr>
<td>Hose bibb = 3 x 2.5</td>
</tr>
<tr>
<td>Sprinkler head = 5 x 2.0</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Table E201.1

Example of E201.1 (Residential Method) cont

- Step 8. From the “Pressure Range 40-49 psi” (from step 5) column, read down the 60’ column.

- Step 9. The meter size from column one is ¾” and the main distribution pipe shall be 1 inch.

**NOTE:** Ohio has not adopted Appendix E. Appendix E is a resource. Appendix E is not enforceable.

Section 604.5 Size of Fixture Supply
Section 604.9 Water Hammer

- Water hammer arrestors are required where quick-closing valves are installed.

- Quick-closing valves:
  - close automatically when released manually; or
  - have fast-action mechanical closure

Example of Water-Hammer Arrestors

Section 606 Installation of the Building Water Distribution System

- Section 606.1 Location of Full Open Valves

- Full-open valves shall be installed in the following locations:
**Valves on Supply to Each Tank**

- HYDRO-PNEUMATIC TANK
- GRAVITY TANK
- TANK VALVE

**Water Heater Valve**

- HOT WATER
- COLD SUPPLY
- VALVE ONLY REQUIRED ON SUPPLY

**Section 606.2 Location of Shutoff Valves**

- Shutoff valves shall be installed in the following locations:
  - 1. On the fixture supply to each plumbing fixture*
  - 2. On the water supply pipe to each sillcock.
  - 3. On the water supply pipe to each appliance or mechanical equipment.

*NOTE: Ohio removed the exemption for residential bathtubs and showers – they are required to have shutoff valves.
Section 607.3
Example of Thermal Expansion Control

Example of closed system

Pressure Reducing Valve with Thermal Expansion Bypass

Air Gap for a Faucet
### Table 608.15.1 Minimum Required Air Gaps

<table>
<thead>
<tr>
<th>Fixture</th>
<th>Minimum Air Gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Least 1 inch diameter of an effective opening greater than 1/2 inch</td>
<td>1</td>
</tr>
<tr>
<td>Least 2 inches diameter of an effective opening greater than 1/2 inch</td>
<td>2</td>
</tr>
<tr>
<td>Least 1 inch diameter of an effective opening greater than 1 inch</td>
<td>3</td>
</tr>
<tr>
<td>Least 1 inch diameter of an effective opening greater than 2 inches</td>
<td>4</td>
</tr>
<tr>
<td>Diameters greater than 3 inches</td>
<td></td>
</tr>
</tbody>
</table>

*Table 608.15.1 Minimum Required Air Gaps*

---

### 608.17 Protection of Individual Water Supplies

- An individual water supply, otherwise known as a private water system, shall be located and constructed so as to be safeguarded against contamination in accordance with the rules of the Ohio Department of Health contained within Chapter 3701-28 of the Administrative Code, “Private Water Systems.”

---

### 612 Solar Systems

- The construction, installation, alterations and repair of systems, equipment and appliances intended to utilize solar energy for space heating or cooling, domestic hot water heating, swimming pool heating or process heating shall be in accordance with the mechanical code.
613 Temperature Control Devices and Valves

- Temperature actuated mixing valves, which are installed to reduce water temperatures to defined limits, shall comply with ASSE 1017.

Chapter Seven
Sanitary Drainage

Section 701 Sanitary Drainage
Section 701.4 Sewage Treatment

- Sewage or other waste from a plumbing system that is deleterious to surface or subsurface waters shall not be discharged into the ground or into any waterway without prior approval from the “Ohio Environmental Protection Agency” for the form of treatment and for the location of discharge.
Building on Same Lot Example 2

Section 701.7 Connections

- No direct connection of a steam exhaust, blow-off or drip pipe to the building drain.
- Waste water discharge shall not be higher than 140°F (60°C).
- When higher temperatures exist, approved cooling methods shall be provided.

Table 702.1 Above-ground Drainage & Vent Pipe

- Table 702.1 identifies the materials that are approved and the standards with which these materials must comply.
Table 702.2 Underground Drainage & Vent Pipe

- The materials listed in this table are for underground use within a building. The materials not allowed underground that were allowed above ground in Table 702.1 are the following:

<table>
<thead>
<tr>
<th>Size</th>
<th>Minimum Slope (in per foot)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2½ or less</td>
<td>⅛</td>
</tr>
<tr>
<td>3 inch</td>
<td>⅛</td>
</tr>
<tr>
<td>3 inch or larger</td>
<td>⅛</td>
</tr>
</tbody>
</table>

Section 704.1 Slope of Horizontal Drainage Piping

- Horizontal drainage piping shall be installed in uniform alignment at uniform slopes. The minimum slope of a horizontal drainage pipe shall be in accordance with Table 704.1.

