

INTERNAL PLUMBING CODE PRESENTATION BASED ON THE 2015 UNIFORM PLUMBING CODE.

**Welcome to the State of Maine's
2015 Uniform Plumbing Code
Presentation**

Purpose

- **To review pertinent issues related to the State of Maine's adopted 2015 Uniform Plumbing Code and how the UPC related to your responsibilities in the field.**

Web address to the Plumbers' Examining Board Rules

- [www.maine.gov/professionallicensing/](http://www.maine.gov/professionallicensing/profession/plumbers)
- [profession/plumbers](http://www.maine.gov/professionallicensing/profession/plumbers)

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Scope

- **101.2 The provisions of this code shall apply to the erection, installation, alteration, repair, relocation, replacement, additions to, use, or maintenance of plumbing systems within this jurisdiction.**

Existing Installations

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

Maine State Law

- **Title 30-A, §4201-3 Plumbing.**
- **Plumbing means the installation, alteration or replacement of pipes, fixtures and other apparatus for bringing in potable water, removing waste water and the piping connections to heating systems using water. Except for the initial connection to a potable water supply and the final connection that discharges indirectly into the public sewer or waste water disposal system, the following are excluded from this definition.**

Plumbing Definition Exclusions

- **A. All pipes, equipment or material used exclusively for manufacturing or industrial processes.**
- **B. The installation or alteration of automatic sprinkler systems used for fire protection and standpipes connected to automatic sprinkler systems or overhead.**
- **C. Building drains outside the foundation wall or structure.**
- **D. The replacement of fixtures with similar fixtures at the same location without any alteration of pipes.**
- **E The sealing of leaks within an existing line.**

PERMITS

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

Required Inspections

- **105.2 The AHJ shall make the following inspections and other such inspections as necessary.**
- **(1) Underground inspection shall be made after trenches or ditches are excavated and bedded, piping installed, and before backfill is put in place.**
- **(2) Rough-in inspection shall be made prior to installation of wall or ceiling membranes.**
- **(3) Final inspection shall be made upon completion of the installation.**

Testing of plastic schedule 40 DWV

- **105.3.4 Allowing the testing of plastic schedule 40 DWV piping systems with 5 psi maximum of air. For safety purposes, when testing with air, a listed 6psi relief valve is required.**
- **Co-extruded ABS and PVC schedule 40 cellular core piping systems with referenced standards ASTM F1488 and ASTM F891 shall not be tested with air.**
- **PVC and ABS building supply and water distribution systems shall not be tested by air.**

PLUMBERS EXAMINING BOARD LAWS

- **32 § 3302. APPLICABILITY**
- **1. License Required. A license is required for any person, corporation, partnership or other entity who is engaged in plumbing or performing plumbing installations. No license is required for any activity for which a permit is not required under Title 30-A, section 3223 or its successor. The section does not apply to the following.**

LICENSES

- **License displayed. All persons licensed by the board must receive a license that must be publicly displayed at the principal place of business of the plumber., if any, and a pocket card license that must be carried on the person and displayed at any time upon request.**

Airbreak

- **A physical separation which may be a low inlet into a indirect waster receptor from the fixture, appliance, or device indirectly connected.**
- ***(Washing machine drains, condensate drain lines, bar and fountain sink traps, walk in coolers)***

Airgap, Water Distribution

- **The unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet conveying potable water to the flood-level rim of any tank, vat or fixture.**
- ***Minimum Air Gaps for Water Distribution***
- ***Table 603.3.1***
- ***Minimum drainage air gap-801.2=1" inch***

Air-Gap



Authority Having Jurisdiction

- **The organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, material, installation, or procedures. The AHJ shall be a federal, state, local, or other regional department or an individual such as a plumbing official, mechanical official, health inspector, building inspector or other having statutory authority.**

Backflow

- **Back-Pressure Backflow-** Backflow due to an increased pressure above the supply pressure, which may be due to pumps, boilers, gravity, or other sources of pressure.
- **Back-Siphonage-** The flowing back of used, contaminated, or polluted water from a plumbing fixture or vessel into a water supply pipe due to a pressure less than atmospheric in such pipe.

