

TITLE 77: PUBLIC HEALTH  
CHAPTER I: DEPARTMENT OF PUBLIC HEALTH  
SUBCHAPTER r: WATER AND SEWAGE

PART 890  
ILLINOIS PLUMBING CODE

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## SUBPART A: DEFINITIONS AND GENERAL PROVISIONS

### Section 890.110 Applicability

- a) The rules in this Part govern the design and installation of new plumbing or plumbing systems and the alteration of plumbing systems. They apply to all new construction and any remodeling or renovation that alters, renovates or replaces existing plumbing or plumbing systems.
- b) The rules in this Part do not apply to existing buildings unless the plumbing or plumbing system is being altered, the building use is being changed or the existing plumbing creates a health or safety hazard.
- c) If an existing building is changed from one use to another or from one classification to another, as provided in Appendix A. Table B, it shall be treated as a new building and shall comply with the requirements of this Part for its new use or occupancy.
- d) Regardless of the age of the building, where a health or safety hazard exists because of an existing plumbing installation or lack thereof, the owner or his or her agent shall install additional plumbing or make corrections as may be necessary to abate the hazard or violation of this Part.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

### Section 890.120 Definitions

For the purpose of administering and enforcing this Part, the following terms, which consist of words or expressions that have a precise meaning in plumbing, shall have the meaning indicated. Refer to Appendix A for standards applicable to plumbing appurtenances and fixtures defined in this Section.

"Abut" or "Abutting": To border, to touch, to terminate at point of contact, adjacent.

"Accessible": Easily approached or entered with minor modifications, such as the removal of an access panel, door or similar obstruction (e.g., drywall, gypsum board, plasterboard, or paneling). Concrete, asphalt and ceramic tile are not considered accessible.

"Air Break" (See "Air Gap".)

"Air Gap": The unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank or plumbing fixture and the flood-level rim of the receptacle. An air gap in a drainage system is a piping arrangement in which a drain from a fixture, appliance or device discharges indirectly into another fixture, receptacle or interceptor at a point above the flood level rim. (See Appendix B. Illustrations A and B.)

"Anchor": An approved support for securing pipe, fixtures and equipment to walls, ceilings, floors or any other structural members.

"Antimicrobial": An additive or surface coating that prohibits the growth of bacteria or staphylococci.

"Anti-siphon Ballcock": A device consisting of a float valve with a flow-splitter to provide for tank and trap refill that has an integral vacuum breaker and that is used in conjunction with water closet flush tanks.

"Approved": Accepted or acceptable under an applicable specification stated or cited in this Part or accepted as suitable for the proposed use.

"Area Drain": A drain placed in the floor of a basement areaway, a depressed or basement entry way, a loading platform, or a paved driveway that cannot otherwise be drained.

"Aspirator": A device supplied with water under positive pressure that passes through an integral orifice, causing a partial vacuum and resulting in movement of fluid by siphonage.

"Atmospheric Vacuum Breaker": A device consisting of a soft disc, reaction cup, fully guided stem guide, air vent port, and air port shield or hood to prevent fouling of the vent port, used for protection against back siphonage.

"Authorities Having Jurisdiction": Any entity that the Illinois Plumbing License Law authorizes to enforce the Law.

"Back Pressure": A condition caused when a force is exerted and reverses the flow of gas, water or air in a direction opposite the intended normal direction of flow.

"Back Siphonage": A condition caused when a negative force or vacuum is exerted and reverses the flow of gas, water or air to a direction opposite the intended normal direction of flow.

"Back Siphonage Preventer": A device designed to prevent reverse flow in a water system, specifically back siphonage. The device should be used only where no back pressure may occur.

"Back Water Valve": A device or valve that is installed in a sanitary sewer, storm drain or storm sewer to prevent sewage or drainage from backing up.

"Backflow": The reversal of flow from that normally intended. Hydraulic conditions that cause backflow include back siphonage, back pressure and aspiration.

"Backflow Preventer": A device or an assembly used to prevent contamination of the potable water supply through an actual or potential cross-connection.

"Backflow Preventer, Double Check Valve Backflow Preventer Assembly" or "DCV": A plumbing appurtenance consisting of two internally force loaded, independently acting check valves that operate normally in the closed position; two tight-closing, resilient seated shut-off valves; and four test cocks.

"Backflow Preventer, Dual Check Valve Type with Atmospheric Vent": A plumbing appurtenance consisting of two internally force loaded, independently acting check valves, designed to operate normally in the closed position, separated by an intermediate chamber able to automatically vent to atmosphere.

"Backflow Preventer, Double Check Detector Backflow Prevention Assembly" or "DCDA": A plumbing appurtenance consisting of two internally force loaded, independently acting check valves, designed to operate normally in the closed position; two tight-closing, resilient seated shut-off valves; and four test cocks. The assembly must include a bypass line with a water meter and double check assembly.

"Backflow Preventer, Dual Check Valve Type": A plumbing appurtenance consisting of two internally force loaded, independently acting check valves, designed to operate normally in the closed position.

"Backflow Preventer, Dual Check Valves, Post-Mix Carbonated Beverage

"Dispenser Type": A plumbing appurtenance used to prevent carbonated water or carbon dioxide from backflow into a potable water system. The assembly consists of two internally force loaded, independently acting check valves, designed to operate normally in the closed position, residing in a common body.

"Backflow Preventer, Reduced Pressure Detector Backflow Prevention Assembly" or "RPDA": A plumbing appurtenance consisting of two internally force loaded, independently acting check valves, designed to operate normally in the closed position, separated by an intermediate zone that includes an internally force loaded hydraulic operated relief for venting to atmosphere, designed to operate normally in the open position, two tight-closing, resilient seated shut-off valves, four test cocks, and a metered reduced pressure backflow prevention assembly bypass.

"Backflow Preventer, Reduced Pressure Principle Backflow Prevention Assembly" or "RPZ": A plumbing appurtenance consisting of two internally force loaded, independently acting check valves, designed to operate normally in the closed position, separated by an intermediate zone that includes an internally force loaded, hydraulically operated relief for venting to atmosphere, designed to operate normally in the open position, two tight-closing resilient shut-off valves, and four test cocks.

"Ballcock": A device consisting of a float valve equipped with a flow-splitter to provide a tank and trap refill; used in conjunction with a flush tank on a water closet.

"Battery of Fixtures": Any group of two or more identical adjacent fixtures that discharge into a common horizontal waste or soil branch. (See Appendix B.Illustration C.)

"Boiler Blow-Down": A controlled outlet on a boiler to permit emptying or discharging of sediment.

"Branch": Any part of the piping system other than a main, riser or stack. (See Appendix B.Illustration D.)

"Branch Interval": A length of soil or waste stack corresponding in general to a story height, but in no case less than 8 feet, within which the horizontal branches from one floor or story of a building are connected to the stack.

"Branch Vent": A horizontal vent connecting one or more individual vents with a

vent stack or stack vent. (See Appendix B.Illustration E.)

"Building Classification": The Department's designation of buildings into differing types based upon use or occupancy, such as residential buildings, dormitories, office buildings, food service establishments, etc.

"Building Drain": The part of the lowest horizontal piping of a drainage system that receives the discharge from soil, waste, and other drainage pipes inside the walls of the building and conveys it to the building (house) sewer. The building drain's developed length terminates 5 feet outside the building foundation wall. (See Appendix B.Illustration F.)

"Building Sewer": The part of the horizontal piping of a drainage system that extends from the end of the building drain, receives the discharge of the building drain and conveys it to a public sanitary sewer or private sewage disposal system. The building sewer commences 5 feet outside the building foundation wall. (See Appendix B.Illustration F.)

"Building Storm Drain": The lowest horizontal portion of the storm drainage system used for conveying rain water, surface water, ground water, subsurface water, site drainage, condensate or cooling water inside the walls of a building to a point 5 feet beyond the outside of the building foundation wall.

"Building Sub-drain": The portion of a sanitary drainage system (see definition of "Drainage System") that cannot drain by gravity into the building drain. (See Appendix B.Illustration G.)

"Building Trap": A device, fitting, or assembly of fittings installed in a building drain to prevent circulation of air between the drainage system of the building and the building sewer.

"Chemical Waste System": Piping that conveys corrosive or toxic chemical waste to the drainage system.

"Circuit Vent": A branch vent that serves two or more traps and extends from the front of the last fixture connection of a horizontal waste branch to the vent stack. This type of venting applies only to floor drains and floor outlet fixtures. (See Appendix B.Illustration H.)

"Clear Water" or "Clear Water Waste": Cooling water and condensate waste from refrigeration or air conditioning equipment, cooled condensate from steam

heating systems, and seepage water.

"Closed Water System": A system that has a backflow device or assembly installed in the water supply system to contain backflow within the premises. Other plumbing appurtenances, such as a single check valve or a water pressure regulator installed in the water supply system, may also create a closed water system.

"Code": State or local statutes, ordinances, or administrative rules, e.g., requirements for plumbing methods, materials, etc. This Part) will be referenced in this rule as "Part". At the local level, a county, city, township, village or sanitary/water district shall adopt a plumbing ordinance or resolution and plumbing rules, and the ordinance or resolution and rule shall be filed with the clerk's office. A standard for plumbing contained in any local rule or ordinance that has not been officially adopted can be construed only as a recommended standard.

"Cold Water": Water below 85 degrees Fahrenheit.

"Combination Fixture": A fixture combining two or more compartments or receptors.

"Combination Waste and Vent System": A system of waste piping with the horizontal wet venting of one or more floor drains by means of a common waste and vent pipe adequately sized to provide free movement of air above the flow line of the drain.

"Combined Building Sewer": A sewer that receives storm water and sewage.

"Common Vent": A vent connecting at the junction of two fixture drains and serving as a vent for both fixtures. (See Appendix B.Illustration I.)

"Connection": The joining of two pieces of pipe, or pipes and fittings, valves or other appurtenances.

"Contaminant": Any solid, liquid or gaseous matter that, when present in a potable water supply distribution system, may cause the water to degrade so that water quality standards are not met or physical illness, injury or death to persons consuming the water could result.

"Contaminated Water": Water not suitable for human use or that does not meet

the water quality standards of rules of the Illinois Pollution Control Board titled Primary Drinking Water Standards.

"Continuous Vent": A vertical vent that is a continuation of the drain to which it connects. The drain may be either vertical or horizontal. (See Appendix B.Illustration J.)

"Continuous Waste": A drain or waste line from two or more fixtures or sink compartments (of a single fixture), such as a combined three- compartment sink, connected to a single common trap.

"Critical Level": The mark on an atmospheric vacuum breaker established by the manufacturer and stamped "-CL-". This determines the minimum elevation above the flood-level rim or top of the fixture, whichever shall apply, at which the device shall be installed. When an atmospheric vacuum breaker does not bear a critical level marking, the bottom of the vacuum breaker shall constitute the critical level.

"Cross-Connection": Any actual or potential connection or arrangement between two otherwise separate piping systems, one containing potable water and the other containing fluids or gases of any kind that do not meet potable water quality standards, in which the non-potable substances in one system may flow into the potable water system or enter it through a means such as back pressure, back siphonage or aspiration.

"Cross-Connection Control Assembly": A tested and approved plumbing appurtenance, complete with shut-off valves, installed in a potable water line to prevent potable water from being mixed with any substance from a piping system containing non-potable substances, connected in any manner to the potable water supply.

"Cross-Connection Control by Containment": The installation of a backflow prevention device or assembly on the service line to a premises to protect water quality.

"Cross-Connection Control by Isolation": The installation of a backflow prevention device or assembly at each actual or potential cross-connection within a premises to protect water quality.

"Cross-Connection Control" or "CCC": The identification and elimination of all unprotected connections between a potable water system and any other substance.



"Cross-Connection Control Device": A plumbing appurtenance installed in a potable water line to prevent any substance of any kind from being mixed.

"Cross-Connection Control Device Inspector": An individual who holds an Illinois Plumbing License and who has been certified in accordance with 35 Ill. Adm. Code 653.802 (Specific Conditions and Installation Procedures) of the Illinois Environmental Protection Agency's rules titled Design, Operation and Maintenance Criteria to inspect, test, maintain and repair cross-connection control devices and assemblies. The certification attests to an inspector's understanding of the principles of backflow and back siphonage, and the public health hazard presented by the improper installation of cross-connection control devices.

"Cross-Connection, Non-Pressure Type": A submerged inlet installation where a potable water pipe is connected or extended below the overflow rim of a receptacle, or an environment that contains a non-potable substance at atmospheric pressure.

"Cross-Connection, Pressure Type": An installation where a potable water pipe is connected to a closed vessel or piping system that contains a non-potable substance above atmospheric pressure.

"Dead End": A pipe that is terminated at a developed distance of 2 feet or more by means of a plug or other closed fitting, except piping serving as a cleanout extension to an accessible area. (See Appendix B.Illustration K.)

"Department": The Illinois Department of Public Health.

"Developed Length": The length of a pipe measured along the center line of the pipe, including fittings.

"Diameter": The length of a straight line passing through the center of an object, e.g., a circle. (For the diameter of a pipe, see "Pipe Diameter".)

"Drain": Any pipe that carries waste water in a building drainage system. (See Appendix B.Illustration L.)

"Drain Laying": The laying and connecting of piping from 5 feet outside the foundation wall of a building to the public sanitary sewer system in the street or alley.

"Drainage Fixture Unit" or "DFU": The mathematical factor used by the plumbing industry to estimate the probable load on the drainage system caused by discharge from various plumbing fixtures. One drainage fixture unit is equivalent to 7½ gallons per minute or 1 cubic foot per minute.

"Drainage Piping" (See "Drainage System".)

"Drainage System": All piping within public or private premises that conveys sewage, rain or other liquid wastes to a point of disposal, but does not include the mains of a public sewer system or a private or public sewage treatment or disposal plant. The drainage system does not include the venting system. Drainage and venting are separate systems, although both are part of the overall plumbing system.

"Durham System": A soil or waste system where all piping is of threaded pipe, using recessed drainage fittings.

"Effective Opening": The minimum cross-sectional area at the point of water supply discharge, measured or expressed in terms of the diameter of a circle or, if the opening is not circular, the diameter of a circle of equivalent cross-sectional area. (This is applicable to sizing an air gap.)

"Existing Plumbing" or "Existing Work": A plumbing system or any part of a plumbing system that has been installed prior to January 1, 2014.

"Extracted Mechanical Joint": A joint that is developed with a special drilling tool used to penetrate a copper pipe wall, after which two steel pins are extended from the drill. While rotating, the drill head is withdrawn from the pipe under power, raising an external collar from the hole in the pipe. The branch pipe is then brazed into the collared outlet.

"Fixed": Stationary, immovable or immobile, as in a fixed air gap.

"Fixture Branch": A water supply pipe, soil pipe or waste pipe serving one or more fixtures.

"Fixture Carrier": A device designed to support an off-the-floor plumbing fixture.

"Fixture Drain": The vertical or horizontal outlet pipe from the trap of the fixture

to the junction of that pipe with any other drain pipe. (See Appendix B.Illustration M.)

"Fixture Supply": A water supply pipe connecting the fixture to a branch or main water supply pipe.

"Fixture Supply Stop": A valve used to control water supply to an individual plumbing fixture, appurtenance or appliance.

"Float Valve": An automatic opening valve, operated by a float, used to control the water level in a vessel, tank or other container.

"Flood Level": The elevation at which a liquid will overflow the fixture or receptacle.

"Flood Level Rim": The top edge of a receptacle or fixture over which a liquid will flow when the receptacle or fixture is filled beyond its capacity (or flooded). "Overflow rim" is used interchangeably with flood level rim.

"Flooded": When the liquid in a fixture equals the maximum capacity of the fixture or when the level of the liquid in the fixture rises to the fixture's flood level rim. Any attempt to add liquid to a flooded fixture causes liquid to overflow.

"Flush Valve": A device for the purpose of flushing water closets and other similar fixtures.

"Flushometer Valve": A device actuated by hand, a photoelectric cell, or other electronic control that discharges a predetermined quantity of water to fixtures for flushing purposes. The valve is closed by direct water pressure.

"Food Service Establishment": Any establishment selling or serving, to the public, food or liquid beverages that can be consumed on the premises.

"Grade": The fall, pitch or slope of a line of pipe in reference to a horizontal plane. In drainage, it is usually expressed as the fraction of an inch fall per foot length of pipe. This may also be expressed as a percentage. (See Appendix B. Illustration O.)

"Graywater": Untreated waste water that has not come into contact with toilet waste, kitchen sink waste, dishwasher waste or similarly contaminated sources.

Graywater includes waste water from bathtubs, showers, lavatories, clothes washers and laundry tubs. Also known as gray water, grey water, and greywater.

"Grease Interceptor": A device used to separate and retain grease, oils and other floating matter from sewage waste while permitting the remaining flow to discharge into the drainage system. See "Interceptor".

"Group of Fixtures": Two or more fixtures adjacent to or near each other.

"Hangers": Devices for supporting and securing pipe, fixtures and equipment to walls, ceilings, floors or any other structural member.

"High Hazard Substance": Any substance that, when present in the potable water system, can cause illness, injury or death if consumed.

"Historic Buildings": All buildings, parts of buildings, facilities or sites individually listed in or eligible for listing in the National Register of Historic Places; a "contributing" building or site in a National Register Historic District as determined by the Illinois Historic Preservation Agency (IHPA) or as determined by a "Certified Local Government" designated by IHPA; a building or site designated as a historic or architectural landmark by a local Landmarks Commission or local Historic Preservation Commission; or buildings that undergo historic reconstruction.

"Horizontal Branch": A drain pipe extending laterally from a soil or waste stack or building drain, with or without vertical sections or branches, that receives the discharge from one or more fixture drains and conducts the discharge to the soil or waste stack or to the building drain. (See Appendix B.Illustration P.)

"Horizontal Pipe": Any pipe or fitting that makes an angle of less than 45 degrees with the horizontal.

"Hose": A flexible tube for conveying fluids (as from a faucet or hydrant).

"Hose Bibb": A faucet to which a hose may be attached.

"Hot Water": Water at a temperature of not less than 120 degrees Fahrenheit.

"House Drain" (See "Building Drain".)

"House Trap" (See "Building Trap".)

"Indirect Waste": A pipe that does not connect directly with the drainage system but conveys liquid waste by discharging through an air gap into the drainage system.

"Individual Dry Vent": A pipe installed to vent a single fixture trap that connects with the vent system above the fixture served, or that terminates in the outside atmosphere. (See Appendix B.Illustration CC.)

"Individual Water System": A piping system that supplies potable water for a single family dwelling and includes the water service line and all potable water piping.

"Industrial Wastes": Liquid wastes resulting from the processes employed in industrial and commercial establishments.

"Insanitary": Contaminated. Not hygienic or sufficiently unclean to endanger health.

"Interceptor": A device designed and installed to separate and retain hazardous or undesirable matter from normal waste and to permit normal sewage or liquid waste to discharge into the drainage system. Interceptors may be designed to remove gas, oil, sand, grit and grease. "Separator" is also commonly used to mean an "interceptor."

"Invert": The lowest part of the internal cross-section of a pipe or conduit.

"Island Fixture Vent": A vent in which the vent pipe rises as near as possible to or above the highest water level in the fixture vented and then turns down before rising to connect to the vent system 6 inches above the flood level rim or terminating to the atmosphere. (See Section 890.1600, "Special Venting for Island Fixtures".)

"Joint": The juncture of two pipes, a pipe and a fitting, or two fittings.

"Kiosk": A freestanding place of employment that has five or fewer employees at any time, located inside or outside a building.

"Kitchen or Bar Sink Faucet": A faucet that discharges into a kitchen or bar sink in domestic or commercial installations. Supply fittings that discharge into other

types of sinks, including clinic sinks, floor sinks, service sinks and laundry trays, are not included.

"Labeled": An indication that an agency approved by the Department or that is an ANSI-accredited certification program has certified the plumbing material to be in compliance with applicable standards in accordance with this Part.

"Lavatory Faucet": A faucet that discharges into a lavatory basin in a domestic or commercial installation.

"Lead Free": When used with respect to solder and flux, refers to products containing not more than 0.2 percent lead and, when used with respect to wetted surfaces of pipe, pipe fittings, and fixtures, refers to materials containing no more than a weighted average of 0.25 percent lead. Exemptions include *pipes, pipe fittings, plumbing fittings, or fixtures, including backflow preventers, that are used exclusively for nonpotable services, such as manufacturing, industrial processing, irrigation, outdoor watering, or any other uses where the water is not anticipated to be used for human consumption; or toilets, bidets, urinals, fill valves, flushometer valves, tub fillers, shower valves, service saddles, or water distribution main gate valves that are 2 inches in diameter or larger.* (Section 1417(a)(4)(A) and (B) of the Safe Drinking Water Act)

"Length of Pipe": The overall distance measured along the center line of a pipe. See "Developed Length".

"Line Valve": A valve in the water supply distribution system, except those immediately controlling one fixture supply.

"Liquid Waste": The discharge from any fixture, appliance or appurtenance, in connection with a plumbing system that does not receive fecal matter.

"Load Factor": The percentage of the total connected fixture unit flow rate that is likely to occur at any point in the drainage system. The load factor varies with the type of occupancy, the total flow above the point being considered, and probability of simultaneous use. Load factor represents the ratio of the probable load to the potential load.

"Local Ventilating Pipe": A pipe on the fixture side of the trap through which vapors or gases or foul air is removed from a room or fixture to the outside atmosphere. Certain special apparatus, such as sterilizers, are sometimes provided with a local ventilating pipe to remove vapors. A local ventilating pipe

is not connected into the vent piping of the drainage system.

"Loop Vent": A circuit vent that loops back to connect with a stack vent instead of a vent stack. Its use is limited to floor drains and floor outlet fixtures.

"Low Hazard Substance": Any substance that, when present in the potable water system, may cause the water to be discolored or have an unusual odor or an unpleasant taste, but will not cause illness, injury or death if consumed.

"Main": The principal artery of a piping system to which branches may be connected.

"Main Vent": The principal artery of the venting system to which vent branches may be connected. A main vent may be a vent stack or stack vent. (See Appendix B.Illustration Q.)

"Maximum Demand": In plumbing, the greatest requirement of flow of either water supply or waste discharge from the fixtures of a building, or any specific segment of the building fixtures.

"Manhole": An opening constructed to permit a person to gain access to an enclosed space. In a sewer or any portion of the plumbing system, it is used to eliminate restriction of flow at changes of direction or junctions and to facilitate cleaning.

"Metering Faucet": A self-closing faucet that dispenses a specific volume of water for each actuation cycle. The volume or cycle duration can be fixed or adjustable.

"Minor Repairs": Repairs that do not require changes in the piping to or from plumbing fixtures or involve the removal, replacement, installation or reinstallation of any pipe or plumbing fixture.

"Multi-person Showers": Shower compartments designed and intended for use by two or more persons simultaneously.

"New Plumbing" or "New Work": Any plumbing system or part of a plumbing system, or any addition to or alteration of an existing system, being installed or recently completed.

"Non-Potable Water": Water that does not meet drinking water quality standards

specified in the Pollution Control Board's rules titled Primary Drinking Water Standards, and is not suitable for human consumption or culinary use, or is of unknown quality.

"Non-Toxic Transfer Fluids": Fluids having no normal detrimental effect on humans.

"Occupancy": The purpose for which a building is currently used. In the case of a single family residence, occupancy shall mean taking possession of and living in the premises as one's sole and exclusive residence for a period of not less than six months after the completion of construction or issuance of a Certificate of Occupancy by a unit of local government.

"Offset": A combination of elbows or bends that brings one section of pipe into a line parallel with another section.

"Open Plumbing": Installation of plumbing so that traps and drainage pipes and their surroundings beneath fixtures are ventilated, accessible and open to inspection. Open plumbing is also referred to as an exposed plumbing installation.

"Overflow Rim": The top edge of a receptacle or fixture over which a liquid will flow when the receptacle or fixture is filled beyond its capacity (or flooded).

"Flood level rim" is used interchangeably with overflow rim.

"Part": This Illinois Plumbing Code in its entirety or any emergency rule that the Department adopts, during the effective period of the emergency rule.

"Peppermint Oil": A pungent, aromatic mint oil sometimes used in testing a drain, waste and vent system by means of a "Peppermint Test".

"Peppermint Test": A test for leakage using peppermint oil and hot water as the media, and the sense of smell to determine any leak; also known as a "scent test" (see Section 890.1930(e)).

"Pet Cock": A small faucet or valve used to drain water, steam or air.

"pH": An expression of acidity and alkalinity on a scale from zero to 14, with 7.0 being neutral. Numbers less than 7.0 indicate increasing acidity as the number decreases, and numbers greater than 7.0 indicate increasing alkalinity as the number increases.



"Pipe": A cylindrical conduit or conductor, the wall thickness of which is sufficient to receive a standard pipe thread.

"Pipe Diameter": The distance measured from the inside wall of a pipe (passing through the center of the pipe) to the opposite inside wall. Any referenced pipe diameter or pipe size shall mean the nominal size or diameter.

"Pipefitting": The installation of piping other than piping that is defined as plumbing.

"Pipe Increments": Increasing or decreasing pipe size by a given number – the following examples constitute one pipe size change: 1, 1¼, 1½, 2, 2½, 3, 3½, 4, 4½, 5.

"Piping": An assembly of pipes or conduit with fittings of compatible design. This term is commonly interchanged with "Pipe".

"Pitch": Synonymous with "grade". (See "Grade".)

"Plumbing": See the Illinois Plumbing License Law.

"Plumbing Appliance": A special class of plumbing fixture intended to perform a special function. This term includes water heaters, water coolers, drinking fountains, and heat exchanger and water treatment equipment other than water softeners.

"Plumbing Appurtenance": An accessory or device used in a plumbing system which demands no additional water supply, nor adds any discharge load to a fixture or the drainage system. Plumbing appurtenances include instruments, gauges, relief valves, limit switches, backflow assemblies, solenoid valves and devices between solenoid valves.

"Plumbing Fixture": Approved, installed receptacles, devices or appliances that are supplied with water or that receive or discharge liquid or liquid-borne waste, with or without discharge of the waste into the drainage system to which they may be directly or indirectly connected; an installed appurtenance to the potable water supply system that makes available intended potable water, or a receptor that receives and discharges liquids or liquid-borne waste either directly or indirectly into the drainage system; or a permanent appendage usually designed as a

receptacle and intended to receive or discharge liquid or liquid-borne waste to a drainage system. Industrial or commercial tanks, vats, and similar processing equipment are not plumbing fixtures, but they may be connected to, or discharged into, approved traps or plumbing fixtures.

"Plumbing Inspector": An employee or agent of State or local government who holds a valid Illinois Plumbing License and is authorized to inspect plumbing.

"Plumbing System": See the Illinois Plumbing License Law.

"Pop-Up Waste": A waste outlet into which a sliding metal or plastic stopper is fitted, and the stopper can be raised to drain the waste. A common pop-up waste used for lavatories has a lever that passes out the side of the drain fitting and connects to a lift rod that extends on top of the lavatory or sink. The rod is lifted to lower the stopper, or depressed to raise the stopper and drain the lavatory.

"Potable Water": Water that meets drinking water quality standards specified in the Pollution Control Board's rules titled Primary Drinking Water Standards and is suitable for human consumption or culinary use.

"Pre-Rinse Spray Valve": A hand-held device for use with commercial dishwashing and ware-washing equipment that sprays water on dishes, flatware and other food service items for the purpose of removing food residue before cleaning and sanitizing the items.

"Pressure Gradient Monitor": A device used to protect the quality of water, failsafe by design, securing the potable water system by isolating a heat exchanger when the pressure between the potable water and the heat exchange medium drops below a preset level.

"Pressure Relief Valve" (See "Relief Valves".)

"Private" or "Private Use": In the classification of plumbing fixtures, private applies to fixtures in residences, apartments and private bathrooms of hotels or motels where the fixtures are intended for the use of a single family or an individual; handwashing stations (lavatories) within residents' rooms, within shared or common resident restrooms, or designated for staff use only in hospitals/long-term care units/mental health facilities, and hand-washing stations where food is being prepared.

"Private Sewage Disposal System": Any sewage handling or treatment facility

receiving domestic sewage from fewer than 15 people or population equivalent and having a ground surface discharge or any sewage handling or treatment facility receiving domestic sewage and having no ground surface discharge. Refer to the Private Sewage Disposal Licensing Act and Private Sewage Disposal Code.

"Private Sewer": A sewer privately owned and not directly controlled by a public authority.

"Private Water Supply": Any potable water supply that provides water for drinking, culinary and sanitary purposes and serves an owner-occupied single family dwelling.

"Proper" or "Properly": To be accurate or meeting the standard of competence for the given situation and properties of the materials involved based upon the standards in this Part and manufacturer's recommendations.

"p.s.i."; "P.S.I."; or "psi": Pounds per square inch gauge of pressure.

"Public" or "Public Use": Any installation or use of plumbing fixtures or facilities except those in residences, apartments or private bathrooms of hotels/motels where the fixtures are intended for the personal use of an individual or single family only.

"Public Area": An area within a building accessible to all persons, including, but not limited to, mercantile units, private clubs and membership organizations.

"Public Sanitary Sewer": A sewer that is controlled by a public authority and is intended to receive and transport sewage.

"Public Water System": A system for providing piped water to the public for human consumption, if the system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days per year. The term public water system includes: any collection, treatment, storage and distribution facility under the control of the operator of the system and used primarily in connection with the system; and any collection or pretreatment storage facilities not under control of the operator of the system that are used primarily in connection with that system. The public water system ends at and with the water service connection.

"Quarter Bend": A fitting changing direction of 90 degrees.

"Quick Closing Valve": A valve or faucet that closes automatically when released or one that has fast action closing.

"Readily Accessible": Direct access without the necessity of removing or moving any panel, door or similar obstruction.

"Receptor": Devices or fixtures that receive the discharge from indirect waste pipes.

"Reduced Pressure Zone Principle Backflow Preventer Assembly" or "RPZ" (See "Backflow Preventer, Reduced Pressure Principle Backflow Preventer Assembly" or "RPZ".)

"Relief Valves":

Temperature relief valve – A valve designed to release water to the atmosphere at a predetermined temperature setting.

Pressure relief valve – A valve designed to relieve excessive pressure to the atmosphere at a predetermined setting.

Temperature and pressure relief valve or pressure-temperature relief valve – A valve incorporating a temperature relief valve and a pressure relief valve in one unit.

Vacuum relief valve – A valve that admits air to the system when the system is attempting to reduce its pressure to less than atmospheric.

"Relief Vent": A vent that permits circulation of air in or between drainage and vent systems. (See Appendix B.Illustration S.)

"Restroom": As a minimum, will consist of one water closet and one lavatory, all located in the same room.

"Return Offset": A double offset installed so as to return the pipe to its original alignment.

"Revent Pipe" (See "Individual Dry Vent".) (See Appendix B.Illustration U.)

"Rim": An unobstructed open edge of a fixture.

"Riser": A water supply pipe that extends vertically one full story or more to convey water to branches or to a group of fixtures.

"Roughing-In": The installation of all parts of the plumbing system that can be completed prior to the installation of fixtures. This includes drainage, water supply, and vent piping, and the necessary fixture supports.

"Safe Pan": An appurtenance installed beneath piping or a fixture to collect and drain any leakage. Safe pans are generally found in food preparation/storage areas and sterile areas of health care facilities that have overhead, exposed drainage piping. Safe pans are not intended to receive discharges from temperature and pressure relief valves.

"Safe Waste" (See "Indirect Waste".)

"Sanitary Sewer": A public or private sewer into which building sewers are connected.

"Sanitary Waste": Sewage containing excrement and liquid wastes or ordinary wastes derived from a plumbing system.

"Self Closing Faucet": A faucet that closes itself after the actuation or control mechanism is deactivated. The actuation or control mechanism can be mechanical or electronic.

"Semi-Private Water System": A water supply that is not a public water system and that serves a segment of the public other than an owner-occupied single family dwelling. (See Section 19 of the Illinois Groundwater Protection Act.)

"Separator" (See "Interceptor".)

"Service Connection": The tap at the water main and any pipe to the property line.

"Sewage": Any waste containing animal, human or vegetable matter in suspension or solution, and may include liquids containing chemicals in solution.

"Sewage Ejector": A device for lifting sewage by pumping means.

"Sillcock": A type of lawn faucet. A faucet used on the outside of a building to which a garden hose may be attached.

"Size of Pipe or Tubing": Pipe is generally sized according to the approximate dimension of its bore or inside diameter, whereas tubing is usually sized by measuring its outside diameter. Both are expressed in inches and fractions of inches. For purposes of this Part, any referenced pipe or tubing size shall mean the nominal size or diameter as designated by the commercial manufacturer.

"Slope": Synonymous with "grade." (See "Grade".)

"Soil Pipe": Any pipe that conveys the discharge of water closets or fixtures having similar functions, with or without the discharge from other fixtures, to the building drain.

"Special Waste Pipe": Piping that conveys special waste. Piping that has been designed and manufactured of special material to handle special waste such as acids.

"Special Wastes": Wastes that require special handling and treatment before they may be discharged into the plumbing system. (See Subpart H.)

"Sprinkler System":

Fire sprinkler system – a system of piping and necessary appurtenances for conveying water or other extinguishing substances to outlets for the purpose of fire extinguishment.

Lawn sprinkler system – a system of piping installed for irrigation purposes.

"Stack": Any vertical line of soil, waste or vent piping.

"Stack Vent": The extension of a soil or waste stack above the highest horizontal drain connected to the stack. (See Appendix B.Illustration V.)

"Stack Venting": A method of venting a fixture or fixtures through the soil or

waste stack.

"Sterilizer":

Boiling Type Sterilizer – a fixture (non-pressure type) used for boiling instruments, utensils or other equipment (used for sterilization). Some devices are portable; others are connected to the plumbing system.

Instruments Sterilizer – a device for the sterilization of various instruments.

Pressure (Autoclave) Sterilizer – a fixture (pressure vessel) designed to use steam under pressure for sterilizing.

Pressure Instrument Washer-Sterilizer – a fixture (pressure vessel) designed to both wash and sterilize instruments during the operating cycle of the fixture.

Sterilizer Vent – a separate pipe or stack that is trapped below the lowest exhaust and indirectly connected to the building drainage systems and that receives the vapors from non-pressure sterilizers, or the exhaust vapors from pressure sterilizers, and conducts the vapors directly to the outside atmosphere. Sometimes called a vapor, steam, atmospheric or exhaust vent.

Water Sterilizer – a device for sterilizing water and storing sterile water.

"Storm Sewer": A sewer that is used for conveying rain water, surface water, ground water, subsurface water, site drainage, condensate, cooling water or other similar liquid waste (excluding sewage) from the building storm drain to an approved point of discharge.

"Sub-soil Drain": A drain that collects sub-soil drainage and conveys it to a place of disposal.

"Sub-soil Drainage": Liquid waste, such as run-off water, seepage water or clear water waste, free of fecal matter and graywater.

"Sump": A receptacle that receives sanitary or storm waste, located below the normal grade level of the gravity system and emptied by pumping or gravity.

"Sump Pump": A pump for the removal of storm, subsoil and clear water waste drainage from a sump.

"Supports": A hanger, anchor or other device for securing or holding pipe fixtures to walls, ceilings, floors or structural members.

"Swimming Pool": See the Swimming Facility Act for minimum sanitary requirements for the design and operation of swimming facilities.

"Tempered Water": Water ranging in temperature from 85 degrees Fahrenheit to, but not including, 120 degrees Fahrenheit.

"Terminal Heating Device": A device located within the environment to be conditioned that directly transfers its heating energy by radiation or forced or gravity convection.

"Test Cock": A small cock, faucet or valve set in a water pipe, pump, backflow device or water jacket and used to drain water or test pressure.

"Toxic": Not fit for human consumption; poisonous.

"Toxic Transfer Fluids": Sanitary waste, graywater, or mixtures containing harmful substances, including, but not limited to, ethylene glycol, hydrocarbons, oils, ammonia refrigerants, and hydrazine.

"Trap": A fitting or device designed and constructed to provide, when properly vented, a liquid seal that will prevent the back passage of air without materially affecting the flow of sewage or waste water through it. (See Appendix B.Illustration W.)

"Trap Arm": The portion of a fixture drain between a trap and its vent.

"Trap Primer": A device or system of piping to maintain a water seal in a trap.

"Trap Seal": The vertical distance between the crown weir and the top of the dip of the trap. (See Appendix B.Illustration W.)

"Tube": A cylindrical conduit or conductor, the wall thickness of which is less than that needed to receive a standard pipe thread. Compare with "Pipe".



"Tuberculation": A condition that develops on the interior of pipe due to corrosion, resulting in the creation of small, hemispherical lumps (tubercules) on the inner walls of the pipe.

"Union": A coupling device used to join two pipes end-to-end, but allow them to be disconnected and re-connected. This joint can be assembled and disassembled without removing any adjacent pipes.

"Unisex Restroom": A restroom shared by males and females and having only one water closet and one lavatory located in the same room. In addition, a single urinal may be installed.

"Vacuum": A pressure less than atmospheric pressure, sometimes referred to as suction. It is usually measured in inches of mercury below atmospheric pressure, such as 10 or 20 inches of mercury. To vacuum also means to siphon.

"Vacuum Breaker": A device that prevents the creation of a vacuum by admitting air at atmospheric pressure, used to prevent back siphonage.

"Vacuum Breaker, Hose Type" or "HVB": A back siphonage prevention device designed for hose connections that are not under continuous pressure, and meeting the requirements of ASSE 1011.

"Vacuum Relief Valve": A device to prevent excessive vacuum in a pressure vessel.

"Vent Pipe": A pipe in a plumbing system that is used to equalize pressure and ventilate the plumbing system. Also see the definition of "Vent System".

"Vent Stack": A vertical vent pipe installed primarily for the purpose of providing circulation of air to and from any part of the drainage system and terminating to the atmosphere or in the stack vent.

"Vent System": The pipe or pipes installed to provide a flow of air to or from a drainage system and to provide a circulation of air within the system to protect trap seals from siphonage and back pressure.

"Venturi": A short section in a pipe with a reduced diameter or cross-sectional area (forming a throat) compared to the larger ends, thereby increasing the

velocity of the fluid passing through the throat and decreasing the pressure at the throat. This decrease in pressure allows another fluid to be drawn into the venturi.

"Vertical Pipe": Any pipe or fitting that makes an angle of 45 degrees or less with the vertical.

"Wall Hung Water Closet": A water closet installed so that no part of the water closet touches the floor.

"Waste" (See "Sanitary Waste".)

"Waste Pipe": A pipe that conveys only waste material.

"Water Closet": A fixture with a water-containing receptor that receives liquid and solid body waste and, on actuation, conveys the waste through an exposed integral trap into a drainage system. Also referred to as a toilet.

"Water Distribution Pipe": A pipe within the building or on the premises that conveys water from the water service to the point of usage.

"Water Hammer": A concussion or sound of concussion of moving water against the sides of a containing pipe or vessel due to a sudden stoppage of flow. A pressure that results from a sudden deceleration of flow of water in a closed conduit. It is also called hydraulic shock.

"Water Hammer Arrester": A device to absorb hydraulic shock.

"Water Heater": An appliance for supplying hot water for domestic or commercial purposes. It may be used for space heating if the water temperature does not exceed 150 degrees Fahrenheit.

"Water Main": A water supply pipe for public or community use.

"Water Outlet": An opening through which water is supplied to a fixture, device, appliance or appurtenance, or into the atmosphere.

"Water Riser Pipe" (See "Riser".)

"Water Service" or "Water Service Pipe": The pipe from the water main or source of potable water supply to the water distribution pipe of the building served.

"Water Supply Fixture Unit" or "WSFU": The mathematical factor used by the plumbing industry to estimate the probable demand on the water supply system (considering the volume, duration of flow, and intervals between operations) caused by various plumbing fixtures.

"Water Supply Stub": A vertical pipe less than one story in height supplying one or more fixtures.

"Water Supply System": The water service pipe, the water distribution pipe, and all fittings, valves and appurtenances in or associated with the building or premises being served.

"Wet Vent": A vent that also serves as a drain. (See Appendix B.Illustration Y.)

"Yard Hydrant": A valve or faucet for drawing water from a buried pipe that includes a stand pipe with a valve or faucet at the upper end and a threaded valve outlet to which a hose may be attached.

"Yoke Vent": A pipe connecting upward from a soil or waste stack to a vent stack for the purpose of preventing pressure changes in the stack. (See Appendix B.Illustration Z.)

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

### **Section 890.130 Incorporated and Referenced Materials**

- a) The following State and federal statutes and State administrative rules are referenced in this Part:
  - 1) Illinois Plumbing License Law [225 ILCS 320]
  - 2) Private Sewage Disposal Licensing Act [225 ILCS 225]
  - 3) Illinois Groundwater Protection Act [415 ILCS 55]
  - 4) Swimming Facility Act [210 ILCS 125]
  - 5) Illinois Safe Bottled Water Act [410 ILCS 655]

- 6) Illinois Bottled Water Act [815 ILCS 310]
  - 7) Bed and Breakfast Act [50 ILCS 820]
  - 8) Hazardous Substances Act (15 USC 1263)
  - 9) Primary Drinking Water Standards (35 Ill. Adm. Code 611)
  - 10) Design, Operation and Maintenance Criteria (Specific Conditions and Installation Procedures) (35 Ill. Adm. Code 653.802)
  - 11) Private Sewage Disposal Code (77 Ill. Adm. Code 905)
  - 12) Illinois Accessibility Code (71 Ill. Adm. Code 400)
  - 13) Food Service Sanitation Code (77 Ill. Adm. Code 750)
  - 14) Youth Camp Code (77 Ill. Adm. Code 810)
  - 15) Recreational Area Code (77 Ill. Adm. Code 800)
  - 16) Boiler and Pressure Vessel Safety (41 Ill. Adm. Code 120)
  - 17) Drinking Water Systems Code (77 Ill. Adm. Code 900)
  - 18) Water Quality Standards (35 Ill. Adm. Code 302)
  - 19) Energy Policy Act of 1992 (PL 201-486)
  - 20) Lawn Irrigation Contractor and Lawn Sprinkler System Registration Code (77 Ill. Adm. Code 892)
  - 21) Safe Drinking Water Act (42 USC 1417)
  - 22) Certification and Operation of Environmental Laboratories (77 Ill. Adm. Code 465)
- b) See Appendix A for approved materials and standards that are incorporated by reference in this Part.

- c) The following nationally recognized standards and federal regulations are incorporated by reference in this Part (see also Appendix A):
  - 1) 2011 American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Handbook – HVAC Applications
  - 2) 2012 American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Handbook – HVAC Systems and Equipment
  - 3) January 20, 2004, Department of Energy: Conservation Program for Consumer Products (10 CFR 430)
- d) All incorporations by reference of federal regulations and the standards of nationally recognized organizations in this Part refer to the regulations or standards on the date specified and do not include any amendments or editions subsequent to the date specified.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

#### **Section 890.140 Compliance with this Part**

- a) Existing Buildings. In existing buildings, including historic buildings, or premises in which plumbing installations are to be altered, renovated or replaced, materials and methods shall meet or exceed the provisions of this Part.
- b) Variances
  - 1) When the Department finds that compliance with all requirements of this Part would result in an undue hardship due to excessive structural or mechanical difficulty, or impracticability, a variance may be granted. The request for a variance shall be submitted in writing to the Department for approval prior to installation.
  - 2) The Department will consider variances to this Part when the applicant has provided documentation citing the particular portion of this Part for which a variance is sought and has provided justification sufficient, in the opinion of the Department, to demonstrate that the variance will not create a condition less protective than that portion of this Part addressed in the variance request. Issuance of variances to this Part is at the sole discretion

of the Department and may not be delegated or assumed by any other authority identified in this Part. Variance authorizations may be conditioned as determined by the Department and are not precedential.

- c) Health and Safety. When a health or safety hazard exists because of an existing plumbing installation or lack of a plumbing installation, the owner or his or her agent shall install additional plumbing or make corrections as necessary to abate the hazard or violation of this Part.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

#### **Section 890.150 Workmanship**

- a) All plumbing work performed shall comply with the provisions of this Part.
- b) In the process of installing or repairing any part of a plumbing system, the floors, walls, ceilings, tile work, or any other part of the building or premises which must be changed, altered or replaced shall be left in a safe structural condition so as not to pose a health or safety hazard.
- c) Exterior/interior openings through walls, floors, and ceilings shall have the annular space around pipes properly closed to prevent the entrance of mice, rats or other rodents. Exterior wall openings shall be made water-tight.