<table>
<thead>
<tr>
<th>Size (inches)</th>
<th>Minimum Slope (in per foot)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2½ or less</td>
<td>⅛</td>
</tr>
<tr>
<td>3 inch</td>
<td>⅛</td>
</tr>
<tr>
<td>3 inch or larger</td>
<td>⅛</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm, 1 inch per foot = 6093.3 mm/in.

Horizontal Branch Connections

- No horizontal branch connections are permitted off the diameters of stack.
Section 706.3

- Change in direction shall be made by fittings installed in accordance with Table 706.3 based on the pattern of flow created by the fitting.

<table>
<thead>
<tr>
<th>Table 706.3 FITTINGS FOR CHANGE IN DIRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE OF Fitting</td>
</tr>
<tr>
<td>------------------------------------------------</td>
</tr>
<tr>
<td>Tee</td>
</tr>
<tr>
<td>Elbow</td>
</tr>
<tr>
<td>Branch Tee</td>
</tr>
<tr>
<td>Union</td>
</tr>
<tr>
<td>Short</td>
</tr>
<tr>
<td>Long</td>
</tr>
<tr>
<td>Non-return</td>
</tr>
<tr>
<td>Non-return</td>
</tr>
</tbody>
</table>

Back-to-Back Fixtures (Exception)

DOUBLE SANITARY TEE PERMITTED WHERE DEVELOPED LENGTH BETWEEN OUTLET OF WATER CLOSET AND CONNECTION IS 18 INCHES OR GREATER

Figure 706.3(5)

Section 706.4 Heel- or Side-Inlet Quarter Bends

- Heel-inlet quarter bends shall be an acceptable means of connection, except where the quarter bend serves a water closet. A low-heel inlet shall not be used as a wet-vented connection. Side-inlet quarter bends shall be an acceptable means of connection for drainage, wet venting and stack venting arrangements.
Section 708.3.1
Cleanouts for Horizontal Drains

Section 708.3.3 Change of Direction

Section 708.3.4 Base of Stack
Section 708.3.4 Cleanouts at Sewer Junction

Section 708.7 Minimum Size of Cleanout (Exception)

Section 708.8 Clearances
Table 709.1 Drainage Fixture Units For Fixtures and Groups

Table 709.1 Drainage Fixture Units For Fixtures and Groups (cont.)

Section 709.2
Fixtures Not Listed In Table 709.1

- Shall have a drainage fixture unit load based on the outlet side of the fixture in accordance with Table 709.2
Section 709.3 Values For Continuous & Semicontinuous flow

10 GPM DISCHARGE
10 x 2 = 20 dfu

RECEPTOR ASSIGNED 20 dfu VALUE

Table 710.1(2)
Horizontal Fixture Branch and Stacks

<table>
<thead>
<tr>
<th>Diameter of Pipe (Inches)</th>
<th>Maximum Number of Drainage Fixture Units Total for Horizontal Branch</th>
<th>Total for Stack Greater Than Three Branch Intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1/2</td>
<td>1 1 2 4 8 12 16 24</td>
<td>26 6 1 0 2 4</td>
</tr>
<tr>
<td>2</td>
<td>3 6 12 30 42 70 100 200</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>4 12 26 84 112 400 900 3,000</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>6 26 68 210 420 1,100 2,200 5,000</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>9 50 150 540 1,100 3,000 6,000 14,000</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>14 260 600 2,200 5,000 12,000 24,000 56,000</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>24 500 1,500 5,400 12,000 28,000 64,000 156,000</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>36 800 2,500 8,400 23,000 58,000 140,000 348,000</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>54 1,200 4,500 15,000 40,000 105,000 260,000 680,000</td>
<td></td>
</tr>
</tbody>
</table>

Horizontal Branch 710.1(2) (Sizing Example)

NOTE: Complete venting not shown
Branch Interval 710.1(2)
(Sizing Example)

Branch Interval = 7

STACK

THE TOTAL D.F.U. OF HORIZONTAL BRANCHES A, B & C CANNOT EXCEED THE TOTAL LISTED IN THE THIRD COLUMN OF TABLE 710.1(2)