Bathroom Group

- **Any combination of fixtures, not to exceed one water closet, two lavatories, either one bathtub or one combination bath/shower, and one shower, and may include a bidet and an emergency floor drain.**

Contamination

- **An impairment of the quality of the potable water that creates an actual hazard to the public health through poisoning or through the spread of disease by sewerage, industrial fluids, or waste. Defined as High Hazard.**

Pollution

- **An impairment of the quality of the potable water to a degree that does not create a hazard to public health but which does adversely and unreasonably affect the aesthetic qualities of such potable water for domestic use.**
- **Also defined as Low Hazard**

Cross-Connection

- **Any physical or potential connection, or structural arrangement between two otherwise separate system, one of which contains potable water and the other which contains water of unknown or questionable safety and/or steam, chemicals, gases, or other contaminants and/or pollutants, whereby there may be a flow of an unapproved water to a potable water supply.**

Grease Interceptor

- **A plumbing appurtenance or appliance that is installed in a sanitary drainage system to intercept non-petroleum fats, oils and grease (FOG) from wastewater discharge.**

Gravity Grease Interceptor

- **A plumbing appurtenance or appliance that is installed in a sanitary drainage system to intercept nonpetroleum fats, oils, and grease from a wastewater discharge and is identified by volume, 30 minute retention time, baffle(s), not less than 2 compartments , a total volume of not less than 300 gallons and gravity separation.**

Hydro-mechanical Grease Interceptor

- **A plumbing appurtenance or appliance that is installed in a sanitary drainage system to intercept nonpetroleum fats, oils, and grease from a wastewater discharge and is identified by flow rate, and separation and retention efficiency. The design incorporates air entrainment, hydro-mechanical separation, interior baffling and or barriers in combination or separately.**

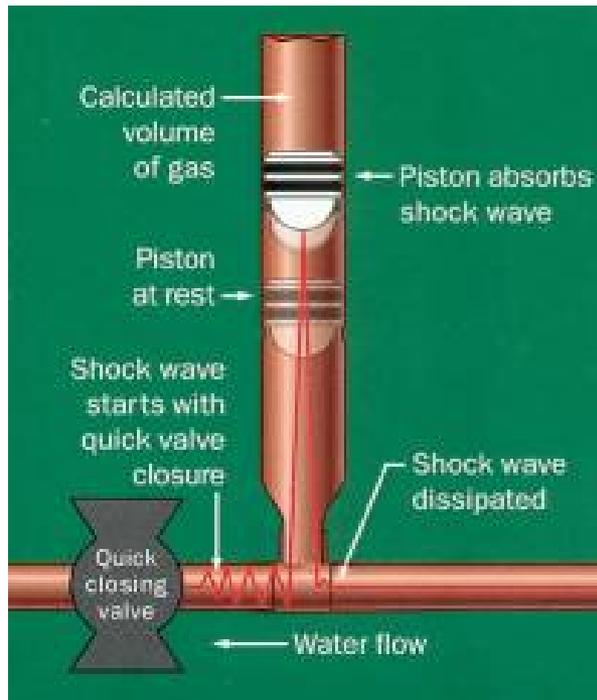
Indirect Waste Pipe

- **A pipe that does not connect directly with the drainage system but conveys liquid wastes by discharging into a plumbing fixture, interceptor, or receptacle that is directly connected to the drainage system.**

Water Hammer Arrestor

- **A device designed to provide protection against hydraulic shock in the building water supply system. ASSE1010**

Water Hammer Arrestors



Chapter 3

General Regulations

- **301.1 Applicability.** This chapter shall govern the general requirements, not specific to other chapters, for the installation of plumbing systems.