#### **Section 890.160 Used Plumbing Material, Equipment, Fixtures**

- a) Previously used plumbing material, equipment and/or fixtures may be re-used for plumbing installations only if it complies with this Part at the time of the new installation.
- b) Used pipe or fittings shall not be installed in a potable water system.

#### **Section 890.170 Sewer and/or Water Required**

- a) Each building which is intended for human habitation or occupancy shall have a connection to a public water system, a semi-private water system, or a private water supply constructed in accordance with the requirements of the Illinois Water Well Construction Code (77 Ill. Adm. Code 920) or the Surface Source Water Treatment Code ( 77 Ill. Adm. Code 930), and a connection to a public sewer system or private sewage disposal system constructed to the requirements of the Illinois Private Sewage Disposal Code (77 Ill. Adm. Code 905). All

installations shall also be in accordance with any additional applicable State and local laws, ordinances, rules and regulations and local codes.

- b) For purposes of this Section, individually owned residences that share a common wall or ownership right and have ground floor access, such as townhouses or rowhouses, shall be treated as separate buildings and shall have separate connections to a public water system, a semi-private water system or a private water supply as required in subsection (a) of this Section. However, such individually owned residences established as part of a condominium association may use a single water supply service line from the public water supply to a centralized location, such as an exterior manifold or meter room with independent shutoff valves to each unit. There shall be a main shutoff valve at the property line. Such arrangements shall comply with requirements set forth by the local water department or water authority.
- c) Private Water Supply Interconnection.
  - 1) A private water supply shall not be interconnected with a public water system unless it is located and constructed in accordance with the Water Well Construction Code (77 Ill. Adm. Code 920) and Water Well and Pump Installation Code (77 Ill. Adm. Code 925), and the public water system is protected against backflow and back siphonage as specified in Section 890.1130.
  - 2) No physical connection shall be permitted between the potable water system and any non-potable water source.
- d) All plumbing fixtures, drains, appurtenances, and appliances used to receive or discharge sanitary waste shall be connected to the drainage system of the building or premises in accordance with the requirements of this Part.

(Source: Amended at 28 Ill. Reg. 4215, effective February 18, 2004)

### **Section 890.180 Sewer and Water Pipe Installation**

- a) Trenching and Bedding. Trenches shall be of sufficient width to permit proper installation of the pipe. If shoring is required, ample allowance shall be made in the width of the trench for working conditions, based on the materials and installation methods. If trenches are excavated to a depth so that the bottom of the trench forms the bed for the pipe, solid and continual bearing between joints shall be provided and bell holes shall be provided at points where the pipe is joined. If

trenches are excavated to a depth so that the bottom of the trench does not form the bed for the pipe, the trench shall be backfilled to the grade of the pipe with sand or fine gravel placed in layers of 6 inches maximum depth and compacted after each placement. The pipe shall not be supported on blocks. If rock is encountered in trenching, it shall be removed to a point at least 3 inches below the grade line of the trench; the trench shall be backfilled to grade with the sand tamped in place to provide a uniform bearing for the pipe between joints. The pipe shall not be allowed to rest on rock at any point. If soft materials of poor bearing qualities are found at the bottom of the trench, stabilization shall be achieved by over-excavating at least 2 pipe diameters and refilling with fine gravel or sand or a concrete foundation. A concrete foundation shall be bedded and sand tamped in place to provide a uniform bearing for the pipe joints. All piping in the ground shall be laid on a firm bed for its entire length.

- b) Backfilling. Trenches shall be backfilled until the crown of the pipe is covered by at least 18 inches of tamped earth to ensure that the pipe beneath is secure. Loose earth that is free of rocks, broken concrete, frozen chunks or other rubble shall be carefully placed in the trench in 6 inch layers and tamped in place. The backfill under and beside the pipe shall be thoroughly compacted to ensure that the pipe is properly supported. Backfill shall be placed evenly on both sides of the pipe and tamped to retain proper alignment.
- c) Breakage and Corrosion. Pipes passing under or through walls or floors shall be protected from breakage caused by stress or strain. Pipes passing under or through cinder, concrete or other corrosive material shall be protected from external corrosion, stress or strain by a protecting sleeve or a wrap-on material. (See Appendix B.Illustration AA.)
- d) Sleeves. In exterior walls or floors, the annular space between sleeves and pipes shall be filled or tightly caulked with a cold tar, asphalt compound or other equally effective material. (See Appendix B.Illustration AA.)
- e) Buried Piping Parallel to Footings. No buried piping shall be laid parallel to inside or outside footings, closer than 18 inches to the footing. (See Appendix B.Illustration BB.)
- f) Depth. Piping installed parallel to footings or bearing walls shall not extend below the 45 degree bearing plane of the wall or footing. (See Appendix B.Illustration BB.)

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)



**Section 890.190 Piping Measurements**

Except where otherwise specified in this Part, all measurements between pipes, or between pipes and walls or footings, shall be made from the outside edge nearest the parallel pipe, wall or footing.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.200 Operation of Plumbing Equipment**

- a) All plumbing equipment required by this Part shall be operated in the manner intended by the manufacturer. No alteration or modifications to plumbing fixtures, equipment and appurtenances which would negate designed safety features shall be allowed. All plumbing systems shall be maintained in a functional, safe and sanitary condition. The owner of the facility shall be responsible for maintenance of the plumbing system.
- b) No groundwater, roof drainage, discharge from footing tile drains or other storm water wastes shall be discharged into the sanitary drainage system.

## SUBPART B: PLUMBING MATERIALS

**Section 890.210 Materials**

All materials, piping, fittings, appliances, appurtenances, faucets, fixture fittings, fixtures and devices used in all plumbing systems shall be approved by the Department, in accordance with the following criteria:

- a) Compliance with the requirements of this Part.
- b) Compliance with the applicable standard (see Appendix A: Table A).
- c) Labeled by an agency that is approved by the Department or is an ANSI-accredited certification program (see Appendix A: Table A).
  - 1) Labeling indicates that the agency certifies the plumbing material to be in compliance with applicable standards. 2) Labeling includes the manufacturer's identification of material. Each length of pipe, each pipe fitting, trap, fixture, device and appurtenance used in a plumbing system shall have cast, stamped or indelibly marked on it the maker's mark or name, the weight, type, class of product and the standard that applies.
- d) Testing. The approved agency has tested a representative sample of the material or piping being labeled to the relevant standard. The approved agency maintains a record of all tests performed, which provides sufficient detail to verify compliance with the testing standard.
- e) Inspection and identification. The approved agency periodically performs inspections, which shall include in-plant inspections during the manufacturing process, to verify that the product being manufactured meets the applicable standard.
- f) Independent. The approved agency discloses all possible conflicts of interest.
- g) Equipment. An approved agency has necessary equipment to perform all required tests. The equipment shall be calibrated according to manufacturer's recommendations.
- h) Personnel. An approved agency employs personnel experienced and educated in conducting, supervising and evaluating tests.

- i) **Manufacturer's Identification of Material.** The approved agency ensures that each length of pipe, each pipe fitting, trap, fixture, device and appurtenance used in a plumbing system has cast, stamped or indelibly marked on it the maker's mark or name, weight, type, class of product and the standard that applies.

(Source: Amended at 28 Ill. Reg. 4215, effective February 18, 2004)

### **Section 890.220 Identification (Repealed)**

(Source: Repealed at 28 Ill. Reg. 4215, effective February 18, 2004)

### **Section 890.230 Safe Pan Material and Construction**

- a) **Material.** Safe pans shall be made only of lead, copper, aluminum, galvanized steel, stainless steel, ABS, PVC or fiberglass material.
  - 1) Lead sheets for safe pans shall weigh at least 4 pounds per square foot.
  - 2) Copper sheets for safe pans shall weigh at least 12 ounces per square foot.
  - 3) Aluminum, galvanized steel and stainless steel safe pans shall be of at least 24 gauge material.
  - 4) ABS or PVC safe pans or liners shall be 30 mil or 40 mil.
  - 5) Fiberglass for safe pans or liners shall be equally durable to the ABS and PVC material described in subsection (a)(3) of this Section.
- b) **Construction.** All safe pans shall be constructed with preformed dam corners, shall be watertight, adequately reinforced and provided with a drain opening designed to make a watertight joint. ABS and PVC safe pans and liners shall be solvent welded together with the proper cement.

(Source: Amended at 28 Ill. Reg. 4215, effective February 18, 2004)

## SUBPART C: JOINTS AND CONNECTIONS

### Section 890.310 Tightness

Joists and Connections. Joists and connections shall be gas-tight and water-tight.

### Section 890.320 Types of Joists

- a) **Caulked joists.** Caulked joists for (drain, waste and vent systems only) cast iron hub-and-spigot pipe shall be firmly packed with oakum or hemp and filled with molten lead at least 1 inch deep and be firmly caulked not to extend more than  $\frac{1}{8}$  inch below the rim of the hub. Paint, varnish, or other coatings shall not be permitted on the jointing material until after a plumbing inspector has been given the opportunity to test and approve or disapprove the joint. (See Appendix C.Illustration A.)
- b) **Threaded/Screwed Joists.** Threaded joists shall conform to American National Taper Pipe Thread, ASME B.1.20.1 (General Purpose). All burrs shall be removed; pipe ends shall be reamed or filed to size of the bore, and all chips shall be removed. Pipe joists compound shall be insoluble in water and non-toxic.
- c) **Wiped Joists.** Joists in lead pipe or fittings, or between lead pipe fittings and brass or copper pipe ferrules, solder nipples, or traps shall be full-wiped joists. Wiped joists shall have exposed surface on each side of the joint at least  $\frac{3}{4}$  inch and at least as thick as the material being joined. Wall or floor flange lead-wiped joists shall be made by using a lead ring or flange placed behind the joists at the wall or floor. Joists between lead pipe and cast iron, steel or wrought iron shall be made by means of a caulking ferrule, soldering nipple or bushing.
- d) **Soldered Joists.** The surface to be soldered shall be cleaned bright. The joists shall be properly fluxed (lead free) and made with approved lead free solder conforming to ASTM Standard B32. Joists in copper water tubing shall be made with approved cast bronze or wrought copper pressure fittings, properly soldered together. All solders or flux containing more than 0.2 percent lead shall bear a warning label that states that the solder or flux is not approved for private or potable water use as required by Section 4 of the federal Hazardous Substances Act (15 USC 1263). Use of this product in making joists or fittings in any private or public potable water system is prohibited. No part of a drain, waste and vent (DWV) system shall be joined or fitted with a solder or flux containing more than 0.2 percent lead.

- e) Flared Joints. Flared joints for plastic pipe and tubing and soft copper water tubing shall be made with approved fittings. The tubing shall be expanded with a proper flaring tool. (See Appendix C.Illustration B.)
- f) Hot-Poured Joints. Hot-poured compound for clay or concrete sewer pipe shall not be water absorbent and when poured against a dry surface shall have a bond of at least 100 pounds per square inch (psi). All surfaces of the joint shall be cleaned and dried before pouring. If wet surfaces are unavoidable, a primer such as oil or tar shall be applied. The compound shall not soften sufficiently to destroy effectiveness of the joint when subjected to a temperature of 160 degrees Fahrenheit, and not be soluble in any of the waste carried by the drainage system. Approximately 25 percent of the joint space at the base of the socket shall be filled with jute or hemp. A pouring collar rope or other device shall be used to hold the hot compound during pouring. Each joint shall be poured in one operation until the joint is filled. Joints shall not be tested until one hour after pouring.
- g) Precast Joints. Precast collars shall be formed in both the spigot and bell of the pipe in advance of use. Prior to making joint contact, surfaces shall be cleaned. When the spigot end is inserted in the collar, it shall bind before contacting the base of the socket.
- h) Brazed Joints. Brazed joints shall be made by first cleaning the surface to be joined down to the base metal, applying flux approved for brazed joints and for the filler metal to be used, and making the joints by heating to a temperature sufficient to melt the approved brazing filler metal on contact. (See Section 890.330(b).) An extracted mechanical joint may be made in copper tube types K or L only for water distribution. The joint shall be made with a mechanical extraction tool and joined by brazing. To prevent the branch tube from being inserted beyond the depth of the extracted joint, depth stops shall be provided. This joint shall be for above-ground use only.
- i) Cement Mortar Joints. Except for repairs, cement mortar joints are prohibited.
- j) Burned Lead (Welded). (For DWV system only) Every burned (welded) joint shall be made so that the two or more sections to be joined shall be uniformly fused together into one continuous piece. The weld shall be at least as thick as the lead being joined.
- k) Bituminized Fiber Pipe Joints. Joints in bituminized fiber pipe shall be made with

tapered type couplings of the same composition as the pipe. Joints between bituminized fiber pipe and metal pipe shall be made by means of an adaptor coupling caulked as required in subsection (a).

l) Plastic Pipe Joints

- 1) Every joint in plastic piping shall be made with approved fittings by either solvent-welded or fusion-welded connections, compression fittings, approved insert fittings, metal clamps and screws of corrosion-resistant material, or threaded joints. (See Appendix A. Table A for approved pipe, fittings and solvent.)
- 2) Joints and Fittings in Plastic Pipe. Potable water piping fittings and joints shall be in accordance with the manufacturer's recommendations subject to the following: (See Appendix A. Table A, "Approved Standards for Fittings".)
  - A) Polyethylene (PE) pipe shall be installed only with compression fittings, insert and clamp type fittings or thermal-welded joints and fittings. All clamps shall be of corrosion-resistant material. The inside diameter (ID) of any insert fitting shall not be less than the minimum allowable size for water service/distribution piping. (See Appendix A. Tables D, N and O, for minimum allowable sizes for water service/distribution piping.)
  - B) Polyvinyl chloride (PVC) pipe shall be installed with solvent-welded or flanged joints only. The pipe shall not be threaded. Transition to metallic or other piping shall be made with the use of adaptor fittings. The fittings shall be molded from PVC. The primer and solvent cement used shall be in accordance with the manufacturer's recommendation for PVC piping.
  - C) Polybutylene (PB) pipe shall be installed only with insert and clamp type fittings, compression type, flanged type, or thermal-welded joints and fittings. All clamps shall be of corrosion-resistant material. The ID of any insert fitting shall not be less than the minimum allowable size for water service/distribution piping. (See Appendix A. Tables D, N and O, for minimum allowable sizes for water service/distribution piping.)
- 3) Joints in Plastic Drainage. Joints in plastic drainage piping or vent piping within a building shall be solvent welded. Threaded or flanged joints may

be used with adaptor fittings. The solvent cement shall be specific for the type of piping material listed in Appendix A. Table A. O-ring expansion joints are acceptable if accessible.

- m) Ground Joint Connections. Ground joint connections (when accessible) may be used on the inlet or outlet side of a fixture trap or within the trap seal. Ground joint connections shall not be used in any inaccessible drainage piping.
- n) No-Hub Soil Pipe Joints. Shielded joints for no-hub cast iron soil pipe shall be made with an elastomeric gasket covered by either a stainless steel shield secured by two or more stainless steel bands or clamps, or covered by cast iron couplings secured with stainless steel nuts and bolts. When a stainless steel shield is used, the shield and clamps shall be corrosion resistant and homogeneous throughout. The joint materials shall comply with ASTM C564 and CISPI 310 or FM 1680.
- o) Compression Type Joints
  - 1) Compression type joints for hub and spigot cast iron soil pipe shall be made with neoprene insert gaskets in accordance with ASTM C564. The pipe shall comply with the specifications contained in ASTM A-74 with regard to hub and spigot dimensions and tolerances. (See Appendix C. Illustration C.)
  - 2) Compression type joints for copper water tube or brass tube shall be made with brass ferrules and ground joint connections.
- p) Grooved Type Mechanical Couplings
  - 1) Cut grooved type mechanical couplings, fittings and valves used on standard weight galvanized steel pipe, cast iron pipe or ductile iron pipe shall comply with the grooving dimensions of the AWWA specifications C606, limited to water distribution piping and downspout pipe above ground.
  - 2) Rolled grooved type mechanical couplings, fittings and valves used on standard weight galvanized steel pipe or type K or L copper tubing shall comply with the manufacturer's standard, limited to water distribution piping above ground. Fittings, couplings, and valves shall be compatible with the pipe material. Transition adapters shall be dielectric type.
  - 3) Gaskets for use with potable water piping shall be fabricated from material that is non-toxic, durable and impervious.

- q) **Copper Press Fittings.** Copper press fittings for joining copper water tubing shall have an elastomeric o-ring that forms the joint. The fitting shall be made by pressing the socket joint under pressure in accordance with the manufacturer's installation requirements and NSF/ANSI Standard 61.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

### **Section 890.330 Special Joints**

- a) **Copper Tubing to Screwed Pipe Joints.** Joints from copper tubing to threaded pipe shall be made by the use of a cast bronze or wrought copper adaptor fitting. The joint between copper tubing and the fitting shall be soldered or, if flared or compression, must be accessible.
- b) **Welding or Brazing.** Brazing or welding shall be in accordance with the provisions of Section 6 of the Code for Pressure Piping, ASME B31.1.
- c) **Slip Joints.** In drainage and water piping, slip joints may be used on the inlet side of the trap or in the trap seal, and on the exposed fixture supply. Slip joints shall not be used in any inaccessible piping. Push-on angle and straight stop valves are permitted, provided that they meet the following specifications: they are installed by being pushed onto copper or chlorinated polyvinyl chloride (CPVC); they are mechanically secured by metal tabs that grip the piping; they are sealed with o-rings; and they are capable of withstanding a water pressure of 150 psi and a temperature of 210 degrees Fahrenheit.
- d) **Expansion Joints.** Expansion joints shall be accessible and may be used where necessary to provide for expansion or contraction of the piping. The expansion joint material shall conform to the type of piping on which it is installed.
- e) **Compression type couplings** shall not be used in unexposed water piping except for water services, water meter yokes, and stop box connections.
- f) **Grooved Type Mechanical Couplings.** Grooved type mechanical couplings, in accordance with Section 890.320(p), may be used in potable water and roof drain piping. These couplings shall not be used in waste, soil or vent piping.
- g) **Plastic Pipe to Non-Plastic Pipe Joints.** Joints between plastic pipe and non-plastic pipe shall be made only by one of the following methods:



- 1) Pressure Piping
  - A) Approved insert fittings (in accordance with Appendix A.Table A);
  - B) Threaded adaptors;
  - C) Flanges; or
  - D) Flared fittings.
- 2) Non-pressure Piping – DWV
  - A) Caulked lead joints with caulked adaptors;
  - B) No-hub soil pipe shielded couplings with approved adaptor having a raised bead;
  - C) Compression type joints for hub and spigot cast iron pipe; or
  - D) Threaded adaptors.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

#### **Section 890.340 Use of Joints**

- a) Clay Sewer Pipe. Joints in vitrified clay pipe or between vitrified clay pipe and metal pipe shall be made with a neoprene gasket and stainless steel bands or as provided in Section 890.320(f), (g) or (o), if applicable.
- b) Concrete Sewer Pipe. Joints in concrete sewer pipe or between concrete sewer pipe and metal pipe shall be made with a neoprene gasket and stainless steel bands or as provided in Section 890.320(f), (g) or (o), if applicable.
- c) Cast Iron Pipe. A joint in cast iron water supply pipe shall be made in accordance with Section 890.320(a) and (b) or shall be a mechanical joint in accordance with AWWA C151. Joints in cast iron soil pipe shall be made in accordance with Section 890.320(a), (b), (n), (o) or (p).
- d) Screw Pipe to Cast Iron. Joints between wrought iron, steel, brass, or copper pipe and cast iron pipe shall be either caulked or threaded joints that are made as

provided in Section 890.320(a) or (b) and shall be made with proper adaptor fittings.

- e) Lead to Cast Iron, Wrought Iron or Steel. Joints between lead and cast iron, wrought iron, or steel pipe shall be made by means of wiped joints to a caulking ferrule, soldering nipple, or bushing as provided in Section 890.320(c).
- f) Copper Water Tube. Joints in copper tubing shall be made with cast bronze or wrought copper pressure fittings, properly soldered or brazed, or by means of compression or flared joints as provided in Sections 890.320(d), (e), (h) and (p)(2). Flared joints and compression fittings shall not be installed underground except for water services, water meter yokes, and stop box connections.
- g) Plastic Pipe. Joints between plastic pipe and non-plastic material shall be made only with an appropriate type adaptor as provided in Section 890.320(l) and 890.330(g).
  - 1) Plastic-Commingling. There shall be no commingling of plastic materials within the same plumbing system except through the use of proper adaptors or approved solvent as listed in Appendix A.Table A, for connections transitioning from one material to another, only.
  - 2) Plastic Pipe. Plastic pipe shall not be installed in any tunnel or chase that contains uninsulated hot water, hot air or steam piping that causes the ambient air temperature in the tunnel or chase to exceed 180 degrees Fahrenheit.
- h) Building Sewer Connections. An elastomeric coupling seal conforming to ASTM C 425, ASTM C 443, ASTM C 564, ASTM D 4161, ASTM F 477, ASTM D 3139, ASTM D 3212, or ASTM D 412 tests may be used to adapt any two building sewer pipes for different materials or size changes. The flexible couplings shall be attached to the pipe with stainless steel clamps or bolts. The manufacturer's recommended method of installation shall be followed.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

### **Section 890.350 Unions**

Unions may be used in the drainage and venting system when accessibly located above ground. Unions shall be installed in a water supply system within 5 feet of regulating equipment, water heaters, water conditioning tanks, water conditioning equipment, pumps, and similar equipment which may require service by removal or replacement.

Where small equipment may be unscrewed, only one union shall be required.

- a) Drainage System. Unions may be used in the trap seal and on the inlet and outlet side of the trap. Unions shall have metal to metal seats except that plastic unions may have plastic to plastic seats.
- b) Water Supply System. Unions in the water supply system shall be metal to metal with ground seats, except that plastic to metal unions may utilize durable, non-toxic, impervious gaskets. Unions between copper pipe/tubing and dissimilar metals shall either be made with a brass converter fitting or be a dielectric type union.

(Source: Amended at 28 Ill. Reg. 4215, effective February 18, 2004)

### **Section 890.360 Water Closet and Pedestal Urinal**

Fixture connections between drainage pipes and water closets, floor outlet service sinks and pedestal urinals, and earthenware trap standards shall be made by means of brass, copper, hard lead, plastic, or iron flanges; caulked, soldered, screwed or solvent welded to the drainage pipe. Flanges of hard lead, plastic and iron flanges for no-hub or compression joints shall be secured to the floor. The connection shall be bolted, with a gasket, washer or setting compound, between the earthenware and the flange. The floor flange shall be set on an approved firm base. The use of putty or non-drying plumber's putty manufactured specifically for plumbing installation is acceptable.

### **Section 890.370 Prohibited Joints and Connections in Drainage Systems**

Drainage System. Any fitting or connection which has an enlargement, chamber, or recess with a ledge, shoulder, or reduction of pipe area that offers an obstruction to flow through the drain is prohibited. No fitting or connection that obstructs flow shall be used. In existing buildings only a flow control valve or device may be connected to the fixture drain and shall not be considered as an obstruction. The enlargement of a three (3) inch closet bend or stub to four (4) inches shall not be considered an obstruction.

### **Section 890.380 Increasesers and Reducers**

Different Sizes. Where different sizes of pipes or pipes and fittings are to be connected, the approved proper size increasesers, reducers or reducing fittings shall be used between the two sizes.

## SUBPART D: TRAPS AND CLEANOUTS

**Section 890.410 Fixture Traps/Continuous Waste**

- a) **Fixture Traps.** All directly connected plumbing fixtures, except those having integral traps, shall be separately trapped by a water-seal trap, placed as close to the fixture outlet as possible. A kitchen sink with up to three basins may be installed on one trap if one compartment is not more than 6 inches deeper than the other and the waste outlets are not more than 30 inches apart. (See Appendix D.Illustration A.)
- b) **Distance of Trap to Fixture.** The developed length from the fixture outlet to the trap weir shall not exceed 24 inches, except that an interceptor used as a trap shall be located as close as possible to the fixture. The maximum developed length from the fixture outlet to the inlet of the interceptor shall not exceed 5 feet. (See Appendix D.Illustration B.) The standpipe inlet for an automatic clothes washer shall not exceed 48 inches above the weir of a trap.
- c) **Trap Size.** The size of trap for a fixture shall comply with Appendix A.Table E for minimum size of traps. No trap shall be larger than the fixture drain to which it is connected or the drainage pipe into which it discharges.
- d) **Type of Traps.** Traps shall have a uniform and smooth interior, and shall have no partitions or movable parts. The trap seal shall be non-adjustable. (See Appendix D.Illustration C.)
- e) **Drum Traps.** Drum traps shall be 3 or 4 inches in diameter and provided with a fixed water seal of at least 2 inches. The trap cleanout shall be one size less than the trap diameter.
- f) **Trap Seal.** Each trap shall have a water seal of 2 inches except where a deeper seal is required to prevent the loss of the trap seal by evaporation. Where loss of the trap seal may occur due to evaporation, one of the following shall be used:
  - 1) Vegetable oil may be added to the trap.
  - 2) A deeper seal not to exceed 8 inches may be used.
  - 3) An automatic trap primer may be used.
- g) **Trap Cleanouts**

- 1) Each fixture trap, except those cast integrally or in combination with fixtures in which the trap seal is readily accessible or except when a portion of the trap is readily removable for cleaning purposes, shall have an accessible threaded or cam lock cleanout plug of ample size protected by the water seal. (Exception: See subsection (g)(4).) The cleanout plug shall be of brass or other non-corrosive type material. (See Appendix D.Illustration D.)
  - 2) Trap cleanouts shall be made gas and water-tight with a threaded cleanout plug and approved washer.
  - 3) A P-trap that is used on a bath waste shall be directly below the tub overflow. The overflow shall be fastened to the tub by means other than the face plate.
  - 4) A P-trap on a plumbing fixture that is not accessible may be installed without a cleanout plug or having a portion of the trap readily removable, provided that there is access to a cleanout within 3 feet of the trap.
- h) Trap Level and Protection. Traps shall be set level with respect to their water seals and, where necessary, they shall be protected from freezing.
- i) Traps Underground. Underground traps shall be provided with accessible and removable cleanouts, except for separate "P" traps into which floor drains, urinals and other fixtures with removable drain strainers discharge.
- j) Building (House) Traps. No trap shall be installed at the base of a soil or waste stack or in a building drain.
- k) Prohibited Traps. Use of the following traps is prohibited (see Appendix D.Illustration E):
- 1) Traps that depend upon the action of movable parts for their seal;
  - 2) Full "S" traps. Exception: Water closet and similar fixtures that depend on self-siphonage for their proper operation;
  - 3) Bell traps;
  - 4) Crown vented traps;

- 5) Unvented running traps; and
  - 6) Fixtures with concealed interior partitioned traps. Exception: Fixtures with integral traps constructed of vitrified earthenware and penal institutional fixtures with integral traps constructed of ferrous material.
- l) Double Trapping. No fixture shall be double trapped.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

### **Section 890.420 Pipe Cleanouts**

- a) Location of Cleanouts Within a Building Drain
  - 1) Cleanouts shall be not more than 50 feet apart, including the developed length of the cleanout pipe, in horizontal drainage lines of 4 inches or less size. Cleanouts shall be not more than 100 feet apart, including the developed length of the cleanout pipe, in horizontal drainage lines of over 4 inches to 10 inches in size. Cleanouts shall not be more than 150 feet apart, including the developed length of the cleanout pipe, in horizontal drainage lines exceeding 10 inches in size. For underground drainage lines exceeding 10 inches in size, manholes instead of cleanouts shall be provided and shall be located at intervals of not more than 150 feet.
  - 2) When it is necessary to conceal a cleanout plug, a readily accessible covering plate or access door shall be provided.
  - 3) A test tee at the base of the stack may be used as a cleanout.
  - 4) A full size cleanout shall be located within 5 feet of the building foundation, inside or outside, in direct line with the building drain and sewer.
  - 5) All cleanouts in vertical stacks shall be located no higher than 48 inches above the floor.
- b) Change of Direction. A cleanout or manhole shall be installed at each change of direction of the horizontal building drainage system greater than 60 degrees; the total of the fittings between cleanouts or manholes shall not exceed 120 degrees. A manhole within a building shall be provided with an iron cover which shall be

securely bolted in place and made gas and water-tight with a soft metallic gasket.

- c) **Underground Drainage.** When installed on an underground drain, cleanouts shall be extended to or above the finished grade level; or may be extended to outside of the building. (See Appendix D: Illustration F.)
- d) **Concealed Piping.** Cleanouts on concealed piping shall be extended through and terminate flush with the finished wall or floor; or pits or chases may be left in the wall or floor, provided they are of sufficient size to permit removal of the cleanout plug and cleaning of the system. (See Appendix D: Illustration G.)
- e) **Base of Stacks.** A cleanout shall be provided at, or no more than 4 feet above, the base of each vertical waste or soil stack.
- f) **Buildings with Slab Floors.** For buildings with a slab floor or with less than a 36 inch crawl space under the floor, or where a stack cleanout is not otherwise readily accessible, one of the following shall be provided in lieu of a cleanout at the base of the stack:
  - 1) The building drain shall be extended to the outside of the building and terminated in an accessible cleanout.
  - 2) An accessible 2 way cleanout shall be installed in the building drain downstream from the stack provided that no other drainage pipe connects to such pipe inside the walls of the building unless it has its own cleanout at the base of the stack or extended outside the building.
- g) **Direction of Flow.** Every cleanout shall be installed so that the cleanout opens in a direction opposite to the flow of the drainage line or at right angles thereto, except as permitted in subsection (f) of this Section.
- h) **Cleanout Plugs.** A cleanout shall not have a plumbing fixture installed in it or be used as a floor drain.
- i) Cleanouts shall be of the same size as the pipe they serve up to a maximum of 6 inches, and at least 6 inches for larger pipe.
- j) **Cleanout Clearance.** All cleanouts shall have a clearance of 18 inches for the purpose of rodding. (See Appendix D: Illustration H.)

(Source: Amended at 28 Ill. Reg. 4215, effective February 18, 2004)

**Section 890.430 Cleanout Equivalent**

Fixture Trap. A fixture trap, readily removable and without disturbing concealed plumbing or requiring fixture removal, is acceptable as a cleanout equivalent, if there is no more than one (1) 90 degree bend on the line to be rodded. A water closet is not considered a cleanout equivalent.

(Source: Amended at 22 Ill. Reg. 21540, effective December 1, 1998)

**Section 890.440 Acid-Proof Traps**

Where a vitrified clay or other brittleware, acid-proof trap is installed underground, it shall be embedded in concrete to a thickness of six (6) inches from the bottom and side of the trap.



## SUBPART E: INTERCEPTORS – SEPARATORS AND BACKWATER VALVES

**Section 890.510 Grease Interceptor Requirements**

Plumbing systems for institutions or commercial establishments in which grease, fats, culinary oils or similar waste products from kitchens or food processing areas are wasted, or in which grease, fats or culinary oils are wasted in connection with utensil, vat, dish or floor cleaning processes shall include grease interceptors. All waste lines and drains carrying grease, fats or culinary oil in these establishments shall be directed to one or more interceptors. (See Appendix E.Illustrations A and B.)

- a) All required grease interceptors shall comply with the following:
  - 1) **Material and Covers.** Grease interceptors shall be constructed of durable, corrosion-resistant materials and shall have water-tight covers securely fastened in place.
  - 2) **Minimum Size.** A grease interceptor installed on the same floor as the fixture shall have one-half the liquid-holding capacity of the fixture. A grease interceptor located on a floor below the fixture shall have 60 percent of the liquid-holding capacity of the fixture. To determine the liquid-holding capacity in gallons of a plumbing fixture, the length is multiplied by the width by the height in inches and divided by 231. Where two or more sinks or receptacles are connected to an interceptor the liquid holding capacity shall be based on the combined volume of the fixtures served.
  - 3) No grease interceptor shall receive the discharge from a food waste disposal.
  - 4) The flow rate of the interceptor shall be sufficient to handle the maximum demand of the connected system.
  - 5) All interceptors shall be installed in an accessible location to permit the convenient removal of the lid and internal contents.
  - 6) All interceptors shall be designed and installed with proper venting so that they do not become air bound. (See Appendix E.Illustration C.)
- b) **Prohibited Type.** Water cooled grease interceptors are prohibited.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

### **Section 890.520 Gasoline, Oil and Flammable Liquids**

- a) Commercial vehicle repair garages, gasoline stations with grease racks or pits, and oil change facilities shall be provided with floor drains or trench drains connected to a gas and oil interceptor. If these facilities are connected to a private sewage disposal system, the floor or trench drains shall be connected to a holding tank in lieu of a gas and oil interceptor in accordance with the Private Sewage Disposal Licensing Act. Where trench drains are used to carry wastes to a gas and oil interceptor, the trench drain shall either extend the entire length of the work area or shall be installed in each working stall. For all facilities specified in this Section in which floor drains are installed, a minimum of one floor drain per working stall or one floor drain for each 500 square feet shall be installed.
- b) Commercial and residential vehicle storage areas greater than 1,000 square feet with floor or trench drains installed shall comply with subsection (c)(1), (2) or (3). Exception: residential garages with fewer than five vehicle bays are exempted from this requirement.
- c) All facilities, other than those specified in subsection (a), that generate fuel, oil or flammable waste shall meet one of the following requirements:
  - 1) provide floor drains or trench drains connected to a gas and oil interceptor.
  - 2) provide floor or trench drains connected to a holding tank in lieu of a gas and oil interceptor when these drains are connected to a private sewage disposal system.
  - 3) provide an alternative system approved by the Department (i.e., an oil reclamation system or containment area).
- d) General Requirements
  - 1) Gas and oil interceptors shall be of cast iron, steel, polyethylene, polymer concrete or equally durable fiberglass materials suitable for gas and oil. Fiberglass interceptors shall not be used for receiving any substance other than gas and oil. Poured concrete interceptors are prohibited.
  - 2) Each gas and oil interceptor or basin shall be provided with a heavy metal cover, which shall be bolted into place and made gas and -water-tight.

- 3) Each gas and oil interceptor and, if provided with separate compartments, each compartment and basin shall be provided with a vent of at least 2 inches, which shall extend independently to the outer air. Two or more vents may be connected to a header, which shall be 6 inches or higher than the lowest floor or trench drain served.
  - 4) The inlet of the gas and oil interceptor or the first basin shall be trapped except when floor drains are individually trapped.
  - 5) Floor drains above the level of the gas and oil interceptor or basins shall connect to a stack vent extending independently to the outer air.
  - 6) Gas and oil interceptors must be constructed in accordance with the Illinois State Fire Marshal's rules and regulations for underground storage tanks (41 Ill. Adm. Code 174, 175, 176, 177), when applicable, and shall be maintained to prevent loss of gas, oil, etc. Gas and oil interceptors using an automatic draw off feature shall have a separate U.L. approved underground storage tank or storage tank installed integral with the interceptor.
  - 7) Minimum Dimension. Gas and oil interceptors shall have a depth of at least 2 feet below the invert of the discharge drain.
  - 8) Performance. The gas and oil interceptor shall have at least a 12-inch water seal with a minimum 90 percent efficiency rating or have a minimum of an 18-inch water seal. Gas and oil in the effluent from the gas and oil interceptor or triple basin shall not exceed the levels specified by the sewage treatment authority having jurisdiction, in accordance with local ordinances and regulations.
  - 9) Poured concrete trench drains are prohibited for gas and oil discharges.
- e) Aircraft hangars used exclusively for storing aircraft shall be exempt from this Section under the following conditions:
- 1) No operation of aircraft or maintenance of any kind, including, but not limited to, mechanical work upon an aircraft, or aircraft fueling, oiling, lubricating or washing, may be performed in the hangar.

- 2) Oil, gasoline or flammable materials of any kind shall not be stored in the hanger.
  - 3) The hangar shall not be provided with floor drains or trench drains.
  - 4) The hangar shall not contain drains of any kind that are connected to a public sewer/private sewage disposal system/holding tank.
  - 5) In lieu of the requirements of subsections (e)(1) through (4), aircraft storage hangars may install floor drains or trench drains that comply with the requirements of subsections (a) through (e).
- f) Sizing
- 1) The minimum size interceptor for all facilities required to comply with subsection (a) shall be 6 cubic feet (45 gallons) for the first 500 square feet of floor area plus 1 cubic foot per each additional 500 square feet to be drained into the interceptor.
  - 2) The minimum size interceptor for all facilities, except those facilities required to comply with subsection (a), shall be 6 cubic feet (45 gallons) for the first 3,000 gross square feet plus 1 cubic foot per each additional 1,000 square feet to be drained into the interceptor. Floor area for parking decks or garages shall be determined by the gross square feet of the parking spaces.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

### **Section 890.530 Special Waste Interceptors**

- a) **Catch Basins.** In all motor vehicle wash racks, drainage shall discharge into a water-tight catch basin at least 36 inches in diameter, or 3 feet by 2½ feet (rectangular shape). The bottom shall not be less than 27 inches below the invert of the outlet pipe. The outlet pipe shall be trapped with a catch basin trap and shall be constructed of cast iron or schedule 40 plastic with a trapseal of at least 6 inches and a cleanout of at least 4 inches in diameter.
- b) Commercial laundries shall be equipped with an interceptor having a removable wire basket or similar device that will prevent materials detrimental to the sewage system from passing into the system.

- c) Sand, bottle and slaughter houses that will produce wastes that either settle or float (Example: oil or grease from meat packing operations, bottling establishments or heavy solids.) shall have an interceptor installed that complies with Section 890.510(a).
- d) Interceptor for Special Waste. Before installing any interceptor for any other flammable or special wastes, a drawing including all pertinent information shall be submitted to the Department for approval.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.540 Laundries (Repealed)**

(Source: Repealed at 28 Ill. Reg. 4215, effective February 18, 2004)

**Section 890.550 Backwater Valves – Sanitary System and Storm System (Repealed)**

(Source: Repealed at 28 Ill. Reg. 4215, effective February 18, 2004)

## SUBPART F: PLUMBING FIXTURES

### Section 890.610 General Requirements - Material and Design

- a) Quality of Fixtures: Plumbing fixtures shall comply with approved designs, be constructed from approved materials, have smooth, impervious surfaces and be free of defects and concealed fouling surfaces. (See Appendix A: Table A "Approved Materials and Standards for Plumbing Fixtures" and "Approved Standards for Plumbing Appliances/Appurtenances/Devices".)
- b) Used plumbing material, equipment and fixtures for plumbing installations shall comply with this Part.
- c) Any plumbing equipment condemned by the Department because of wear, damage, defects or sanitary hazards shall not be used in a plumbing system.

### Section 890.620 Overflows

- a) Design. When any fixture is provided with an overflow, the waste piping shall be so designed that the standing water in the fixtures cannot rise in the overflow when the stopper is closed or remain in the overflow when the fixture is emptied.
- b) Connection. The overflow pipe from a fixture shall be connected on the house or inlet side of the fixture trap, except that overflows of flush tanks may discharge into the water closets or urinals served by them. No overflow shall be connected to any other part of the drainage system.

### Section 890.630 Installation

- a) Cleaning. Plumbing fixtures shall be installed in a manner to afford easy access for cleaning.
- b) Securing Fixtures. Floor outlet or wall hung fixtures shall be secured by screws or bolts of copper, brass or other equally durable corrosion resistant materials.
- c) Wall-Hung Fixtures. Wall-hung fixtures shall be rigidly supported by a concealed metal supporting member so that no strain is transmitted to the fixture connection.
- d) Setting. Plumbing fixtures and traps shall be set level and in a true alignment.
- e) Potable Water Supply Connection. Hot and cold, tempered and cold, or tempered

water only shall be supplied to all plumbing fixtures that are designed for hot and cold, tempered and cold, or tempered water. All mixing faucets and single lever faucets shall have both hot or tempered and cold water connected to them with the hot or tempered water supply on the left side of the faucet. The cross piping of hot or tempered and cold water to a mixing faucet by internal modification of the faucet shall not be allowed. Each lavatory and sink faucet shall have supply pipes that are accessible.

- f) **Improper Location.** Piping, fixtures or equipment shall not be located or installed so as to interfere with the normal operation of windows, doors or other exit openings. Plumbing fixtures shall be installed in an area where there is sufficient room for the fixture to be used for its intended purpose.
- g) **When plumbing is installed it shall meet the requirements of the Illinois Accessibility Code.**
- h) **Surrounding Materials.** Where water closets or urinals are installed for public use, the flooring under the fixture base extending to at least 18 inches from the front and both sides of the water closet or urinal, and extending from the back of the water closet or urinal to the wall, shall be of non-absorbent material.
- i) **A water heater thermostat shall not be an acceptable alternative water temperature control device.**

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

#### **Section 890.640 Prohibited Fixtures**

- a) **Drinking fountains shall not be installed in public toilet rooms.**
- b) **Fixed wooden, concrete, cement or tile wash trays or sinks used for food preparation, utensil washing, or hand washing shall not be installed in any food service establishment or commercial food establishment.**
- c) **Bathtub liners/inserts are prohibited unless all of the following conditions are met:**
  - 1) **Bathtub liners/inserts must be manufactured to an exact fit over existing bathtubs or be custom fabricated according to the dimensions of an existing bathtub;**
  - 2) **The floor (bottom surface) of the liner/insert must have a slip-resistant**

surface; and

- 3) The bathtub liner/insert must be manufactured/fabricated from high-impact plexiglass/ABS or acrylic/plastic material complying with IAPMO/ANSI Z124.8 or from porcelain enameled formed steel complying with ASME A112.19.1/CSA 45.2.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

### **Section 890.650 Water Closets**

- a) **Public Use**
  - 1) Water closet bowls for public use shall be the elongated type, and the seat shall be an antimicrobial plastic open-front seat. Exception: Water closet bowls for public use may have closed-front seats provided that the seat is encased with a continuous plastic sleeve capable of providing a clean surface for every user.
  - 2) The activating handle, button or mechanism of the flush valve shall be at least 10 inches above the overflow rim of the bowl and not more than 44 inches above the floor.
  - 3) In schools that are not licensed by the Illinois Department of Children and Family Services as day care centers or homes, water closets provided for the use of children under five years of age shall be of size and height suitable for children's use, either child or juvenile type in accordance with ASME A112.19.2/CSA B45.1.
  - 4) Water closets designed for institutional use may be used in intensive care facilities and intensive coronary care facilities provided that the water closet swings only horizontally and has an integral trap. A water closet flushometer shall be used to flush the fixture. The plans and specifications shall be submitted to the Department for approval prior to installation, and approval will be in writing from the Department provided that the requirements of this subsection (a) are met.
- b) **Water Closet Tanks.** Water closet tanks shall have a volume sufficient to properly flush the water closet bowls with which they are connected.
- c) **Ballcocks.** Ballcocks for flush tanks shall be of the anti-siphon type, be properly



installed, and have a provision for trap refill.

- d) Flushing Device. The flush valve seat in all water closet tanks shall be 1 inch or more above the flood level rim of the water closet bowl, with the exception of one-piece water closets in accordance with ASME A112.19.2/CSA B45.1.
- e) Flushometer Valve. Flushometer valves shall comply with ASSE 1037. Flushometer valves shall be installed so that they are readily accessible for repair. When the valve is operated, it shall complete the cycle of operation automatically, opening fully and closing completely under the service pressure. At each operation, the valve shall deliver water in sufficient volume and at a rate that will thoroughly flush the fixture and refill the fixture trap. Flush valve flow shall be regulated. Protection against backflow shall be provided by an approved vacuum breaker installed on the discharge side of the flushing valve. The bottom of the vacuum breaker, or the critical level line shown on the vacuum breaker, shall be at least 4 inches above the overflow rim of the bowl (see Section 890.1140(a) and (b)). Not more than one water closet shall be served by a single flushometer valve.
- f) Seats. Water closets shall be equipped with seats of smooth, non-absorbent material. All seats of water closets provided for public use shall be an antimicrobial plastic material and an open-front style, except that closed-front seats may be provided if the seat is encased with a continuous plastic sleeve ensuring a clean surface for every user. No water closet seat shall be more than 1½ inches thick. Seats for accessible water closets may be open or closed front, and may have a lid or not have a lid.
- g) A flushometer tank (or pressurized flushometer valve in accordance with ASSE 1037) shall be used only with a water closet bowl specifically designed for that type tank/flushing device (i.e., in accordance with ASME A112.19.2/CSA B45.1) and when the flow pressure at the fixture meets the manufacturer's minimum recommendations.
- h) Water closets that rely on substances other than water for proper operation shall comply with the Private Sewage Disposal Code. Privies and chemical toilets shall not be used inside any building.
- i) Bidet. A bidet shall be equipped with hot and cold, tempered and cold, or tempered water only. An atmospheric vacuum breaker shall be installed on the discharge side of the flushing valve. The bottom of the vacuum breaker, or the critical level line shown on the vacuum breaker, shall be at least 4 inches above

the overflow rim of the bidet.