Floor

Stack Sizing 710.1(2)

Sizing of Stack Greater Than Three Branch Intervals 710.1(2)
715 Backwater Valves

- 715.1 Sewage Backflow. If required by the "Ohio Environmental Protection Agency" or local sewer purveyor, a backwater valve shall be installed only for plumbing fixtures where the flood level rims of the lowest plumbing fixtures are below the elevation of the manhole cover of the next upstream manhole.
Section 801.1 Scope

- Clear-water waste
- Swimming pools
- Methods of providing air breaks or air gaps
- Neutralizing devices for corrosive waste

Section 802.1 Where Required

- Fixtures not required by this section to be indirectly connected shall be directly connected to the plumbing system in accordance with Chapter 7

Potable Clear-water Waste

PROHIBITED - MUST BE AIR GAP TO PREVENT CROSS-CONNECTION (OUTLET ABOVE FLOOD LEVEL RIM OF RECEPTOR)
Dishwasher Waste Connections

DISHWASHING MACHINE

KITCHEN SINK

MAY CONNECT DIRECTLY TO FOOD WASTE GRINDER

LOOP REQUIRED PER MANUFACTURER'S INSTRUCTIONS

KITCHEN SINK

BRANCH TAPE EDGE OF DISHWASHER TAPE EDGE TO RECEIVE DISHWASHER WASTE CONNECTION

Indirect/Special Waste Inspection

Trapping of Indirect Waste Piping

Indirect waste pipes that exceed 4 feet in total developed length shall be trapped.

Any indirect waste pipe greater than two feet developed length measured horizontally requires a trap.

Indirect/Special Waste Inspection

Waste Receptor
Traps for Indirect Waste Pipes

- Shall not be trapped over 4' total developed length.
- Shall not be trapped if total developed length is less than 2'.
- Shall not be trapped if total developed length is less than 2'.

Air Break

- Air break is required for standpipe.
- Standpipe connecting to a floor drain.

Standpipes

- Discharge from residential and commercial clothes washer.
- 18" minimum, 42" maximum.
- 2" minimum drain.
- Standpipe connecting to a floor drain.
Vents – Chapter Nine

- Venting protects the trap seal by reducing differential pressures within the drainage system.
- Only plumbing systems with traps require vents, example: rainwater systems
Separation of Vent Terminal

10' MINIMUM

VENT

2' MINIMUM AIR INTAKE

ROOFTOP UNIT WITH OUTDOOR AIR INTAKE

Grade of Vents

THERE IS NO MINIMUM PITCH REQUIRED, ONLY A GRADING IN THE DIRECTION OF FLOW TO THE DRAINAGE SYSTEM

ACCEPTABLE

PROPERLY GRADED

THE VENT MAY BE COMPLETELY BLOCKED BY CONDENSATE AND RAINWATER CAUSING THE TRAP TO BE UNVENTED

NOT ACCEPTABLE

IMPROPERLY GRADED

Vent Connections

ACCEPTABLE CONNECTIONS TO TRAPS

UNACCEPTABLE CONNECTION CLOSING ALL openings BLOCKED

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**Maximum Fall of Fixture Drain Between Trap and Vent**

![Diagram showing the maximum fall of fixture drain between trap and vent]

**Section 906.2 Vent Connection**

![Diagram illustrating vent connection requirements]

**Crown Vent**

![Diagram explaining the crown venting technique]

**Crown Venting Guide:**
- **Vent Opening:** Should never exceed 1/8 inch.
- **Min. Diameter:**
  - Trap Size:
    - 1 inch: 2 inches
    - 1 1/2 inch: 3 inches
    - 2 inch: 4 inches
    - 3 inch: 6 inches

---

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Common Vents with Fixture Drains Connecting at Different Level

<table>
<thead>
<tr>
<th>Drain Component</th>
<th>Minimum Size</th>
<th>DFUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAV DRAIN</td>
<td>1½&quot;</td>
<td>1</td>
</tr>
<tr>
<td>SH DRAIN</td>
<td>2&quot;</td>
<td>2</td>
</tr>
<tr>
<td>WC DRAIN</td>
<td>3&quot;</td>
<td>3</td>
</tr>
<tr>
<td>A-B</td>
<td>1½&quot;</td>
<td>1</td>
</tr>
<tr>
<td>B-C</td>
<td>2&quot;</td>
<td>2</td>
</tr>
<tr>
<td>C-D</td>
<td>3&quot;</td>
<td>3</td>
</tr>
<tr>
<td>A-X</td>
<td>1½&quot;</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Double Bathroom Group (Private) Wet Vent