Approvals

- **301.2 Approvals. All pipe, pipe fittings, traps, fixtures, materials, and devices used in a plumbing system shall be listed or labeled by a listing agency.**

Marking

- **301.2.1 Each length of pipe and each pipe fitting, trap, fixture, material and devices used in a plumbing system shall have cast, stamped, or indelibly marked on it the manufacture's mark or name, which shall readily identify the manufacturer to the end user of the product.**

Non-listed Product



Disposal of Liquid Waste

- **303.0 It shall be unlawful for any person to cause, suffer or permit the disposal of sewerage, human excrement, or other liquid wastes, in any place or manner, except through and by means of an approved drainage system, installed and maintained in accordance with the provisions of this code.**

Connection to Plumbing System Required

- **304.0 Plumbing fixtures, drains appurtenances, and appliances, used to receive or discharge liquid wastes or sewage, shall be connected properly to the drainage system of the building or premises, in accordance with the requirements of this code.**

Installation Practices

- **309.4 Plumbing systems shall be installed in a manner conforming that is in accordance with this code, applicable standards, and the manufacture's installation instructions.**

Exposed ABS and PVC Piping

- **The Board does not adopt 312.13 and 312.14**

Protection of Piping, Materials and Structures

- **312.2 No piping shall be directly embedded in concrete or masonry.**
- **No structural member shall be seriously weakened or impaired by cutting, notching or otherwise, as defined in the building code.**
- **312.10 Sleeves shall be provided to protect all piping through concrete and masonry walls.**

Hanger and Supports

- **313.1 Piping, fixtures, appliances, and appurtenances shall be supported in accordance with this code, the manufacturer's installation instructions, and in accordance with the AHJ.**
- **313.3 Suspended piping shall be supported at intervals not to exceed those shown in Table 313.3.**
- **313.5 Piping in ground shall be laid on a firm bed for its entire length.**

Backfill

- **314.4 Excavations shall be completely backfilled as soon after inspection as practicable. Precaution shall be taken to ensure compactness of backfill around piping without damage to such piping. Trenches shall be backfilled in thin layers to 12 inches above the top of the piping with clean earth, which shall not contain stones, boulders, cinder fill, frozen earth, construction debris, or other material that would damage or break the piping or cause corrosive action.**

Chapter 4

Plumbing Fixtures and Fixture Fittings

- **401.1 Applicability.** This chapter shall govern the materials and installation of plumbing fixtures, including faucets and fixture fittings, and the minimum number of plumbing fixtures required based on occupancy.

Installation

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

Shower and Tub/Shower Combination Control Valves

- **408.3 Showers and tub-shower combinations shall be provided with individual control valves of the pressure balance, thermostatic, or combination pressure balance/ thermostatic mixing valve type that provide scald and thermal shock protection and set to deliver a maximum mixed water setting of 120°F.**
- **Water heater thermostats shall not be considered a suitable control for meeting this provisions.**

Illegal Tub/Shower Valve



Flushing Devices Required

- **413.1 Each water closet, urinal, clinic sink, or other plumbing fixture that depends on trap siphonage to discharge its waste contents shall be provided with a flushometer valve, flushometer tank, or flush tank designed and installed so as to supply water in sufficient quantity and rate of flow to flush the contents of the fixture to which it is connected, to cleanse the fixture and to refill the fixture trap, without excessive water use. Flushing devices shall meet anti-syphon requirements required in Chapter 6.**

Chapter 5

Water Heaters

- **501.1 Applicability.** The regulations of this chapter shall govern the construction, location, and installation of fuel burning and other types water heaters heating potable water.
- **The minimum capacity for storage water heaters shall be in accordance with the first hour rating listed in Table 501.1(1)**

Water Heaters

- The board only adopts the following section of Chapter 5.
- Chapter 501.1 Applicability
- Table 501.1(1)
- Chapter 505.1 Water Heaters
- Chapter 505.2 Safety Devices
- Chapter 505.4 Indirect fired Water heaters
- Chapter 505.4.1 Single-Wall Heat Exchangers
- Chapter 507.1 Dielectric Unions
- Chapter 507.4 Ground Support
- Chapter 507.5 Drainage Pans
- Chapter 507.24 Installation Instructions

Chapter 6

Water Supply and Distribution

- **601.1 Applicability.** This chapter shall govern the materials, design, and installation of water supply systems, including methods and devices used for backflow prevention.
- **The Board does not adopt Chapter 612.0 Residential Fire Sprinkler Systems.**