- j) Prohibited Water Closets. Hopper-style water closets and water closets with concealed couplings or submerged side inlets are prohibited. (See Appendix F.Illustration A.)

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

### **Section 890.660 Urinals**

- a) Automatic Flushing Tank.
  - 1) Flushing tanks shall be used for washout urinals only. Tanks flushing more than one (1) urinal shall be automatic, shall provide a sufficient volume of water to flush all urinals simultaneously, and shall flush at least four (4) times per hour. One automatic flushing tank may serve no more than three (3) washout urinals.
  - 2) Float Valves. Float valves or ball cocks, if provided for flushing tanks, shall be of the anti-siphon type and of sufficient capacity to refill the trap.
- b) Urinal Flush Valves. No valve shall be used to flush more than one (1) blow-out, siphon-jet or pedestal urinal. One (1) properly sized automatic flush valve may serve more than one (1), but not more than a battery of three (3) washout urinals, and shall flush at least four (4) times per hour. The water supply line to each urinal flush valve shall be as required by the manufacturer, but not less than three-fourths (3/4) inch. Protection against backflow shall be provided by an approved vacuum breaker. (See Sections 890.1130(a), (b), (c) and 890.1140.)
- c) Trough urinals are prohibited.

### **Section 890.670 Strainers and Fixture Outlets**

- a) Strainers. All plumbing fixtures other than water closets, urinals with integral traps, and any sink outlet having a disposal unit shall be provided with a strainer. A pop-up waste shall be considered a strainer.
- b) Bathtubs - Waste Outlets. The waste outlet for a bathtub shall have a strainer or stopper and shall have an outlet at least one and one-half (1 1/2) inches in diameter.

**Section 890.680 Lavatories**

- a) Waste Outlets. Wastes shall have a strainer or stopper and have a waste outlet at least 1¼ inches in diameter.
- b) Lavatory Faucets. All lavatory faucets shall have air gaps as specified in Appendix A.Table C.
- c) When metering faucets are located on lavatories in public restrooms, they shall be adjusted to remain open for a minimum of 10 seconds and shall comply with the water consumption requirements of ASME/ANSI 112.18.1. Metering faucets shall be designed for hot and cold, tempered and cold, or tempered water only.
- d) Fixture Calculation. Eighteen lineal inches of wash sink or 18 inches of a circular basin, when provided with water outlets for the space, shall be considered equivalent to one lavatory. (See Appendix F.Illustration B.)
- e) Water Temperature. All lavatory faucets for public use shall be provided with an automatic safety water mixing device to prevent sudden unanticipated changes in water temperature or excessive water temperatures. The automatic safety water mixing device shall comply with ASSE 1070 or 1017 in accordance with Section 890.210, and shall be adjusted to a maximum setting of 110 degrees Fahrenheit, at the time of installation. Exception: Units constructed in accordance with Section 890.1220(a)(9)(B) may be used in lieu of an automatic safety water mixing device to provide hot or tempered water to public lavatories.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.690 Shower Receptors and Compartments**

- a) Shower Installation. All shower compartments, except those built directly on a slab floor or having receptors constructed of precast stone, terrazzo, concrete, molded stone, molded fiberglass, or an equally durable material such as cultured stone or synthetic stone, shall have a lead, copper, ABS, PVC or fiberglass shower pan. (See Section 890.220.) All sides of the shower pan shall turn up at least 2 inches above the finished shower floor level. Precast molded receptors shall have a minimum ¼- inch thick flange. Traps shall be constructed so that the pan is fastened to the trap at the seepage entrance, making a water-tight joint between the pan and the trap. Shower receptacle waste outlets shall be at least 2 inches in diameter and have a removable strainer.

- b) **Water Temperature Safety.** All shower compartments and shower-bath combinations shall be provided with an automatic safety water mixing device to prevent sudden unanticipated changes in water temperature or excessive water temperatures. The automatic safety water mixing device shall comply with ASSE 1016/ASME A112.1016/CSA B125.16, in accordance with Section 890.210, and be designed with a maximum handle rotation limit/stop, or comply with ASSE 1017 or ASSE 1070, in accordance with Section 890.210. The automatic safety water mixing device shall be adjusted to a maximum setting of 115 degrees Fahrenheit at the time of installation. The temperature of mixed water provided to multi-shower units or multi-person showers shall be controlled by a master automatic safety water mixing device, or the mixed water temperature shall be individually regulated by automatic safety mixing valves for each shower unit. A water heater thermostat shall not be an acceptable alternative water temperature control device.
- c) **Dimensions.** Single family shower compartments or stalls shall have at least 1,024 square inches outside dimension (OD) floor area and shall be at least 32 inches in shortest outside dimension. All other shower compartments or stalls shall have no less than 1,296 square inches outside dimension floor area and shall be at least 32 inches in shortest outside dimension.
- d) **Materials.** Shower walls shall be constructed of durable, smooth, non-absorbent, non-corrosive and waterproof materials, such as fiberglass, enameled metal or plastic sheeting. All shower compartments or stalls shall have a slip-resistant floor (bottom) surface.
- e) **Public or Institution Showers.** Floors of public shower rooms shall be drained so that no waste water from any bather will pass over areas occupied by other bathers. This will not prohibit the use of column showers.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

### **Section 890.700 Sinks**

- a) **Waste Outlets.** Kitchen sinks shall be provided with waste outlets at least 1½ inches in diameter. Other special purpose sinks such as bar sinks, lab sinks and dipper wells may have smaller waste outlets. Waste outlets shall be of the flat or basket (cup) strainer type.
- b) **Food Grinders.** Sinks in which food grinders are installed shall have a waste opening inlet for the food grinder at least 3½ inches in diameter.

- c) No special purpose sink shall be substituted for kitchen purposes.
- d) Service sinks, mop sinks, laundry trays or similar utility sinks shall be provided with hot water.
- e) Sinks in laboratories that are not designated for hand washing or personal hygiene may be supplied with cold water only.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

### **Section 890.710 Food Waste Disposal Units**

- a) Installation. Food waste disposal units shall be trapped separately from any other fixture or compartment, shall be connected directly to the sanitary drainage system, and shall be properly vented. Dishwashers shall not discharge into food waste disposal units. Units may have either automatic or hand-operated water supply control. (See Section 890.1130(a), (b) and (c).)
- b) Commercial-Type Grinders. Commercial-type food grinders shall be provided with a waste line at least 2 inches in diameter. (See Appendix F: Illustration D.)

(Source: Amended at 28 Ill. Reg. 4215, effective February 18, 2004)

### **Section 890.720 Drinking Fountains**

- a) Design and Construction. Drinking fountains shall conform to the standards specified in Appendix A. Table A. No modification of the mouth guard or nozzle shall be made. (See Appendix F. Illustration E.)
- b) Protection of the Water Supply
  - 1) All drinking fountain nozzles, including those which may at times extend through a water surface, with an orifice not greater than  $\frac{7}{16}$  or 0.440 inch diameter or 0.150 square inches area, shall be placed so that the lower edge of the nozzle orifice is at an elevation at least  $\frac{3}{4}$  inch above the flood level rim of the receptacle.
  - 2) The  $\frac{3}{4}$  inch elevation shall also apply to nozzles with more than one orifice, provided that the sum of the area of all orifices shall not exceed the area of a circle  $\frac{7}{16}$  inch in diameter or shall not exceed 0.150 square

inches area.

- 3) The nozzle shall be set at an angle from vertical to prevent the return of water in the jet to the orifice.
- c) **Material.** The fountain shall be constructed of impervious materials such as vitreous china, porcelain, enameled cast iron, stainless steel, or other metals or stoneware. (See Section 890.610.)
- d) **Flow Regulator.** The water supply for the drinking fountain shall be provided with an adjustable valve fitted with a loose key stop or an automatic valve regulating the rate of flow of water through the fountain so that the valve manipulated by the user of the fountain will merely turn the water on or off.
- e) **Installation and Location.** Drinking fountains shall not be installed as an integral part of or connected to any other plumbing fixture, such as a lavatory or sink, nor shall a drinking fountain be installed in a restroom or toilet room, except those in correctional facilities.
- f) **Substitution.** Whenever a drinking fountain is required by this Part, bottled drinking water or a water dispensing faucet (water station) may be substituted for a drinking fountain, provided that drinking water is accessible to the public. When bottled drinking water is provided in lieu of a drinking fountain, the bottled water used shall be commercially sealed in accordance with the Illinois Bottled Water Act and the Illinois Safe Bottled Water Act.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

### **Section 890.730 Floor Drains/Trench Drains**

- a) **Trap and Strainer.** Floor drains shall be trapped and have a minimum water seal of 2 inches and shall be provided with a removable strainer. The open area of the strainer shall be at least  $\frac{2}{3}$  of the area of the drain line to which it connects. (See Appendix F.Illustration F.)
- b) **Trench drains for gas or oil discharges** shall be constructed of cast iron, steel, polymer concrete, fiberglass, high-density polyethylene (HDPE), or Schedule 40 PVC material. Continuous trench drains for gas or oil discharges shall have a trapped and vented opening no less than every 40 lineal feet. Intermittent trench drains shall be treated as individual floor drains and shall meet the trap and venting requirements for floor drains.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

### **Section 890.740 Kidney Dialysis Machines**

- a) The water supply inlet to kidney dialysis equipment shall have a reduced pressure principle backflow preventer assembly complying with ASSE 1013 or a fixed air gap.
  - 1) A portable dialysis unit or machine shall have a reduced pressure principle backflow preventer assembly installed on the water supply inlet on the unit.
  - 2) Stationary dialysis equipment within a facility shall require, at the filter room or the dialysis machines, a reduced pressure principle backflow preventer assembly on the water supply or a water supply with a fixed air gap.
  - 3) Dialysis equipment shall be installed in accordance with this Part and the manufacturer's specifications. Any conflicts shall be submitted to the Department for resolution.
- b) The water supply to a dialysis reuse room or dialysis machine repair room shall be isolated from all other deionized (DI) or reverse osmosis (RO) water lines by an RPZ or an air gap.
- c) A sign no smaller than 8 by 10 inches with the wording "This Water For Dialysis Only" shall be placed above a sink with DI water or RO water supplied to the faucet.
- d) The discharge for each dialysis unit or machine, portable or stationary, shall be provided with an individual indirect waste connection to the sanitary drainage system. Each stand pipe shall be individually trapped and vented.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

### **Section 890.745 Dental Units**

- a) A reduced pressure principle backflow preventer assembly conforming to ASSE 1013, or a fixed air gap, shall be installed on each dental unit or group of dental units.

- b) Dental vacuum systems connected to the water supply shall be provided with backflow protection.
- c) If a dental unit has a water outlet below the flood rim level of a cuspidor, then an approved reduced pressure principle backflow preventer assembly, a fixed air gap, an air vent hole on the outlet, or an approved vacuum breaker shall protect the water supply from each dental unit.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

### **Section 890.750 Hydromassage/Whirlpool Bathtubs**

- a) Whirlpool bathtubs shall be installed so that the tub, pump, jets and pump tubing drain completely after each use. The pump shall be located above the weir of the whirlpool tub trap.
- b) All whirlpool bathtubs shall comply with ASME A112.19.7/CSA 45.10 (Whirlpool Bathtub Appliances). The suction fittings used in whirlpool bathtubs shall conform to ANSI/APSP 16 (Standard Suction Fittings for Use in Swimming Pools, Wading Pools, Spas, and Hot Tubs).

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

### **Section 890.760 Pressure Type Water Treatment Units**

Wash water and rinse water drain lines from water softeners and other types of water treatment units shall discharge through a vertical air gap at least twice the diameter of the pipe, but not less than two (2) inches. Any water softening unit which depends on a venturi created by the flow of water from the water supply line to the softener, for the purpose of siphoning brine solution for regeneration, shall not be required to have a backflow preventer on the water supply line. All other types (those that depend on internal check valves to prevent backflow and/or have the inlet supply of water stopped during regeneration) shall have a double check valve backflow preventer assembly installed on the inlet water supply line.

### **Section 890.770 Dishwashing Machines**

- a) Domestic Dishwasher (Private Residence). When a domestic dishwashing machine drain line is connected to the house side of a trap from a sink, the drain from the dishwasher shall be carried up to the underside of the spill rim of the sink. Dishwashing machines shall discharge separately into a trap or tail piece of the kitchen sink and shall not connect to the food waste disposal unit.



- b) **Water Supply Connection.** The water supply to commercial dishwashing machines shall be connected through an air gap or by means of proper backflow protection, e.g., a non-pressure type (atmospheric) vacuum breaker or a dual check valve backflow preventer assembly (DuC), depending upon the circumstances.
- c) **Commercial dishwashing machines** shall indirectly discharge to a proper receptor connected to the drainage system or as permitted in Section 890.1010(a).
- d) **Hot Water.** A commercial dishwashing machine or similar dishwashing equipment that relies upon hot water for sanitizing dishes and utensils, rather than chemicals for sanitizing, shall provide rinse water at 180 degrees F., except for a single-tank, stationary-rack, single temperature dishwashing machine which shall provide a rinse water temperature of 165 degrees F., in accordance with Section 750.830(h) of the "Food Service Sanitation Code" (77 Ill. Adm. Code 750).

#### **Section 890.780 Garbage Can Washers**

- a) **Water Supply Connection.** The water supply to garbage can washers shall be connected through an air gap or by means of proper backflow protection in accordance with Sections 890.1130 and 890.1140.
- b) **Discharge.** Garbage can washers shall not discharge through a trap serving any other device or fixture.
- c) **Baskets.** The receptor receiving the waste water from garbage can washing shall be provided with a basket, strainer or similar device to catch large solid waste particles, thereby preventing their discharge into the building drainage system.
- d) **Grease Interceptor.** The discharge from a garbage can washer shall be directed to a grease interceptor. (See Section 890.510.)

#### **Section 890.790 Laundry Trays/Sinks and Drains**

- a) **Waste openings.** Each compartment of a laundry tray shall be provided with a waste opening at least 1½ inches in diameter and with a stopper or strainer.
- b) **Commercial Laundry Drains.** Commercial laundry machines shall discharge individually into a trapped and vented outlet or may discharge into a trapped and vented trench drain. (Also see Section 890.530(b), which requires all commercial

laundries to have a lint separator/interceptor.)

- c) All laundry/washer boxes shall have a minimum of a 2 inch drain that is properly trapped and vented. (See Section 890.410(b).)

(Source: Amended at 28 Ill. Reg. 4215, effective February 18, 2004)

### **Section 890.800 Special Fixtures and/or Items Designed for a Particular Purpose**

- a) Emergency showers and eye wash stations within a building shall be provided with potable water and a trapped and vented receptor and shall comply with ANSI Z358.1.
- b) Emergency eye wash stations shall not be installed on a faucet spout.
- c) Baptiseries, ornamental and lily ponds, aquariums, ornamental fountain basins, and similar type constructions, when provided with water supplied from the potable water system, shall be protected from back siphonage as required in Section 890.1130(f).
- d) A request for permission to install special fixtures or items designed for a particular purpose requiring water and waste connections not otherwise provided for in this Part shall be submitted, in writing, to the Department for approval prior to installation.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

### **Section 890.810 Minimum Number of Plumbing Fixtures**

- a) **Minimum Number of Fixtures Required.** Plumbing fixtures shall be provided, for each building type and occupant load, in the minimum numbers shown in Appendix A.Table B, Minimum Number of Plumbing Fixtures, except as noted in footnote 2. Questions concerning the minimum numbers of fixtures required for building types not listed in Appendix A.Table B, shall be referred to the Department in writing prior to construction for a decision concerning the minimum numbers (and types) of plumbing fixtures required. The Department's decision shall be in writing based on Appendix A.Table B.
  - 1) **Building Classification.** For purposes of this Part, buildings shall be classified according to the types shown in Appendix A.Table B. Buildings that incorporate more than one type of building use or occupancy, as

classified by the Department, shall provide the combined numbers of fixtures required for the individual uses. Individual businesses within the same building or within an enclosed mall may share public or employee restroom facilities, provided that the access to the restrooms does not require trespass on adjoining businesses or leased space. Restrooms shall be open at all times when any individual business within the same building or within an enclosed mall is open.

- 2) Occupant Load. For those building types for which the minimum number of plumbing fixtures required in Appendix A. Table B is dependent upon the building's occupant load, the occupant load shall be the estimated total occupant load. If the building's occupant load is not known or determinable, the following shall be used to estimate the total occupant load:
- A) In assembly places (sports arenas, stadiums, convention centers, theaters, auditoriums, gymnasiums or other facilities for spectator events); worship places and funeral homes; schools; office buildings; food service establishments; and mercantile units, the total occupant load (employees and public users of the facility) shall be based on the capacity of the rooms or spaces used for assembly purposes or other intended occupancy and shall be determined as follows:
- i) In rooms or spaces with fixed seating, the occupant load shall be the actual number of seats provided. When no divisions between seats are provided (e.g., benches or pews), fixed seating shall be computed assuming 18 inches per person.
- ii) In rooms or spaces without fixed seating, the occupant load shall be determined by dividing the gross floor area by the estimated floor area per person shown in the following table:

<u>Building Type or Occupancy</u>	<u>Floor Area per Person (Sq. Ft.)</u>
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Assembly Places – Facilities for Spectator Events; Worship Places and Funeral Homes	50
Museums, Libraries, Exhibition Areas and Similar Uses	50
Schools	50
Day Care Centers	70
Office Buildings	200
Food Service Establishments, Clubs, Taverns, and Other Eating/Drinking Facilities	30
Mercantile Units, Except Grocery Stores, Auction Houses, Sale Barns, Car Auction Centers, and other similar Mercantile Units	
– First Floor	100
– All Other Floors	120
Combination Grocery Store/Non-Grocery Mercantile Units	150
Mercantile Units, such as Auction Houses, Sale Barns, Car Auction Centers, and other similar Mercantile Units	40
Grocery Stores	200
Storage/Shipping Area	400
Power Plants/Industrial Units	500

iii) For a drive-in food service establishment, the occupant load shall be considered as equal to the number of parking stalls.

B) Dormitories and Institutions. For dormitories, penal institutions and other residential institutions other than hospitals, the total occupant load shall be based upon the number of beds in the dormitory or institution.

C) Restroom Location and Requirements. The required number of

plumbing fixtures for a restroom shall be located within the restroom area and not in the hallways or vestibules. Lavatories required by Appendix A.Table B shall be installed in restrooms at a ratio of not less than one lavatory per two water closets or urinals. (See Footnote 2, Appendix A.Table B.)

b) Required Restroom Facilities and Drinking Fountains

1) Employee Restrooms and Drinking Fountains

A) Restroom facilities and drinking fountains shall be provided for all employees within each place of employment. The minimum numbers of fixtures provided shall be based on the maximum number of male and female employees working at any one time, as shown in Appendix A.Table B. (The numbers of fixtures required for employees are included in the numbers shown in Table B for all building types/uses except hospital rooms, penal institutions and other institutions. The entry in Appendix A.Table B (All Facilities for Employee Use) shall be used to determine the minimum number of fixtures required for employees in hospitals, penal and other institutions, and all other buildings/facilities that do not appear in Appendix A.Table B.)

i) If there are more than five employees working at any one time, separate restrooms for men and women shall be provided.

ii) If there are no more than five employees working at any time, one restroom may serve both sexes. A restroom shall have a minimum of one water closet and one lavatory.

iii) For schools, day care centers and office buildings, the employee restrooms and drinking fountains shall be located on the same floor or one floor above or below each location where employees regularly work.

iv) Individual businesses within the same building or within an enclosed mall may share public/employee restroom facilities, provided that the access to the restrooms does not require trespass on adjoining business or leased space. The restrooms shall be designed for the combined occupant load

of the individual businesses served, be open at all times when any individual business is open, and be located no more than 300 feet from the entrance of each business served. Exception: Any food service establishment that sells or serves food or beverages to be consumed on its premises or within the building/mall shall be located no more than 100 feet from the shared public/employee restrooms and shall be on the same floor.

- v) Kiosks, which are free-standing places of employment, that have five or fewer employees at any time who have access to public restrooms and a drinking fountain within 300 feet of the kiosks, shall not be required to have employee restroom facilities or a drinking fountain.
  - B) If public restrooms and drinking fountains are also required for the building type, employees may share the restrooms and drinking fountains with the public, provided that the numbers of fixtures are sufficient for the combined numbers of males and females and the restrooms and drinking fountains are provided within the place of employment (and within the required location for schools, day care centers and office buildings).
- 2) Public Restrooms and Drinking Fountains
- A) General Requirements
    - i) Buildings with 5,000 square feet of gross public area or with occupancies of 100 or more persons shall provide public restrooms and drinking fountains as shown in Appendix A. Table B. Buildings other than those exceptions in subsection (b)(2)(B), with less than 5,000 square feet of gross public area, or with occupancies of fewer than 100 persons, need not provide public restrooms and drinking fountains.
    - ii) Individual businesses within the same building or within an enclosed mall, may share public/employee restroom facilities, provided that the access to the restrooms does not require trespass on adjoining business or leased space. The restrooms shall be designed for the combined occupant load

of the individual businesses served, always be open when any individual business is open or when employees are present, and be located no more than 300 feet from the entrance of any business served. Exception: Any food service establishment that sells food or beverages to be consumed on its premises or within the building/mall shall be located no more than 100 feet from the shared public/employee restrooms and shall be on the same floor.

- iii) When public restroom facilities are required by this Part, separate facilities for males and females shall be provided. If additional public restroom facilities are provided in excess of the minimum requirements of this Part, they shall comply with one of the following:
- For each additional two water closets or urinals installed in a restroom, one additional lavatory shall be installed in that restroom.
  - Unisex restrooms shall not have more than one water closet and one lavatory and the option of one urinal.
- iv) Plumbing shall meet the requirements of the Illinois Accessibility Code.

B) Additional Requirements for Special Building Types

- i) All food service establishments that sell or serve food or beverages to be consumed on the premises (regardless of their gross area) shall provide readily accessible restroom facilities for the public. If public restrooms are not provided within the premises of the food service establishment, they shall be located within the same building, on the same floor/level and within 100 feet of an entrance to the food service establishment, and they shall be available for public use at all times that the food service establishment is open. Exception: Food service establishments with no more than 10 combined employees and seats (for patrons) at any one time need not provide public restrooms, provided that the employee restrooms are

accessible and made available to the public.

- ii) All businesses selling motor vehicle fuel to the public (regardless of their gross area) shall provide at least one public restroom for male use and one public restroom for female use. Exception: Facilities that do not have any employees working as attendants during any part of a 24 hour period and sell only motor fuel to the public using automated machines need not provide male/female public restrooms or drinking fountains. One employee restroom shall be provided for use by maintenance staff when maintenance staff are present.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

#### **Section 890.820 Outside Kiosks Serving Food**

- a) **General Plumbing.** All plumbing shall be sized, installed and maintained in accordance with applicable provisions of this Part.
- b) **General Restrooms.** Restrooms for employees shall be provided and accessible to employees at all times. If a restroom is not located within the building, then there shall be an accessible and available restroom within 300 feet of the building.

(Source: Added at 28 Ill. Reg. 4215, effective February 18, 2004)



**SUBPART G: HANGERS, ANCHORS AND SUPPORTS****Section 890.910 Hangers, Anchors and Supports**

- a) General. Hangers, anchors and supports shall be of material and strength to support the piping and its contents and maintain its proper alignment. Hangers, anchors and supports shall be securely attached to the building construction at sufficient intervals to support the piping and its contents. Provisions shall be made to allow for expansion, contraction, structural settlement and vibrations. Installation shall be in accordance with manufacturers' directions if more stringent than this Part.
- b) Material. Hangers, anchors and supports shall be of metal or other material strong enough to support the piping when full. Piers may be of concrete, brick or other approved materials.

**Section 890.920 Vertical Piping**

- a) Attachment. Vertical piping shall be secured at intervals to keep the pipe in alignment and carry the weight of the pipe at its maximum capacity. Stacks shall be supported at their base and, if over two (2) stories in height, shall be supported at each floor by floor clamps. (See Appendix G: Illustrations A and B.)
- b) Cast Iron Soil Pipe. Cast iron soil pipe shall be supported at not less than every story height and at its base. Hubless or compression gasket joint shall be supported at not less than every story height, at its base and at intervals to keep the pipe in alignment and to adequately support the weight of the pipe at its maximum capacity. (See Appendix G: Illustrations A and B.)
- c) Threaded Pipe. Threaded pipe shall be supported at every other story height. Supports shall be of ferrous material.
- d) Copper Tube. Hard drawn copper tube and annealed copper tubing shall be supported at least every story at not more than ten (10) foot intervals. On long lines where there are provisions for expansion and contraction, anchors may be a maximum of four (4) stories apart for cold water risers and drain/waste/vent (DWV) stacks, and two (2) stories apart for hot water risers, provided there are sleeves or similar devices at intermediate floors to restrain lateral movement. Supports shall be of copper material or other material which will not react with the piping material, and which will properly support the pipe.

- e) Lead Pipe. Lead pipe shall be supported at intervals not exceeding four (4) feet. Supports shall be of lead or softer material.
- f) Plastic Pipe. Hangers and straps shall not compress, distort, cut or abrade the piping and shall allow free movement of the pipe. Wire pipe hooks shall not be used to support plastic pipe. Restraining joints and expansion joints shall be installed as required. All vertical piping shall be maintained in straight alignment with supports at each floor level or at intervals of ten (10) feet, whichever is less. Trap arms in excess of three (3) feet shall be supported as close as possible to the trap.

### **Section 890.930 Horizontal Piping**

- a) Support. Horizontal piping shall be supported at sufficiently close intervals to keep the piping in alignment and prevent sagging.
- b) Cast Iron Soil Pipe. Where joints occur, suspended cast iron pipe shall be supported within 18 inches of each hub or joint and at not more than 5 foot intervals; however, pipe exceeding 5 feet in length may be supported at not more than 10 foot intervals. Hubless or compression gasket joints must be supported at least at every other joint except that when the developed length between hubless or compression gasket joints exceeds 4 feet, supports shall be provided at each joint. Supports shall be placed on or immediately adjacent to the joint. Suspended pipes shall be braced to prevent horizontal movement.
- c) Threaded Pipe. Threaded pipe 1½ inches and larger shall be supported at least at 12 foot intervals; smaller pipe (e.g., 1¼ inch pipe) shall be supported at least at 8 foot intervals. Supports shall be of ferrous material.
- d) Copper Tube. Hard drawn copper tube shall be supported at least every 8 feet for one inch and smaller tube, and at 10 foot intervals for larger sizes. Annealed copper tubing shall be supported at least every 8 feet. Supports shall be of copper material or other material of sufficient strength to support the tubing and which will not react with copper piping material.
- e) Lead Pipe. Lead pipe shall be supported for its entire length. Supports in contact with the pipe shall be of lead or softer material.
- f) Plastic Pipe. Hangers and straps shall not compress, distort, cut or abrade the piping and shall allow free movement of the pipe. Wire pipe hooks shall not be used to support plastic pipe. Restraining joints and expansion joints shall be

installed as required. All horizontal piping shall be supported at intervals of not more than 4 feet, and at ends of branches, and at changes of direction or elevation. Trap arms in excess of 3 feet shall be supported as close as possible to the trap.

(Source: Amended at 28 Ill. Reg. 4215, effective February 18, 2004)

## SUBPART H: INDIRECT WASTE PIPING, SPECIAL WASTE

**Section 890.1010 Indirect Waste Piping**

- a) Food and Beverage Handling. Commercial dishwashing machines, dishwashing sinks, pot-washing sinks, pre-rinse sinks, silverware sinks, bar sinks, soda fountain sinks, vegetable sinks, potato peelers, ice machines, steam tables, steam cookers and other similar fixtures shall have their drain lines indirectly discharged to a proper receptor. The only exception shall be when the fixtures are located adjacent to a floor drain. The waste may be directly connected on the sewer side of the floor drain trap provided that the fixture waste is trapped and vented as required by this Part (see Appendix H.Illustrations A and B), and the floor drain is located within 4 feet horizontally of the fixtures and in the same room. In the case of direct connection, no other fixture waste shall be connected between the floor drain trap and the fixture being protected. All indirect waste shall discharge to a vented trap located as close as possible to the fixture and in the same room. (See Appendix H.Illustrations C and D.)
- b) Connection. Indirect waste connections shall be provided for drains, overflows and relief valves from the water supply system. (See Appendix H.Illustration E.) A clear water waste shall discharge through an indirect waste into a sanitary or storm drain system located on the same floor.
- c) Sterile Materials. Stills, sterilizers and other appliances, fixtures, devices and water and waste connections used for preparation of sterile material shall be indirectly discharged to the drainage system.
- d) Swimming Pools. When backwash or other waste water from a swimming pool filter discharges to the sanitary waste system, it shall be indirectly wasted. When deck drains around a pool discharge to the sanitary waste system, they shall be indirectly wasted.
- e) Clear Water Wastes. Water lifts, expansion tanks, cooling jackets, sprinkler systems, drip or overflow pans, refrigerated cases, or similar devices that discharge only clear water shall discharge indirectly into a building storm drain or building drain located on the same floor, or into a vacuum waste system.
- f) Fire Sprinkler Systems. The relief valve (port) of a backflow device located on a fire sprinkler system that contains an additive shall drain indirectly to the building drain.

- g) Cleaning. Indirect waste piping shall be installed so as to permit access for flushing and cleaning.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

### **Section 890.1020 Material and Size**

Indirect waste pipe sizes shall be the same as the fixture outlets, but at least three-fourths (3/4) inch.

### **Section 890.1030 Length and Grade**

- a) Maximum Length. The maximum developed length of the indirect waste of any sanitary waste line shall not exceed 5 feet.
- b) Grade. Indirect waste pipes shall be installed at a uniform grade, in compliance with Section 890.1320(f), (g) and (h).

(Source: Amended at 28 Ill. Reg. 4215, effective February 18, 2004)

### **Section 890.1040 Air Gaps**

The air gap between an indirect waste and the drainage system shall be at least two (2) times the diameter of the fixture drain or drainage pipe served, but shall never be less than one (1) inch. For requirements in excess of this minimum, see Appendix A: Table C, and Appendix H: Illustration F.

### **Section 890.1050 Receptors**

- a) Installation. Receptors serving indirect waste pipes shall be trapped and vented and shall not be installed in any concealed, inaccessible or unventilated space, and shall be sized to prevent overflow.
- b) Strainers and Baskets. A receptor shall be equipped with either a readily removable basket over which the indirect waste pipe shall discharge or the indirect waste receptor shall be equipped with a strainer. The basket or receptor shall be constructed of approved material for the waste that will discharge into it.
- c) Splashing. All plumbing receptors receiving the discharge of indirect waste pipes

shall be of such design and capacity as to prevent splashing or flooding under normal conditions. No plumbing fixtures with potable water connected to them, except service sinks, shall be used to receive the discharge of an indirect clear water waste pipe.

(Source: Amended at 28 Ill. Reg. 4215, effective February 18, 2004)

### **Section 890.1060 Special Wastes and Chemical Wastes**

- a) Acid Wastes. Acid and chemical waste piping and fittings, including the trap, shall be of material that will not be damaged by the waste being discharged.
- b) Neutralizing Device. Corrosive liquids, spent acids, or other harmful chemicals shall not be discharged into the building sewer without first being properly diluted or neutralized.

**SUBPART I: WATER SUPPLY AND DISTRIBUTION****Section 890.1110 Quality of Water Supply**

All premises intended for human habitation or occupancy shall be provided with a potable water supply. The potable water supply shall not be connected to non-potable water and shall be protected from backflow and back siphonage. (See Appendix I.Illustration A.)

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.1120 Color Code**

Identification of Piping. All piping conveying non-potable water shall be permanently identified by a continuous purple coloring so that the piping is readily distinguishable from piping carrying potable water. (See the color codes of ANSI/NEMA Z535.1 and ASME A13.1.)

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.1130 Protection of Potable Water**

- a) **Cross-Connection (Submergence).** Potable water supply piping and water discharge outlets shall not be submerged in any sewage or toxic substance. Potable water supply piping or water discharge outlets that are submerged in other substances shall be provided with backflow protection as listed in subsection (f). (See Appendix I.Illustrations B and C.)
- b) **Approval of Devices and Maintenance.** All devices and assemblies for the prevention of backflow shall comply with the standards listed in Appendix A.Table A. All reduced pressure principle (RPZ), reduced pressure detector (RPDA), double check (DCA) and double check detector (DCDA) backflow prevention assemblies shall be tested and approved by a Cross-Connection Control Device Inspector (CCCDI) before initial operation, and at least annually after initial inspection. Records to verify testing and maintenance shall be available at the site of the installation.
- c) **Backflow.** The water distribution system shall be protected against backflow. Each water outlet shall be protected from backflow by having the outlet end from which the water flows spaced a sufficient distance above the flood-level rim of the receptacle into which the water flows to provide a minimum fixed air gap. When it is not possible to provide a minimum fixed air gap, the water outlet shall be equipped with an accessible backflow prevention device or assembly in

accordance with subsection (f) of this Section or Section 890.1140.

- d) Fire Safety Systems. The installation of any fire safety system involving the potable water supply system shall be protected against backflow as follows:
- 1) Backflow protection is not required for fire safety systems constructed as follows:
    - A) The system shall be looped, with no dead ends, to allow circulation, to prevent the stagnation of water in the line;
    - B) The system shall not have any non-potable connections or a fire department hose (Siamese) connection;
    - C) The system shall have 20 sprinkler heads or less; and
    - D) The system shall be constructed of potable water supply quality pipe in accordance with Appendix A. Table A.
  - 2) When backflow protection is required, a double detector check valve or double check valve backflow preventer assembly shall be installed at the fire safety system's point of connection to the potable water supply when a fire safety system has no chemical additives or non-potable connection and:
    - A) The fire safety system has no fire department hose connections; or
    - B) The fire safety system has one or more fire department hose connections (for boosting pressure and flow to the fire safety system) that are served only by fire fighting apparatus connected to a public water supply or a fire department that does not use chemical additives or rely upon any non-potable water supply.
  - 3) A fixed air gap with a break tank or other storage vessel or a reduced pressure principle backflow preventer assembly (RPZ) shall be installed at the fire safety system's point of connection to the potable water supply if:
    - A) The fire safety system contains additives such as antifreeze, fire retardant or other chemicals. (The RPZ may be located at the point of connection to that section of the system containing additives when the system's connection to the water supply is protected by a



- double detector check valve backflow preventer assembly.); or
- B) Non-potable water flows into the fire safety system by gravity; or
  - C) There is a permanent or emergency connection through which water can be pumped into the fire safety system from any other non-potable source; or
  - D) Fire department connections are available that could permit water to be pumped into the fire safety system from a non-potable source capable of serving the fire safety system. A non-potable source of water shall be considered capable of serving the fire safety system under the following conditions: it must be capable of year-round use, maintained with at least 50,000 gallons of usable water not subject to freezing, accessible to fire fighting pumper equipment, and located within 1,700 feet of the facility.
- e) Prohibited Connections
- 1) Sewage Lines. There shall be no direct connection between potable water lines and sewage lines or equipment and vessels containing sewage. Connections shall be made only through a minimum fixed air gap as outlined in subsection (f)(5).
  - 2) Chemical or Petroleum Pressure Vessels. No direct connection shall occur between any potable water supply and any pressure vessel, i.e., storage tank, tank car, tank truck or trailer, or other miscellaneous pressurized tank or cylinder containing or having contained liquified gaseous petroleum products or other liquified gaseous chemicals. When it is necessary to discharge from a potable water line to a pressure vessel, the discharge shall be through a minimum fixed air gap as outlined in subsection (f)(5). Exception: Chemical pressure vessels containing chemicals used in the water treatment process, for uses other than private purposes, are exempt from this subsection (e)(2).
  - 3) If water under pressure is required, as in subsections (e)(1) and (2), it shall be supplied by means of an auxiliary pump taking suction from a tank provided for this purpose only with an over-rim supply having the required minimum fixed air gap.
  - 4) A potable water line to a single wall refrigerant condenser shall be

provided with a backflow preventer complying with ASSE 1012 or 1013.

- 5) No pipe or fitting of the water supply system shall be drilled or tapped nor shall any band or saddle be used except at the water main in the street.  
Exception: See Section 890.320(h) for potable water use only.
- f) Devices for the Protection of the Potable Water Supply. Approved backflow preventers or vacuum breakers shall be installed with all plumbing fixtures and equipment that may have a submerged potable water supply outlet and that are not protected by a minimum fixed air gap. Connection to the potable water supply system for the following fixtures or equipment shall be protected against backflow with one of the appropriate devices as indicated below:
  - 1) Inlet to receptacles containing low hazard substances (steam, compressed air, food, beverages, etc.):
    - A) fixed air gap fitting;
    - B) reduced pressure principle backflow preventer assembly;
    - C) atmospheric vacuum breaker unit;
    - D) double check valve backflow preventer assembly;
    - E) double check backflow preventer with atmospheric vent assembly;  
or
    - F) dual check valve.
  - 2) Inlet to receptacles containing high hazard substances (vats, storage containers, plumbing fixtures, etc.):
    - A) fixed air gap fitting;
    - B) reduced pressure principle backflow preventer assembly; or
    - C) atmospheric vacuum breaker unit.
  - 3) Coils or jackets used as heat exchangers in compressors, degreasers and other equipment involving high hazard substances:

- A) fixed air gap fitting; or
  - B) reduced pressure principle backflow preventer assembly.
- 4) Direct connections that are subject to back pressure:
- A) Receptacles containing low hazard substances (vats, storage containers, plumbing fixtures, etc.):
    - i) fixed air gap fitting;
    - ii) reduced pressure principle backflow preventer assembly;
    - iii) double check valve backflow preventer assembly;
    - iv) double check backflow preventer with atmospheric vent assembly; or
    - v) dual check valve.
  - B) Receptacles containing high hazard substances (vats, storage containers, etc.):
    - i) fixed air gap fitting; or
    - ii) a reduced pressure principle backflow preventer assembly.
- 5) Inlet to or direct connection with sewage or lethal substances: fixed air gap fitting.
- 6) Hose and spray units or stations shall be protected by one of the appropriate devices as indicated below:
- A) Fixed air gap;
  - B) Reduced pressure principle backflow preventer assembly;
  - C) Double check valve backflow preventer assembly;

- D) Double check valve backflow preventer with atmospheric vent assembly;
  - E) Dual check valve backflow preventer assembly;
  - F) Atmospheric vacuum breaker unit.
- g) Installation of Devices or Assemblies
- 1) Devices of All Types. Backflow preventer assemblies and devices shall be installed to be accessible for observation, maintenance and replacement services. Backflow preventer devices or assemblies shall not be installed where they would be subject to freezing conditions, except as allowed in Section 890.1140(d).
  - 2) All in-line backflow/back siphonage preventer assemblies shall have a full port type valve with a resilient seated shut-off valve on each side of the preventer. Relocation of the valves is not permitted.
  - 3) A protective strainer shall be located upstream of the first check valve on all backflow/back siphonage preventers unless the device contains a built-in strainer. Fire safety systems are exempt from the strainer requirement.
  - 4) Atmospheric vacuum breakers shall be installed with the critical level above the flood level rim of the fixture they serve, and on the discharge side of the last control valve of the fixture. No shut-off valve or faucet shall be installed beyond the vacuum breaker.
  - 5) No in-line double check valve backflow preventer assembly (DCV) or reduced pressure principle backflow preventer assembly (RPZ) shall be located more than 5 feet above a floor, or be installed where it is subject to freezing or flooding conditions. After installation, each DCV and RPZ shall be field tested in-line in accordance with the manufacturer's instructions by a cross-connection control device inspector before initial operation. (See subsection (b).)
  - 6) A dual check backflow preventer with atmospheric vent assembly shall not be installed where it is subject to freezing or flooding conditions.

- 7) Closed water systems with hot water storage shall have a properly sized thermal expansion tank located in the cold water supply as near to the water heater as possible and with no shut-off valve or other device between the heater and the expansion tank. Exception: In existing buildings with a closed water system, a properly sized pressure relief valve may be substituted in place of a thermal expansion tank. For closed water systems created by backflow protection in manufactured housing, as required in Section 890.1140(i), a ballcock with a relief valve may be substituted for the thermal expansion tank.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

#### **Section 890.1140 Special Applications and Installations**

- a) Atmospheric Vacuum Breaker. An atmospheric vacuum breaker shall be installed between the control valve and the fixture in a manner that it will not be subject to water pressure, except the pressure incidental to water flowing to the fixture. An atmospheric vacuum breaker shall be installed on the outlet side of the control valve.
- b) Flushometer Valve. Flush valves shall be equipped with vacuum breakers installed on the discharge side of the flushing valve with the critical level at least 4 inches above the overflow rim of the bowl or 4 inches above the top of the urinal. (See Appendix I.Illustration D.)
- c) Flushing Tanks. Flushing tanks shall be equipped with anti-siphon ballcocks. The ballcocks shall be installed with the critical level of the vacuum breaker at least 1 inch above the full opening of the overflow pipe. If the ballcock has no hush tube, the bottom of the water supply inlet shall be installed 1 inch above the top of the overflow pipe. (See Section 890.650(d).)
- d) Lawn Sprinklers. Any lawn sprinkler system connected to a potable water supply shall be equipped with an RPZ. The RPZ may be located outside provided that it is protected from freezing or is removed at the end of the season, and it complies with Section 890.1130(g)(1).
- e) Valve Outlets for Hose Attachments
  - 1) All threaded valve outlets shall have backflow protection in accordance

- with Section 890.1130. All outside threaded valve outlets shall not be subject to freezing.
- 2) Yard hydrants shall be installed as follows:
    - A) Potable Water. All hydrants with threaded spigots shall have backflow protection attached to the hydrant spigot (if threaded) and either:
      - i) Hydrants with buried drain down (weep) holes shall have the weep holes protected from ground water backup by proper open site drainage. A backflow preventer shall not be used on the buried weep hole to protect the hydrant from ground water backup; or
      - ii) A yard hydrant that automatically drains back to a sealed container when flow is shut off, such as a canister type hydrant.
    - B) Non-potable Water. One or more hydrants may be installed for non-potable use if they are isolated from the potable water supply by a backflow preventer device installed in accordance with Section 890.1130(f). The hydrants shall be clearly identified as non-potable by color (see Section 890.1120) and bear a sign that reads as follows: "This water unsafe for drinking."
  - 3) In a campground licensed in accordance with the Department's rules titled Youth Camp Code or Recreational Area Code, backflow protection is not required if the water supply line is directly connected to a recreational vehicle and is under constant pressure.
- f) Commercial Laundry Machines. The potable water supply to commercial laundry machines shall be protected against back siphonage by an air gap or backflow protection device. If a vacuum breaker is used, it shall be a minimum of 26 inches above the top of the machine.
  - g) Commercial Dishwashers. Commercial dishwashers shall be equipped with an approved vacuum breaker located in the rinse water supply line on the discharge side of the final control valve, a minimum distance of 6 inches above the uppermost spray outlets. The cold water or make-up water supply line shall be provided with an air gap or a vacuum breaker located on the discharge side of the

final control valve, a minimum distance of 6 inches above the overflow level or flood rim.