<table>
<thead>
<tr>
<th>Drain Component</th>
<th>Minimum Size</th>
<th>DFUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAV DRAIN</td>
<td>1½&quot;</td>
<td>1</td>
</tr>
<tr>
<td>SH DRAIN</td>
<td>2&quot;</td>
<td>2</td>
</tr>
<tr>
<td>WC DRAIN</td>
<td>3&quot;</td>
<td>3</td>
</tr>
<tr>
<td>A-B</td>
<td>1½&quot;</td>
<td>1</td>
</tr>
<tr>
<td>B-C</td>
<td>2&quot;</td>
<td>2</td>
</tr>
<tr>
<td>C-D</td>
<td>3&quot;</td>
<td>3</td>
</tr>
<tr>
<td>A-X</td>
<td>1½&quot;</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Single Bathroom Group Wet Vent

<table>
<thead>
<tr>
<th>Drain Component</th>
<th>Minimum Size</th>
<th>DFUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAV DRAIN</td>
<td>1½&quot;</td>
<td>1</td>
</tr>
<tr>
<td>SH DRAIN</td>
<td>2&quot;</td>
<td>2</td>
</tr>
<tr>
<td>WC DRAIN</td>
<td>3&quot;</td>
<td>3</td>
</tr>
<tr>
<td>A-B</td>
<td>1½&quot;</td>
<td>1</td>
</tr>
<tr>
<td>B-C</td>
<td>2&quot;</td>
<td>2</td>
</tr>
<tr>
<td>C-D</td>
<td>3&quot;</td>
<td>3</td>
</tr>
<tr>
<td>A-X</td>
<td>1½&quot;</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Note: a = from Table 909.3
N/A = Not Applicable
### Section 912 Combination Drain and Vent System

- **ISLAND SINK**
- **FIXTURE DRAIN**
- **COMBINATION DRAIN AND VENT (OVERSIZED DRAIN)**
- **FIXTURE DRAIN FOR SINK - 1 1/2”**
- **COMBINATION DRAIN AND VENT - 2”**
- **SINK**
- **LAV**
- **1 1/2”**
- **2”**
- **2”**
- **1 1/4”**
- **COMBINATION DRAIN AND VENT**
- **2”**
- **3”**
- **(2 1/2” PERMITTED)**
- **1 1/2”**
- **FIXTURE DRAIN WITHIN DISTANCE FROM TRAP TO VENT**
- **EXTENSION OF BUILDING DRAIN**

### Section 912 Vertical Fixture Drain Component in Combination Drain and Vent System

- **Section 912 Combination Drain and Vent**

### Section 912 Combination Drain and Vent

- **Section 912 Vertical Fixture Drain Component in Combination Drain and Vent System**
**Section 915 Vent Connections for Horizontal Offset**

![Diagram of vent connections for horizontal offset.](image)

**Vent Sizing**

![Diagram of vent sizing.](image)
Air Admittance Valves

- Air admittance valves (AAV) are approved for individual vents, branch vents, circuit vents and stack vents. Stack-type air admittance valves shall conform to ASSE 1050
- Individual and branch type AAVs may only vent fixtures that are on the same floor and that connect to a horizontal branch drain.

- The maximum allowable developed length of the vent applies.
- Individual and branch AAVs shall be located a minimum 4 inches (102 mm) above the horizontal branch drain or fixture drain being vented.
- The AAV is required to be accessible.
- At least one stack vent or vent stack shall extend to the outside of the structure.

Air Admittance—Individual Vent
Chapter Ten
Traps, Interceptors and Separators

Section 1002.1 Fixture Traps

INLET
OUTLET
EXCEPTION #1
EXCEPTION #2
CROWN WEIR
SEAL
DIP
WATER CLOSETS HAVE AN INTEGRAL TRAP
SINK
MAX. VERTICAL DISTANCE - 24"
TWO-COMPARTMENT SINK MAX. DISTANCE - 30"
MAX. DISTANCE - 6"