Hot & Cold Water Required

- **Except where not deemed necessary for safety or sanitation by the AHJ, each plumbing fixture shall be provided with an adequate supply of potable running water piped thereto in an approved manner, so arranged as to flush and keep it in a clean and sanitary condition without danger of backflow or cross-connection.**

Unlawful Connections

- **602.2 No person shall make a connection or allow one to exist between pipes or conduits carrying domestic water supplied by any public or private water system, and any pipes, conduits, or fixtures containing or carrying water from any other source or containing or carrying water that has been used for any purpose whatsoever.**

Backflow Prevention Devices, Assemblies and Methods

- **TABLE 603.2**
- **Backflow Prevention Device, Assemblies and Methods**
- **Degree of Hazard**
- **Applicable standards**
- **Pollution (low hazard)**
- **Contamination (high hazard)**
- **Installation**
- **(pages 93 and 94 of the 2015 UPC)**

Improper Device for Backflow Protection



No Backflow Prevention Device



General Requirements

- **603.4.4 Direct connections between potable water piping and sewer connected wastes shall not exist under any condition with or without backflow protection. Where potable water is discharged to the drainage system it shall be by means of an approved airgap of two (2) pipe diameters of the supply inlet, but no case shall the gap be less than one (1) inch. *Table 603.3.1***

Materials for Building Supply and Water Distribution Piping and Fittings

- **TABLE 604.1**

- Building supply pipe and fittings**

- **Water distribution pipe and fittings**

- **Referenced Standards Material pipe and fittings.**

- **604.2 Lead Content and Exceptions**

Excessive Water Pressure and Thermal Expansion

- **608.3 Any water system provided with a check valve, backflow preventer or any other normally closed device that prevents the dissipation of building pressure back into the water main shall be provided with an approved, listed and adequately sized expansion tank. The tank shall be installed in the cold water distribution piping downstream of each such regulator to prevent excessive pressure from developing due to thermal expansion.**

Temperature & Pressure Relief Valves

- **608.3 Any water system containing storage water heating equipment shall be provided with an approved, listed, adequately sized combination pressure and temperature relief valve.**
- **Each such combination temperature and pressure relief valve shall be provided with a drain as required in 608.5 -1 through 7.**

Size of Potable Water Piping

- **610.1 The size of each water meter and each potable water supply pipe from the meter or other source of supply to the fixture supply branches, risers, fixtures, connections, outlets, or other uses shall be based on the total demand and shall be determined according to the methods and procedures outlined in this section.**

Water Pipe Sizing

- **Four key elements are needed for proper water pipe sizing.**
 - **1. Minimum incoming water pressure**
 - **2. Elevation from where the water entering the building to its' highest point**
 - **3. Length of water piping system**
 - **4. Water supply fixture units, Table 610. 3 and Table 610.4 for determining water pipe and meter size.**

Chapter 7

Sanitary Drainage

- **701.1 Applicability.** This chapter shall govern the materials, design, and installation of sanitary drainage systems and building sewers.
- **The board amend 705.5.2 Solvent Cement Joints , as follows. Solvent cement joints for PVC pipe and fittings shall be clean from dirt and moisture. Pipe shall be cut square and pipe shall be deburred. Where surface to be joined are clean and free of dirt, moisture, oil, and other foreign material **apply primer in accordance with ASTM F656.****
- **The board does not adopt Chapter 713.5 Permits**
- **The board does not adopt Table 721.1**

Material for Drain, Waste, Vent Pipe and Fittings

- Drainage, waste , vent pipe and fitting is referenced in Table 701.2
- Table 701.2 includes underground and above ground pipe and fitting along with material and fittings for sewer pipe.