- h) Aspirators. Water-operated aspirators shall meet the following specifications:
  - 1) The water supply line shall be equipped with a shut-off valve.
    - A) If aspirators are used in operating rooms, emergency rooms, recovery rooms, delivery rooms, autopsy rooms, dental offices and laboratories for removing blood, pus or other fluids, a vacuum breaker shall be installed on the discharge side of the control valve, at ceiling height (a minimum of 7 feet, 6 inches) and the water supply shall be protected against backflow and back siphonage by an air gap; or an RPZ shall be used.
    - B) Chemical dispensing units shall have a dedicated water supply and shut-off valves to each unit. Each unit shall have a backflow device installed to protect against backflow and back siphonage.
  - 2) The aspirator water discharge shall be provided with a 2-inch air gap to the receiving fixture.
- i) Manufactured Housing and Mobile Home Units Manufactured Prior to June 15, 1976. At the time of water service connection, backflow protection shall be installed between the water service line and any manufactured housing or mobile home unit that was manufactured prior to June 15, 1976. Backflow protection shall be provided by at least a dual check valve backflow preventer assembly (DuC) conforming to ASSE 1024. This backflow protection shall be installed in all instances where a unit manufactured prior to June 15, 1976 is connected or re-connected to a water service line, e.g., for connection of a relocated unit, or re-connection of a unit that was disconnected to allow repairs to the water line; however, backflow protection is not required for existing units unless a new connection or re-connection to the water service line occurs.
- j) Carbonated Beverage Dispensers Water Supply. The water supply to carbonated beverage dispensers shall be protected by one of the following methods:
  - 1) Air gap;
  - 2) ASSE 1022 backflow preventer; or

- 3) ASSE 1022 backflow preventer with vent port added.
- k) **Water-Powered Sump Pump.** Sump pumps powered by potable or reclaimed water pressure shall be used only as an emergency backup pump. The water-powered pump shall be equipped with a battery powered alarm having a minimum rating of 85 dBa at 10 feet. Water-powered pumps shall have a water efficiency factor of pumping at least 1.4 gallons of water to a height of 10 feet for every gallon of water used to operate the pump, measured at a water pressure of 60 psi. Pumps shall be clearly labeled as to the gallons of water pumped per gallon of potable water consumed. Water-powered stormwater sump pumps shall be equipped with a dual check valve with atmospheric vent conforming to ASSE 1012 or CSA B64.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

#### **Section 890.1150 Water Service Pipe Installation**

- a) **Underground Water Service.** Water service pipe shall be installed outside the foundation wall in accordance with either subsection (a)(1) or (2) and shall comply with both subsections (a)(3) and (4).
  - 1) Water service and building drain or building sewer may be installed in separate trenches with a minimum of 10 feet horizontal separation. Material listed in Appendix A.Table A (Approved Materials for Building Sewer and Approved Materials for Water Service Pipe) shall be used, provided that the material is specific for this type of installation. (See Appendix I.Illustration E.)
  - 2) The water service and the building drain or building sewer may be installed in the same trench provided that the water service is placed on a solid shelf a minimum of 18 inches above the building drain or building sewer. The building sewer shall be of material listed in Appendix A.Table A (Approved Building Drainage/Vent Pipe) for a building drain. (See Appendix I.Illustration F for the proper installation of water service, building drain and building sewer.)
  - 3) The minimum depth for any water service pipe shall be at least 36 inches or the maximum frost penetration of the local area, whichever is of greater depth.



- 4) No water service pipe shall be installed or permitted outside of a building or in an exterior wall unless the pipe is protected from freezing, in accordance with Section 890.1210(a).
- b) Potable Water Piping and Sanitary Sewer Crossing Installation Requirements
- 1) Potable water piping that passes above or below a sanitary sewer shall be installed with a minimum vertical separation of 18 inches for a distance of 10 feet on either side from the center of the sanitary sewer.
  - 2) If potable water piping passes beneath a sanitary sewer or drain, the sanitary sewer or drain shall be constructed of materials as specified in Appendix A.Table A (Approved Building Drainage/Vent Pipe) for building drains and shall extend on each side of the crossing to a distance of at least 10 feet as measured at right angles to the water line. The potable water piping shall comply with Appendix A.Table A as specified for a water service pipe (Approved Materials for Water Service Pipe). (See Appendix I.Illustration G.)
  - 3) When compliance with subsection (b)(1) or (2) is not possible, a pressure rated pipe, approved for building drain material listed in Appendix A.Table A, shall encase the water service pipe. The casing pipe shall be sealed with a casing seal and extend 10 feet on either side of the center of the sanitary sewer pipe. The sleeve or case shall be at least two times the size of the water service.
- c) When compliance with subsection (a) or (b) is not possible, the Department shall be contacted for consideration of alternative methods.
- d) Stop-and-Waste Valve. Combination stop-and-waste valves and cocks shall not be installed in an underground potable water pipe. Frost-free hydrants and fire hydrants shall not be considered stop-and-waste valves. (See Section 890.1140(e).)

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

### **Section 890.1160 Potable Water Pumping and Storage Equipment**

- a) Pumps and Other Appliances. Potable water pumps, tanks, filters, and all other appliances and devices shall be protected against contamination.

- b) **Water Supply Tanks.** Potable water supply tanks shall be properly covered to prevent contamination of the water supply. Soil or waste lines shall not pass directly over such tanks.
- c) **Cleaning, Painting, Repairing Water Tanks.** A potable water supply tank used for domestic purposes shall not be lined, painted or repaired with any material which affects either the taste or the potability of the water. Tanks shall be disconnected from the system during such operations to prevent any foreign substance from entering the system.

#### **Section 890.1170 Potable Water Supply Tanks and Auxiliary Pressure Tanks**

- a) **Water Pressure.** When the water pressure from the public water supply main is insufficient during periods of peak flow or due to the building height to supply all fixtures in accordance with Section 890.1210(c), the rate of supply shall be supplemented by a gravity tank or auxiliary pressure (booster) system. Auxiliary pressure systems shall not substitute for adequate sizing of water distribution piping within the building.
- b) **Support.** All water supply tanks shall be supported in accordance with local building codes or authorities having jurisdiction.
- c) **Tank Supply Inlet and Outlet.** The water supply inlet to the tank shall have a minimum air gap of at least 6 inches. The supply outlet shall be a minimum of 4 inches above the bottom of the tank.
- d) **Overflow For Water Supply Tanks.** Overflow pipes for gravity tanks shall be indirectly connected to the drainage system with an air gap of at least 6 inches. Overflow pipes shall be full sized, unrestricted and screened with 24-mesh per inch stainless steel or bronze screen.
- e) **Size of Overflow.** Overflow drains for gravity water supply tanks shall have an area of at least twice the size of the supply pipe.
- f) **Drains.** Water supply tanks shall be provided with valved drain lines located at their lowest point and shall discharge through an indirect waste with an air gap of twice the diameter of the drain line. The drain line and valve shall have no restrictions and need not exceed 2 inches in diameter.
- g) **Gravity and Suction Tanks.** Tanks used for potable water supply or only to supply fire-fighting equipment shall be equipped with tight, overlapping covers

that are rodent and insect proof. The tanks shall be vented with a return bend (turned down) pipe having an area at least  $\frac{1}{2}$  the area of the tank outlet pipe, and the vent opening shall be covered with a stainless steel or bronze screen of at least 24-mesh per inch.

- h) Pressure Tanks. Pressure tanks used for supplying water to the water distribution system, or only to supply standpipes for fire equipment, shall be equipped with a vacuum relief valve located on top of the tank. An air inlet of this device shall be covered with a stainless steel or bronze screen of at least 24-mesh per inch. (See Section 890.1230(f).)

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

### **Section 890.1180 Flushing/Disinfection of Potable Water System**

New or repaired potable water systems shall be flushed or disinfected prior to use as follows:

- a) Chlorinated Water Supply. If the potable water supply serving the water supply system is chlorinated, e.g., a community water system, the water supply system, or appropriate repaired portion, shall be flushed with clean, potable water until no dirty water appears at the point of outlet.
- b) Non-Chlorinated Water Supply. The pipe system shall be flushed with clean, potable water until no dirty water appears at the point of outlet.
  - 1) The system, or part of the system, shall be filled with a chlorine solution containing at least 50 parts per million of chlorine and shall be valved off and allowed to stand for 24 hours, or the system, or part of the system, shall be filled with a chlorine solution containing at least 200 parts per million of chlorine and be allowed to stand for three hours.
  - 2) Following the required contact (standing) time, the system shall be flushed with clean, potable water until the chlorine level in the water discharging from the system is within acceptable limits for potable water, i.e., generally until the water has no detectable chlorine odor.
  - 3) To ensure that the water supplied by the water system is safe for drinking, a bacteriological examination of a water sample taken from the water supply system shall be secured. This examination shall be performed by a laboratory certified in accordance with 77 Ill. Adm. Code 465. The chlorine residual in any water sample collected for examination shall not

exceed 4 parts per million (or 4 milligrams/liter) for a reliable laboratory result. If the examination reveals that contamination still persists in the system, the procedure for disinfection shall be repeated.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

### **Section 890.1190 Water Supply Control Valves and Meter**

- a) A full-port shut-off valve shall be located near the curb or property line and immediately inside the building, on the inlet and outlet side of the water meter. When located underground, this valve shall be in a stop box or meter vault. (See Appendix I.Illustration H.)
- b) The utility meter may be installed outside in an accessible meter vault or within the building. The meter shall have unions on the inlet and outlet openings. A full-port valve with an open area at least that of the water service shall be provided for all meters and shall be provided with a drain valve installed on the discharge side of the meter valve when located inside of a building. (See Appendix I.Illustrations H and I.)
- c) Tank Controls. Supply lines taken from pressure or gravity tanks shall be valved at or near their source.
- d) Water Heating Equipment. A shut-off valve shall be provided in the cold water branch within 5 developed feet of each water storage tank or each water heater and located in the same room.
- e) Separate Controls for Each Family Unit. In multiple family dwellings, the water service or water distribution pipe to each family unit shall be controlled by an arrangement of line valves that permits each group of fixtures and each individual fixture to be shut off without interference with the water supply to any other family unit or portion of the building. The location of these valves shall be uniform in each family unit of a multiple family dwelling. (See Appendix I.Illustration J.)
- f) Buildings Other Than Dwellings. In all buildings other than dwellings and health care facilities as specified in subsection (g), line valves shall be installed to permit the water supply to all equipment or fixtures in each separate room to be shut off without interfering with the water supply to any other room or portion of the building. For plumbing equipment or fixtures that are installed back-to-back in adjacent rooms, e.g., in adjacent restrooms, a common line valve may be used to

shut off the water supply to the back-to-back fixtures in no more than two adjacent rooms. (See Appendix I.Illustration K.)

- g) Health Care Facilities. In the residence rooms of health care facilities, the water distribution pipe to each resident unit shall be controlled by an arrangement of line valves that permits each group of fixtures, and each individual fixture, to be shut off without interference with the water supply to any other unit or portion of the building.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

### **Section 890.1200 Water Service Sizing**

- a) Water Service Pipe Sizing. The water service pipe from the street main (including the tap) to the water distribution system for the building shall be sized in accordance with Appendix A, Tables M, N, O, P and Q. Water service pipe and fittings shall be at least  $\frac{3}{4}$  inch diameter. Plastic water pipe shall be rated at a minimum of 160 psi at 73.4°F. If flushometers or other devices requiring a high rate of water flow are used, the water service pipe shall be designed and installed to provide this additional flow.
- b) Demand Load. The calculation of the water service demand load for a building shall be based on the total number and types of fixtures installed in the building, assuming the simultaneous use of such fixtures.
- c) Unused sections of water service or water distribution piping ("dead ends"), where the water in the piping may become stagnant, are prohibited. A developed length of more than 2 feet shall be considered a dead end.

(Source: Amended at 28 Ill. Reg. 4215, effective February 18, 2004)

### **Section 890.1210 Design of a Building Water Distribution System**

- a) Design and Installation. The design and installation of the hot and cold water building distribution systems shall provide a volume of water at the required rates and pressures to ensure the safe, efficient and satisfactory operation of fixtures, fittings, appliances and other connected devices during periods of peak use. No distribution pipe or pipes shall be installed or permitted outside of a building or in an exterior wall or attic unless the pipe is protected from freezing.
- b) Size of Water Distribution Pipes. The fixture supply for each fixture shall be at

least the minimum size provided in Appendix A. Table D. The size of all other water distribution pipes shall be determined by calculating the water supply demand (in water supply fixture units) for that portion of the water distribution system served by the pipe. Using Appendix A. Tables M, N, O, P and Q, the cumulative water supply demand or load shall be calculated for all fixtures, piping, valves and fittings served by the water distribution pipe, and the pipe shall meet the minimum size provided in Appendix A. Table N or O, as applicable. Exception: As an alternative to using Tables M, N, O, P and Q to design and size the piping in the water distribution system, the system may be designed and sized employing current engineering practices, provided that the design/plans are approved in writing by an Illinois licensed professional engineer, an Illinois licensed architect or an individual Certified in Plumbing Design (CPD) by the American Society of Plumbing Engineers and approved in writing by the Department.

- c) **Minimum Water Pressure.** The minimum constant water service pressure on the discharge side of the water meter shall be (at least) 20 psi, and the minimum constant water pressure at each fixture shall be at least 8 psi or the minimum recommended by the fixture manufacturer.
- d) **Auxiliary Pressure. Supplementary Tank.** If the pressure in the system is below the minimum 8 psi at the highest water outlet when the flow in the system is at peak demand, an automatically controlled pressure tank or gravity tank of a capacity to supply sections of the building installation that are too high to be supplied directly from the public water main shall be installed.
- e) **Low Pressure Cut-Off.** When a booster pump, except those used for fire protection, is used on an auxiliary pressure system, a low-pressure cut-off switch shall be installed on the booster pump to prevent the creation of pressures less than 5 psi on the suction side of the pump. A shut-off valve shall be installed on the suction side of the water system and within 5 feet from the pump suction inlet, and a pressure gauge shall be installed between the shut-off valve and pump.
- f) **Water Hammer.** All building water supply systems shall be provided with air chambers or approved mechanical devices or water hammer arrestors to absorb pressure surges. Water pressure absorbers shall be installed at the ends of long pipe runs or near batteries of fixtures.
  - 1) **Air Chambers –** An air chamber that is installed in a fixture supply shall be at least 12 inches in length and the same diameter as the fixture supply, or an air chamber with an equivalent volume may be used. An air

chamber that is installed in a riser shall be at least 24 inches in length and at least the same size as the riser.

- 2) Mechanical Devices – If a mechanical device or water hammer arrestor is used, the manufacturer's specifications for location and installation shall be followed.
- g) Excessive Static Water Pressure
- 1) If water main pressure exceeds 80 psi, a pressure reducing valve and a strainer with a by-pass relief valve shall be installed in the water service pipe near the entrance to the building to reduce the water pressure to 80 psi or lower, except where the water service pipe supplies water directly to a water pressure booster system, an elevated water tank, or to pumps provided in connection with a hydropneumatic or elevated water supply tank system. Sill cocks and outside hydrants may be left on full water main pressure.
  - 2) When the water pressure exceeds 80 psi at any plumbing fixture, a pressure reducing valve, pressure gauge and a strainer with a by-pass relief valve shall be installed in a water supply pipe serving the fixture to reduce the water pressure at the fixture to 80 psi or lower.
- h) Approval of Auxiliary Pressure Systems. Whenever, in any building, structure or premises receiving its potable water supply from the public water system, a pump or any other device for increasing the water pressure is to be installed, installation plans shall be approved by the Department prior to installation in accordance with Section 890.1940.
- i) Variable Street Pressures. If the water main has a wide fluctuation in pressure, the water distribution system shall be designed for minimum pressure available at the main.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

### **Section 890.1220 Hot Water Supply and Distribution**

- a) All water heaters shall comply with Appendix A.Table A (Approved Standards for Plumbing Appliances/Appurtenances/Devices) and ASHRAE 90 Standards. Hot water storage tanks shall meet construction requirements of ASME, AGA or UL listed in Appendix A.Table A (Approved Standards for Plumbing

Appliances/Appurtenances/Devices), as appropriate. Hot water supply boilers with heat input in excess of 200,000 BTU per hour, water temperature in excess of 200 degrees Fahrenheit, or capacity in excess of 120 gallons shall also comply with the requirements of 41 Ill. Adm. Code 120(Boiler and Pressure Vessel Safety). Smaller water storage tanks that are not subject to ASME requirements shall be constructed of durable materials and constructed to withstand 150 psi. (See Appendix I.Illustrations L and M, for examples of typical water heater installations.)

- 1) All equipment used for heating and storage of hot water shall bear the marking of an approved testing agency certifying that it has been tested and approved and listed as meeting the requirements of the applicable standard. Listing by UL, the Canadian Standards Association (CSA), or National Board of Boiler and Pressure Vessel Inspectors, or the ASME Standard shall constitute evidence of conformance with these standards.
- 2) Solar Hot Water Heat Exchangers
  - A) A hot water heat exchanger used in a solar-heated system may be of single wall construction if a non-toxic transfer fluid with no conditioning chemicals in the system is used.
  - B) A hot water exchanger used in a solar-heated system using a toxic transfer fluid or having conditioning chemicals in the system shall be separated from the potable water by double wall construction that has an air gap vented to the atmosphere between the walls.
- 3) A hot water heat exchanger may be of single wall construction if a non-toxic transfer fluid with no conditioning chemicals in the system is used.
- 4) A hot water heat exchanger operating at or below 65 psi using a toxic transfer fluid or having conditioning chemicals in the system shall be separated from the potable water by double wall construction, with an air gap open to the atmosphere between the two walls.
- 5) A hot water heat exchanger shall not be permitted on any hot water boiler system operating in excess of 65 psi or 250 degrees Fahrenheit, unless:
  - A) the heat exchanger is double-walled;
  - B) the heat exchanger has an air gap open to the atmosphere between



the two walls; and

- C) the heat exchanger has a pressure gradient monitor system with a "fail-safe to off" switch installed to isolate the heat exchanger from the potable cold or hot water system. If pressure on the potable water side reaches a pressure less than 20 psi above the pressure of the transfer fluid or steam and a pressure-reducing valve is installed on the inlet to the heat exchanger with a setting 20 psi lower than the potable water pressure at the heat exchanger, an audible alarm shall be activated and the heat exchanger shall be automatically shut off until the alarm and heat exchanger can be reset manually.
- 6) Any boiler using toxic chemicals shall have a label with a minimum size of 5 inches by 5 inches attached to the boiler in a conspicuous place. The label shall read as follows:

**WARNING**

Chemicals and additives used to treat the boiler feed water in this boiler are not approved for potable water. The steam or hot water produced by this boiler is not potable. If the steam or hot water produced by this boiler is used to heat water, the water will not be considered potable if the steam and potable water are mixed.

- 7) Indirect, External, Submerged Coils. Indirect, external, tankless or submerged coils used in heating water shall be equipped with a thermostatic mixing valve or valves when not connected to a storage tank. A pressure relief valve shall be installed on the cold water inlet of the tank. A properly sized temperature and pressure relief valve, based upon the energy input rating of the coils, shall be installed on the tempered line with the temperature sensing element immersed in the tempered water line as close as possible to the mixing valve.
- 8) Water Heaters Used for Space Heating. Any water heater to be used for space heating, in addition to hot water supply, shall conform to ANSI Z21.10.1, Z21.10.1a and Z21.10.1b and shall be constructed for continuous use, and the piping for space heating shall be conducted to a proper terminal heating device.
- A) A thermostatic mixing valve, conforming to ASSE 1017, shall be

installed on the hot water line to the plumbing fixtures. (The mixing valve shall be set to prevent temperatures exceeding 120 degrees Fahrenheit from reaching the plumbing fixtures.)

- B) A single check valve shall be installed in the cold water line supplying the water heater. This will prevent hot water backing up from the heating unit to the plumbing fixtures.
- C) A properly sized and approved expansion tank shall be located on the outlet side of the check valve in the water heater's cold water supply, with no shut-off valve between the heater and expansion tank.
- D) Valves (manual, automatic) supplying hot water to the heat transfer unit for space heating shall have a minimum of a 1/8-inch orifice. This will prohibit potable water from standing in the heat transfer unit when not in use. This does not prohibit full shut off/isolation valves on either side of the pump within a heat transfer unit, as needed, to permit the servicing of the pump.
- E) The water heater instructions shall have a statement specifying that piping and components connected to the water heater for the space heating application shall be suitable for use with potable water, and the water heater shall not exceed a developed length of more than 25 feet from the heating coil.
- F) A statement specifying that toxic chemicals, such as those used for boiler treatment, shall not be introduced into the potable water used for space heating shall be included in the instructions. A label with the following words shall be firmly attached to any water heater used for space heating: "DO NOT INJECT TOXIC MATERIALS INTO THIS TANK."
- G) A statement specifying that a water heater that will be used to supply potable water shall not be connected to any heating system or components previously used with a non-potable water heating appliance shall be included in the installation instructions.
- H) Each water heater shall bear a statement on the rating plate as follows: "SUITABLE FOR POTABLE WATER HEATING AND SPACE HEATING."

- 9) Point-of-Use Water Heaters. Point-of-use water heaters shall meet the following requirements:
- A) Non-storage and non-pressurized units intended to deliver water temperatures exceeding 110 degrees Fahrenheit, or with no mechanical or electrical temperature limiting device, shall have the faucet located at least 3 inches from the 110 degrees Fahrenheit hot water or cold water faucet. Faucet outlets shall have labels clearly and conspicuously indicating extremely hot water. These units are exempt from the requirement that a relief valve or valves be used to protect against excessive or unsafe temperature or pressure.
  - B) Units intended to deliver water temperatures 110 degrees Fahrenheit or less shall have an internal burnout element. These units are exempt from the requirement that a relief valve or valves to be used to protect against excessive or unsafe temperature and/or pressure.
  - C) All pressurized point-of-use water heaters, other than those in subsection (a)(9)(A) or (B), shall be provided with proper temperature and pressure relief.
- 10) Steam Heat. All water heaters, including storage heaters, instantaneous shell and tube heat exchangers, steam injection heaters and any other device using steam to heat water for potable use, shall meet the following requirements:
- A) All chemicals and additives used to treat the boiler feed water in a boiler supplying steam to heat potable water shall be approved for use with potable water. If approved chemicals and additives are used with steam boilers generating at 15 psi or less, or are used with pressure reducing stations with pressure relief valves set at 15 psi or less downstream from the pressure reducing valves, single wall heat exchangers may be used.
  - B) All steam heat exchangers operating in excess of 15 psi but less than 50 psi shall be separated by double wall construction, with an air gap open to the atmosphere between the two walls.

- C) All steam heat exchangers operating in excess of 50 psi shall meet the following requirements:
- i) The heat exchanger shall be double-walled;
  - ii) The heat exchanger shall have an air gap open to the atmosphere between the 2 walls; and
  - iii) The heat exchanger shall have a pressure gradient monitoring system with a "fail-safe to off" switch installed to isolate the heat exchanger from the potable cold or hot water system. If the pressure on the potable water side reaches a pressure less than 20 psi above the pressure of the transfer fluid or steam and a pressure reducing valve is installed on the inlet to the heat exchanger with a setting 20 psi lower than the potable water pressure at the heat exchanger, an audible alarm shall be activated and the heat exchanger shall automatically shut off until the conditions resulting in an alarm are corrected and the heat exchanger pressure gradient monitoring system can be manually reset.
- D) The steam pressure to all the steam heat injectors shall be 15 psi lower than the water pressure at the ejector. Steam injection heaters shall be supplied with steam from a generator or boiler that uses only United States Food and Drug Administration (FDA) approved additives or chemicals.
- E) The following warning label with a minimum size of 5 inches by 5 inches shall be permanently attached on the front of any boiler providing steam to direct-injection steam hot water heaters:
- "If the chemicals used to treat the boiler feed water in this boiler are not approved for potable water, the steam produced by this boiler cannot be considered potable. Therefore, if steam from this boiler is used to heat water, the water shall not be considered potable and any cross-connections between the hot water produced and a potable water supply must be provided with a device to prevent the backflow of the non-potable hot water into the potable water supply."

- b) Water Heaters – Food Service. Water heaters installed and used in food service establishments with dishwashing machines shall comply with National Sanitation Foundation (NSF)/ANSI Standard Number 5.
- c) Discharge. With the exception of special water heaters used for space heating in addition to hot water supply, as provided in subsection (a)(8), water that leaves the potable water system for heating, cooling, use in equipment or other similar uses shall not be returned to the potable water distribution system. If water is discharged to the building drainage system, it shall be discharged through a fixed air gap.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

### **Section 890.1230 Safety Devices**

- a) All equipment used for heating water or storing hot water shall be provided, at the time of installation of the equipment, with the required relief valve or valves to protect against excessive or unsafe temperature and pressure. This shall be achieved by installing either a pressure relief valve and a temperature relief valve or by installing a combination pressure-temperature relief valve.
- b) Pressure and Temperature Relief Valves
  - 1) Pressure Relief Valves. Pressure relief valves shall have an ASME relief rating to meet the pressure conditions specified on the equipment served. They shall be installed in the cold water supply line to the heating equipment served, except where scale formation from hard water may be encountered, in which case they shall be installed in the hot water supply line from the heating equipment served. There shall not be a shut-off valve between the pressure relief valve and the tank. Except when an alternate design is approved by the Department in writing pursuant to Section 890.140(a)(2) or 890.1940, the pressure relief valve shall be set to open at a maximum of the working pressure rating of the water heater, but shall not exceed 150 psi. Each pressure relief valve shall have a test lever.
  - 2) Temperature Relief Valves. Temperature relief valves shall bear the Canadian Standard Association (CSA) relief rating, expressed in British Thermal Units (BTU) of heat input per hour, for the equipment served. They shall be installed so that the temperature-sensing element is

immersed in the hottest water within the top 6 inches of the tank. The valve shall be set to open full when the stored water temperature is 210 degrees Fahrenheit.

c) Combination Pressure-Temperature Relief Valves

- 1) Combination pressure-temperature relief valves shall comply with the applicable requirements listed in Appendix A. Table A (Approved Standards for Plumbing Appliances/Appurtenances/Devices) for individual pressure and individual temperature relief valves, shall be installed so that the temperature sensing element is immersed in the hottest water within the top 6 inches of the tank, and shall have a test lever.
- 2) A check valve or shut-off valve shall not be installed between any safety device and the hot water equipment, nor shall there be any shut-off valve in the discharge pipe from the relief valve. (See Appendix I. Illustrations N and O.)
- 3) Energy cut-off devices shall not be used in lieu of subsections (c)(1) and (2) and shall be of a design to properly serve the intended use of the plumbing appliance, appurtenance or device. Exception: Instantaneous cut-off devices are exempted or may be used.

d) Relief Discharge Outlet

- 1) A relief discharge outlet shall be installed and be indirectly connected to waste. The discharge pipe from the relief valve shall not be located so as to create a safety hazard or to discharge so as to cause damage to the building or its contents. The relief valve shall not discharge through a wall into the outside atmosphere or where there is a possibility of freezing.
- 2) No reduced coupling, valve or any other restriction that would impede the flow of discharge shall be installed in the discharge line of any relief valve. The discharge line shall be installed from the relief valve to within 6 inches of the floor or receptor and the end of the line shall not be threaded.
- 3) Any piping used for discharge from the relief valve shall be of metallic material, shall comply with Appendix A. Table A (Approved Materials for Water Distribution Pipe) for potable water piping, and shall drain continuously downward to the outlet.

- 4) The discharge piping shall discharge indirectly into a floor drain, hub drain, service sink, sump or a trapped and vented P-trap that is located in the same room as the water heater. (See Sections 890.1010 and 890.1050(a), (b) and (c).) The trap shall have a deep seal to protect against evaporation or shall be fed by means of a priming device designed and installed for that purpose. The use of a light grade oil in the trap will retard evaporation.
- e) Pressure Marking – Hot Water Storage Tank. Hot water storage tanks shall be permanently marked in an accessible place with the maximum allowable working pressure.
- f) Vacuum Relief Valve. If a hot water storage tank or water heater is located at an elevation above the fixture outlets in the hot water system, or if the storage tank or water heater is bottom fed, a vacuum relief valve as listed in Appendix A.Table A (Approved Standards for Plumbing Appliances/Appurtenances/Devices) shall be installed on the storage tank or heater.
- g) Multiple Temperature Hot Water Systems. These systems shall be provided with thermostatic mixing valves to control the desired temperatures.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

#### **Section 890.1240 Miscellaneous**

Drain Cock. All storage tanks shall be equipped with drain cocks.

**SUBPART J: DRAINAGE SYSTEM****Section 890.1310 Materials**

- a) General. All materials used for drainage systems and clear water vacuum waste systems shall comply with Appendix A.Table A (Approved Building Drainage/Vent Pipe).
- b) Corrosive Waste. If corrosive waste is discharged to the drainage system, or if soil conditions are corrosive, only piping material listed in Appendix A.Table A(Approved Building Drainage/Vent Pipe) and approved for use with corrosive material shall be used. Fittings shall be of the same material as piping. No other material (piping, fitting, etc.) shall be used unless its use is approved in writing by the Department prior to installation, in accordance with Section 890.1940.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.1320 Drainage System Installation**

- a) Drain – Underground. A building drainage system installed in the ground shall be of cast iron, copper Type "K", or non-metallic Schedule 40 or heavier. Drains shall be installed on a continuous bed of undisturbed earth or granular fill so as to support the pipe and fittings.
- b) Existing Drain and Sewer Installation. Existing drain, waste, vent and sewer may be used in the renovation of the plumbing system of an existing structure if they are in serviceable condition and the materials comply with Appendix A.Table A (Approved Building Drainage/Vent Pipe and Approved Materials for Building Sewer).
- c) Freezing. No soil or waste pipe shall be installed or permitted outside of a building or in an exterior wall unless the piping is protected from freezing. This does not prohibit a soil or waste pipe from extending from a manufactured or mobile home unit to an approved point of discharge, provided that the waste line is protected from freezing.
- d) Dead Ends. Dead ends shall be avoided in a drainage system, except where necessary to extend the system to install a cleanout in an accessible location. A dead end intended for future connection (extension) that is more than 2 feet above a floor or more than 10 feet horizontally from the nearest vented connection shall have a vented connection to the outside atmosphere. (See Appendix J.Illustration



- A.)
- e) Horizontal Drainage Piping. Horizontal drainage piping shall be installed at a uniform grade.
  - f) Small Piping. Horizontal drainage piping of 3 inches diameter or less shall be installed with a grade of at least 1/4-inch per foot.
  - g) Large Piping. Horizontal drainage piping larger than 3 inches but less than 8 inches in diameter shall be installed with a grade of at least 1/8-inch per foot. For piping 8 inches or larger in diameter, the grade is determined by the number of drainage fixture units connected to the drain pipe. (See Appendix A. Table G.)
  - h) Minimum Velocity. If conditions do not permit building drains to be installed with a grade as great as that specified in subsections (f) and (g), a lesser grade may be used, provided that the computed velocity will not be less than 2 feet per second.
  - i) Changes in Direction. Changes in direction shall be made in drainage piping by the use of 45 degree wyes, long sweeps, short sweeps, quarter, fifth, sixth, eighth, or sixteenth bends, or by a combination of these fittings. Single and double sanitary tees and short sweep quarter bends shall be used in drainage lines only where the direction of flow is from the horizontal to the vertical and may be used for making necessary vertical offsets between the ceiling and floor above. (See Appendix J. Illustrations B, C and D.) Exception: A short sweep drainage quarter bend of less than 3 inches diameter and placed in a horizontal to horizontal position for a stack vent arm may be used to receive graywater.
  - j) No fittings having a hub in the direction opposite to flow, or tee branch, shall be used as a drainage fitting. No running threads, bands or saddles shall be used in the drainage system. No drainage or vent pipe or fitting shall be drilled or tapped.
  - k) No fitting, connection, device or method of installation shall be used that obstructs or retards the flow of water, waste or air in the drainage or venting system by an amount greater than the normal frictional resistance to flow. The enlargement of a 3-inch closet bend or stub to 4 inches shall not be considered an obstruction if it is necessary to increase the bend or stub at the floor line to 4 inches in diameter to accommodate the water closet outlet.
  - l) Fixture Connections. Branch wastes and fittings for circuit-vented fixtures shall be installed so that the fixture drain enters the side of the branch drain. (See

subsection (i) and Appendix J.Illustration E.)

- m) **Back-to-Back Fixtures.** Back-to-back fixtures shall be installed with fittings that will prevent mixing of the discharge prior to a change in direction of flow of the discharge from each fixture, or shall be installed with fittings especially designed to eliminate throw-over or backflow of the discharge from one fixture to the other fixture.
- n) **Location of Drains.** All building drains, branches of building drains, building sewers or any sanitary sewers shall be located at least 50 feet from a well or buried suction line, except that, when cast iron pipe with mechanical or compression joints or Schedule 40 PVC pipe with solvent weld and watertight joints is used for the building sewer, the drains shall be located at least 10 feet from a well or buried suction line.
- o) **Backwater valves** may be installed in the building storm drain or the building drain to prevent backflow into the building, where backflow of storm water or sewage could occur. Backwater valves may be installed in the branches of the building drain that are below grade. Backwater valves, when fully opened, shall have a capacity of at least that of the pipes in which they are installed. Backwater valves shall be installed to be accessible. All backwater valves shall conform to ASME A112.14.1. All bearing parts of backwater valves shall be made of corrosion-resistant material.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

### **Section 890.1330 Drainage Fixture Units (DFUs)**

- a) **Values for Fixtures.** Drainage fixture units (DFUs) (see Appendix A.Table E) designate the relative load of different kinds of fixtures that shall be used to calculate the total load carried by a soil or waste pipe, and shall be used with the tables of sizes for soil, waste and drain pipes for which the permissible load is given in terms of DFUs.
- b) **Values for Continuous Flow.** For a continuous or semi-continuous flow into a drainage system, such as from a pump, ejector, air-conditioning equipment or similar devices, two DFUs shall be considered to be equal to each gallon per minute (gpm) of flow.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.1340 Determination of Sizes for Drainage System**

- a) **Maximum Fixture Unit Load.** The maximum number of DFUs that may be connected to a given size of building drain, horizontal branch, or vertical soil or waste stack is established in Appendix A.Tables G and H. Exception: As an alternative to using Appendix A.Tables G and H to design and size the building drain, horizontal branch, or vertical soil or waste stack, the system may be designed and sized employing current engineering practices, provided that the design/plans are signed and sealed by an Illinois licensed professional engineer, an Illinois licensed architect or an individual Certified in Plumbing Design (CPD) by the American Society of Plumbing Engineers and approved in writing by the Department.
- b) **Minimum Size of Building Drain, Horizontal Branches, Drainage Piping**
  - 1) The minimum size of any gravity building drain shall be 4 inches in diameter.
  - 2) Pressure-building drains shall not be used where gravity drains may be installed. Pressure-building drains shall be sized in accordance with the ejector pump manufacturer's recommendation, but shall not be less than 2 inches in diameter.
  - 3) Gravity drained horizontal branches of the building drain shall be sized in accordance with Appendix A.Table H.
  - 4) No portion of the drainage system installed underground or below a basement or cellar shall be less than 2 inches in diameter. The venting system is excluded from this requirement.
  - 5) The drainage piping shall not be reduced in size in the direction of flow.
- c) **Minimum Size of Soil and Waste Stacks.** No soil or waste stack shall be smaller than the largest horizontal branch connected to the stack, except that a 4 inch by 3 inch water closet connection shall not be considered as a reduction in pipe size.
- d) **Waste Stacks Serving Kitchen Sinks.** In one- or two-family dwellings in which the waste stack or vent receives the discharge of a kitchen-type sink and also serves as a vent for fixtures connected to the horizontal portion of the branch served by the waste stack, the minimum size of the waste stack up to the highest sink branch connection shall be 2 inches in diameter. Above that point the size of

the stack shall be governed by the total number of drainage fixture units vented by the stack. (See Appendix J.Illustration F.)

- e) Future Fixtures. If the future installation of fixtures is provided for during initial construction, the fixtures provided for shall be considered in determining the required size of drain pipes and vent piping. Piping provided for future installation of fixtures shall be terminated with a plugged fitting or fittings at the stack so as to form no dead ends. In a multi-story building, when openings are roughed in for future fixtures below the uppermost level, properly sized vent piping shall be connected to the vent system and carried down to the appropriate lower level and be capped or plugged in an accessible location for venting of the future fixtures.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

#### **Section 890.1350 Offsets in Drainage Piping**

- a) Offsets of 45 Degrees or Less. An offset in a vertical soil or waste stack with a change of direction of 45 degrees or less from the vertical shall be sized as a straight vertical stack. If a horizontal soil or waste branch connects to the soil or waste stack within two (2) feet above or below the offset, a relief vent shall be installed in accordance with Section 890.1550(c). (See Appendix J: Illustration G.)
- b) Offsets of More Than 45 Degrees. A soil or waste stack with an offset of more than 45 degrees from the vertical shall be sized and installed as follows:
  - 1) The portion of the stack above the offset shall be sized as for a regular stack based on the total number of drainage fixture units above the offset.
  - 2) The offset shall be sized as for a building drain. (See Appendix A: Table G.)
  - 3) The portion of the stack below the offset shall be sized as for the offset or based on the total number of drainage fixture units on the entire stack, whichever is larger. (See Appendix A: Table L.)
  - 4) The drain offset shall have a relief vent installed as provided in Section 890.1550. In no case shall a horizontal soil or waste branch connect to the soil or waste stack within two (2) feet above or below the drain offset. (See Appendix J: Illustration H.)

- c) Above Highest Branch. An offset above the highest horizontal waste branch is an offset in the stack vent and shall be considered only as it affects the developed length of the vent. (See Appendix J: Illustration I.)
- d) Below Lowest Branch. In the case of an offset in a soil or waste stack below the lowest horizontal branch, no change in diameter of the stack shall be required because of the offset if it is made at an angle of not greater than 45 degrees. If such an offset is made at an angle greater than 45 degrees, the required diameter of the offset and the stack below it shall be determined as for a building drain. (See Appendix A: Table G, and Appendix J: Illustration J.)

### **Section 890.1360 Sanitary Wastes below Sewer**

- a) Sanitary Wastes below Sewer
  - 1) Sanitary wastes that cannot be discharged by gravity flow shall be discharged into a gas-tight, covered and vented sump from which the waste shall be lifted and discharged into a sanitary waste drain by automatic sewage ejection pumping equipment. (See Appendix J: Illustration K.)
  - 2) Sumps and ejectors handling sub-soil drainage and footing drains shall not receive any sewage.
  - 3) Sumps and ejectors handling sewage shall not receive subsoil drainage and footing drains.
- b) Design. Sump and pumping equipment shall be designed and installed to discharge, during the pumping cycle, all contents accumulated in the sump except for sump contents that must remain in the sump for the continued proper operation of the pumping equipment (e.g., contents needed to submerge or prime the pump) according to the manufacturer's recommendations.
- c) Sub-Drainage. The system of drainage piping below the building drain level shall be installed and vented in the same manner as that of the gravity drainage system.
- d) Duplex Equipment. Sumps receiving the discharge of more than six water closets or 60 DFUs shall be provided with duplex pumping equipment.
- e) Vent Sizes. Building sump vents shall be sized in accordance with Appendix

## A.Table K.

- f) Connections. No direct connection of a steam exhaust, blowoff, or drip pipe shall be made with the building drainage system waste water. Steam exhaust, blowoff or drip pipes discharged into the building drainage system shall not exceed a temperature of 180 degrees Fahrenheit. When higher temperatures exist, cooling methods shall be provided to reduce the temperature to 180 degrees Fahrenheit or less.
- g) Elevator Pits
  - 1) Drains connected directly to sewers shall not be installed in elevator pits.
  - 2) All discharges from elevator sumps shall indirectly discharge to the sanitary sewer or storm drain.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.1370 Floor Drains**

- a) Required. Any building or structure in which plumbing fixtures or piping is installed in or under a concrete floor to accommodate fixtures on the level of the concrete floor shall have at least one trapped and vented floor drain. Additional floor drains shall be required if the installation of fixtures and appurtenances requires the use of floor drains. In a multi-family dwelling, each unit shall have a floor drain if fixtures and appurtenances installed in the dwelling require the use of a floor drain.
  - 1) Underground floor drains connected to a building drain or a building sub-drain within 4 feet of a stack shall be individually vented. All floor drains shall be vented as required by Appendix A.Table I.
  - 2) Each floor drain shall be connected to a sanitary waste drain, except those drains receiving only clear water discharges, which may be connected to the sub-soil drainage system.
  - 3) Any sump or hub drain for receiving clear water waste shall extend 2 inches above the floor, and all indirect clear water waste lines shall be above the floor level. Any floor drain level with the floor shall discharge to a sanitary waste drain. (See Appendix A.Tables F and I.)

- 4) At least one floor drain shall be located in every restroom having a masonry or concrete floor except those for private use.
- 5) In hospitals and nursing homes, floor drains will not be required in toilet/bath facilities serving four or fewer individual residents where access to the facilities is direct from no more than two resident rooms. Toilet/bath facilities in hospitals and nursing homes serving rooms with more than four residents or consisting of multiple toilets, lavatories, etc., are required to have floor drains.
- b) **Size.** Each floor drain shall be sized for its intended use and the surface area that it drains. Any floor drain or drain trap installed below a basement floor or underground shall be no less than 2 inches in diameter.
- c) **Accessibility.** Floor drains shall connect into traps, shall be accessible and readily cleaned, and shall be located so that they are easily visible.
- d) **Provision for Evaporation.** Floor drain seals subject to evaporation shall be of the deep seal type, shall be fed by means of a priming device designed for that purpose, or shall be filled with vegetable oil.
- e) **Floor Drains in Food Establishments.** Floor drains installed in coolers, freezers, refrigerated holding areas, dressing rooms or processing rooms shall meet the following requirements:
  - 1) Floor drains shall have a minimum inside diameter of 4 inches.
  - 2) Drainage lines from water closets and urinals shall not be connected with any other sanitary drainage lines having floor drains located in the food service establishments listed in subsection (e).
  - 3) Floor drains shall be indirectly discharged to the drainage system, or a backwater valve that conforms with the requirements of Section 890.1320(o) shall be installed to isolate these floor drains from other sanitary discharges.
  - 4) Floor drains shall comply with the requirements of subsections (b), (c) and (d).

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.1380 Storm Water Drainage within a Building**

Any piping installed within a building for the purpose of carrying storm water from a roof and connected to a building drain or building sewer shall comply with the requirements of Appendix A.Table A (Approved Building Drainage/Vent Pipe) and Sections 890.910 through 890.930.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)



**SUBPART K: VENTS AND VENTING****Section 890.1410 Materials**

- a) All piping and fittings used in the vent system shall conform to requirements of Appendix A, Table A, "Approved Building Drainage/Vent Pipe" and "Approved Standards for Fittings".
- b) A system carrying corrosive waste shall be of approved materials as in Appendix A, Table A, "Approved Building Drainage/Vent Pipe". Vent piping shall be of the same material as the waste piping. (See Section 890.1310(b).)

**Section 890.1420 Stack Vents, Vent Stacks, Main Vents**

- a) Design. A properly designed and installed venting system, in conjunction with the soil or waste system, is essential to protect trap seals and prevent siphonage, aspiration, or back pressure. The venting system shall be designed and installed to permit the admission or emission of air so that under normal and intended use the seal of any fixture trap shall never be subjected to a pneumatic pressure differential of more than a 1-inch water column. All fixture traps shall be protected by the use of a vent or venting system constructed in accordance with this Part.
- b) Installation. Fixture traps shall be protected by the appropriate method as follows: an individual dry vent, a wet vent, a common vent, a circuit or loop vent, an island vent, or a combination waste and vent system. A stack vent or vent stack shall be installed with a soil or waste stack whenever vents, relief vents or other branch vents are required. (See Appendix K.Illustration A.)
- c) Main Vent. Each building in which plumbing is installed shall have at least one main vent no smaller than 3 inches for each building drain installed. (See Appendix A.Table K and Appendix K.Illustration C.)

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.1430 Vent Terminals**

- a) Vent Terminals. Vents shall terminate independently above the roof to the outside atmosphere or shall be connected to another vent at least 6 inches above the flood-level rim of the highest fixture served by the vent. (See Appendix K.Illustration B.)