Prohibited Traps

WATER SEAL
BELL TRAP
VEHIT
SINK
CROWN TRAP
TRAP WITH FLOAT BALL (MOVING PARTS)
"OLD STYLE" FLOOR TRAP WITH浮球隔断
TRAP WITH FLOAT BALL (MOVING PARTS)
EXCEPTION: NO BELL TRAP IN SEPARATE INTERCEPTOR
Section 1002.4 Trap Seals

- Minimum liquid seal is 2 inches
- Maximum liquid seal is 4 inches
- When evaporation threatens the trap seal, a trap seal primer valve shall be installed
- Trap primer Valve shall conform to ASSE 1018 or ASSE 1044
  - **Exception:**
    - Where a fixture trap is supplied with water on a regular basis, a trap seal primer valve shall not be required.
  - A trap seal primer valve is not required in garage floor drains in one-, two- and three-family dwellings.

Section 1002.4 Trap Seals

- Trap seal primer valve discharge piping must connect to the trap above the trap seal water line.

Questions

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Thank you for participating!

To schedule a seminar, contact:

The ICC Training & Education Department
1-888-ICC-SAFE (422-7233) Ext. 33818
or
E-mail: icctraining@icc safe.org

Hyperlinked Slides

Beyond This Point
Exception:

- Shower Compartment

- Note: Shower stalls over 30 sq ft shall be protected by a barrier of approved waterproof material.

- Centerline of threshold

- Plan

- Back

- Back

- Back
Static Pressure Loss

Example:
Pressure at meter = 80 psi
Elevation change = 20 feet

\[ P = 0.5 \times \text{Head (feet)} \]
\[ = 0.5 \times 20 \text{ feet} \]
\[ = 10 \text{ psi} \]

Pressure for sizing, then, is
80 psi - 10 psi = 70 psi

Static Pressure Gain

Gain in Pressure (+)

Pressure for sizing, then, is
80 psi + 10 psi = 90 psi
TABLE E103.3(2) (Private) WATER SUPPLY FIXTURE UNIT VALUES FOR VARIOUS PLUMBING FIXTURES AND FIXTURE GROUPS

<table>
<thead>
<tr>
<th>TYPE OF FIXTURES OR GROUP OF FIXTURES</th>
<th>WATER SUPPLY FIXTURE UNIT VALUE (w.s.f.u.)</th>
<th>HOT</th>
<th>COLD</th>
<th>COMBINED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bathtub (with/without overhead shower head) Private</td>
<td>1.0</td>
<td>1.0</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>Clothes washer (Private)</td>
<td>1.0</td>
<td>1.0</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>Dishwasher (Private)</td>
<td>1.4</td>
<td>—</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>Bathroom group (Private), (Flush tank) with bathtub or shower stall</td>
<td>1.5</td>
<td>2.7</td>
<td>3.6</td>
<td></td>
</tr>
<tr>
<td>Half-bath group (water closet and lavatory)</td>
<td>0.5</td>
<td>2.5</td>
<td>2.6</td>
<td></td>
</tr>
<tr>
<td>Hose bibb (Silcock)</td>
<td>—</td>
<td>2.5</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>Kitchen group (dishwasher and sink with/without garbage grinder)</td>
<td>1.9</td>
<td>1.0</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>Kitchen sink (private)</td>
<td>1.0</td>
<td>1.0</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>Laundry group (clothes washer standpipe and laundry tub)</td>
<td>1.8</td>
<td>1.8</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>Laundry tub (private)</td>
<td>1.0</td>
<td>1.0</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>Lavatory (private)</td>
<td>0.5</td>
<td>0.5</td>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td>Shower stall (private)</td>
<td>1.0</td>
<td>1.0</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>Water closet (tank type), (private)</td>
<td>—</td>
<td>2.2</td>
<td>2.2</td>
<td></td>
</tr>
</tbody>
</table>

TABLE E201.1 MINIMUM SIZE OF WATER METERS, MAINS AND DISTRIBUTION PIPING BASED ON WATER SUPPLY FIXTURE UNIT VALUES (w.s.f.u.)