Drainage Fixture Unit Values

- **Table 702.1 references drainage fixture unit values for plumbing appliance and fixtures, and drainage fixture unit values for private, public and assembly uses.**
- **Table 702.1 includes the minimum size of the trap and the trap arms.**

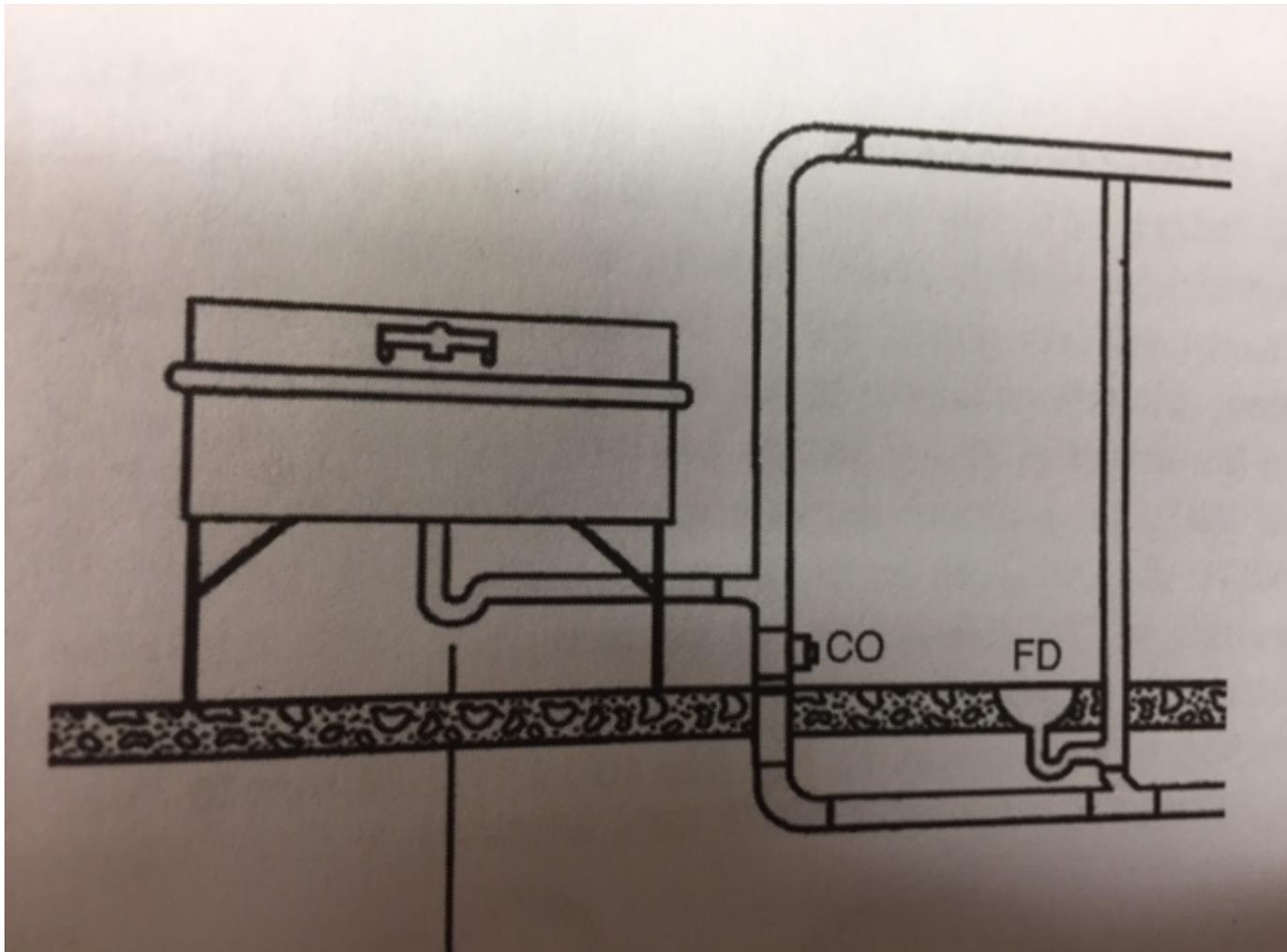
Maximum Unit Loading and Maximum Length of drainage and Vent Piping

- **Table 703.2 references the minimum sizes of vertical and horizontal drainage and vent piping, and includes footnotes.**

Commercial Sinks

- **704.3 Pot sinks, scullery sinks, dishwashing sinks, silverware sinks, silverware-washing machines, and other similar fixtures shall be connected directly to the drainage system.**
- **A floor drain shall be provided adjacent to the fixture....**

Fixture Connection



Cleanouts

- **707.4 Each horizontal drainage pipe shall be provided with a cleanout at its upper terminal and each run of piping, which is more than one hundred feet in total developed length, shall be provided with a cleanout for each one hundred feet, or fraction thereof, in length of such piping.**

Cleanouts (cont.)