- b) Roof Extensions. Extensions of vent pipes through a roof shall be terminated at least 12 inches above the roof unless a roof is to be used for any purpose other than weather protection. If a roof is to be used for any purpose other than weather protection, the vent shall be extended at least 7 feet above the roof. (See Appendix K.Illustration D.)
- c) Flashings. Each vent terminal shall be made water-tight with the roof by proper flashing.
- d) Location of Vent Terminal. No vent terminal from a drainage system shall be directly beneath a door, window, overhang or other ventilating intake opening of the building, nor shall any vent terminals be within 12 feet horizontally of an opening or within 4 feet of a vertical obstruction unless it is at least 2 feet above the top of the opening. (See Appendix K.Illustration E.)
- e) Extensions Outside Building. No soil, waste or vent pipe extension (except for vent terminals as provided in subsections (b) and (d) of this Section()) shall be located on the outside of a wall of any building, but shall be installed inside the building. Wet vents located within an exterior wall or in a wall adjacent to an unheated space shall be protected from freezing.
- f) Flag poles. Vent terminals shall not be used for the purpose of supporting flag poles, television aerials, or similar purposes.
- g) Vent Terminal Size. Each vent extension through the roof shall be a minimum of 3 inches in diameter and no smaller than the vent that it terminates. Vent terminals shall not be screened.
- h) Increases. Changes in size or diameter of vent terminals shall be made by the installation of an increaser commencing at least 1 foot below the roof.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

#### **Section 890.1440 Vent Terminal Size (Repealed)**

(Source: Repealed at 38 Ill. Reg. 9940, effective April 24, 2014)

#### **Section 890.1450 Vent Grades and Connections**

- a) Grade. All vent and branch vent pipes shall be installed so as to drain back to the

soil or waste pipe. (See Appendix K.Illustration F.)

- b) Vertical Rise. Where vent pipes connect to a horizontal soil or waste pipe, the vent shall be taken off above the center line of the soil or waste pipe, and the vent pipe shall rise vertically, or at an angle not more than 45 degrees from the vertical before offsetting horizontally or before connecting to the branch vent. Exception: Wet vent and floor drain vents may connect horizontally. (See Appendix K.Illustrations F, G and AA.)
- c) Height above Fixtures. The connection between a vent pipe and a vent stack or stack vent shall be made at least 6 inches above the flood-level rim of the highest fixture served by the vent. Horizontal vent pipes forming branch vents or relief vents shall be at least 6 inches above the flood-level rim of the highest fixture served. (See Appendix K.Illustration H.)
- d) Heel or Side-Inlet Bend. A heel or side-inlet quarter bend or closet bend shall not be used as a dry vent when the inlet is placed in a horizontal position. (See Appendix K.Illustration I.) Heel or side inlet quarter or closet bends are permitted only in cases where the fixture connecting is vented. (See Appendix K.Illustration I.)
- e) All main vents or vent stacks shall connect full size at their base to the building drain or to the main soil or waste pipe at or below the lowest fixture branch. (See Appendix K.Illustration EE).

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

#### **Section 890.1460 Fixtures Back-to-Back (Repealed)**

(Source: Repealed at 38 Ill. Reg. 9940, effective April 24, 2014)

#### **Section 890.1470 Fixture Trap Vents**

- a) Distance of Trap From Vent. Each fixture trap shall have a protecting vent located so that the developed length in the fixture drain from the trap weir to the vent fitting is within the requirements in Appendix A.Table I. (See Appendix K.Illustration L.)
- b) Trap Weir. The vent pipe opening from a soil or waste pipe, except for water closets or fixtures with an integral trap, shall not be below the trap weir. (See Appendix K.Illustration N.)

- c) Crown Vent. No trap vent shall be installed within two pipe diameters of the trap weir. (See Appendix K.Illustration M.)
- d) Hydraulic Gradient. Fixture drains shall be vented within the hydraulic gradient between the trap outlet and the junction with another drain. The hydraulic gradient as applied to a gravity drain and its corresponding vent connection is interpreted as the grade line. (See Appendix A.Table I and Appendix K.Illustration N.)
- e) Different Level. If any stack has fixtures entering at different levels, the fixtures other than the fixtures entering at the highest level shall be vented in accordance with Section 890.1420(b).
- f) Fixture Trap Protection. Each fixture trap shall be protected by the appropriate method as follows: an individual dry vent, a wet vent, a common vent, a circuit or loop vent, an island vent or a combination waste and vent system.
- g) Mechanical Vents. Mechanical devices shall not be installed in lieu of vent piping.
- h) Trap Seal Loss. Trap seal that is subject to loss by evaporation shall be prevented. (See Section 890.410(f).)

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

#### **Section 890.1480 Types of Fixture Trap Vents**

- a) Individual Dry Vent is a single fixture trap vent only and shall not be installed as part of a wet vent.
- b) Common Vent. A vertical common vent may be used for two fixture traps if both traps connect with a vertical waste at the same level. (See Appendix K.Illustration O.) A horizontal common vent may be used for two fixture traps if both traps connect to the horizontal waste at the same point and the vent is located downstream of the fixture connection. The horizontal trap-to-vent distance shall comply with Appendix A.Table I. (See Appendix K.Illustration O and Appendix A.Table I.)
- c) Wet venting shall be installed in accordance with Section 890.1500.

- d) Circuit and loop venting shall be installed in accordance with Section 890.1520.
- e) Combination waste and vent systems shall be installed in accordance with Section 890.1590.
- f) Island vent systems shall be installed in accordance with Section 890.1600.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

#### **Section 890.1490 Installation of Vents for Fixture Traps (Repealed)**

(Source: Repealed at 38 Ill. Reg. 9940, effective April 24, 2014)

#### **Section 890.1500 Installation of Wet Venting**

- a) The following shall not be used to wet vent another fixture trap: water closets, washing machine connections, blowout urinals, or dishwashers.
- b) Two lavatories with 1¼-inch traps shall be considered a single fixture for the purpose of this Section.
- c) A vertical wet vent may be used for two fixtures set on the same floor level, but connecting at different levels in the stack, provided that the vertical wet vent/drain between the two traps is one pipe diameter larger than the upper fixture trap and that both drains conform to Appendix A.Table I. (See Appendix K.Illustration P.)
- d) A horizontal wet vent may be used for two fixtures set on the same floor level with one fixture connecting upstream of the other fixture on the horizontal line, provided that the horizontal wet vent/drain between the two fixtures is one pipe diameter larger than the upstream fixture trap. The vent connection shall be located between the traps, and each trap-to-vent distance shall be in accordance with Appendix A.Table I. (See Appendix K.Illustration Q.)
- e) A vertical/horizontal wet vent may be used for two fixtures set on the same floor level with one fixture connecting to the vertical stack and one fixture connecting to the horizontal line, provided that the wet vent/drain is one pipe diameter larger than the upper fixture trap and the drains conform to Appendix A.Table I. (See Appendix K.Illustration R.)
- f) A single bathroom group of fixtures, consisting of a water closet, lavatory and a bathtub, shower or floor drain, may be installed with the drain from a lavatory

serving as a wet vent for a bathtub, shower or floor drain and for the water closet, provided that:

- 1) Not more than four DFUs drain into a 2-inch diameter wet vent; and
  - 2) The horizontal branch is a minimum of 2 inches and connects to the stack at the same level as the water closet drain. The horizontal branch may also connect to the water closet bend. (See Appendix K.Illustration S.)
- g) Bathroom groups installed back-to-back consisting of two water closets, two lavatories, and two bathtubs, showers or floor drains may be installed without individual vents, provided that:
- 1) The water closets are wasted to a proper vertical drainage fitting;
  - 2) The bathtubs, showers or floor drains connect to the stack at the same level as the water closets;
  - 3) The lavatories connect to the stack at the same level; and
  - 4) The vent is a minimum of 2 inches in diameter. (See Appendix K.Illustration T.)
- h) When bathroom groups are connected to the same soil stack, the waste pipe from one or two lavatories may be used as a wet vent for one or two bathtubs or showers, provided that:
- 1) The wet vent and its corresponding extension to the vent stack are 2 inches in diameter;
  - 2) Each water closet is provided with an individual dry vent or vertical common vent; and
  - 3) The vent stack is sized as given in Appendix A.Table J. (See Appendix K.Illustrations U and V.)
- i) On the lower floors of a multi-story building, a water closet may be wet vented with a single lavatory in lieu of the requirements of Section 890.1470(h).

- j) Bathroom groups consisting of a water closet, lavatory, and bathtub or shower, connected to a stack by a separate branch, may wet vent the water closet and bathtub or shower with the lavatory, provided that:
- 1) The water closet and bathtub/shower connect to the stack at the same level;
  - 2) The wet vent and its corresponding extension are a minimum of 2 inches in diameter; and
  - 3) A vent stack connects at or below the lowest fixture connection and is installed for a stack of this type. (See Appendix K.Illustration W.)

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

#### **Section 890.1510 Stack Venting (Repealed)**

(Source: Repealed at 38 Ill. Reg. 9940, effective April 24, 2014)

#### **Section 890.1520 Circuit and Loop Venting**

- a) **Battery Venting.** A soil or waste branch to which two but not more than eight of the same type of floor outlets or fixtures, such as eight water closets, eight pedestal urinals, eight shower stalls or eight floor drains are connected in battery, may be vented by a circuit vent that shall take off from in front of the last fixture connection. Blowout type fixtures are prohibited. , Lower floor branches serving more than three water closets shall be provided with a relief vent taken off in front of the first fixture connection. The horizontal branch for its full length to the farthest fixture opening shall be uniformly sized based on the total drainage fixture load as listed in Appendix A.Tables G, H and L. (See Appendix K.Illustration Y.)
- b) **Dual Branches.** When parallel horizontal branches serve a total of eight water closets (four on each branch), each branch shall be provided with a relief vent at a point between the two water closets most distant from the soil stack. The horizontal branch for its full length to the farthest fixture opening shall be uniformly sized based on the total drainage fixture load as listed in Appendix A.Tables G, H and L. Intermediate floor branches shall be provided with a relief vent taken off in front of the first fixture connection. If traps other than water

closets discharge above the horizontal branch, each such trap shall be provided with a continuous vent. (See Appendix K.Illustration Z.)

- c) Vent Connections. When the circuit or relief vent connections are taken off the horizontal branch, the vent branch connection shall be taken off vertically from the top of the horizontal branch. (See Appendix K.Illustration AA.)
- d) Fixtures Back-to-Back in Battery. When fixtures are connected to one horizontal branch through a double wye, a sanitary cross in a vertical position, or a manufactured fixture carrier, a common vent for each two fixtures back-to-back shall be provided. (See Appendix K.Illustration BB.)
- e) Fixture Connections. Branch wastes and fittings for circuit vented fixtures shall be installed so that the fixture drain enters the side of the branch drain. (See Section 890.1320(i) and Appendix K.Illustrations Y and CC.)
- f) Circuit and Loop Vented Fixtures. For circuit and loop vented fixtures are installed in a multi-story building, a relief vent shall be provided at the base connection into the horizontal by connecting the vent stack, full-size, into or near the base of the soil stack, or by connecting the vent stack directly into the horizontal branch near the soil stack. The vent shall be carried full size. (See Appendix K.Illustration DD.)

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

### **Section 890.1530 Pneumatic Ejectors**

An air pressure relief vent from a pneumatic ejector shall not be connected to the regular venting system but shall be connected separately to the outside atmosphere terminating as required in Section 890.1430 for vent extensions through roofs. Such relief pipe shall be of sufficient size to relieve air pressure inside the ejector to atmospheric pressure within ten (10) seconds, but shall not be smaller than one and one-half (1 1/2) inches in diameter.

### **Section 890.1540 Relief Vents**

Stacks with More Than Ten (10) Branch Intervals. Soil and waste stacks in buildings having more than ten (10) branch intervals shall be provided with a relief vent at each tenth interval, beginning with the top floor, or may be installed mid-way between the first and twentieth interval. The size of the relief vent shall be equal to the size of the vent stack to which it connects. The lower end of each relief vent shall connect to the soil or waste stack through a wye below the horizontal branch serving the floor, and the upper end shall connect to the vent stack



through a wye at least 42 inches above the floor level.

**Section 890.1550 Offsets at an Angle Less Than 45 Degrees from the Horizontal in Buildings of Five or More Stories**

- a) **Offset Vents.** Offsets less than 45 degrees from the horizontal in a soil or waste stack, except as provided in Section 890.1350, shall comply with subsections (b) and (c) of this Section. (See Appendix K: Illustration CC.)
- b) **Separate Venting.** The stack section below the offset and the stack section above the offset shall be vented as separate soil or waste stacks.
- c) **Offset Reliefs.** Offsets shall be vented by installing a relief vent as a vertical continuation of the lower section of the stack or as a side vent connected to the lower section between the offset and the next lower fixture or horizontal branch. The upper section of the offset shall be provided with a yoke vent. The diameter of the vents shall not be less than the diameter of the main vent, or of the soil or waste stack, whichever is smaller.

**Section 890.1560 Main Vents to Connect at Base (Repealed)**

(Source: Repealed at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.1570 Vent Headers**

**Connection of Vents.** Stack vents and vent stacks may be connected into a common vent header at the top of the stacks and then be extended through the roof to the outside atmosphere at one point. This header shall be sized as provided in Appendix A, Table K, the number of units being the sum of all units on all stacks connected thereto, and the developed length being the longest vent length from the interception at the base of the most distant stack to the vent terminal to the outside atmosphere, as a direct extension of one (1) stack.

**Section 890.1580 Size and Length of Vents**

- a) **Size of Water Closet Vents.** A water closet shall have at least a 2-inch vent.
- b) **Size of Individual Vents.** The diameter of an individual vent shall be at least 1¼ inches or at least half the diameter of the drain to which it connects, whichever is greater.
- c) **Size of Relief Vents.** The diameter of a relief vent shall be at least half the diameter of the soil or waste branch to which it is connected.

- d) **Size of Circuit Vents.** The diameter of a circuit vent shall be at least half the diameter of the horizontal soil or waste branch or the diameter of the vent stack, whichever is smaller. (See Appendix A.Table L.)
- e) **Size of Vent Piping.** The size of vent piping shall be determined based upon its length and the total number of drainage fixture units connected to the vent pipe as provided in Appendix A.Table K. No more than 20 percent of the maximum developed length as determined from Table K may be installed in the horizontal position. Vent piping serving floor drains shall be installed so as to minimize horizontal vent distances.
- f) **Building Sub-drain Sump Pump Vent Sizes.** Building sub-drain sump pump vents shall be sized in accordance with Appendix A.Table K.
- g) All vents pipes shall extend undiminished in size from the vent connection or stack cleanout through the roof to the outside atmosphere, or shall be reconnected with a branch vent, vent stack, or stack vent.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

#### **Section 890.1590 Combination Waste and Vent (Floor and Hub Drains Only)**

A combination waste and vent system consisting of floor and hub drains may be installed when structural conditions preclude conventional plumbing. Appurtenances delivering large quantities or surges of water shall not be discharged to a combination waste and vent.

- a) The waste piping and trap in a combination waste and end-vented (both ends) system shall be a minimum of 4 inches in diameter. The vents in the system shall be a minimum of 3 inches in diameter. Only one floor drain shall be connected to each branch of a combination waste and vent.
- b) A branch more than 15 feet in length shall be separately end vented. The minimum area of any vent installed in a combination waste and vent system shall be half the area of the drain pipe served.
- c) Sinks, lavatories and other fixtures that are roughed in above the floor shall not be permitted on a combination waste and vent system.
- d) Long mains shall be provided with additional relief vents located at intervals of every 100 feet. (See Appendix K.Illustration FF.)

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.1600 Special Venting for Island Fixtures**

- a) Traps for island sinks and similar equipment shall be roughed in above the floor and shall be vented by extending the vent as high as possible, but at least the drainboard height, and then returning it downward and connecting it to the horizontal sink drain immediately downstream from the vertical fixture drain. Back-to-back island vented fixtures shall meet the requirements of Section 890.1480(b).
- b) The returned vent shall be connected to the horizontal drain through a sanitary drainage fitting and shall be provided with a vent taken off the vertical fixture vent by means of a sanitary drainage fitting immediately below the floor and extending to the nearest partition and then through the roof to the outside atmosphere, or may be connected to other vents at a point at least 6 inches above the flood level rim of the fixture served. Drainage fittings shall be used on all parts of the vent below the floor level, and a minimum grade of  $\frac{1}{4}$  inch per foot back to the drain shall be maintained. The returned bend used under the drainboard shall be a one-piece fitting or assembly of a 45 degree, a 90 degree, and a 45 degree elbow in the order named. (See Section 890.1340 and Appendix K.Illustration GG.)

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**SUBPART L: PLUMBING SYSTEMS/CORRECTIONAL FACILITIES****Section 890.1710 General Requirements**

- a) All material, fittings, appurtenances and devices shall be in accordance with standards listed in Appendix A, Table A.
- b) The drainage and venting for security fixtures shall be in accordance with Sections 890.910 through 890.930, 890.1010 through 890.1060, 890.1310 through 890.1380 and Sections 890.1410 through 890.1600.
- c) The water supply for security fixtures shall be in accordance with Sections 890.1110 through 890.1240. Note: A full-way valve for each cell shall be located outside the cell.

**Section 890.1720 Water Closets**

- a) All water closets shall either be of stainless steel (Type 304) construction, including framework, reinforcing and interior piping, or be vitreous china complying with ASME A112.19.2/CSA B45.1.
- b) If stainless steel water closets are used, they shall comply with the following:
  - 1) The bowl and flushing rim shall not be less than 14 gauge.
  - 2) The water closet shall have a minimum of a 3-inch diameter, fully enclosed stainless steel P-trap and shall pass a 2 $\frac{1}{8}$ -inch diameter ball.
  - 3) All welds shall be ground smooth, and exterior surfaces polished.
  - 4) Integral contoured seats that are self-draining and crevice free shall be a part of the water closet.
- c) All water closets shall have push button flush valves.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.1730 Urinals**

- a) All urinals shall be either Type 304 stainless steel or vitreous china complying with ASME A112.19.2/CSA B45.1.

- b) All stainless steel urinals shall comply with the following:
- 1) The urinal shall be fabricated of Type 304 stainless steel with exposed edges polished.
  - 2) All exposed welds are to be ground smooth.
  - 3) All construction is to be free from visible voids, seams or crevices.
  - 4) The trap shall provide a 2-inch seal and pass a 1.9-inch diameter ball.
  - 5) The urinal shall be fitted with an integrally welded steel beehive dome strainer.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

#### **Section 890.1740 Combination Lavatory/Toilet**

- a) The cabinet shall be of stainless steel (Type 304) with a minimum of 12 gauge for the cabinet and 14 gauge for the top.
- b) The cabinet top shall have a backsplash.
- c) The lavatory shall include adjustable control valves on the hot and cold, self-closing filler valve with a maximum ½ gpm flow control and a combination penal filler/bubbler spout. A maximum of 115°F temperature is allowed.
- d) The lavatory drain shall not have a mechanical air vent attached.
- e) Supply inlets to the lavatory shall have screw driver stops, gate or globe valves.
- f) The water closet shall have no less than a 3 inch diameter, fully enclosed stainless steel toilet P-trap and shall pass a 2⅛ inch diameter ball.

(Source: Amended at 28 Ill. Reg. 4215, effective February 18, 2004)

#### **Section 890.1750 Service Sinks/Lavatory**

- a) Service sinks/lavatories shall be either stainless steel, cast iron complying with ASME A112.19.1/CSA B45.2, or vitreous china complying with ASME A112.19.2/CSA B45.1. Stainless steel service sinks/lavatories shall be fabricated of Type 304 stainless steel with the exterior surfaces polished; all exposed welds

are to be ground smooth, and there shall be no visible voids, seams or crevices.

- b) Security sink/lavatory shall include a self-closing valve set with integral stops, gate or globe valves, reversible union inlets and plain-end filler spout, or a grid strainer drain, elbow waste with a 2-inch female connection. Timing of control valves shall be field adjustable from five to 40 seconds and shall not require shutting off the supply lines.
- c) The waste assembly shall comply with Section 890.410(g)(1) and be of brass, copper or bronze construction.
- d) Drains with mechanical air vents are prohibited.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

#### **Section 890.1760 Sinks**

- a) All sinks for food preparation or cleansing of utensils used to prepare food shall be of stainless steel (Type 304) construction, including framework and reinforcing.
- b) All welds shall be ground smooth, and exterior surfaces polished.
- c) All sinks shall be provided with waste outlets at least one and one-half (1 1/2) inches in diameter. A crossbar, strainer, or other means shall be provided to restrict the clear opening of the waste outlet. No kitchen sink basket shall be less than three and one-half (3 1/2) inches in diameter.
- d) Waste lines and water supply lines shall conform with Sections 890.130 through 890.1600.

#### **Section 890.1770 Cabinet Showers**

- a) All cabinet showers shall be unitized one-piece fixtures of stainless steel with the exposed surfaces polished, except the receptor which shall have a non-skid surface. All exposed welds shall be ground smooth and all construction is to be free of visible voids, seams or crevices.
- b) Shower compartments shall have at least 1,296 square inches outside dimensions and shall be at least 32 inches in shortest dimension outside dimensions.
- c) The valve shall be an adjustable type with a maximum of two and one-half (2 1/2)

gpm flow control, integral screwdriver stop valve.

- d) The shower shall include a stainless steel soap dish, shower head and clothes hook, designed for correctional facility use.
- e) The shower head within shower cabinets or site constructed showers shall be located in such a manner as not to pose an insanitary or nuisance condition outside the shower area. The shower heads are to be on a side wall or overhead so as not to spray water out of the shower cabinet or area and create a slipping hazard on the tile floor or cause water to pond in areas other than the shower area.

#### **Section 890.1780 Flush Valves**

- a) All flush valves for water closets or urinals shall conform with Sections 890.650(e) and 890.660(b) of this Part.
- b) All flush valves shall feature rubber diaphragm operation, non-hold-open push buttons (and handles), union check stops and vacuum breakers as approved in this Part. (See Sections 890.1130(c) and 890.1140(a) and (b).)
- c) Flush valves shall be concealed wherever possible.

#### **Section 890.1790 Soap Dishes**

Soap dishes shall be of the air circulating, self draining design.

#### **Section 890.1800 Floor Drains**

- a) Location. Floor drains can be located either within a cell or outside the cell.
- b) Drain Cover. Each drain cover shall be securely anchored by means of vandal resistant screws.

**SUBPART M: INSPECTIONS, TESTS, MAINTENANCE AND ADMINISTRATION****Section 890.1910 Inspections**

A plumbing system or any part thereof shall not be enclosed, covered up or used until the system has been inspected and approved by a plumbing inspector. It is the responsibility of the licensed plumber or plumbing contractor on the job to arrange for inspection by the Department or a local plumbing inspector. The plumbing inspector may require tests as listed in Section 890.1930 to determine whether or not the system as installed is in compliance with this Part. Plumbing found not to be in compliance with this Part shall not be approved. A plumbing system not complying with the provisions of this Part shall not be used until such time as it is brought into compliance with this Part. After the plumbing corrections have been made, the plumbing contractor shall arrange for reinspection.

**Section 890.1920 Testing of Plumbing Systems**

**Defective Plumbing.** Where there is reason to believe that the plumbing system fails to comply with this Part, the Department or local plumbing inspector may require such tests (see Section 890.1930) and inspections as may be necessary to assure that any defects are found and corrected.

- a) **Exposure of Work.** When plumbing work has been covered or concealed prior to being tested and approved, it shall be exposed for testing. It is the responsibility of the licensed plumber or plumbing contractor to expose plumbing for inspection purposes.
- b) **Equipment, Material and Labor for Tests.** All equipment, material and labor required for inspection and testing a plumbing system or any part thereof is the responsibility of the licensed plumber or plumbing contractor.

**Section 890.1930 Test Methods**

- a) **Roughed-In Plumbing.** The piping of plumbing drainage and venting systems shall be tested upon completion of the roughed-in piping installation by water or air to prove watertight. The Department or local plumbing inspector may require the removal of any cleanout plugs to ascertain if the pressure has reached all parts of the system.
- b) **Water test.** The water test shall be applied to the drainage system either in its entirety or in sections after piping has been roughed-in. 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 point of overflow. If the



system is tested in sections, each opening shall be tightly plugged except the highest opening of the section being tested and each section shall be filled with water; however, a section shall not be tested with less than a ten (10) foot head of water. In testing successive sections, at least the upper ten (10) feet of the next higher section shall be tested, so that every joint or pipe in the building (except the uppermost ten (10) feet of the system) shall be submitted to a test of at least a ten (10) foot head of water. The water shall be kept in the system or in the portion being tested for at least 15 minutes before inspection starts; and inspection or testing of the system shall confirm that the system is tight at all points.

- c) Air test. An air test shall be made by attaching an air compressor testing apparatus to any suitable opening and after closing all other inlets and outlets to the system, forcing air into the system until there is a uniform gauge pressure of five (5) pounds per square inch (p.s.i.) or sufficient to balance a column of mercury ten (10) inches in height. This pressure shall be held without introduction of additional air for a period of at least fifteen (15) minutes.
- d) Water Supply System. Upon completion of a section, or the entire water supply system, the system shall be tested and proved tight under a water pressure at least one and one-half (1 1/2) times the system pressure but at least 100 p.s.i., by air or water. When exceeding 100 p.s.i., the test shall be of the hydrostatic type only. Testing pressure shall be maintained for 15 minutes. The water used for this test shall be from a potable water supply.
- e) Finished Plumbing. After the plumbing fixtures have been set and their traps filled with water, their connections shall be tested and proved gas and watertight. The test for gas and water tightness of the completed drainage and vent system shall be made by filling all traps with water, and then introducing into the system a pungent, thick smoke produced by one or more smoke machines. When the smoke appears at stack openings on the roof, the stack opening shall be closed and a pressure equivalent to a one (1) inch water column shall be maintained for the period of the inspection. Where the Department or local plumbing inspector finds that a smoke test cannot be performed, a peppermint test may be substituted. A peppermint test is conducted by introducing two (2) ounces of oil of peppermint into the roof terminal of every line or stack to be tested. Immediately after the oil of peppermint is introduced into the system, ten (10) quarts of hot (160 degrees F.) water shall be added, and each terminal sealed. The detection of the odor of peppermint at any trap or at any other point in the plumbing system denotes a leak. Individuals whose body or clothing have come in contact with oil of peppermint shall be excluded from the area until the test is completed.

- f) **Building Sewer.** The building sewer shall be tested by insertion of a test plug at the point of connection with the public sewer. The building sewer shall be filled with water under a head of at least ten (10) feet of water. The water level at the top of the water column shall not drop for at least 15 minutes.

#### **Section 890.1940 General Administration**

The plans and specifications for a plumbing system whose design does not comply with this Part must be submitted to the Department for approval prior to installation of such a plumbing system. Such approval shall be in writing from the Department and shall be based on a determination that the system is expected to perform and exhibit durability as if meeting the requirements of this Part.

#### **Section 890.1950 Violations**

- a) **Notice of Violation**
  - 1) Violators of this Part shall be informed of any violation at the time of inspection, followed by a formal notice in writing, including a deadline date for correction of the violation(s).
  - 2) Factors to be considered in establishing deadline dates for correction shall include the nature and complexity of the violation, the stage of construction, the type of violation involved, the weather, and whether or not the violation represents a potential or immediate health hazard.
- b) **Reinspection.** Upon receipt of information from the violator indicating correction of violations or upon expiration of the established deadline date, a reinspection shall be made.

**Section 890.APPENDIX A Plumbing Materials, Equipment, Use Restrictions and Applicable Standards**

Abbreviations used in Appendix A. Table A refer to the following agencies or organizations:

- 1) ANSI – American National Standards Institute;  
1819 L Street, N.W., 11<sup>th</sup> Floor, Washington DC 20036.
- 2) ASHRAE – American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.;;  
1791 Tullie Circle, NE, Atlanta, Georgia 30329.
- 3) ASME – American Society of Mechanical Engineers;  
Three Park Avenue, New York, New York 10016-5990.
- 4) ASPE – American Society of Plumbing Engineers;  
6400 Shafer Ct, Suite 350, Rosemont IL 60018.
- 5) ASSE – American Society of Sanitary Engineering;  
18927 Hickory Creek Drive, Suite 220, Mokena IL 60448..
- 6) ASTM – American Society for Testing and Materials;  
100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428.
- 7) AWWA – American Water Works Association;  
6666 West Quincy Avenue, Denver, Colorado 80235.
- 8) CISPI – Cast Iron Soil Pipe Institute;  
1064 Delaware Avenue SE, Atlanta, Georgia 30316.
- 9) FM – Factory Mutual Approvals;  
1151 Boston-Providence Turnpike,  
P.O. Box 9102, Norwood, Massachusetts 02062.
- 10) NSF (National Sanitation Foundation) International;  
789 N. Dixboro Road, Ann Arbor, Michigan 48113.
- 11) PDI – Plumbing and Drainage Institute;  
800 Turnpike Street, Suite 300, North Andover, Massachusetts 01845.
- 12) UL – Underwriters Laboratories, Inc.;;  
333 Pfingsten Road, Northbrook, Illinois 60062-2096.

**Approved Certification Agencies**

- 1) ASSE – American Society of Sanitary Engineering;  
901 Canterbury Road, Suite A, Westlake, Ohio 44145.
- 2) CSA (Canadian Standards Association) International;  
8501 E. Pleasant Valley Road, Cleveland, Ohio 44131-5575.
- 3) IAPMO – International Association of Plumbing and Mechanical Officials;  
4755 E. Philadelphia Street, Ontario, California 91761.
- 4) ICC – International Code Council;

- 500 New Jersey Avenue NW, 6<sup>th</sup> Floor, Washington DC 20001.
- 5) NSF (National Sanitation Foundation) International;  
789 N. Dixboro Road, Ann Arbor, Michigan 48113.
  - 6) PDI – Plumbing and Drainage Institute;  
800 Turnpike Street, Suite 300, North Andover, Massachusetts 01845.
  - 7) Truesdail Laboratories, Inc.;;  
14201 Franklin Avenue, Tustin, California 92780-7008.
  - 8) UL – Underwriters Laboratories, Inc.; 333 Pfingsten Road, Northbrook, Illinois  
60062-2096.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX A Plumbing Materials, Equipment, Use Restrictions and Applicable Standards**

**Section 890.TABLE A Approved Materials and Standards**

All materials shall meet at least one of the approved standards listed.

**Approved Building Drainage/Vent Pipe**

- |    |  |  |
|----|--|--|
| 1) | Acrylonitrile Butadiene Styrene (ABS) Pipe   | ASTM D 2661-2011<br>ASTM F 628-2012<br>CSA B181.1-2011 in B1800  |
|    | Joints   | ASTM D 2235-2011<br>CSA B602-2010  |
|    | Solvent Cement <sup>1</sup>  | ASTM D 2235-2011<br>ASTM D 3138-2011<br>CSA B181.1-2011 in B1800                                       |
| 2) | Brass Pipe   | ASTM B 43-2009   |
| 3) | Cast Iron Pipe   | ASTM A 74-2009<br>ASTM A 888-2011<br>ASTM C 564-2012<br>CISPI 301-2009<br>CSA B70-2012<br>FM 1680-1989 |
| 4) | Chlorinated Polyvinyl Chloride (CPVC)<br>(Pipe and Fittings for Chemical Waste Drainage Systems) | ASTM F2618-2009  |
| 5) | Copper/Copper Alloy Pipe   | ASTM B 42-2010<br>ASTM B 302-2012  |
| 6) | Copper/Copper Alloy Tubing<br>(K-L-M or DWV) <sup>2</sup>  | ASTM B 75/B75M-2011<br>ASTM B 88-2009<br>ASTM B 251-2010<br>ASTM B 306-2009                            |
| 7) | Galvanized Steel Pipe <sup>2</sup>   | ASTM A 53/A53M-2012  |

- |     |  |  |
|-----|--|--|
| 8)  | Glass Fiber Borosilicate Pipe <sup>3</sup>   | ASTM C 1053-2010   |
| 9)  | High Silicon Content Cast Iron Pipe <sup>3</sup>   | ASTM A 377-2008e1<br>CSA B70-2012  |
| 10) | Polypropylene Pipe <sup>3</sup>  | CSA B137.1-2009 in B137  |
| 11) | Polyvinyl Chloride (PVC) Pipe and Fittings   | ASTM D 2665-2012<br>ASTM D 2949-2010<br>CSA B137.2-2009 in B137<br>CSA B181.2-2011 in B1800                      |
| 12) | Polyvinyl Chloride (PVC) Pipe with Cellular Core <sup>4</sup><br>Joints<br>Primer<br>Solvent Cement <sup>1</sup> | ASTM F891-2010<br>ASTM F1760-2011<br>ASTM D 2855-2010<br>ASTM F 656-2010<br>ASTM D 2564-2012<br>ASTM D 3138-2011 |
| 13) | Polyvinylidene Fluoride <sup>3</sup>   | ASTM D 3222-2010   |
| 14) | Solder   | ASTM B 32-2008   |
| 15) | Stainless Steel – types 304 and 316L   | ASME A112.3.1-2007 (R2012)   |
| 16) | Stainless Steel Buttweld Fittings  | ASTM A 403/A 403M-2012<br>ASTM A 774/A 774M-2009   |
| 17) | Stainless Steel Flanges  | ASTM A 2400/A 240M-2012a   |
| 18) | Identification of Piping Systems   | ASME A13.1-2007  |

## Agency Notes:

- <sup>1</sup> Solvent cement must be handled in accordance with ASTM F 402-1993.  
<sup>2</sup> Type M copper tubing, DWV copper tubing, and galvanized steel pipe are approved for above-ground uses only.  
<sup>3</sup> Approved for corrosive waste or corrosive soil conditions.  
<sup>4</sup> PVC pipe with cellular core is approved only for gravity drainage and venting.  
<sup>5</sup> ASME B.1.20.1-1983

**Approved Materials for Building Sewer**

- |    |  |   |
|----|--|---|
| 1) | Acrylonitrile Butadiene Styrene (ABS) Pipe | ASTM D 2661-2011<br>ASTM D 2751-2005<br>ASTM F 628-2012<br>CSA B181.1-2011 in B1800 |
|    | Joints                                     | ASTM D 2235-2011<br>CSA B602-2010   |
|    | Solvent Cement <sup>1</sup>                | ASTM D 2235-2011<br>ASTM D 3138-2011<br>CSA B181.1-2011 in B1800                    |
| 2) | Asbestos Cement Pipe                       | ASTM C 428/C 428M-2011e1<br>CSA B127.1-1999 (R2009)                                 |
| 3) | Cast Iron Soil Pipe/Fittings               | ASTM A 74-2009<br>CSA B70-2012  |
|    | Hubless Soil Pipe                          | CISPI 301-2009<br>CISPI 310-2011<br>CSA B70-2012<br>FM 1680-1989                    |
|    | Rubber Gaskets                             | ASTM C 564-2012<br>ASTM D 4161-2010<br>CSA B70-2012<br>CSA B602-2010                |
| 4) | Copper/Copper Alloy Tubing                 | ASTM B 88-2009  |
| 5) | Concrete Pipe                              | ASTM C 14-2011  |

		ASTM C 76-2013 ASTM C 443-2012 CSA B602-2010
6)	High-Density Polyethylene (HDPE) Pipe	ASTM D 3350-2012
7)	Polyvinyl Chloride (PVC) Pipe	ASTM F 1866-2007 ASTM D 2665-2012 ASTM D 2949-2010 ASTM D 3034-2008 CSA B182.1-2011 in B1800 CSA B182.2-2011 in B1800 CSA B182.4-2011 in B1800 CSA B181.2-2011 in B1800
	Joints	ASTM D 2855-2010 ASTM D 3212-2013 CSA B602-2010
	Primer	ASTM F 656-2010
	Solvent Cement <sup>1</sup>	ASTM D 2564-2012 ASTM D 3138-2011 CSA B181.2-2011 in B1800
8)	Polyvinyl Chloride (PVC) Pipe with Cellular Core <sup>2</sup>	ASTM F 891-2010
	Joints	ASTM D 2855-2010 ASTM D 412-2006ae2
	Primer	ASTM F 656-2010
	Solvent Cement <sup>1</sup>	ASTM D 2564-2012 ASTM D 3138-2011
9)	Solder	ASTM B 32-2008
10)	Vitrified Clay Pipe <sup>2</sup>	ASTM C 4-2009 ASTM C 700-2013 ASTM C 425-2009



- |     |                                  |   |
|-----|----------------------------------|---|
| 11) | Polypropylene Pipe <sup>2</sup>  | ASTM F 2389-2010<br>AWWA C901-2008<br>AWWA C906-2012<br>(Material Code PE3408) <sup>3</sup><br>(Material Codes PE2406 and<br>PE3406) <sup>4</sup> |
| 12) | Identification of Piping Systems | ASME A13.1-2007   |

## Agency Notes:

- <sup>1</sup> Solvent cement must be handled in accordance with ASTM F 402-1988.  
<sup>2</sup> PVC pipe with cellular core and vitrified clay pipe are approved only for gravity drainage.  
<sup>3</sup> Dimension Ratio (DR) 17 or less.  
<sup>4</sup> Dimension Ratio (DR) 13.5 or less.

**Approved Materials for Water Service Pipe**

- |    |   |  |
|----|---|--|
| 1) | Acrylonitrile Butadiene Styrene (ABS) Pipe <sup>2</sup> | ASTM D 1527-2005   |
|    | Joints<br>Solvent Cement <sup>1</sup>                   | ASTM D 2235-2011<br>ASTM D 2235-2011   |
| 2) | Brass Pipe <sup>2</sup>                                 | ASTM B 43-2009   |
| 3) | Cast Iron (ductile iron) <sup>2</sup><br>Water Pipe     | ASTM A 377-2008e1<br>CSA B70-2012<br>AWWA C151-2009  |
| 4) | Chlorinated Polyvinyl Chloride (CPVC) Pipe <sup>2</sup> | ASTM D 2846/D 2846M-<br>2009be1<br>ASTM F 441/F 441M-2012<br>ASTM F 442/F 442M-2012<br>CSA B137.6-2009 in B137 |
|    | Joints  | ASTM D 2846/D 2846M-<br>2009be1<br>CSA B137.6-2009 in B137   |
|    | Solvent Cement <sup>1</sup>                             | ASTM F 493-2010<br>CSA B137.6-2009 in B137   |

5)	Copper/Copper Alloy Pipe <sup>2,3</sup>	ASTM B 42-2010 ASTM B 302-2012
6)	Copper/Copper Alloy Tubing <sup>2,3</sup>	ASTM B 88-2009
7)	Galvanized Steel Pipe <sup>2</sup>	ASTM A 53/A 53M-2012
8)	Poly Butylene (PB) Pipe/Tubing <sup>2</sup>	CSA B137.8-2009 in B137
9)	Polyethylene (PE) Pipe <sup>2</sup>	ASTM D 2239-2012a AWWA C901-2008 AWWA C906-2012 (Material Code PE3408) <sup>4</sup> (Material Codes PE2406 and PE3406) <sup>5</sup>
10)	Polyethylene (PE) Tubing <sup>2</sup>	ASTM D 2737-2012a CSA B137.1-2009 in B137
11)	Polypropylene Pipe <sup>2</sup>	ASTM F 2389-2010
12)	Polyvinyl Chloride (PVC) Pipe <sup>2</sup>	ASTM D 1785-2012 ASTM D 2241-2009 ASTM D 2672-2009 ASTM F 477-2010 AWWA C900-2007 CSA B137.3-2009 in B137
	Joints	ASTM D 2855-2010 ASTM D 3139-2011 CSA B137.2-2009 in B137 CSA B137.3-2009 in B137
	Primer Solvent Cement <sup>1</sup>	ASTM F 656-2010 ASTM D 2564-2012

		CSA B137.3-2009 in B137
13)	Stainless Steel Pipe <sup>2</sup>	ASTM A 312/A 312M-2012a ASTM A 403/A 403M-2012 ASTM A 511/A 511M-2012
142)	Welded Copper Water Tube <sup>2</sup>	ASME B31.1-2012 ASTM B 447-2012a WK and WL
15)	Solder	ASTM B 32-2008

## Agency Notes:

- <sup>1</sup> Solvent cement must be handled in accordance with ASTM F 402-1988.  
<sup>2</sup> Water service pipe must meet the appropriate NSF standard for potable water.  
<sup>3</sup> Type K or L copper may be installed underground.  
<sup>4</sup> Dimension Ratio (DR) 17 or less.  
<sup>5</sup> Dimension Ratio (DR) 13.5 or less.  
<sup>6</sup> ASME B.1.20.1-1983.

**Approved Materials for Water Distribution Pipe**

1)	Brass Pipe <sup>2</sup>	ASTM B 43-2009
2)	Chlorinated Polyvinyl Chloride <sup>2</sup> (CPVC) Pipe/Tubing	ASTM D 2846/D 2846M- 2009be1 ASTM F 441/F 441M-2012 ASTM F 442/F 442M-2012 CSA B137.6-2009 in B137
	Joints	ASTM D 2846/D 2846M- 2009be1 CSA B137.6-2009 in B137
	Solvent Cement <sup>1</sup>	ASTM F 493-2010 CSA B137.6-2009 in B137
3)	Copper/Copper Alloy Pipe <sup>2</sup>	ASTM B 42-2010

		ASTM B 302-2012 AWWA C606-2011
4)	Copper/Copper Alloy Tubing <sup>2</sup>	ASTM B 88-2009
5)	Cross Linked Polyethylene <sup>2</sup> Distribution Systems	ASTM F 876-2013a ASTM F 877-2011a ASTM F 1807-2012 ASTM F 1960-2012 ASTM F 2080-2012 ASTM F 2098-2008 ASTM F 2159-2011 ASSE 1061-2011 CSA B137.5-2009 in B137
	Joints	
6)	Galvanized Steel Pipe <sup>2</sup>	ASTM A 53-2012 AWWA C606-2011
7)	Poly Butylene (PB) Pipe/Tubing <sup>2</sup>	CSA B137.8-2009 in B137
8)	Polypropylene Pipe <sup>2</sup>	ASTM F 2389-2010
9)	Polyvinyl Chloride (PVC) Pipe <sup>2,3</sup>	ANSI/NEMA Z535.1-2006 (R2011) ASTM D 1785-2012 ASTM D 2241-2009 ASTM D 2672-2009 CSA B137.3-2009 in B137 ASTM D 2855-2010 ASTM F 441/F 441M-2012 CSA B137.2-2009 in B137 CSA B137.3-2009 in B137
	Joints	
	Primer Solvent Cement <sup>1</sup>	ASTM F 656-2010 ASTM D 2564-2012 CSA B137.3-2009 in B137

- |     |                                       |  |
|-----|---------------------------------------|--|
| 10) | Stainless Steel Pipe <sup>2</sup>     | ASTM A 312/A 312M-2012<br>ASTM A 403/A 403M-2012<br>ASTM A 511/A 511M-2012 |
| 11) | Welded Copper Water Tube <sup>2</sup> | ASTM B 447-2012a WK, WL<br>and WM  |
| 12) | Solder                                | ASTM B 32-2008   |

## Agency Notes:

- <sup>1</sup> Solvent cement must be handled in accordance with ASTM F 402-1988.
- <sup>2</sup> Water distribution pipe must meet the appropriate NSF standard for potable water. Plastic shall be rated at 160 psi at 73.4 degrees Fahrenheit.
- <sup>3</sup> Use for cold or tempered water only.
- <sup>4</sup> ASME B.1.20.1-1983.
- <sup>5</sup> Safety Color.

**Approved Materials and Standards for  
Plumbing Fixtures and Fixture Fittings**

- |    |   |                                     |
|----|---|-------------------------------------|
| 1) | Bathtub Liners (plexiglass/ABS or acrylic/plastic)                      | IAPMO/ANSI Z124.8-2013              |
| 2) | Bathtubs, Plastic   | CSA B45.5-2011/IAPMO Z124-2011      |
| 3) | Bidets  | ASME A112.19.2-2013/CSA B45.1-2013  |
| 4) | Enameled Cast Iron and Enameled Steel Plumbing Fixtures                 | ASME A112.19.1-2008/CSA B45.2-2008  |
| 5) | Fittings:<br>Plumbing Fixture Fittings (metering valves, faucets, etc.) | ASME A112.18.1-2012/CSA B125.1-2012 |

	Suction Fittings for Use in Swimming Pools, Wading Pools, Spas, Hot Tubs and Whirlpool Bathtub Appliances	ANSI/APSP 16-2011 CSA C22.2 No. 218.1-M1989 (R2011) CSA C22.2 No. 218.2-1993 (R2008)
6)	Floor Drains and Trench Drains	ASME A112.6.3-2001 (R2007) CSA B79-2008
7)	Flushometer Bowls  Flushometers	ASME A112.19.2-2013/CSA B45.1-2013 CSA B125.3-2011 ASSE 1037-1990 CSA B125.3-2011
8)	Grease Interceptors	ASME A112.14.3-2000 (R2004)
9)	Low Consumption (1.6 gpf) Water Closets <sup>1</sup>	ASME A112.19.2-2013/CSA B45.1-2013 ASME A112.19.14-2006 (R2-11)
10)	Plastic Lavatory	CSA B45.5-2011/IAPMO Z124-2011
11)	Plastic Shower Receptors/Shower Stalls	CSA B45.5-2011/IAPMO Z124-2011
12)	Plastic Water Closets Bowls/Tanks	CSA B45.5-2011/IAPMO Z124-2011
13)	Plastic Urinals Fixtures	CSA B45.5-2011/IAPMO Z124-2011
14)	Porcelain Enameled Formed Steel Plumbing Fixtures, including Bathtub Liners	ASME A112.19.1-2008/CSA 45.2-2008
15)	Stainless Steel Plumbing Fixtures (Residential)	ASME A112.19.3-2008/CSA B45.4-2008
16)	Vitreous China Plumbing Fixtures	ASME A112.19.2-2013/CSA B45.1-2013

- |     |                                 |                                     |
|-----|---------------------------------|-------------------------------------|
| 17) | Vitreous China Nonwater Urinals | ASME A112.19.19-2006 (R2011)        |
| 18) | Whirlpool Bathtub Appliances    | ASME A112.19.7-2012/CSA B45.10-2012 |
|     |                                 | CSA C22.2 No. 218.2-1993 (R2008)    |

Agency Note:

The water pressure at each fixture installation shall meet the manufacturer's minimum recommended level for the fixture.