<table>
<thead>
<tr>
<th>PRESSURE RANGE</th>
<th>WATER METER (INCHES)</th>
<th>DISTRIBUTION PIPE (INCHES)</th>
<th>MAXIMUM DEVELOPMENT LENGTH (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>¾</td>
<td>¾</td>
<td>9.5</td>
</tr>
<tr>
<td>20</td>
<td>¾</td>
<td>¾</td>
<td>13.5</td>
</tr>
<tr>
<td>25</td>
<td>1</td>
<td>1</td>
<td>18.5</td>
</tr>
<tr>
<td>30</td>
<td>1½</td>
<td>1½</td>
<td>23.5</td>
</tr>
<tr>
<td>35</td>
<td>2½</td>
<td>2½</td>
<td>28.5</td>
</tr>
</tbody>
</table>

Table 604.5 Minimum Sizes of Fixture Water Supply Pipes
### Table 710.1(2a) Horizontal Branch Capacity

<table>
<thead>
<tr>
<th>Diameter of Pipe (Inches)</th>
<th>Total For Horizontal Branch</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>2-1/2</td>
<td>12</td>
</tr>
<tr>
<td>3</td>
<td>160</td>
</tr>
<tr>
<td>4</td>
<td>320</td>
</tr>
<tr>
<td>6</td>
<td>1,400</td>
</tr>
<tr>
<td>8</td>
<td>4,000</td>
</tr>
<tr>
<td>10</td>
<td>7,000</td>
</tr>
<tr>
<td>12</td>
<td>11,000</td>
</tr>
<tr>
<td>15</td>
<td>17,000</td>
</tr>
</tbody>
</table>

### Table 710.1(2) Stack Capacities

<table>
<thead>
<tr>
<th>Diameter of Pipe (Inches)</th>
<th>Total Discharge into One Branch Interval</th>
<th>Total for Stack Three Branch Intervals or Less</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>25 DFU</td>
<td>26</td>
</tr>
<tr>
<td>2</td>
<td>100 DFU</td>
<td>104</td>
</tr>
<tr>
<td>3</td>
<td>250 DFU</td>
<td>260</td>
</tr>
<tr>
<td>4</td>
<td>450 DFU</td>
<td>480</td>
</tr>
<tr>
<td>5</td>
<td>800 DFU</td>
<td>830</td>
</tr>
<tr>
<td>7</td>
<td>1,400 DFU</td>
<td>1,440</td>
</tr>
<tr>
<td>8</td>
<td>2,500 DFU</td>
<td>2,540</td>
</tr>
<tr>
<td>10</td>
<td>3,900 DFU</td>
<td>3,940</td>
</tr>
<tr>
<td>12</td>
<td>6,000 DFU</td>
<td>6,040</td>
</tr>
<tr>
<td>15</td>
<td>7,000 DFU</td>
<td>7,040</td>
</tr>
</tbody>
</table>
### Table 710.1(2) Stack Capacities

<table>
<thead>
<tr>
<th>Diameter of Pipe (Inches)</th>
<th>Maximum DFU</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Discharge into One Branch Interval</td>
</tr>
<tr>
<td></td>
<td>Total for Stack Three Branch Intervals or Less</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>25</td>
</tr>
<tr>
<td>4</td>
<td>30</td>
</tr>
<tr>
<td>5</td>
<td>100</td>
</tr>
<tr>
<td>6</td>
<td>200</td>
</tr>
<tr>
<td>8</td>
<td>350</td>
</tr>
<tr>
<td>10</td>
<td>600</td>
</tr>
<tr>
<td>12</td>
<td>900</td>
</tr>
</tbody>
</table>

#### Table 710.1(1) Building Drains and Sewers

<table>
<thead>
<tr>
<th>Diameter of Pipe (Inches)</th>
<th>Maximum Number of Drainage Fixture Units Connected to Any Portion of the Building Drain or the Building Sewer, Including Branches of the Building Drain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Diameter per foot</td>
</tr>
<tr>
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</tr>
<tr>
<td>1/2</td>
<td>20</td>
</tr>
<tr>
<td>3/4</td>
<td>30</td>
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<tr>
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<td>40</td>
</tr>
<tr>
<td>1 1/4</td>
<td>50</td>
</tr>
<tr>
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<td>60</td>
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<td>70</td>
</tr>
<tr>
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</tr>
<tr>
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<td>90</td>
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<tr>
<td>3</td>
<td>100</td>
</tr>
<tr>
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<td>110</td>
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<td>3 1/2</td>
<td>120</td>
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<td>130</td>
</tr>
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</tr>
<tr>
<td>4 1/2</td>
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<td>220</td>
</tr>
<tr>
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</tr>
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</tr>
<tr>
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<tr>
<td>12 1/4</td>
<td>290</td>
</tr>
<tr>
<td>12 1/2</td>
<td>300</td>
</tr>
</tbody>
</table>

DFU: Drainage Fixture Units