- **707.4 An additional cleanout shall be provided in a drainage line for each aggregate horizontal change of direction exceeding one hundred and thirty-five degrees.**
- ***A cleanout shall be installed above the fixture connection fitting, serving each urinal, regardless of the location of the urinal in the building.***

Clearances

- ***707.9 Clearances. Each cleanout in piping 2 inches or less shall be so installed that there is a clearance of not less than 18 inches in front of the cleanout. Cleanouts in piping exceeding 2 inches shall have a clearance of not less than 24 inches in front of the cleanout.***

Improper Sewerage Ejector Cover



Drainage of Fixtures Located Below the Main Sewer Level

- **710.3 A sewerage ejector or sewerage pump receiving the discharge of water closets and urinals:**
- **710.3.1 Shall have a discharge rate of 20 gallons per minute.**
- **710.4 The discharge line from such ejector, pump, or other mechanical devices shall be of approved pressure rated material.**
- **710.5 Building drains and building sewers receiving discharge from any pump or ejector shall be adequately sized to prevent overloading. Two fixture units shall be allowed for each gallon per minute.**

Chapter 8

Indirect Wastes

- **801.1 Applicability.** This chapter shall govern the materials, design, and installation of indirect waste piping, receptors, and connection; and provisions for discharge and disposal of condensate wastes, chemical wastes, industrial wastes and clear water wastes.

Food and Beverage Handling Establishments

- **801.2.3 Food preparation sinks, steam kettles, potato peelers, ice cream dipper wells, and similar equipment shall be indirectly connected to the drainage system by means of an airgap. The piping from the equipment to the receptor shall not be smaller than the drain on the unit, but it shall not be smaller than one inch.**

Condensate

- **Sewerage or other waste from a plumbing system, including condensate from fuel burning equipment that may be deleterious to surface or subsurface waters shall not be discharged into the ground or into any waterway unless it has first been rendered safe by some acceptable form of treatment as required.**
- **Public Sewer- Discharge indirectly into the drainage system after being neutralized.**
- **Private Sewer- Discharge indirectly into the drainage system after being neutralized.**
- **Shall not be drained under the slab into the crushed stone.**

Chapter 9

Vents

- **901.1 Applicability.** This chapter shall govern the materials, design, and installation of plumbing vent systems.

Vents

- **901.0 Each plumbing fixture trap, except as otherwise provided in the Code, shall be protected against siphonage and back-pressure, and air circulation shall be assured throughout all parts of the drainage system by means of vent pipes installed in accordance with the requirements of this chapter and as otherwise required by this code.**

Size of Vents

- **904.1 The drainage piping of each building and each connection to a public sewer or a private sewerage disposal system shall be vented by means of one or more vent pipes, the aggregate cross-sectional area of which shall not be less than that of the largest required building sewer, as determined from Table 703.2**

Aggregate Cross Sectional Area



Vent Pipe Grades and Connections

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

Vent Pipe Grades and Connections



Vent Pipe Grades and Connections

- **905.3** Where two or more vents pipes converge, each such vent pipe shall rise to a point not less than 6” in height above of the flood level rim of the plumbing fixture it serves before being connected to any other vent. Vents less than six (6) inches above the flood-level rim of the fixture shall be installed with approved drainage fittings, material and grade to drain.