**Approved Standards for Plumbing  
Appliances/Appurtenances/Devices**

- |    |  |   |
|----|--|---|
| 1) | Anti-Backflow Freezeless Wall Hydrants                         | ASSE 1019-2011<br>ASME A112.18.1-2012/CSA<br>B125.1-2012  |
| 2) | Anti-Scald Control Valve                                       | ASSE 1016-2011/ASME<br>A112.1016-2011/CSA B125.16-<br>2011  |
| 3) | Anti-siphon Self-Drain Frost Proof Sillcock                    | ASSE 1019-2011<br>CSA B125.3-2012   |
| 4) | Automatic Ice Making Equipment                                 | NSF/ANSI 12-2009<br>CSA C22.2 No. 120-M1991<br>(R2008)  |
| 5) | Automatic Storage Type Water Heater Less Than<br>75,000 BTU/HR | ANSI Z21.10.1-2009/CSA 4.1-<br>2009<br>ASHRAE 90.1 2010<br>ASHRAE 90.2-2007<br>ANSI Z21.10.1a-2009/CSA 4.1a-<br>2009<br>ANSI Z21.10.1b-2011/CSA 4.1b-<br>2011 |

- 6) Back Water Valves ASME A112.14.1-2003 (R2012)  
CSA B181.1-2011 in B1800  
CSA B181.2-2011 in B1800  
CSA B182.1-2011 in B1800  
CSA B70-2012
- 7) Circulating Tank, Instantaneous ANSI Z21.10.1-2009/CSA 4.1-2009  
ANSI Z21.10.1a-2009/CSA 4.1a-2009  
ANSI Z21.10.1b-2011/CSA 4.1b-2011  
ANSI Z21.10.3-2011/CSA 4.3-2011  
ANSI Z21.13-2010/CSA 4.9-2010  
ANSI Z21.13a-2010/CSA 4.9a-2010  
ANSI Z21.13b-2012/CSA 4.9b-2012  
CSA B140.12-2003 (R2008)  
CSA C22.2 No. 110-1994 (R2009)  
UL 499-2005
- 8) Circulating Tank, Instantaneous, Automatic ANSI Z21.10.3-2011/CSA 4.3-2011  
ANSI Z21.13-2010/CSA 4.9-2010  
ANSI Z21.13a-2010/CSA 4.9a-2010  
ANSI Z21.13b-2012/CSA 4.9b-2012  
UL 174-2004  
CSA 4.1-2011  
CSA B140.12-2003 (R2008)  
CSA C22.2 No. 110-1994 (R2009)
- 9) Detergent/Chemical Feeders for Commercial Use ASSE 1055-2009  
CSA C22.2 No. 0-2010  
CSA C22.2 No. 0.4-2004 (R2009)  
CSA C22.2 No. 68-1992 (R2008)



		CSA C22.2 No. 142-M1987 (R2009)
10)	Dishwashing Machine (Commercial)	ASSE 1004-2008 ANSI Z83.21-2005/CSA C22.2 No. 168-2005 ANSI Z83.21a-2012/CSA C22.2 No. 168a-2012 CSA C22.2 No. 0-2010 CSA C22.2 No. 0.4-2004 (R2009)
11)	Dishwashing Machine (Residential)	ASSE 1006-1986 (R1989) CSA C22.2 No. 167-2008
12)	Diverters for Residential – Anti-Siphon	ASME 1112.18.1-2012/CSA B125.1-2012
13)	Double Check Detector Assembly	ASSE 1048-2011 CSA B64-2011
14)	Double Check With Atmospheric Vent	ASSE 1012-2009 CSA B64-2011
15)	Double Check Valve Assembly	ASSE 1015-2011 CSA B64-2011
16)	Drinking Fountains	ASHRAE 18-2008 (R2013) UL 399-2008 ASME A112.19.2-2013/CSA 45.1- 13
17)	Drinking Water Treatment Units – Health Effects	NSF/ANSI 53-2011a
18)	Drinking Water Treatment Units – Aesthetic Effects	NSF/ANSI 42-2011
19)	Drinking Water Treatment Chemicals	NSF/ANSI 60-2012
20)	Dual Check Valve	ASSE 1024-2004

		CSA B64-2011
21)	Duel Check Valve (Carbonated Beverage) (Relief Port Required)	ASSE 1022-2003 CSA B64-2011
22)	Food Waste Disposal (Commercial)	ASSE 1009-1990 CSA C22.2 No. 1-2010 CSA C22.2 No. 68-1992
23)	Food Waste Disposal (Residential)	ASSE 1008-2006 CSA C22.2 No. 0-2010 CSA C22.2 No. 68-2008
24)	Gas Water Heater Above 75,000 BTU	ANSI Z21.10.3-2011/CSA 4.3-2011
25)	Gas Water Heater 75,000 BTU or Less	ANSI Z21.10.1-2009/CSA 4.1-2009 ANSI Z21.10.1a-2009/CSA 4.1a-2009 ANSI Z21.10.1b-2011/CSA 4.1b-2011
26)	Gas Water Heater (Continuous Use)	ANSI Z21.10.1-2009/CSA 4.1-2009 ANSI Z21.10.1a-2009/CSA 4.1a-2009 ANSI Z21.10.1b-2011/CSA 4.1b-2011
27)	Gas Water Heater – Space Heating	ANSI Z21.10.1-2009/CSA 4.1-2009 ANSI Z21.10.1a-2009/CSA 4.1a-2009 ANSI Z21.10.1b-2011/CSA 4.1b-2011
28)	Grease Interceptors	PDI-G 101-2010 ASME A112.14.3-2000 (R2004)

29)	Handheld Showers	ASSE 1014-2005 ASSE 1016-2011/ASME A112.1016-2011/CSA B125.16-2011
30)	Home Laundry Equipment	ASSE 1007-1986 (R1992) CSA C22.2 No. 0-2010 CSA C22.2 No. 0.4-2004 (R2009)  CSA C22.2 No. 169-1997 (R2012)
31)	Hot Water Dispensers-Electrical	ASSE 1023-1979 CSA C22.2 No. 64-2010
32)	Hot Water Generating/Heat Recovery Equipment	NSF/ANSI 5-2012
33)	Ice Makers	UL 563-2009 CSA B45-2008 CSA C22.2 No. 0-2010 CSA C22.2 No. 0.4-2004 (R2009) CSA C22.2 No. 63-1993 (R2008) CSA C22.2 No. 120-M1991 (R2008)
34)	Individual Pressure Balancing In-line valves for individuals fixture fittings	ASSE 1066-1997
35)	Mixing Valves	ASSE 1016-2011/ASME
	Automatic Compensating Valves for Individual Shower and Tub/Shower Combinations	A112.1016-2011/CSA B125.16-2011
	Temperature Actuated Mixing Valves for Hot Water Distribution	ASSE 1017-2009
	Automatic Temperature Control Mixing Valves	ASSE 1069-2005
	Water Temperature Limiting Devices	ASSE 1070-2004

	Mixing Valves for Plumbed Emergency Equipment	ASSE 1071-2012
36)	Oil Fired Water Heaters	UL 732-2010 CSA B140.0-2003 (R2008) CSA B140.12-2003 (R2008) CSA C22.2 No. 0-2010 CSA C22.2 No. 3-M1988 (R2009)
37)	Pressure Relief Valve	ANSI Z21.22-1999 (R2008)/CSA 4.4-M1999 (R2008)  ANSI Z21.22a-2000 (R2008)/CSA 4.4a-2000 (R2008) ANSI Z21.22b-2001 (R2008)/CSA 4.4b-2001 (R2008)
38)	Pressurized Flushing Device	ASSE 1037-1990
39)	Reduced Pressure Detector Assembly	ASSE 1047-2011 CSA B64-2011
40)	Reduced Pressure Principle Backflow Preventer	ASSE 1013-2011 CSA B64-2011
41)	Refuse Compactors/Compactor System	NSF/ANSI 13-2012 CSA C22.2 No. 0-2010 CSA C22.2 No. 68-2008
42)	Relief Valves For Hot Water System	ANSI Z21.22-1999 (R2008)/CSA 4.1-M1999 (R2008)  ANSI Z21.22a-2000 (R2008)/CSA 4.4a-2000 (R2008) ANSI Z21.22b-2001 (R2008)/CSA 4.4b-2001 (R2008)
43)	Reverse Osmosis Drinking Water Treatment System	NSF/ANSI 58-2012

- |     |   |  |
|-----|---|--|
| 44) | Spray Type Dishwashing Machine for Commercial Use | NSF/ANSI 3-2012 CSA C22.2 No. 0-2010<br>CSA C22.2 No. 0.4-2004 (R2009)<br><br>ANSI Z83.21-2005/CSA C22.2 No. 168-2005<br>ANSI Z83.21a-2012/CSA C22.2 No. 168a-2012 |
| 45) | Trap Seal Primer Valve                            | ASSE 1018-2001<br>CSA B125.3-2012  |
| 46) | Vacuum Breakers, Anti-siphon                      | ASSE 1001-2008<br>CSA B64-2011   |
| 47) | Vacuum Breakers Hose Connection                   | ASSE 1011-2004<br>CSA B64-2011   |
| 48) | Vacuum Breaker (Laboratory Faucet)                | ASSE 1035-2008<br>CSA B64-2011   |
| 49) | Vacuum Breakers Pressure Type                     | ASSE 1020-2004<br>CSA B64-2011   |
| 50) | Vacuum Relief Valve                               | ANSI Z21.22b-2001 (R2008)<br>CSA B64-2011  |
| 51) | Vending Machine for Food/Beverage                 | NSF/ANSI 25-2012<br>CSA C22.2 No. 0-2010<br>CSA C22.2 No. 120-M1991 (R2008)<br>CSA C22.2 No. 128-1995 (R2009)<br>ASSE 1002-2008                                    |
| 52) | Water Closet Personal Hygiene Devices             | ASME A112.4.2-2009   |
| 53) | Water Closet Tank Ballcock                        | ASSE 1002-2008<br>CSA B64-2011<br>CSA B125.3-2012  |

- |     |   |  |
|-----|---|--|
| 54) | Water Hammer Arresters                    | ASSE 1010-2004                         |
| 55) | Water Heater Drain Valve                  | ASME A121.18.1-2011/CSA<br>B125.1-2011 |
| 56) | Water Pressure Reducing Valves (Domestic) | ASSE 1003-2009<br>CSA B356-2010        |
| 57) | Water Softener and Treatment Devices      | NSF/ANSI 44-2012                       |

#### **Approved Standards for Fittings**

- |    |   |  |
|----|---|--|
| 1) | Cast Iron Threaded Drainage Fittings            | ASME B16.12-2009   |
| 2) | Cast Copper Alloy Solder Pressure Fittings      | ASME B16.18-2012   |
| 3) | Cast Copper Alloy Solder Drainage Fitting (DWV) | ASME B16.23-2011   |
| 4) | Copper Fittings                                 | ASME B16.15-2011<br>ASME B16.51-2011<br>ASME B16.18-2012<br>ASME B16.22-2012<br>ASME B16.23-2011<br>ASME B16.26-2011<br>ASME B16.29-2012<br>NSF/ANSI 61-2012 |
| 5) | Forged Steel Fittings, Socket, Welded, Threaded | ASME B16.11-2011   |
| 6) | Gray Iron/Ductile Iron                          | AWWA C 110-2009<br>AWWA C 151-2009   |
| 7) | Malleable Iron                                  | ASME B 16.3-2011   |
| 8) | Plastic   | ASTM D 2466-2006<br>ASTM D 2467-2006<br>ASTM D 2564-2012<br>ASTM F409-2012<br>ASTM F438-2009<br>ASTM F439-2012   |

		CSA B137.3-2009 in B137 CSA B181.2-2011 in B1800 CSA B182.1-2011 in B1800
		CSA B137.6-2009 in B137 CSA B137.6-1999 in B137
9)	Plumbing Fixture Fittings (Metering valves, faucets, etc.)	ASME A112.18.1-2012/CSA B125.1-2012
10)	Steel	ASME B 16.9-2012 ASME B 16.11-2011
11)	Wrought Copper/Bronze Solder Pressure Fitting	ASME B 16.22-2012
12)	Wrought Copper and Wrought Copper Alloy Solder (Drainage Fittings)	ASME B16.29-2012 ASME B16.22-2012
13)	Wrought Steel Buttwelding Fittings	ASME B16.9-2012
14)	Wrought Steel Buttwelding Short Radius Ells	ASME B16.9-2012

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX A Plumbing Materials, Equipment, Use Restrictions and Applicable Standards**

**Section 890.TABLE B Minimum Number of Plumbing Fixtures**

Type of Building	All Facilities for Employee Use		Single Dwelling or Unit of Multiple Dwelling; Condo. or Apartment; or Hotel/Motel Unit
	Male	Female	
Water closets (Fixtures per person)	For 1-5 Total Employees See Section 890.810(b)(1)		1 per dwelling or unit
	1: 1-15	1: 1-15	
	2: 16-35	2: 16-35	
	3: 36-55	3: 36-55	
	4: 56-80	4: 56-80	
	5: 81-110	5: 81-110	
	Over 110, add 1 fixture per restroom for each additional 40 males/females. (See Footnote #1)		
Urinals	See footnote #2	See footnote #2	None
Lavatories <sup>3</sup> (Fixtures per person)	1: 1-15	1: 1-15	1 per dwelling or unit
	2: 16-35	2: 16-35	
	3: 36-60	3: 36-60	
	Over 60, add 1 fixture per restroom for each additional 45 males/females.		
Bathtubs/showers	1 per 10 <sup>7</sup> (If Required)	1 per 10 <sup>7</sup>	1 per dwelling or unit
Drinking fountains <sup>4</sup> (Fixtures per person)		1 per 100	None



Other Fixtures <sup>5</sup>	None	1 Double Kitchen Sink; or 1 Single Bowl – 24 inches x 21 inches x 6½ inches minimum 1 Laundry Tray or 1 Clothes Washer connection for each 10 units <sup>5</sup>
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Type of Building	Dormitories		Assembly Places: Sports Arenas, Stadiums, Convention Halls, Etc.	
	Male	Female	Male	Female
Water Closet (Fixtures per person)	1 per 10 Add 1 fixture for each additional 25 males over 10; and 1 for each additional 20 females over 8.	1 per 8	1: 1-100 2: 101-200 3: 201-400 4: 400-800	2: 1-100 3: 101-150 4: 151-200 5: 201-300 6: 301-400 7: 401-500 8: 501-650 9: 651-800
				Over 800, add 1 fixture for each additional 700 males and 1 for each 150 females. See Footnote #1
Urinals (Fixtures per person)	1 per 25 Over 150, add 1 fixture for each 50 males added; over 400, add 1 for each 200 males added. <sup>2</sup>	See Footnote #2	1: 1-100 2: 101-200 3: 201-400 4: 401-600	See Footnote #2
				Over 600, add 1 fixture for each additional 250 persons.
Lavatories <sup>3</sup> (Fixtures per person)	1 per 12 Over 12, add 1 fixture for each additional 20 males and 1 for each 15 females.	1 per 12	1: 1-200 2: 201-400 3: 401-750	1: 1-200 2: 201-400 3: 401-750

Over 750, add 1 fixture per restroom for each added 400 males/females.

Bathtubs, Showers (Fixtures per person)	1 per 8 See Footnote #13.	None
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Type of Building	Dormitories		Assembly Places: Sports Arenas, Stadiums, Convention Halls, Etc.	
	Male	Female	Male	Female
Drinking Fountains <sup>4</sup> (Fixtures per person)	1 per 75		1 per each set of male and female public restrooms (High-Low)	
Other Fixtures (Fixtures per person)	1 service sink per floor		1 service sink per floor	

Type of Building	Assembly Places: Theaters, Auditoriums, Other Facilities for Spectator Events				Mercantile Units, Malls, Stores, Etc.				
	Male		Female		Male		Female		
Water Closet (Fixtures per person)	1:	1-100	2:	1-100	1:	1-100	1:	1-50	
	2:	101-200	3:	101-150	2:	101-200	2:	51-100	
	3:	201-400	4:	151-200	3:	201-400	3:	101-150	
	4:	401-800	5:	201-300	4:	401-800	4:	151-250	
			6:	301-400			5:	251-350	
			7:	401-500			6:	351-500	
			8:	501-650			7:	501-650	
			9:	651-800			8:	651-800	
		Over 800, add 1 fixture for each additional 400 males and 1 for each 150 females. See Footnote #1					Over 800, add 1 fixture for each additional 500 males and 1 for each 150 females. See Footnote #1		

Urinals (Fixtures per person)	1: 1-100 See Footnote #2 2: 101-200 3: 201-400 4: 401-600 Over 600, add 1 fixture for each additional 300 males.	1: 51-200 See Footnote #2 2: 201-400 3: 401-600 4: 601-800 Over 800, and 1 fixture for each additional 300.
Lavatories <sup>3</sup> (Fixtures per person)	1: 1-200 1:1-200 2: 201-400 2:201-400 3: 401-750 3:401-750 Over 750, add 1 fixture per restroom for each added 400 males/females.	1: 1-200 1: 1-200 2: 201-400 2: 201-400 3: 401-750 3: 401-750 Over 750, add 1 fixture per restroom for each added 350 males/females.
Drinking Fountains <sup>4</sup> (Fixtures per person)	1: 1-100 1 High-Low for each set of male and female restrooms.	1: 1-100 1 High-Low for each set of male and female restrooms.
Other Fixtures (Fixtures per person)	1 service sink per floor	1 service sink per floor

Type of Building	Worship Places and Funeral Homes		Businesses Selling Motor Fuel to the Public <sup>10</sup>	
	Male (See Footnote #1)	Female	Male	Female
Water Closets (Fixtures per person)	1 per 250	1 per 125	1 per station	1 per station
Urinals (Fixtures per person)	1 per 250	See Footnote #2		None
Lavatories <sup>3</sup> (Fixtures per person)	1 per 125	1 per 125	1 per station	1 per station

Other Fixtures (Fixtures per person)                      1 service sink                      1 service sink where public restrooms are required.

Type of Building	Office Buildings/Public Buildings		Food Service Establishments, Pubs, Lounges, Nightclubs, and Places Serving Food or Liquid to be Consumed on the Premises <sup>8</sup>	
	Male	Female	Male	Female
Water Closet (Fixtures per person)	1: 1-15 2: 16-35 3: 36-55 4: 56-80 5: 81-110 Over 110, add 1 fixture per restroom for each additional 50 males/females. See Footnote #1	1: 1-15 2: 16-35 3: 36-55 4: 56-80 5: 81-110	1: 1-100 2: 101-300	1: 1-50 2: 51-100 3: 101-150 4: 151-300 Over 300, add 1 fixture for each additional 200 males and 1 fixture per each 100 females. See Footnotes #1.
Urinals (Fixtures per person)	See Footnote #2		1: 1-150	See Footnote #2  Over 150, add 1 fixture for each added 150 males.
Lavatories <sup>3</sup> (Fixtures per person)	1: 1-15 2: 16-35 3: 36-60 4: 61-90 5: 91-125 Over 125, add 1 fixture per restroom for each additional 50 males/females. See Footnote #1	1: 1-15 2: 16-35 3: 36-60 4: 61-90 5: 91-125	1: 1-100 2: 101-200 3: 201-400	1: 1-100 2: 101-200 3: 201-400  Over 400, add 1 fixture per restroom for each additional 200 males/females. See Footnotes #1 and #6

Drinking Fountains <sup>4</sup> (Fixtures per person)	1 per 75	See Footnote #12
Other Fixtures (Fixtures per person)	1 service sink per floor on which restrooms are located	1 service sink and 1 3-Compartment Sink as required by 77 Ill. Adm. Code 750 See Footnote #6

Type of Building	Schools-Student Use: Elementary		Schools-Student Use: Secondary, Colleges, Universities, Adult Centers, Etc.	
	Male	Female	Male	Female
Water Closets (Fixtures per person)	1: 1-20 2: 21-50 Over 50, add 1 fixture per restroom for each additional 50 persons. See Footnote #1	1: 1-20 2: 21-50	1 per 40 See Footnote #1	1 per 20
Urinals (Fixtures per person)	See Footnote #2	See Footnote #2	1 per 40 See Footnote #2	See Footnote #2
Lavatories <sup>3</sup> (Fixtures per person)	1: 1-25 2: 26-50 Over 50, add 1 fixture per restroom for each additional 50 persons. See Footnote #1	1: 1-25 2: 26-50	1 per 40 1 per exercise room	1 per 40
Drinking Fountains <sup>4</sup> (Fixtures per person)	1 per 75		1 per 75	

Other Fixtures (Fixtures per person)	1 service sink per floor and kitchen area.	1 service sink per floor and kitchen area.
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Type of Building	Day Care, Nursery and Preschool Center Toddlers 16-36 Months Excludes Infants (0-15 Months)	
	Male	Female
Water Closets (Fixtures per person)	1: 1-10 2: 11-25 3: 26-50 4: 51-75 5: 76-100 6: 101-125 7: 126-150 8: 151-175	1: 1-10 2: 11-25 3: 26-50 4: 51-75 5: 76-100 6: 101-125 7: 126-150 8: 151-175
	Over 175: Add a fixture per restroom for each additional 50 males/females. See Footnotes #1 and #11	
Urinals (Fixtures per person)	See Footnote #2	See Footnote #2
Lavatories <sup>3</sup> (Fixtures per person)	1: 1-10 2: 11-25 3: 26-50 4: 51-75 5: 76-100 6: 101-125 7: 126-150 8: 151-175	1: 1-10 2: 11-25 3: 26-50 4: 51-75 5: 76-100 6: 101-125 7: 126-150 8: 151-175
	Over 175: Add a fixture per restroom for each additional 50 males/females. See Footnotes #1 and #11	
Drinking Fountains <sup>4</sup> (Fixtures per person)	1 per 75	

Other Fixtures 1 service sink per facility and kitchen area.

Type of Building	Hospital Individual Room	Hospitals Ward Room
Water Closets (Fixtures per person)	1 per room	1 per 8 patients
Urinals (Fixtures per person)	None	None
Lavatories <sup>3</sup> (Fixtures per person)	1 per room	1 per 8 patients
Bathtubs, Showers (Fixtures per person)	1 per room	1 per 8 patients
Drinking Fountains <sup>4</sup> (Fixtures per person)	None	1 per 75
Other Fixtures (Fixtures per person)	1 service sink per floor	1 service sink per floor

Type of Building	Institutional – Other than Hospitals or Penal Institutions (on each floor)		Penal Institutions For Prisoner Use Cell or Dormitories
	Male	Female	
Water Closets (Fixtures per person)	1 per 25	1 per 20	1 per cell 1 per 8 in a dormitory
Urinals (Fixtures per person)	1 per 50 (#2)	See Footnote #2	None
Lavatories <sup>3</sup>	1 per 10	1 per 10	1 per cell

(Fixtures per person)			1 per 8 prisoners in a dormitory
Bathtubs, Showers (Fixtures per person)	1 per 8	1 per 8	1 per 8 prisoners
Drinking Fountains <sup>4</sup> (Fixtures per person)		1 per 75	1 per 75 prisoners
Other Fixtures (Fixtures per person)	1 service sink per floor		1 service sink per floor

#### Instructions/Footnotes For Table B

The numbers of fixtures required for employees are included in the numbers shown in Table B for all building types/uses except Hospital Rooms, Penal Institutions, and Other Institutions. The entry in Table B entitled "All Facilities for Employee Use" shall be used to determine the minimum number of fixtures required for employees in hospitals, penal/other institutions, and all other buildings/facilities that do not appear in Table B.

Questions concerning the minimum numbers of fixtures required for building types not listed in Appendix A, Table B, shall be referred to the Department in writing prior to construction for a decision concerning the minimum numbers (and types) of plumbing fixtures required.

#### Footnotes:

1. The figures shown are the minimum number of fixtures required for the number of persons indicated or any fraction of that number. Based on the total occupant load determined, the number of fixtures shall be calculated assuming 50 percent of the occupants are male and 50 percent are female. The total male/female occupants shall be calculated first; then the number of fixtures for each (males/females) shall be determined from the appropriate table.
2. Urinals may be substituted for water closets for males, not to exceed half of the required total number of water closets. Comparable fixtures for females may be substituted for water closets for females, not to exceed half of the required total number of water closets.
3. 18 lineal inches of wash sink or 18 inches of a circular basin, when provided with water outlets for space of this kind, shall be considered equivalent to one lavatory.



4. Whenever a drinking fountain is required by this Part, bottled drinking water or a water dispensing faucet (water station) may be substituted for a drinking fountain, provided drinking water is accessible to the public. When bottled drinking water is provided in lieu of a drinking fountain, the bottled water used must be commercially sealed in accordance with the Illinois Bottled Water Act and with the Illinois Safe Bottled Water Act.
5. The kitchen sink and laundry tray or connection for the washer are not required for the hotel/motel unit.
6. In addition to providing separate hand-washing facilities in the kitchen for employees, all food service establishments shall provide a minimum of one service/utility sink and one three-compartment sink to sanitize dishes and eating utensils; however, a mechanical dishwasher may be substituted for a three-compartment sink to sanitize dishes and utensils. (See 77 Ill. Adm. Code 750.)
7. Bathtubs/showers that are required for employees by OSHA requirements, collective bargaining agreements, etc., shall be provided at the rate of one per 10 employees.
8. Food Service Establishments with no more than 10 combined employees and seats (for patrons) at any one time need not provide public restrooms, provided that the employee restrooms are accessible and made available to the public.
9. Bed and Breakfast facilities with more than five sleeping rooms shall meet the minimum requirements of this Part for Hotel/Motel units. Bed and Breakfast facilities with five or fewer sleeping rooms, in compliance with the Bed and Breakfast Act, need not provide individual restrooms for each sleeping room.
10. Businesses that sell motor fuel but do not have any employees working as attendants are not required to provide public restrooms.
11. In Day Care Centers providing restroom training facilities for occupants ages three and younger where continuous adult supervision is provided, restrooms are not required to be separated into facilities for males and females, and are allowed to contain multiple lavatories and water closets as required by this Part. Public restrooms shall be required for everyone over the age of three separate from the restroom training facilities as required by this Part.
12. Drinking water shall be provided in accordance with Section 890.720(f).

13. The total number of bathing facilities shall include one bathtub for males and one bathtub for females or one individual user restroom with a bathtub.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX A Plumbing Materials, Equipment, Use Restrictions and Applicable Standards**

**Section 890.TABLE C Minimum Air Gaps for Plumbing Fixtures**

	Minimum Air Gap (Inches)	
	When <u>Not</u> Affected by Near Wall <sup>1</sup>	When Affected by Near Wall <sup>2</sup>
Laboratories and other fixtures with effective opening not greater than ½ inch diameter.	1	1½
Drinking water fountains, single orifice not greater than 7/16 (0.437) inch diameter or multiple orifices having total area of 0.150 square inches (area of circle 7/16 inch diameter).	1	1½
Sink, laundry trays, goose neck bath faucets and other fixtures with effective opening not greater than one inch diameter.	1½	2¼
Stills, sterilizers and other appliances, fixtures, devices and water and waste connections used for preparation of sterile material.	2	3

Over rim bath fillers and other fixtures with effective openings not greater than one inch diameter.

2

3

Effective openings greater than one inch.

2 X Diameter of effective opening

3 X Diameter of effective opening

- <sup>1</sup> Side walls, ribs or other similar obstructions do not affect air gaps when spaced from inside edge of spout opening a distance greater than three times the diameter of the effective opening for a single wall, or a distance greater than four times the diameter of the effective opening for two intersecting walls.
- <sup>2</sup> Vertical walls, ribs or similar obstructions extending from the water surface or to above the horizontal plane of the spout opening require a greater air gap when spaced closer to the nearest inside edge of spout opening than specified in Footnote 1 above. The effect of three or more such vertical walls or ribs has not been determined. In such cases, the air gap shall be measured from the top of the wall.

**Section 890.APPENDIX A Plumbing Materials, Equipment, Use Restrictions and Applicable Standards**

**Section 890.TABLE D Minimum Water Distribution Pipe Size**

<u>Type of Fixture or Device (See Footnotes 1 &amp; 2)</u>	<u>Pipe Size (inches)</u>
Bathtubs	1/2
Combination sink and tray	1/2
Drinking fountain	3/8
Dishwasher (domestic)	1/2
Dishwasher (commercial)	3/4
Kitchen sink (residential)	1/2
Kitchen sink (commercial) 1 Faucet	1/2
Kitchen sink (commercial) 2 Faucets	3/4
Lavatory	3/8
Laundry tray (1, 2 or 3 compartment)	1/2
Shower (single head)	1/2
Sinks (service/slop)	1/2
Sinks (flushing rim)	3/4
Urinal (flush tank)	1/2
Urinal (direct flush valve)	3/4
Urinal (siphon jet)	1
Washing machine (automatic)	1/2
Water closet (tank type)	3/8
Water closet (flush valve type)	1
Hose bibbs	1/2
Wall hydrant	1/2

<sup>1</sup> For fixtures not listed, the minimum supply branch shall be installed in the diameters required for similar type fixtures.

- <sup>2</sup> The fixture supply pipe shall be extended to within 12 inches of the point of connection to fixture and be within the same area and physical space as the point of connection to the fixture.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX A Plumbing Materials, Equipment, Use Restrictions and Applicable Standards**

**Section 890.TABLE E Drainage Fixture Units (D.F.U.) Per Fixture Group**

Type of Fixture	D.F.U./Fixture (Load)	Minimum Size of Trap <sup>2</sup> (inches)
Bathroom groups:		
1 tank water closet, 1 lavatory with 1¼ inch trap and 1 bathtub <sup>1</sup> or shower stall	7	1¼
1 water closet with flush valve, 1 lavatory with 1¼ inch trap and 1 bathtub or shower <sup>1</sup>	11	
Bathtub (with or without overhead shower) <sup>1</sup>	2	1½
Bathtub <sup>1</sup>	3	2
Bidet	2	1½
Clothes washer, automatic	3	2
Dental unit or cuspidor	1	1¼
Drinking fountain	½	1
Dishwasher <sup>2</sup> , domestic	2	1½
Floor drains	See Appendix A, Table F	2
Lavatories:		
Lavatory	1	1¼
Lavatory	2	1½
Lavatory, barber, beauty parlor	2	1½

Lavatory, dental	1	1¼
Lavatory, surgeon's	2	1½
Laundry tray (1 or 2 compartments)	2	1½
Type of Fixture	D.F.U./Fixture (Load)	Minimum Size of Trap <sup>2</sup> (inches)
Shower stall	3	2
Showers (group) per head <sup>2</sup>	3	2
Sinks:		
Combination sink and tray	3	1½
Combination sink and tray with food-disposal unit	4 Separate Traps	1½
Flushing rim (with valve)	8	3
Kitchen sink, domestic	2	1½
Kitchen sink, domestic, with food-waste grinder	3 Separate Traps	1½
Pot, scullery, etc. <sup>2</sup>	4	1½
Service (P trap)	3	3
Service (P trap)	2	2
Surgeon's	3	1½
Wash sink <sup>2</sup> (circular or multiple), each set of faucets	2	1½
Urinals:		
Urinal, pedestal, siphon jet, blowout	8	2
Urinal stall	3	2



Urinal, wall integral trap	3	2
Urinal, wall P trap, exposed	2	1½
Water closets:		
Tank operated	4	3
Valve-operated	8	3

<sup>1</sup>A shower head over a bathtub does not increase the fixture value.

<sup>2</sup>See Appendix A: Table F and Section 890.1330(b) for method of determining unit values of fixtures not listed in this Table or for rating of devices with intermittent flows.

(Source: Amended at 28 Ill. Reg. 4215, effective February 18, 2004)

**Section 890.APPENDIX A Plumbing Materials, Equipment, Use Restrictions and Applicable Standards****Section 890.TABLE F Fixtures Not Listed in Table E**

<u>Fixture Drain or Trap Size</u>	<u>Drainage Fixture Unit Valve (D.F.U.)</u>
1¼ inches and smaller	1
1½ inches	2
2 inches	3
2½ inches	4
3 inches	5
4 inches	6

**Section 890.APPENDIX A Plumbing Materials, Equipment, Use Restrictions and Applicable Standards**

**Section 890.TABLE G Building Drains**

Diameter of Pipe (inches)	Maximum Number of Drainage Fixture Units (D.F.U.) That May be Connected to Any Portion of the Building Drain			
	Grade per Foot			
	$\frac{1}{16}$ Inch	$\frac{1}{8}$ Inch	$\frac{1}{4}$ Inch	$\frac{1}{2}$ Inch
4	–	180	216	250
5	–	390	480	575
6	–	700	840	1,000
8	1,400	1,600	1,920	2,300
10	2,500	2,900	3,500	4,200
12	3,900	4,600	5,600	6,700
15	7,000	8,300	10,000	12,000

**Section 890.APPENDIX A Plumbing Materials, Equipment, Use Restrictions and Applicable Standards**

**Section 890.TABLE H Horizontal Fixture Branches and Stacks**

Maximum Number of Drainage Fixture Units (D.F.U.)  
That May be Connected to:

Diameter of Pipe (inches)	Any Horizontal Fixture Branch	One Stack of 3 Stories in Height or 3 Intervals	More than 3 Stories in Height	
			Total for Stack	Total at One Story or Branch Interval
1¼	1	2	2	1
1½	3	4	8	2
2	6	10	24	6
2½	12	20	42	9
3	20 <sup>1</sup>	30 <sup>2</sup>	60 <sup>2</sup>	16 <sup>1</sup>
4	100	240	500	90
5	360	540	1,100	200
6	620	960	1,900	350
8	1,400	2,200	3,600	600
10	2,500	3,800	5,600	1,500
12	3,900	6,000	8,400	1,500
15	7,000	—	—	—

<sup>1</sup> Not over two water closets.

<sup>2</sup> Not over six water closets, or more than two per branch interval or per floor.

**Section 890.APPENDIX A Plumbing Materials, Equipment, Use Restrictions and Applicable Standards****Section 890.TABLE I Allowed Distance from Fixture Trap to Vent**

<u>Size of Fixture Drains (Inches)</u>	<u>Maximum Allowed Distance from Trap to Vent</u>
1¼	2 ft. 6 in.
1½	3 ft. 6 in.
2	4 ft. 0 in.
3	5 ft. 0 in.
4 and larger	6 ft. 0 in.

**Section 890.APPENDIX A Plumbing Materials, Equipment, Use Restrictions and Applicable Standards**

**Section 890.TABLE J Size of Vent Stacks**

<u>Number of Bathroom Groups</u>	<u>Diameter of Vent Stacks (Inches)</u>
1 or 2	2
3 to 9	3
10 to 16	4

**Section 890.APPENDIX A Plumbing Materials, Equipment, Use Restrictions and Applicable Standards**

**Section 890.TABLE K Size and Length of Vents**

Size of Soil or Waste Stack	Fixture Units Connected	Diameter of Vent Required (Inches)								
		1¼	1½	2	2½	3	4	5	6	8
		Maximum Length of Vent (Feet)								
1¼	2	30								
1½	8	50	150							
1½	10	30	100							
2	12	30	75	200						
2	20	26	50	150						
2½	42		30	100	300					
3	10		30	100	200	600				
3	30			60	200	500				
3	60			50	60	400				
4	100			35	100	260	1,000			
4	200			30	90	250	900			
4	500			20	70	180	700			
5	200				35	80	350	1,000		
5	500				30	70	300	900		
5	1,100				20	50	200	700		
6	350				25	50	200	400	1,300	
6	620				15	30	125	300	1,100	
6	960					24	100	250	1,000	
6	1,900					20	70	200	700	
8	600						50	150	500	1,300
8	1,400						40	100	400	1,200
8	2,200						30	80	350	1,100
9	3,600						25	60	250	800
10	1,000							75	125	1,000
10	2,500							50	100	500
10	3,800							30	80	350
10	5,600							25	60	250

Agency Note: Per Section 890.1580(e), no more than 20 percent of the maximum developed length may be installed in the horizontal position. Vent piping serving floor drains shall be installed in such a manner as to minimize horizontal vent distances.

**Section 890.APPENDIX A Plumbing Materials, Equipment, Use Restrictions and Applicable Standards**

**Section 890.TABLE L Horizontal Circuit and Loop Vent Sizing Table**

Line	Soil or waste pipe diam. (in.)	Fixture Units (max. number)	Diameter of circuit or loop vent (in.)					
			1½	2	2½	3	4	5
Maximum Horizontal Length (ft.)								
1	1½	10	20					
2	2	12	15	40				
3	2	20	10	30				
4	3	10		20	40	100		
5	3	30			40	100		
6	3	60			16	80		
7	4	100		7	20	52	200	
8	4	200		6	18	50	180	
9	4	500			14	36	140	
10	5	200				16	70	200
11	5	1,100				10	40	140



**Section 890.APPENDIX A Plumbing Materials, Equipment, Use Restrictions and Applicable Standards**

**Section 890.TABLE M Load Values Assigned to Fixtures**

Fixture	Occupancy	Type of Supply Control	Load Values in Water (Supply Fixture Units)		
			Cold	Hot	Total
Water Closet	Public/Private	Flush Valve	10	–	10
Water Closet	Public/Private	Flush Tank	3	–	3
Urinal	Public	1" Flush Valve	10	–	10
Urinal	Public	¾" Flush Valve	5	–	5
Urinal	Public	Flush Tank	3	–	3
Lavatory	Public	Faucet	1	1	2
Bathtub	Public	Faucet	3	3	4
Shower Head	Public	Mixing Valve	2	2	3
Service Sink	Offices, etc.	Faucet	2	2	3
Kitchen Sink	Hotel/Restaur.	Faucet	3	3	4
Drinking Fountain	Office, etc.	3/8" Valve	0.25	–	0.25
Lavatory	Private	Faucet	0.75	0.75	1
Bathtub	Private	Faucet	1.5	1.5	2
Shower Stall	Private	Mixing Valve	1	1	2
Kitchen Sink	Private	Faucet	1.5	1.5	2
Laundry Trays (1 to 3)	Private	Faucet	2	2	3
Dishwashing Machine	Private	Automatic		-1	1
Laundry Machine (8 lb)	Private	Automatic	1.5	1.5	2
Laundry Machine (16 lb)	Public/ General	Automatic	3	3	4

Agency Notes: For fixtures not listed, loads shall be assumed by comparing the fixtures to one listed using water in similar quantities and at similar rates. The assigned loads for fixtures with both cold and hot water supplies are given for separate cold and hot water loads and for total load.

Where a unit of local government or the community public water supply does not require

separate water service lines for irrigation or similar systems that are likely to impose continuous demands (e.g., lawn sprinkler or air conditioning systems), the following rule applies: estimate the continuous demand (in gallons per minute) for outlets/systems separately from the intermittent demand from the fixtures listed in this table, and add this amount to the demand of the fixtures (in gallons per minute).

Fire sprinkler systems are exempt from this table.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX A Plumbing Materials, Equipment, Use Restrictions and Applicable Standards**

**Section 890.TABLE N Water Supply Fixture Units (WSFU) for a Supply System with Flush Tanks Water Closets**

WSFU	Demand (GPM)	Pipe Size (Inches)	Pressure Loss (PSI/100' of Pipe)	Velocity (Ft./Sec.)	Meter Size (Inches)
2	2	1/2"	4.2	2.7	5/8"
4	3	1/2"	8.7	4.2	5/8"
6	5	1/2"	22.5	7.0	5/8"
8	6.5	3/4"	6.3	4.3	5/8"
10	8	3/4"	9.0	5.4	3/4"
12	9.2	3/4"	11.5	6.1	3/4"
14	10.4	3/4"	15.0	6.9	3/4"
16	11.6	3/4"	18.0	7.7	3/4"
20	14	1"	7.2	5.6	3/4"
25	17	1"	10.0	6.6	3/4"
30	20	1"	13.6	8.0	1"
35	22.5	1 1/4"	5.8	5.7	1"
40	25	1 1/4"	7.0	6.3	1"
45	27	1 1/4"	8.2	6.9	1"
50	29	1 1/4"	9.5	7.4	1"
60	32	1 1/2"	5.0	5.8	1 1/2"
70	35	1 1/2"	6.2	6.4	1 1/2"
80	38	1 1/2"	7.0	7.2	1 1/2"
90	41	1 1/2"	8.0	7.5	1 1/2"
100	43.5	1 1/2"	8.7	7.8	2"
120	48	2"	2.7	5.0	2"
140	52.5	2"	3.1	5.4	2"
160	57	2"	3.6	5.8	2"
180	61	2"	3.9	6.1	2"
200	65	2"	4.5	6.6	2"

225	70	2"	5.2	7.1	2"
250	75	2"	6.0	7.7	3"
275	80	2½"	2.6	5.5	3"
300	85	2½"	2.9	5.8	3"
350	95	2½"	3.5	6.5	3"
400	105	2½"	4.2	7.1	3"
450	115	2½"	5.0	8.0	3"
500	125	3"	2.3	5.9	3"
600	145	3"	3.1	6.8	4"
750	170	3"	4.0	8.0	4"
1000	208	4"	1.5	5.7	4"
1250	240	4"	1.9	6.4	4"
1500	267	4"	2.3	7.0	4"
1750	294	4"	2.8	7.8	4"
2000	320	6"	0.36	3.7	6"

Agency Notes:

Where a unit of local government or the community public water supply does not require separate water service lines for irrigation or similar systems that are likely to impose continuous demands (e.g., lawn sprinkler or air conditioning systems), the following rule applies: estimate the continuous demand (in gallons per minute) for outlets/systems separately from the intermittent demand from the above fixtures, and add this amount to the demand of the fixtures (in gallons per minute).

Meter and meter yoke sizes shown in this table shall apply only to those jurisdictions or governmental units where local ordinances or community public water supply requirements do not prescribe specific sizes of meters or meter yokes. Where local ordinances or community public water supply requirements cover sizing, those requirements shall be followed.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX A Plumbing Materials, Equipment, Use Restrictions and Applicable Standards**

**Section 890.TABLE O Water Supply Fixture Units (WSFU) for a Supply System with Flushometer Water Closets**

WSFU	Demand (GPM)	Pipe Size (Inches)	Pressure Loss (PSI/100' of Pipe)	Velocity (Ft./Sec.)	Meter Size (Inches)
10	27	1¼"	8.3	6.8	¾"
12	28.6	1¼"	9.2	7.2	¾"
14	30.2	1¼"	10	7.9	¾"
16	31.8	1¼"	11	8.0	¾"
20	35	1½"	6.0	6.4	¾"
25	38	1½"	7.0	6.9	1"
30	41	1½"	8.0	7.4	1"
35	43.8	1½"	8.8	8.0	1"
40	46.5	2"	2.5	4.7	1"
45	49	2"	2.7	5.1	1"
50	51.5	2"	2.9	5.4	1½"
60	55	2"	3.4	5.8	1½"
70	58.5	2"	3.7	6.0	1½"
80	62	2"	4.0	6.2	1½"
90	64.8	2"	4.6	6.5	1½"
100	67.5	2"	5.0	6.8	1½"
120	72.5	2"	5.6	7.2	2"
140	77.5	2"	6.3	8.0	2"
160	82.5	2½"	2.7	5.7	2"
180	87	2½"	3.0	6.1	2"
200	91.5	2½"	3.4	6.4	2"
225	97	2½"	3.7	6.8	2"
250	101	2½"	4.0	7.1	3"
275	106	2½"	4.2	7.3	3"
300	110	2½"	4.6	7.6	3"
350	119	3"	2.1	5.5	3"
400	126	3"	2.3	5.9	3"

450	138	3"	2.7	6.3	3"
500	145	3"	3.0	6.8	3"
600	160	3"	3.6	7.4	4"
750	178	4"	1.1	4.7	4"
1000	208	4"	1.5	5.6	4"
1250	240	4"	1.9	6.4	4"
1500	267	4"	2.3	7.0	4"
1750	294	4"	2.8	7.8	4"
2000	321	6"	0.4	3.7	6"

Agency Notes:

Where a unit of local government or the community public water supply does not require separate water service lines for irrigation or similar systems that are likely to impose continuous demands (e.g., lawn sprinkler or air conditioning systems), the following rule applies: estimate the continuous demand (in gallons per minute) for outlets/systems separately from the intermittent demand from the above fixtures, and add this amount to the demand of the fixtures (in gallons per minute).

Meter and meter yoke sizes shown in this table shall apply only to those jurisdictions or governmental units where local ordinances or community public water supply requirements do not prescribe specific sizes of meters or meter yokes. Where local ordinances or community public water supply requirements cover such sizing, those requirements shall be followed.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX A Plumbing Materials, Equipment, Use Restrictions and Applicable Standards**

**Section 890.TABLE P Demand at Individual Water Outlets**

Demand at Individual Water Outlets

Type of Outlet	Demand (g.p.m.)
Ordinary Lavatory Faucet	2.0
Self Closing Lavatory Faucet	2.5
Sink Faucet, $\frac{3}{8}$ " or $\frac{1}{2}$ "	4.5
Sink Faucet, $\frac{3}{4}$ "	6.0
Bath Faucet, $\frac{1}{2}$ "	5.0
Shower Head, $\frac{1}{2}$ "	5.0
Laundry Faucet, $\frac{1}{2}$ "	5.0
Ballcock in Water Closet Flush Tank	3.0
1" Flush Valve (25 psi flow pressure)	35.0
1" Flush Valve (15 psi flow pressure)	27.0
$\frac{3}{4}$ " Flush Valve (15 psi flow pressure)	15.0
Drinking Fountain Jet	0.75
Dishwashing Machine (domestic)	4.0
Laundry Machine (8 to 16 pounds)	4.0
Aspirator (operating room or laboratory)	2.5

(Source: Amended at 22 Ill. Reg. 21540, effective December 1, 1998)

**Section 890.APPENDIX A Plumbing Materials, Equipment, Use Restrictions and Applicable Standards**

**Section 890.TABLE Q Allowance in Equivalent Length of Pipe for Friction Loss in Valves and Fittings**

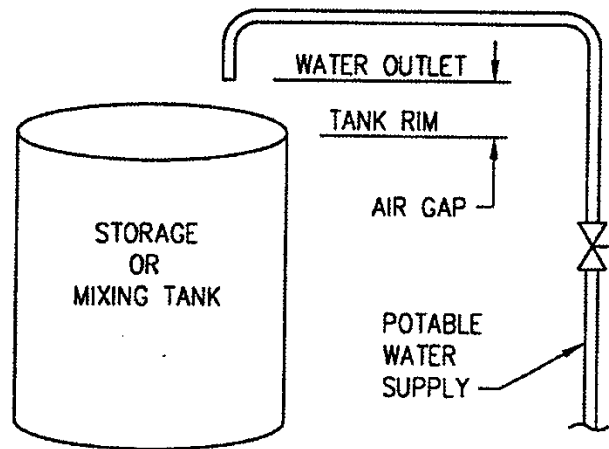
The following applies to all types of material approved for potable water distribution:

Valve or Fitting	Equivalent Feet of Pipe for Various Pipe Sizes							
	½"	¾"	1"	1¼"	1½"	2"	2½"	3"
45° ell (wrought)	0.5	0.5	1.0	1.0	2.0	2.0	3.0	4.0
90° ell (wrought)	0.5	1.0	1.0	2.0	2.0	2.0	2.0	3.0
Tee, Run (wrought)	0.5	0.5	0.5	0.5	1.0	1.0	2.0	–
Tee, Branch (wrought)	1.0	2.0	3.0	4.0	5.0	7.0	9.0	–
45° ell (cast)	0.5	1.0	2.0	2.0	3.0	5.0	8.0	11.0
90° ell (cast)	1.0	2.0	4.0	5.0	8.0	11.0	14.0	18.0
Tee, Run (cast)	0.5	0.5	0.5	1.5	1.0	2.0	2.0	2.0
Tee, Branch (cast)	2.0	3.0	5.0	7.0	9.0	12.0	16.0	20.0
Compression Stop	13.0	21.0	30.0	–	–	–	–	–
Globe Valve	–	–	–	53.0	66.0	90.0	–	–
Gate Valve	–	–	1.0	1.0	2.0	2.0	2.0	2.0



**Section 890.APPENDIX B Illustrations for Subpart A****Section 890.ILLUSTRATION A Air Gap Drawing #1**

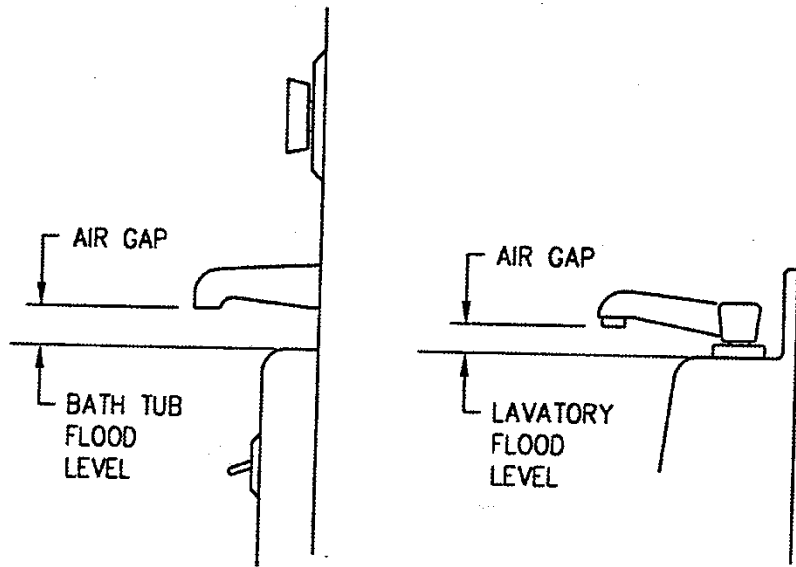
(Referenced in Section 890.120, Definition of "Air Gap.")



**Section 890.APPENDIX B Illustrations for Subpart A**

**Section 890.ILLUSTRATION B Air Gap Drawing #2**

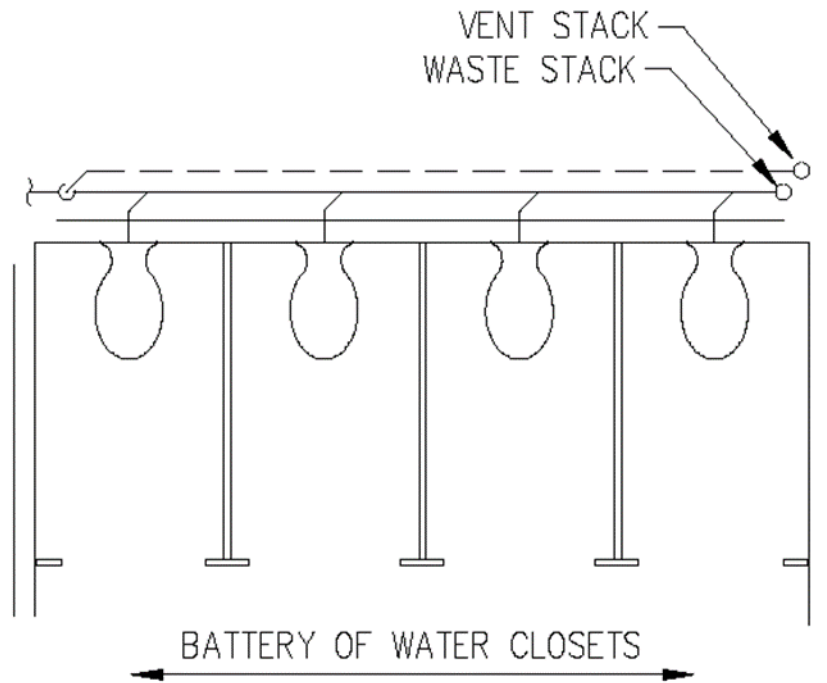
(Referenced in Section 890.120, Definition of "Air Gap.")



**Section 890.APPENDIX B Illustrations for Subpart A**

**Section 890.ILLUSTRATION C Battery of Fixtures**

(Referenced in Section 890.120, Definition of "Battery of Fixtures.")

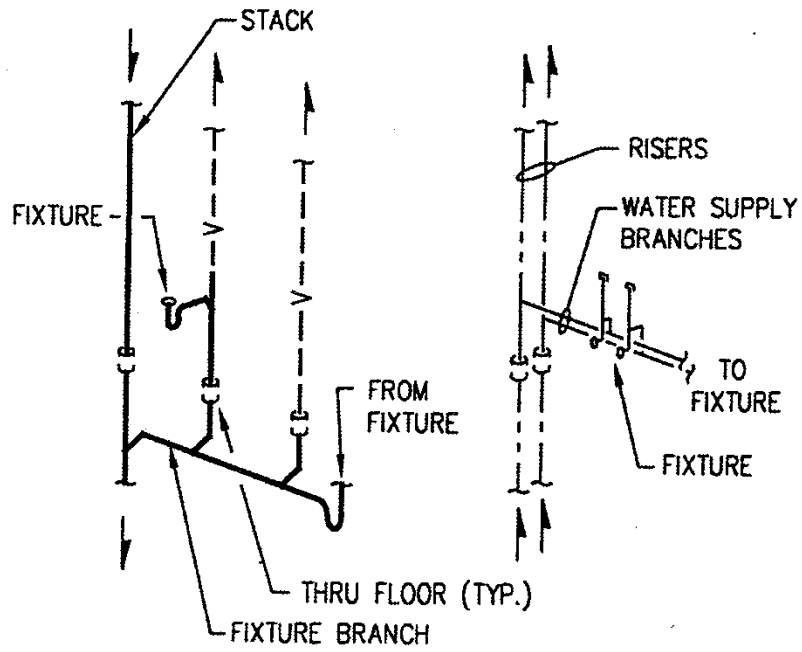


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX B Illustrations for Subpart A**

**Section 890.ILLUSTRATION D Branch**

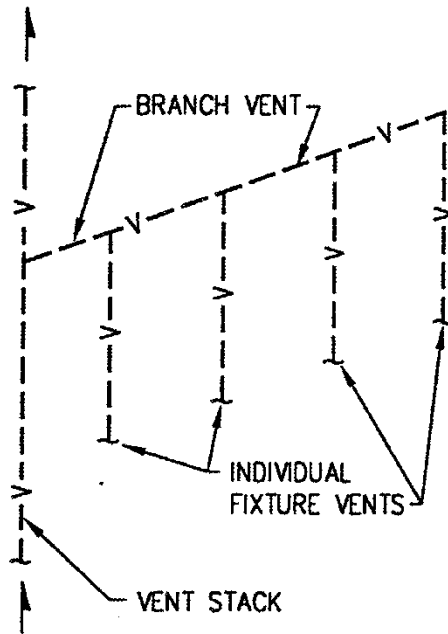
(Referenced in Section 890.120, Definition of "Branch.")



**Section 890.APPENDIX B Illustrations for Subpart A**

**Section 890.ILLUSTRATION E Branch Vent**

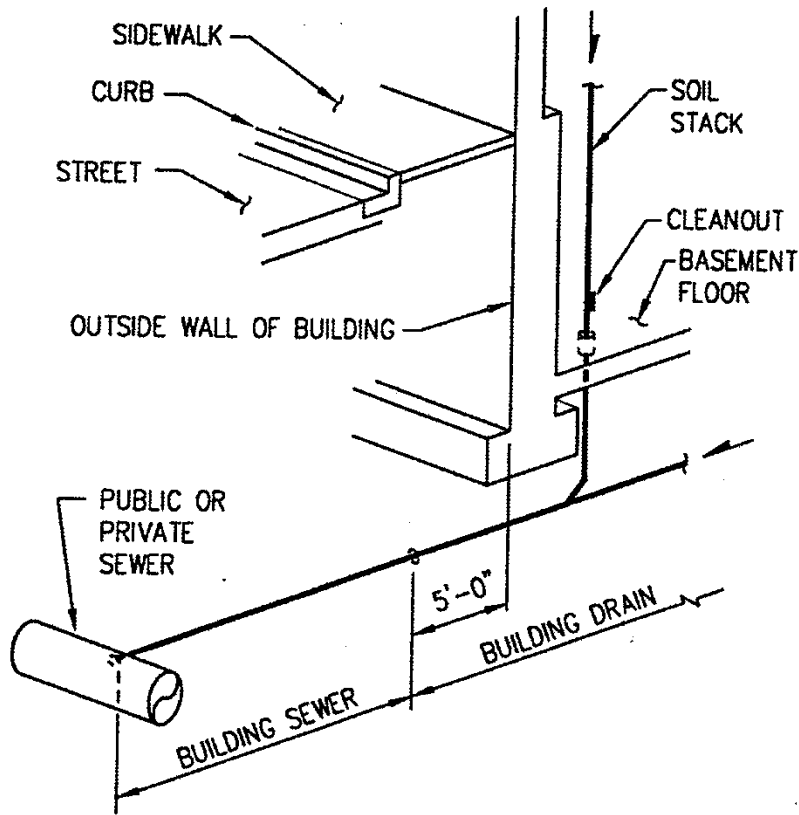
(Referenced in Section 890.120, Definition of “Branch Vent.”)



**Section 890.APPENDIX B Illustrations for Subpart A**

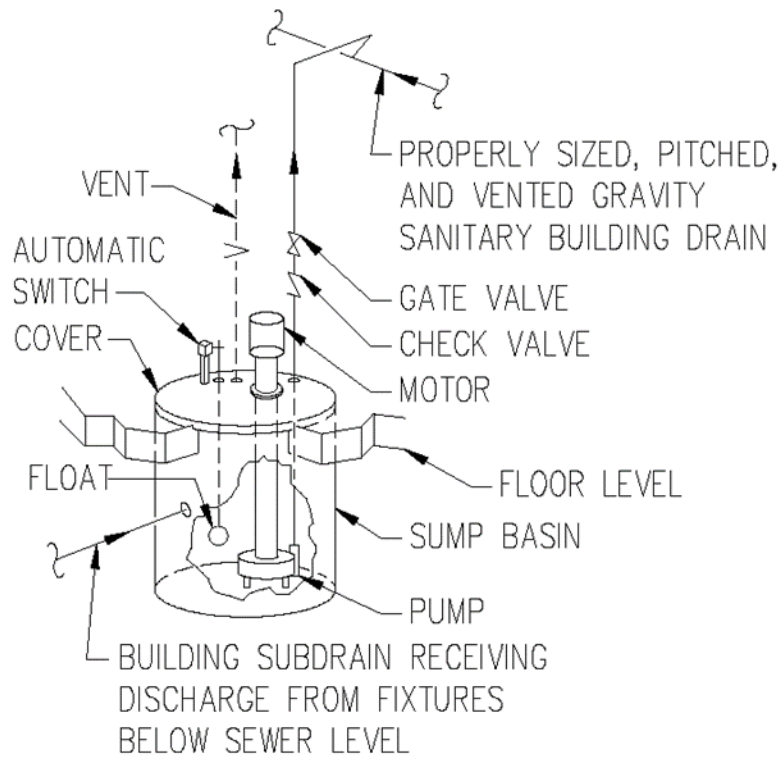
**Section 890.ILLUSTRATION F Building Drain**

(Referenced in Section 890.120, Definition of "Building Drain.")



**Section 890.APPENDIX B Illustrations for Subpart A****Section 890.ILLUSTRATION G Building Sub-Drain**

(Referenced in Section 890.120, Definition of "Building Sub-Drain.")

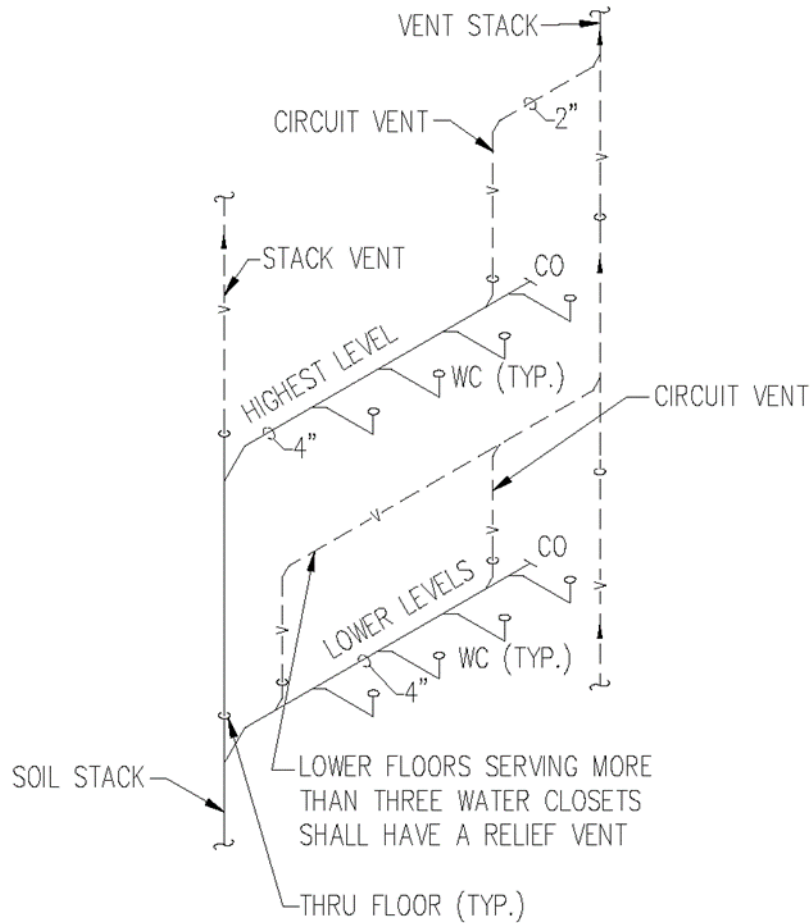


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX B Illustrations for Subpart A**

**Section 890.ILLUSTRATION H Circuit Vent**

(Referenced in Section 890.120, Definition of "Circuit Vent.")



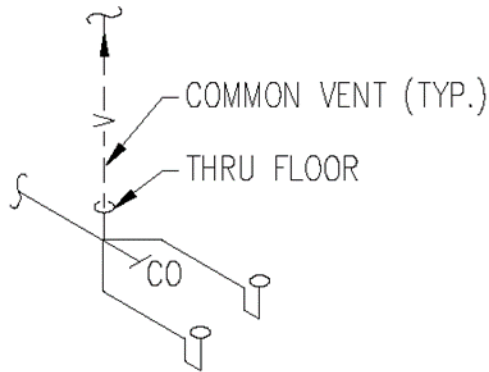
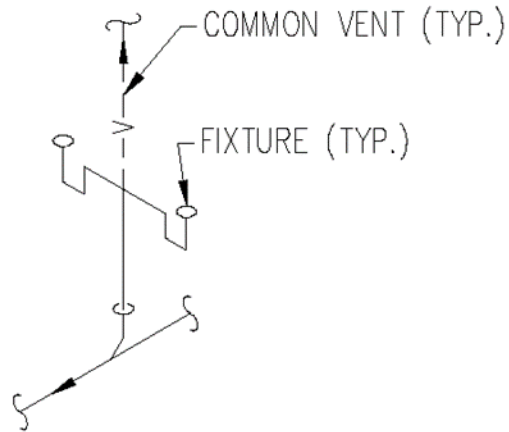
(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)



**Section 890.APPENDIX B Illustrations for Subpart A**

**Section 890.ILLUSTRATION I Common Vent**

(Referenced in Section 890.120, Definition of "Common Vent.")

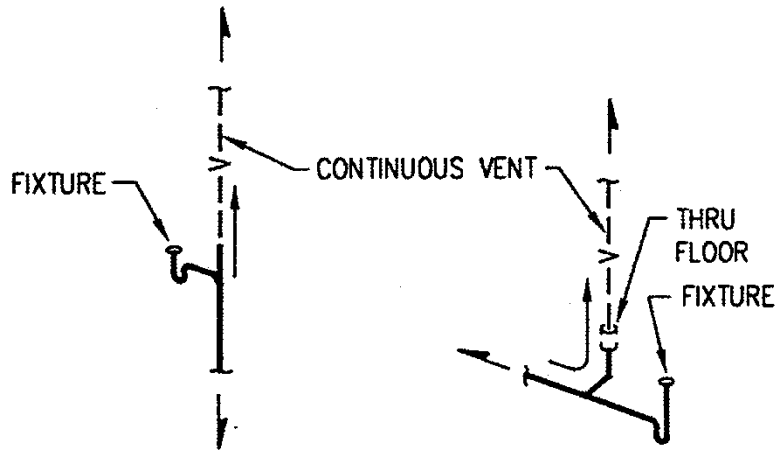


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX B Illustrations for Subpart A**

**Section 890.ILLUSTRATION J Continuous Vent**

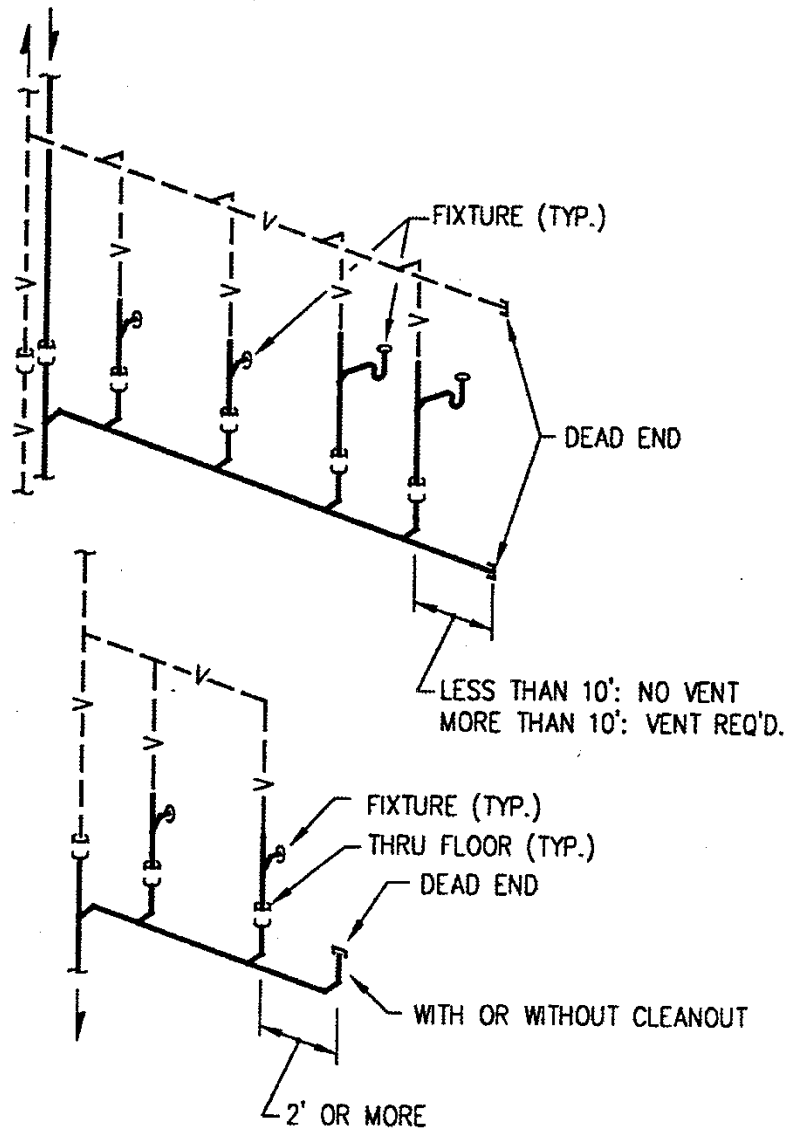
(Referenced in Section 890.120, Definition of "Continuous Vent.")



**Section 890.APPENDIX B Illustrations for Subpart A**

**Section 890.ILLUSTRATION K Dead End**

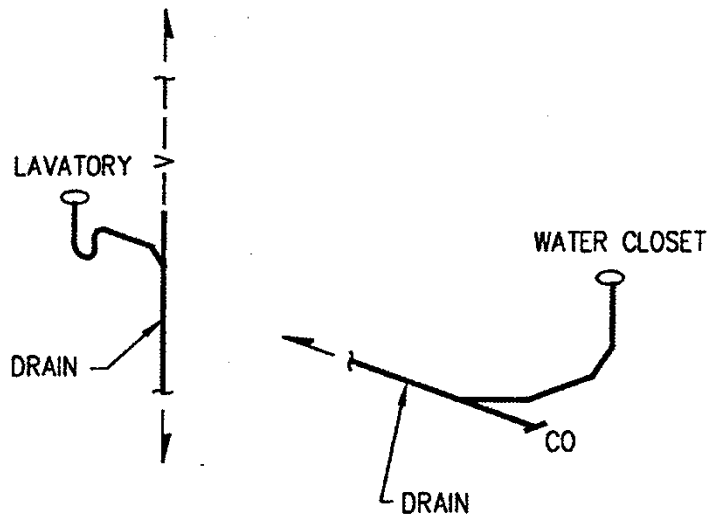
(Referenced in Section 890.120, Definition of "Dead End.")



**Section 890.APPENDIX B Illustrations for Subpart A**

**Section 890.ILLUSTRATION L Drain**

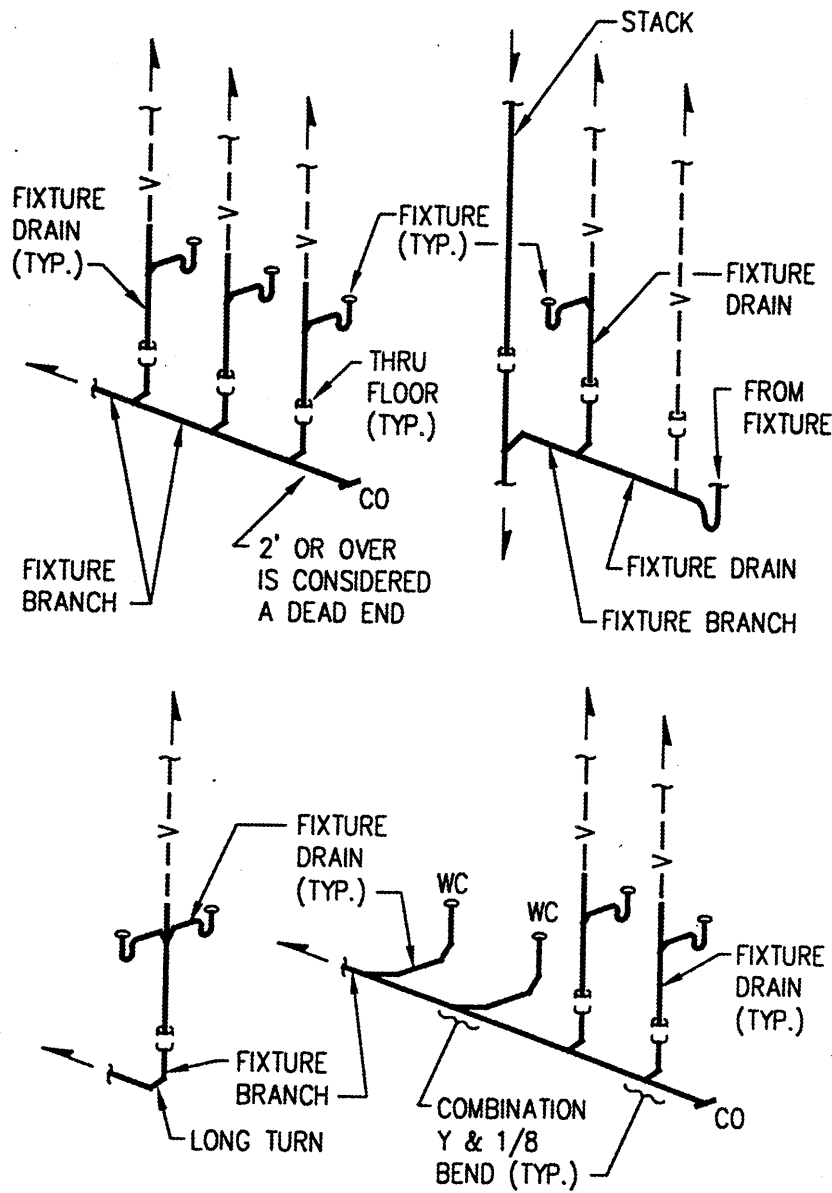
(Referenced in Section 890.120, Definition of "Drain.")



**Section 890.APPENDIX B Illustrations for Subpart A**

**Section 890.ILLUSTRATION M Fixture Drain**

(Referenced in Section 890.120, Definition of "Fixture Drain.")



**Section 890.APPENDIX B Illustrations for Subpart A**

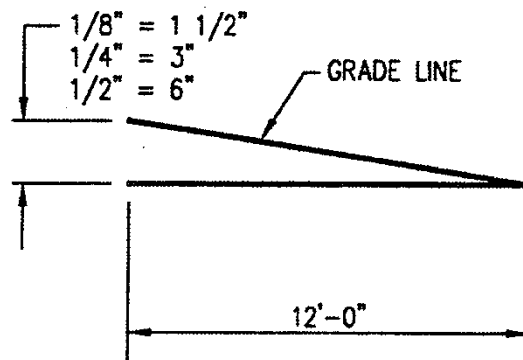
**Section 890.ILLUSTRATION N Flush Valve (Repealed)**

(Source: Repealed at 28 Ill. Reg. 4215, effective February 18, 2004)

**Section 890.APPENDIX B Illustrations for Subpart A**

**Section 890.ILLUSTRATION O Grade**

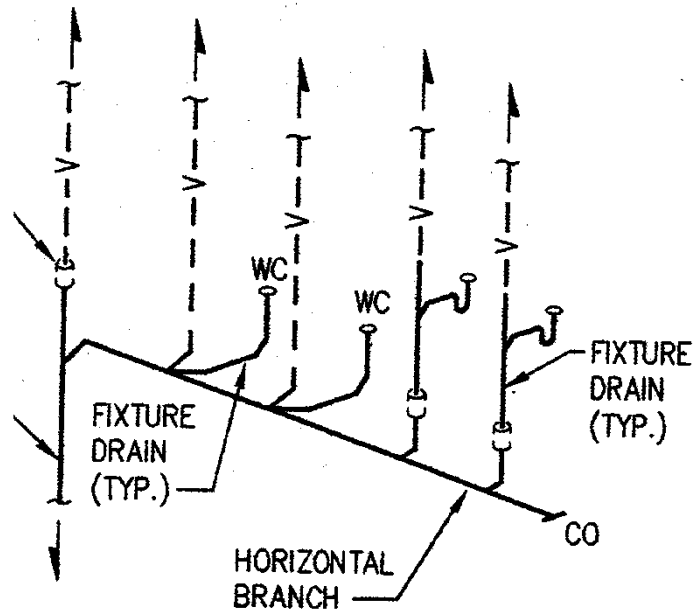
(Referenced in Section 890.120, Definition of "Grade.")



**Section 890.APPENDIX B Illustrations for Subpart A**

**Section 890.ILLUSTRATION P Horizontal Branch**

(Referenced in Section 890.120, Definition of "Horizontal Branch.")

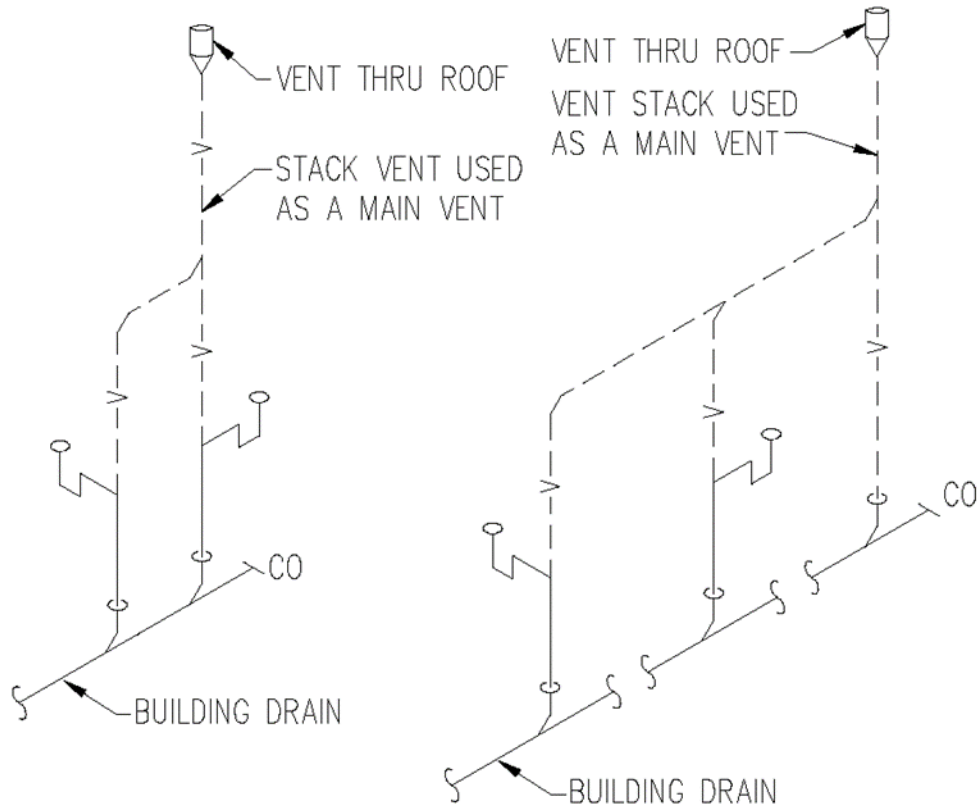




**Section 890.APPENDIX B Illustrations for Subpart A**

**Section 890.ILLUSTRATION Q Main Vent**

(Referenced in Section 890.120, Definition of "Main Vent.")



(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX B Illustrations for Subpart A**

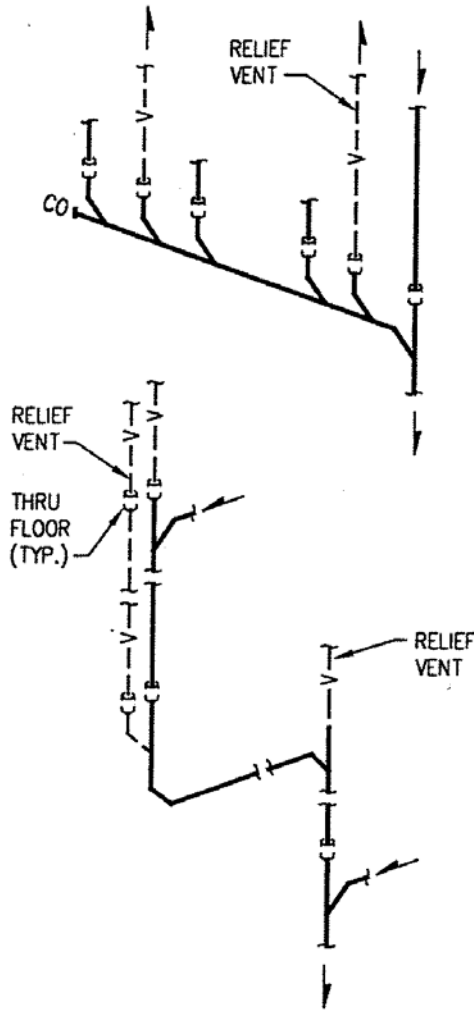
**Section 890.ILLUSTRATION R Quarter Bend (Repealed)**

(Source: Repealed at 28 Ill. Reg. 4215, effective February 18, 2004)

**Section 890.APPENDIX B Illustrations for Subpart A**

**Section 890.ILLUSTRATION S Relief Vent**

(Referenced in Section 890.120, Definition of "Relief Vent.")



**Section 890.APPENDIX B Illustrations for Subpart A**

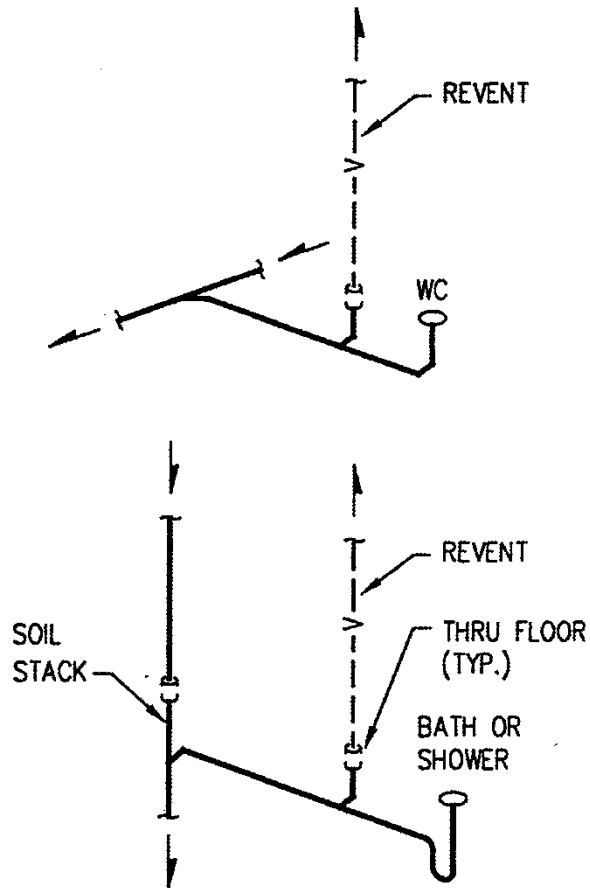
**Section 890.ILLUSTRATION T Return Offset (Repealed)**

(Source: Repealed at 28 Ill. Reg. 4215, effective February 18, 2004)

**Section 890.APPENDIX B Illustrations for Subpart A**

**Section 890.ILLUSTRATION U Revent Pipe**

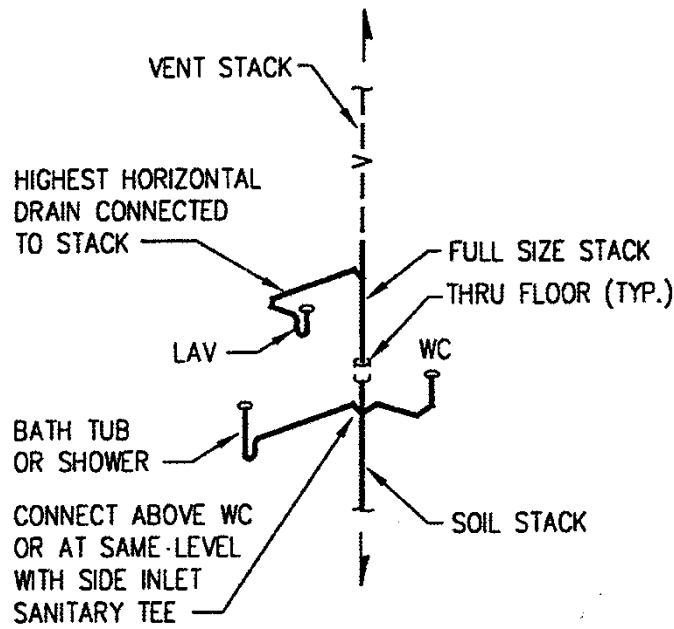
(Referenced in Section 890.120, Definition of "Revent Pipe.")



**Section 890.APPENDIX B Illustrations for Subpart A**

**Section 890.ILLUSTRATION V Stack Vent**

(Referenced in Section 890.120, Definition of "Stack Vent.")

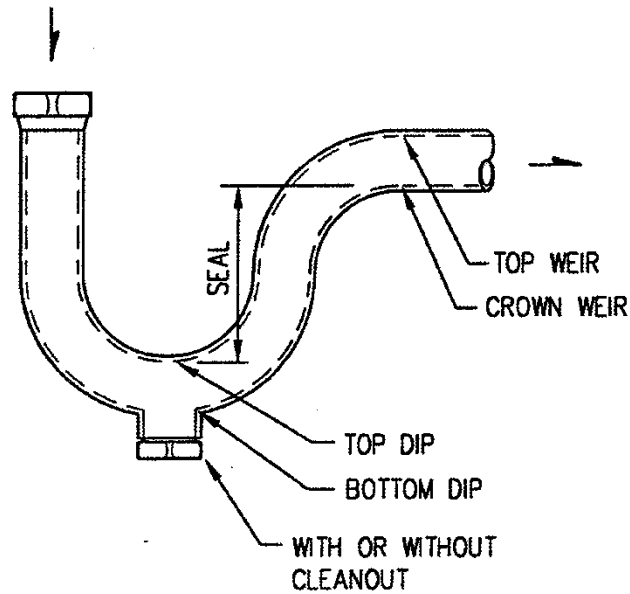


**Section 890.APPENDIX B Illustrations for Subpart A**

**Section 890.ILLUSTRATION W Trap**

(Referenced in Section 890.120, Definition of "Trap.")

(Referenced in Section 890.120, Definition of "Trap Seal.")



**Section 890.APPENDIX B Illustrations for Subpart A**

**Section 890.ILLUSTRATION X Vent Stack (Repealed)**

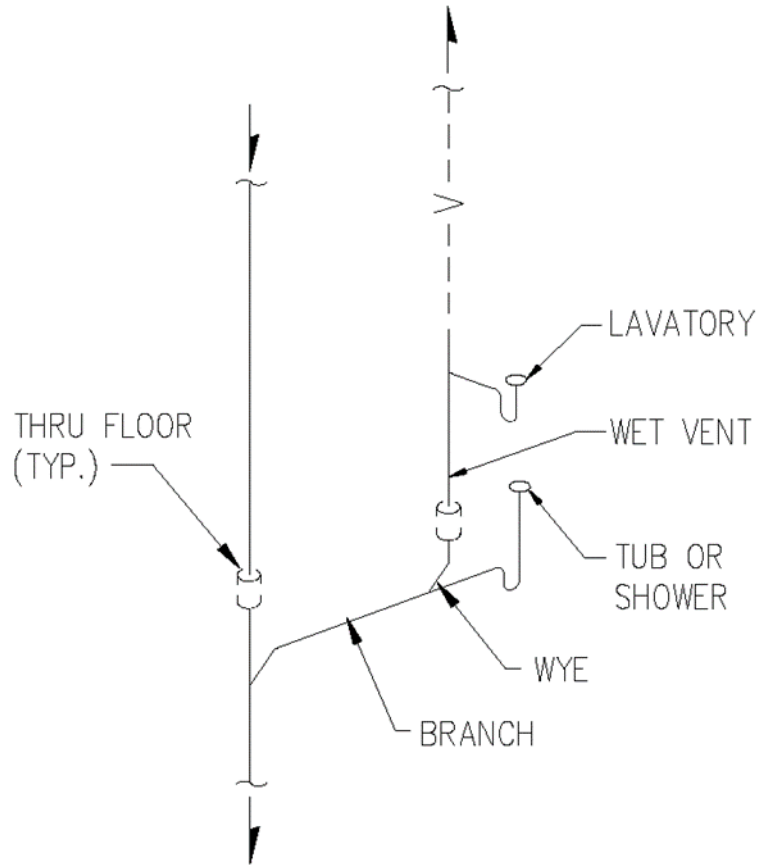
(Source: Repealed at 38 Ill. Reg. 9940, effective April 24, 2014)



**Section 890.APPENDIX B Illustrations for Subpart A**

**Section 890.ILLUSTRATION Y Wet Vent**

(Referenced in Section 890.120, Definition of "Wet Vent.")