Vent Pipe Grades and Connections



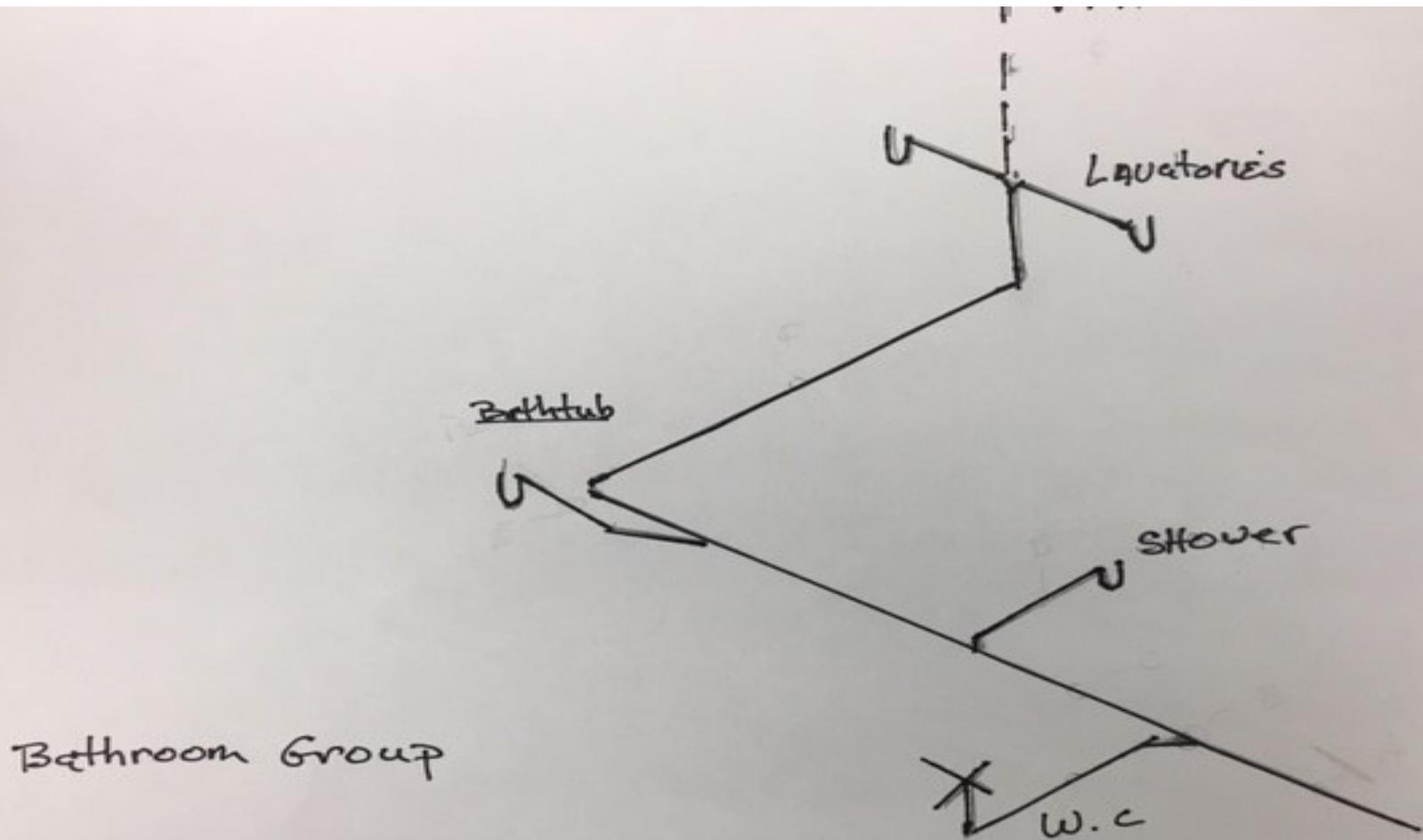
Vent Termination

- **906.1 Roof Termination.** Vents shall terminate vertically not less than 2 feet above the roof nor less than 1 foot from any vertical surface.
- **906.7 Frost or Snow Closure.** The vent pipe size shall be a minimum of 2”.

Horizontal Wet Venting for a Bathroom Group.

- **908.2.** A bathroom group located on the same floor level shall be permitted to be vented by a horizontal wet vent where all of the conditions of section 908.2.1 through 908.2.5 are met.
- **908.2.1 Vent Connection.**
- **908.2.2 Size.**
- **908.2.3 Trap Arm.**
- **908.2.4 Water Closet.**
- **908.2.5 Additional Fixtures**

Horizontal Wet Venting



Circuit Venting

- **911.1 Circuit Venting Permitted.** A maximum of eight fixtures connected to a horizontal branch shall be permitted to be circuit vented. Each fixture drain shall connect horizontally to the horizontal branch being circuit vented. The horizontal branch drain shall be classified as a vent from the most downstream fixture drain connection to the most upstream fixture drain connection to the horizontal branch.
- **911.2 through 911.5 shall be followed.**

Non-Circuit Vented Bathroom Groups



Chapter 10

Traps and Interceptors

- **1001.1 Applicability.** This chapter shall govern the materials, design, and installation of traps and interceptors.
- **1001.2 Where Required.** Each plumbing fixture, shall be separately trapped by an approved type liquid seal trap. This section shall not apply to fixtures with integral traps. Not more than one (1) trap shall be permitted on a trap arm.

Traps Protected by Vent Pipes

- **1002.1** Each fixture trap, except as otherwise provided in this code, shall be protected against siphonage, backpressure and air circulation shall be assured throughout the drainage system by means of a vent pipe installed in accordance with the requirements of the code.
- **Table 1002.2** Horizontal Lengths of Trap Arms
- **1002.4** The vent pipe open from a soil or waste pipe, except for water closets and similar fixtures, shall not be below the weir of the trap.

Double Trapped Three Bay Sink



Grease Interceptors

- **1014.1 general. Where it is determine by the AHJ that waste pretreatment is required, an approved type of grease interceptor(s)complying with the provisions of this section shall be correctly sized and properly installed in grease waste lines leading from sink and drains such as floor drains, floor sinks and other fixtures or equipment in serving establishments.**

Grease Interceptors

- **Two type of grease interceptors**
- **1014.2 Hydro-mechanical Grease Interceptor is an internal device with an vented flow control device installed on the inlet end of the interceptor. It is sized per table 1014.2.1 and example 1014.2.1.**
- **1014.3 Gravity Grease Interceptors is an external tank and is sized per table 1014.3.6 and example 1014.3.6.**

Fixtures

- **1014.1.1 Each fixture discharging into a grease interceptor shall be individually trapped and vented in an approved manner.**
- **1014.1.2 All grease interceptors shall be maintained in efficient operating condition by periodic removal of accumulated grease and latent material.**
- **The AHJ shall have the authority to mandate the installation of additional equipment or devices and to mandate a maintenance program. The AHJ could be either a LPI or Public Utilities or other entity.**

Hydro-mechanical Grease Interceptors

- **1014.2. Plumbing fixtures or equipment connected to a Type A or B hydro-mechanical grease interceptor shall discharge through an approved type vented flow control installed in a readily accessible and visible location. Flow control devices shall be designed and installed so that the total flow through such device or devices shall at no time be greater than the rated flow of the connected grease interceptor. No flow control device having adjustable or removable parts shall be installed.**

Hydro-mechanical Grease Interceptors

- **1014.2 The vented flow control device shall be located such that no system vent shall be between that flow control and the grease interceptor inlet. The vent or air inlet of the flow control device shall connect with the sanitary drainage vent system, as elsewhere required by this code, or shall terminate through the roof of the building, and shall not terminate to the free atmosphere inside the building.**

Improper Vent and Trap Location



Hydro-mechanical Grease Interceptors

Exceptions

- **Exception: Listed grease interceptors with integral flow controls or restricting devices shall be installed in an accessible location in accordance with the manufactures' instructions.**

Hydro-mechanical Grease Interceptors

- **1014.2.2** The total capacity in gallons of fixtures discharging into any hydro-mechanical grease interceptor shall not exceed two and one half (2-1/2) times the certified GPM flow rated of the interceptor as per table 10-2.
- **1014.2.3** A vent shall be installed downstream of hydro-mechanical grease interceptors in accordance with the requirements of this code.