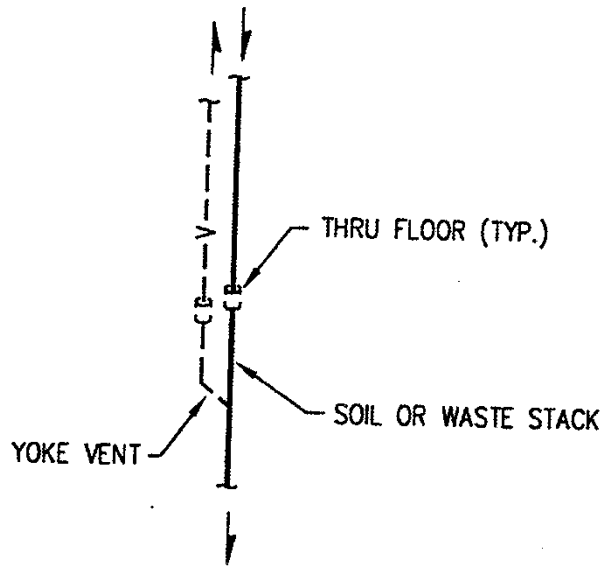


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX B Illustrations for Subpart A**

**Section 890.ILLUSTRATION Z Yoke Vent**

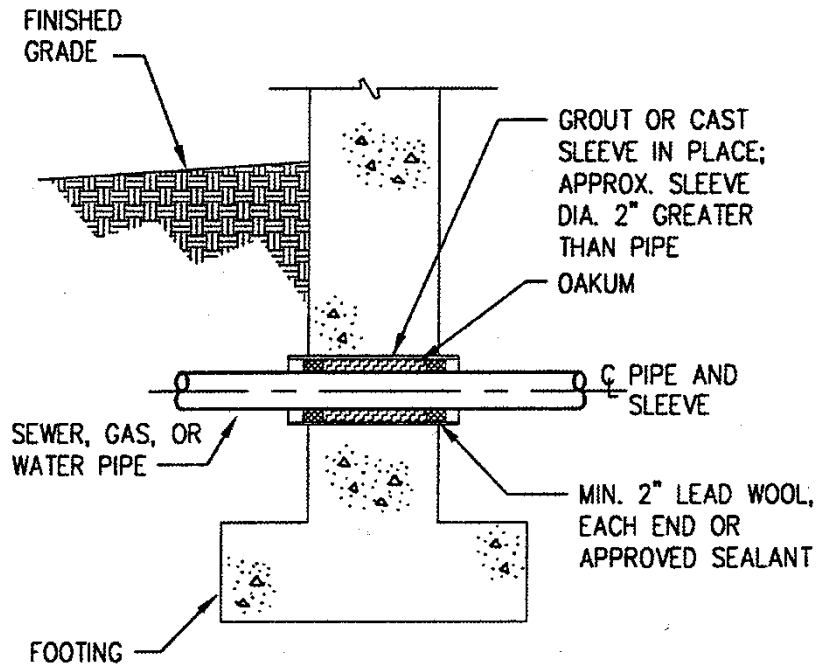
(Referenced in Section 890.120, Definition of "Yoke Vent.")



**Section 890.APPENDIX B Illustrations for Subpart A**

**Section 890.ILLUSTRATION AA Sleeves**

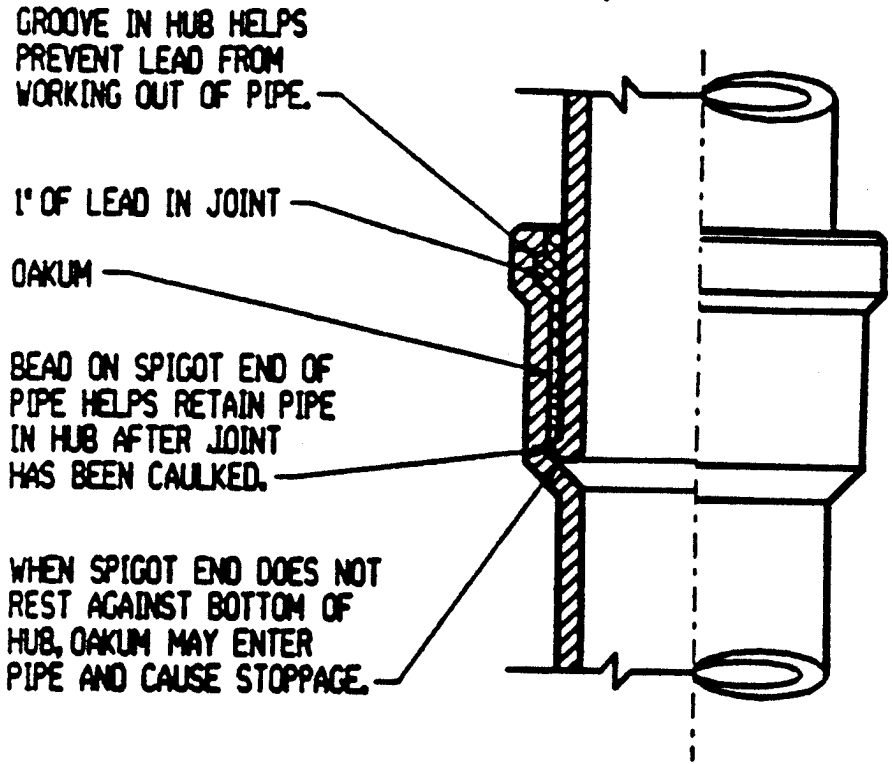
(Referenced in Section 890.180(c) and (d))



Section 890.APPENDIX C Illustrations for Subpart C

Section 890.ILLUSTRATION A Caulked Joints

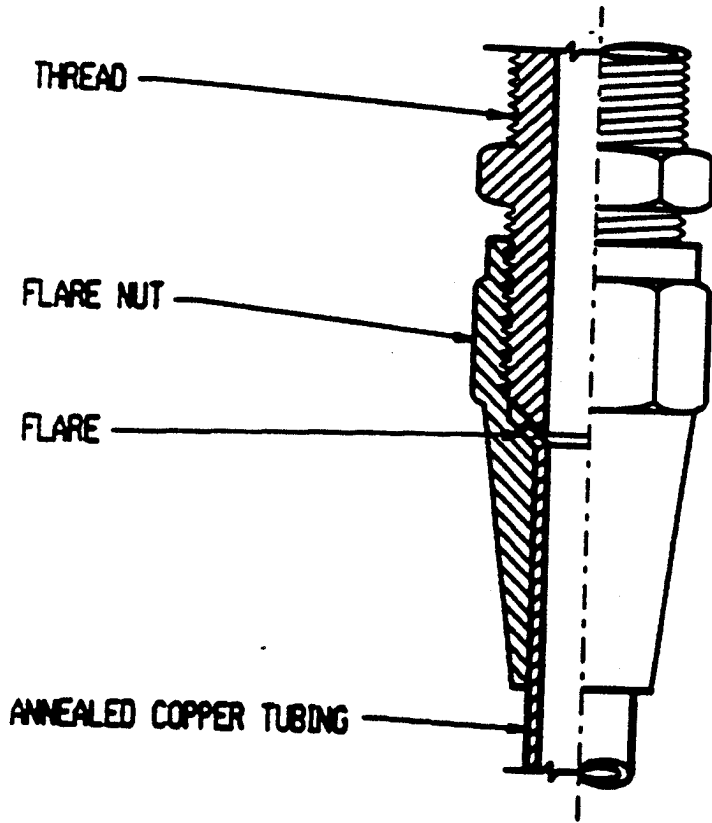
(Referenced in Section 890.320(a))



**Section 890.APPENDIX C Illustrations for Subpart C**

**Section 890.ILLUSTRATION B Flared Joints**

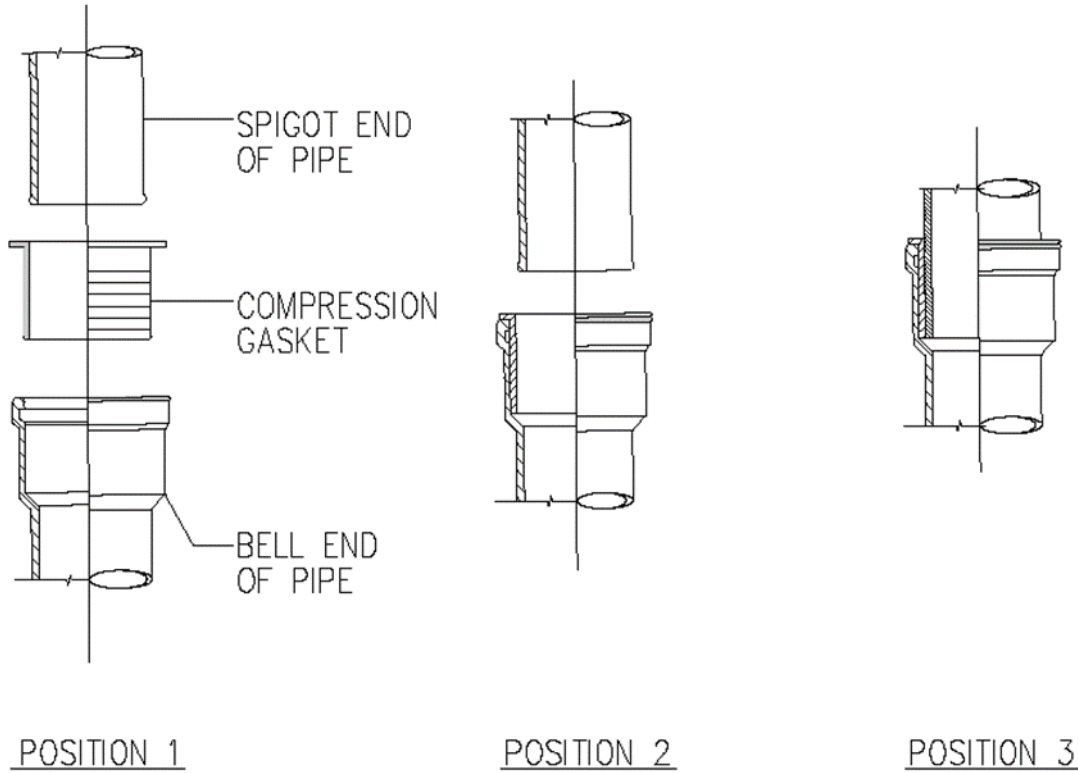
(Referenced in Section 890.320(e))



**Section 890.APPENDIX C Illustrations for Subpart C**

**Section 890.ILLUSTRATION C Positions of Application for Compression Type Joints**

(Referenced in Section 890.320(o)(1))

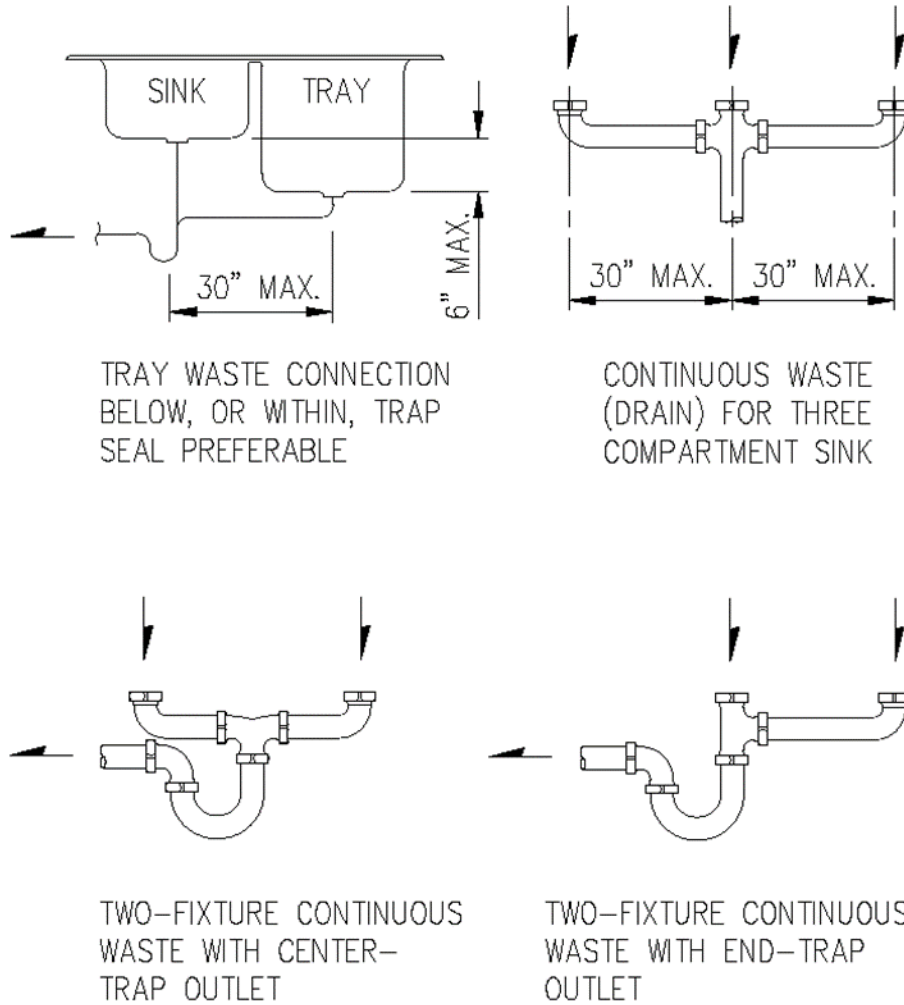


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX D Illustrations for Subpart D**

**Section 890.ILLUSTRATION A Fixture Traps**

(Referenced in Section 890.410(a))

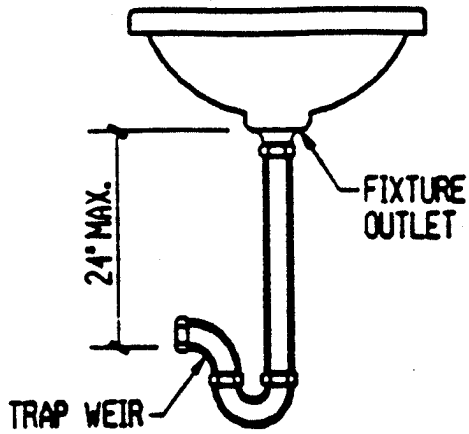


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX D Illustrations for Subpart D**

**Section 890.ILLUSTRATION B Distance of Trap to Fixture**

(Referenced in Section 890.410(b))

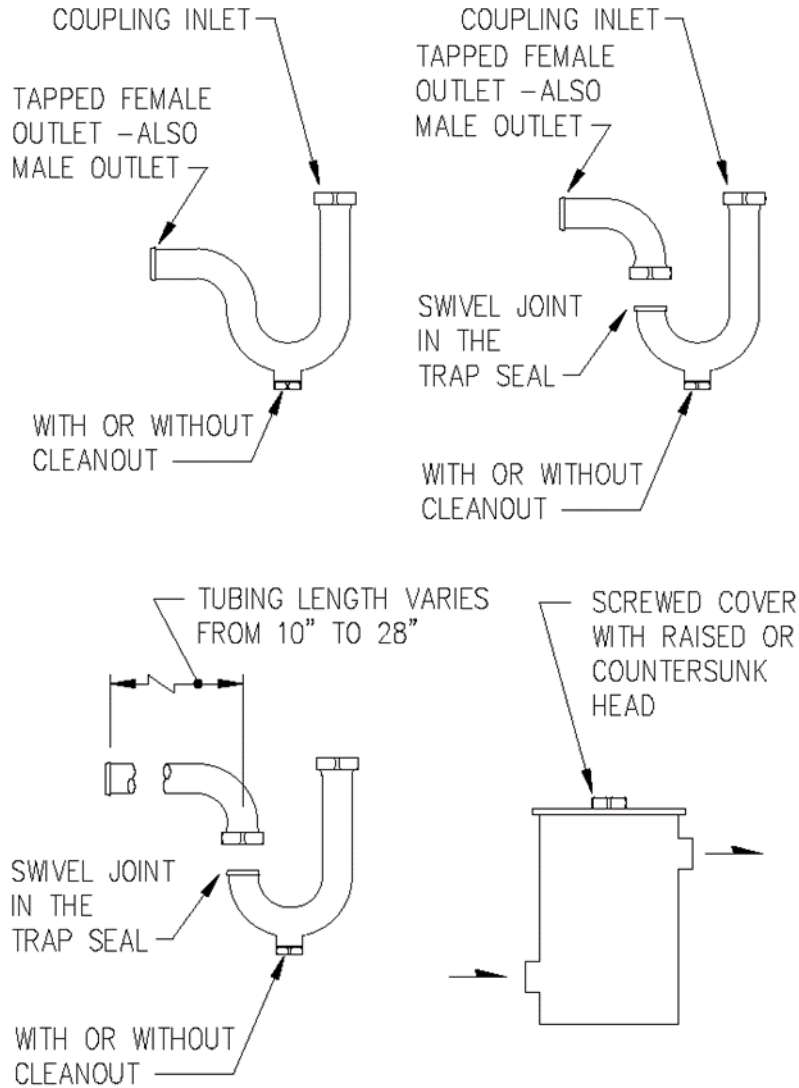




**Section 890.APPENDIX D Illustrations for Subpart D**

**Section 890.ILLUSTRATION C Types of Traps**

(Referenced in Section 890.410(d))

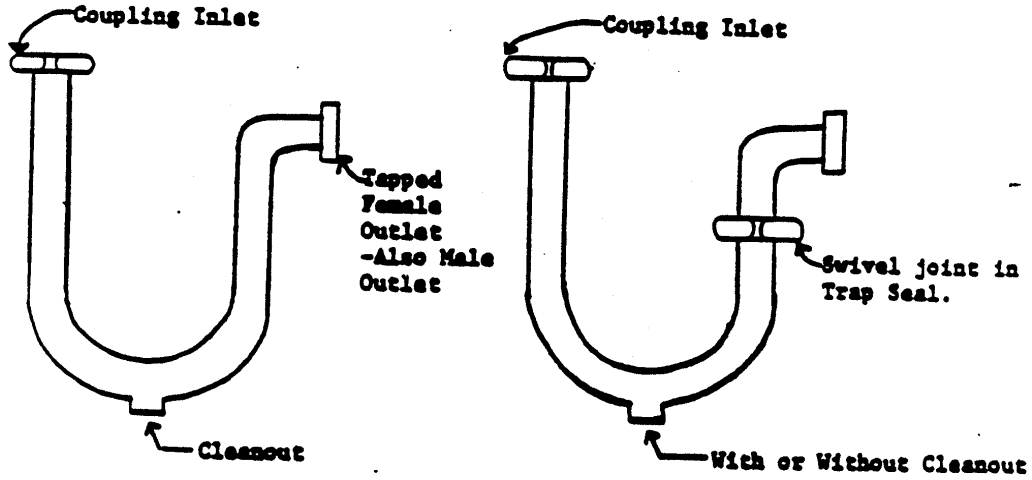


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX D Illustrations for Subpart D**

**Section 890.ILLUSTRATION D Trap Cleanouts**

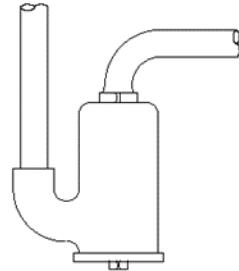
(Referenced in Section 890.410(g))



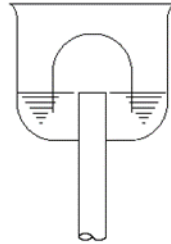
**Section 890.APPENDIX D Illustrations for Subpart D**

**Section 890.ILLUSTRATION E Prohibited Traps**

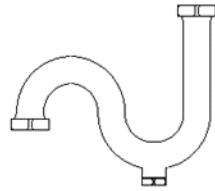
(Referenced in Section 890.410(k))



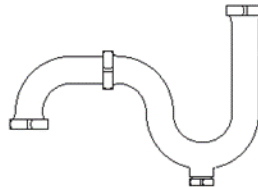
ANTI-SIPHON TRAP



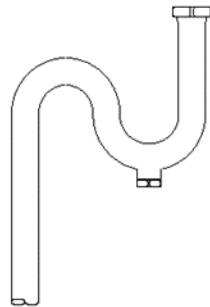
BELL TRAP



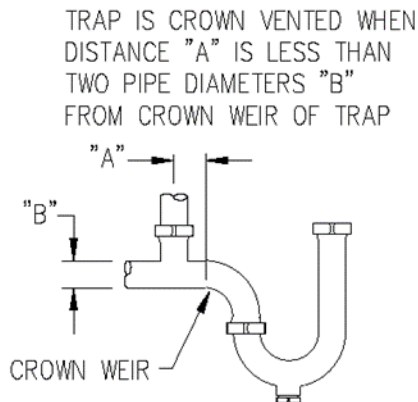
FULL "S" TRAP



WITH STREET ELBOW



BENT TUBE FULL "S" TRAP



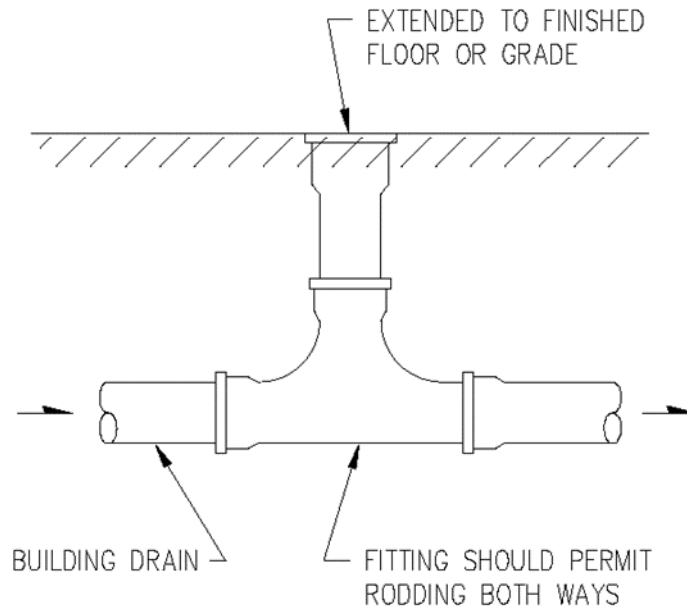
CROWN VENTED TRAP

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX D Illustrations for Subpart D**

**Section 890.ILLUSTRATION F Underground Drainage**

(Referenced in Section 890.420(c))

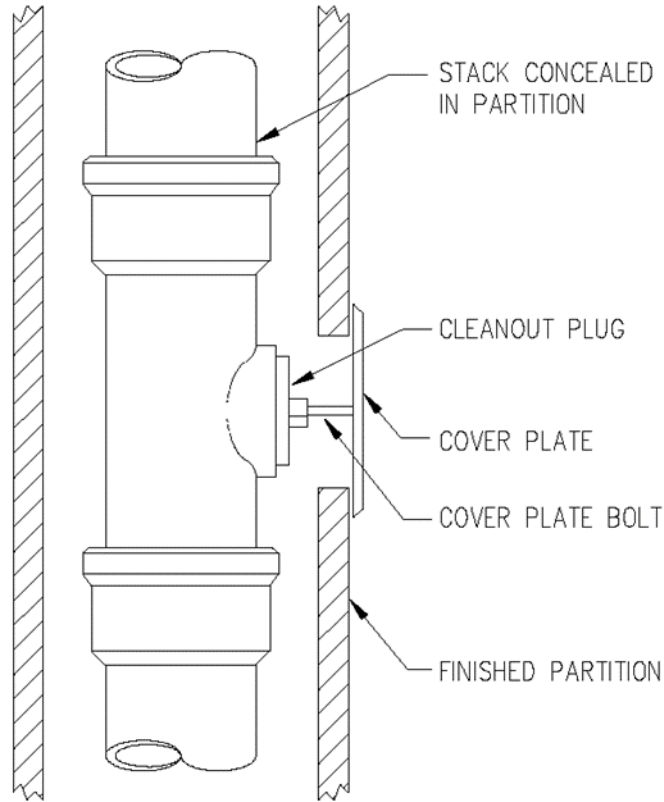


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX D Illustrations for Subpart D**

**Section 890.ILLUSTRATION G Concealed Piping**

(Referenced in Section 890.420(d))

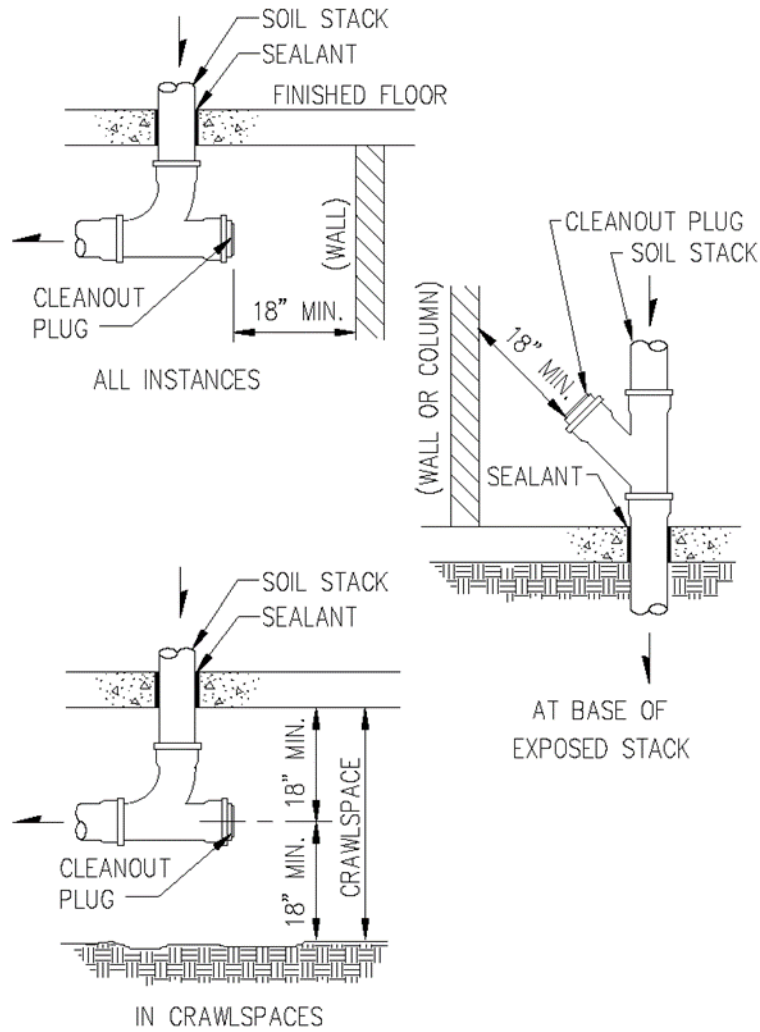


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX D Illustrations for Subpart D**

**Section 890.ILLUSTRATION H Cleanout Clearance**

(Referenced in Section 890.420(j))

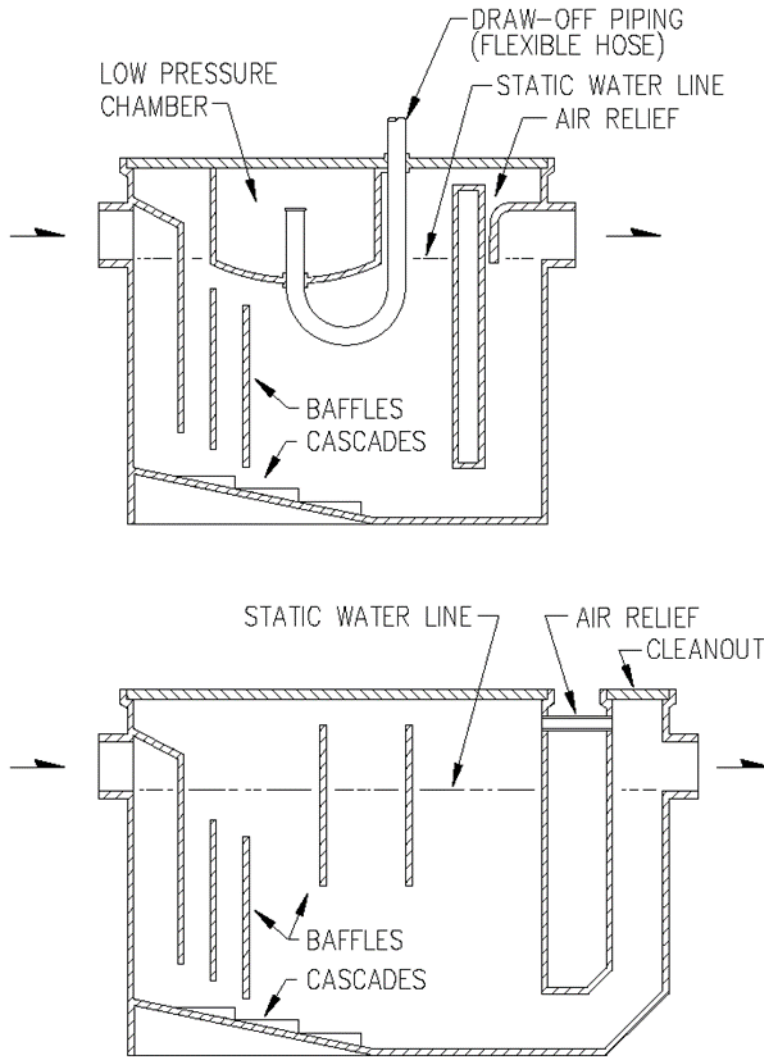


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX E Illustrations for Subpart E**

**Section 890.ILLUSTRATION A Grease Interceptor**

(Referenced in Section 890.510)

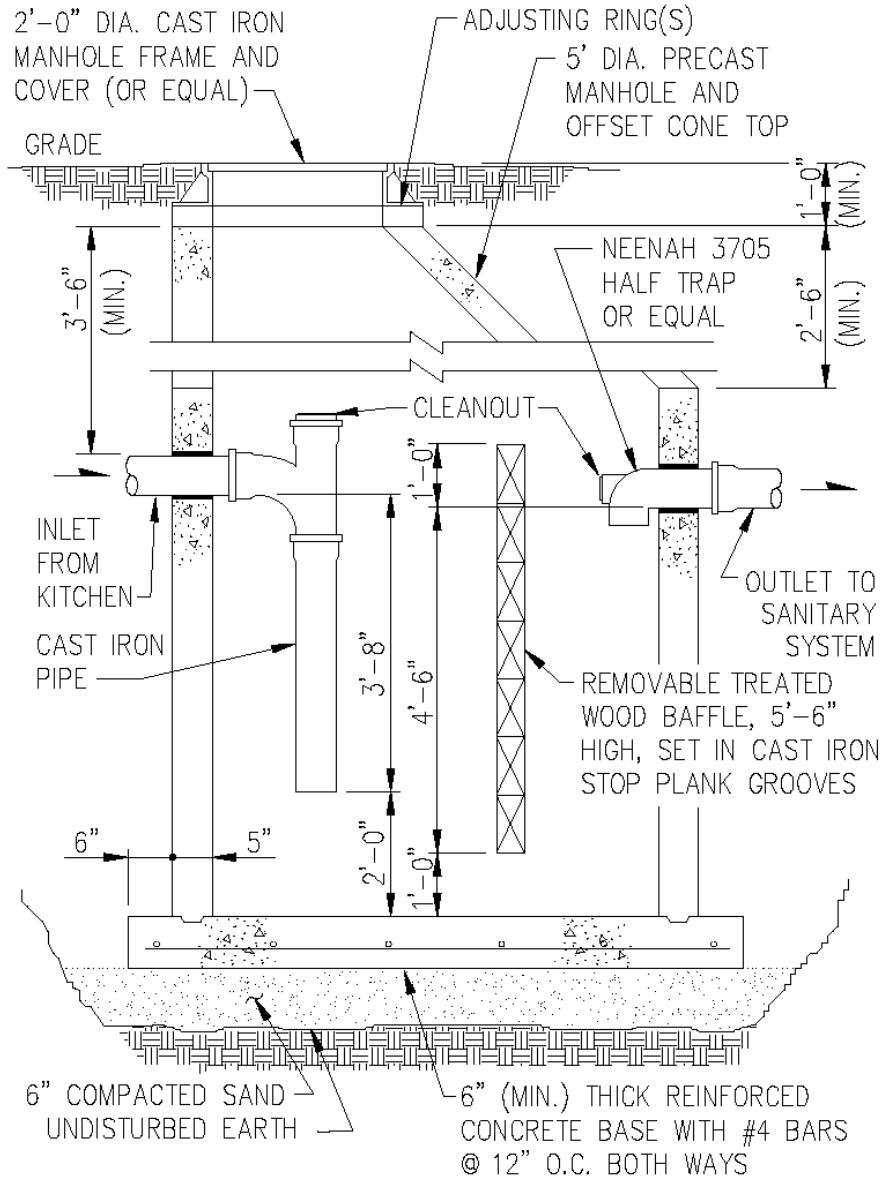


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX E Illustrations for Subpart E**

**Section 890.ILLUSTRATION B Typical Grease Interceptor/Catch Basin**

(Referenced in Section 890.510)



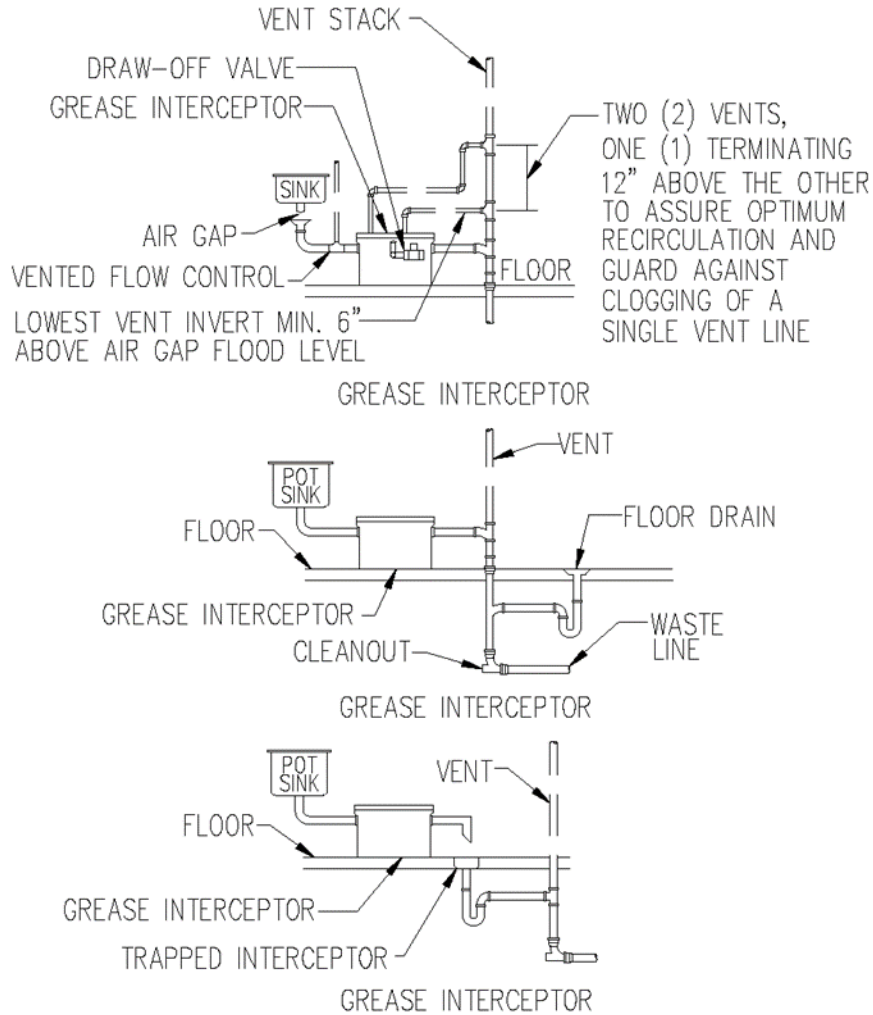
(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)



**Section 890.APPENDIX E Illustrations for Subpart E**

**Section 890.ILLUSTRATION C Interceptor/Separator Vents**

(Referenced in Section 890.510(a)(6))



(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX E Illustrations for Subpart E****Section 890.ILLUSTRATION D Interceptors for Bottling Plants (Repealed)**

(Source: Repealed at 28 Ill. Reg. 4215, effective February 18, 2004)

**Section 890.APPENDIX E Illustrations for Subpart E****Section 890.ILLUSTRATION E Laundry Interceptors (Repealed)**

(Source: Repealed at 29 Ill. Reg. 5713, effective April 8, 2005)

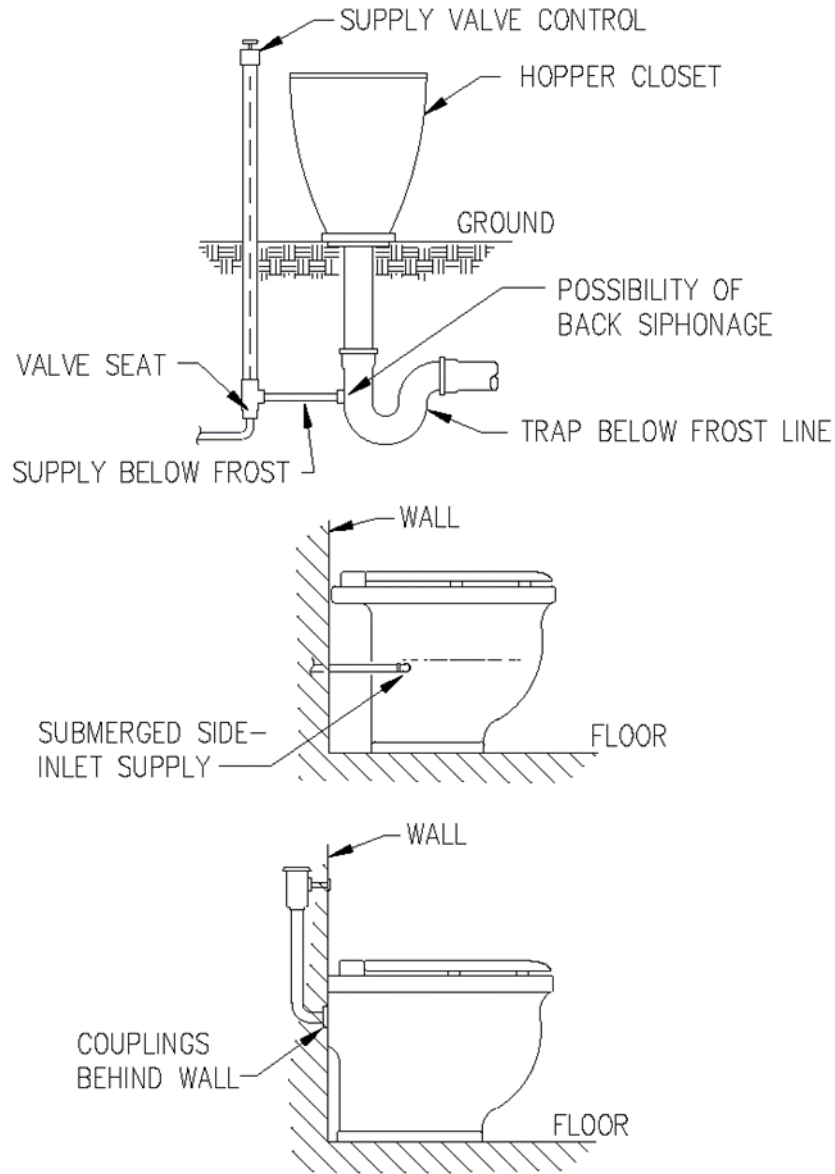
**Section 890.APPENDIX E Illustrations for Subpart E****Section 890.ILLUSTRATION F Backwater Valve Location (Repealed)**

(Source: Repealed at 29 Ill. Reg. 5713, effective April 8, 2005)

**Section 890.APPENDIX F Illustrations for Subpart F**

**Section 890.ILLUSTRATION A Prohibited Fixtures**

(Referenced in Section 890.650(j))

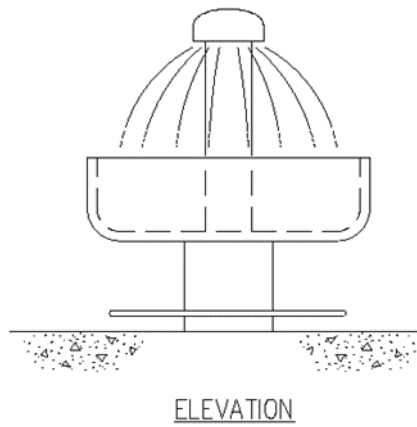
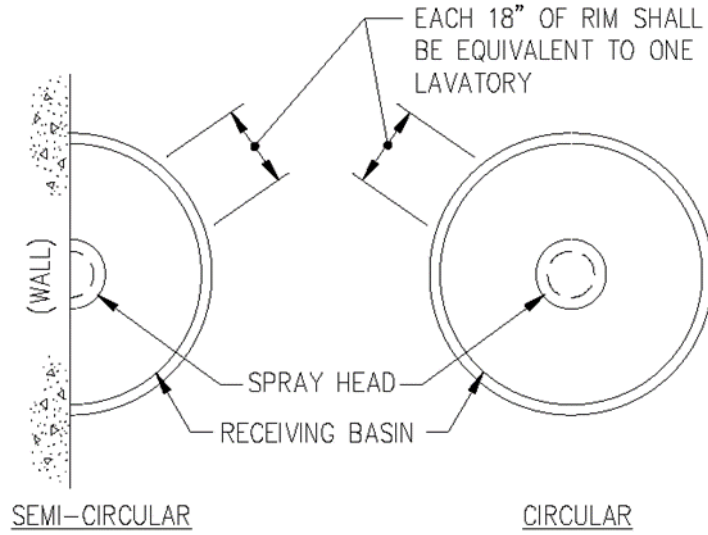


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX F Illustrations for Subpart F**

**Section 890.ILLUSTRATION B Circular Wash Sinks**

(Referenced in Section 890.680(d))



(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

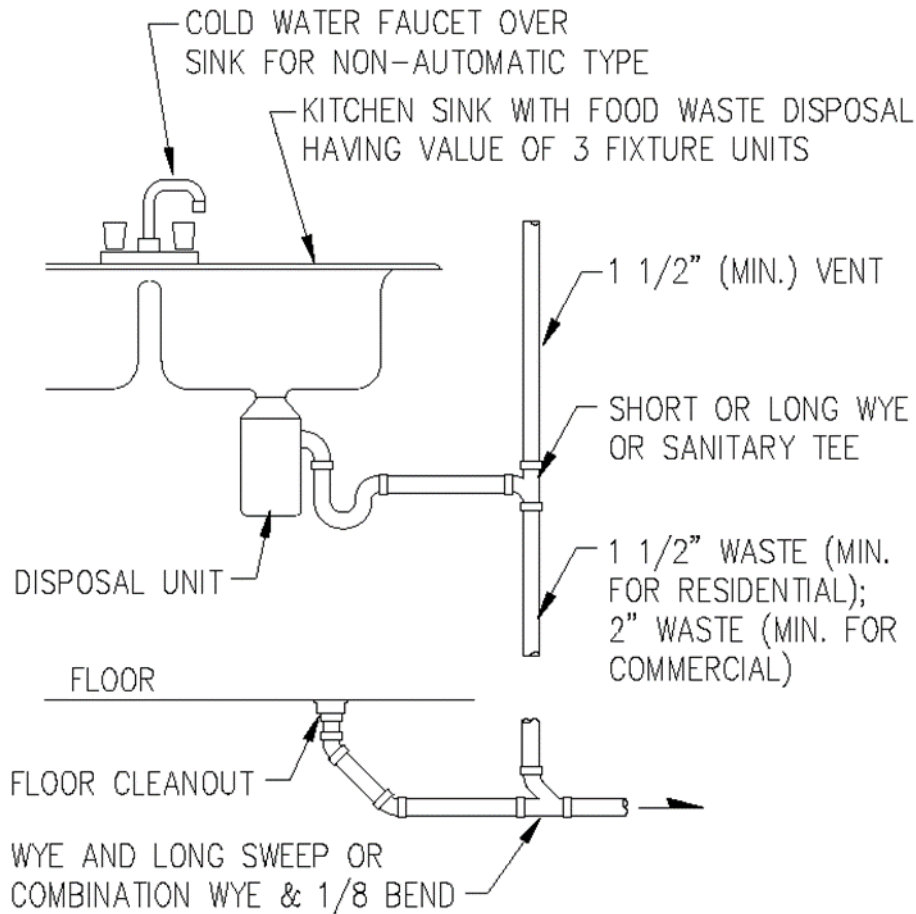
**Section 890.APPENDIX F Illustrations for Subpart F****Section 890.ILLUSTRATION C Commercial Type Grinder #1 (Repealed)**

(Source: Repealed at 28 Ill. Reg. 4215, effective February 18, 2004)

**Section 890.APPENDIX F Illustrations for Subpart F**

**Section 890.ILLUSTRATION D Commercial-Type Grinder**

(Referenced in Section 890.710(b))



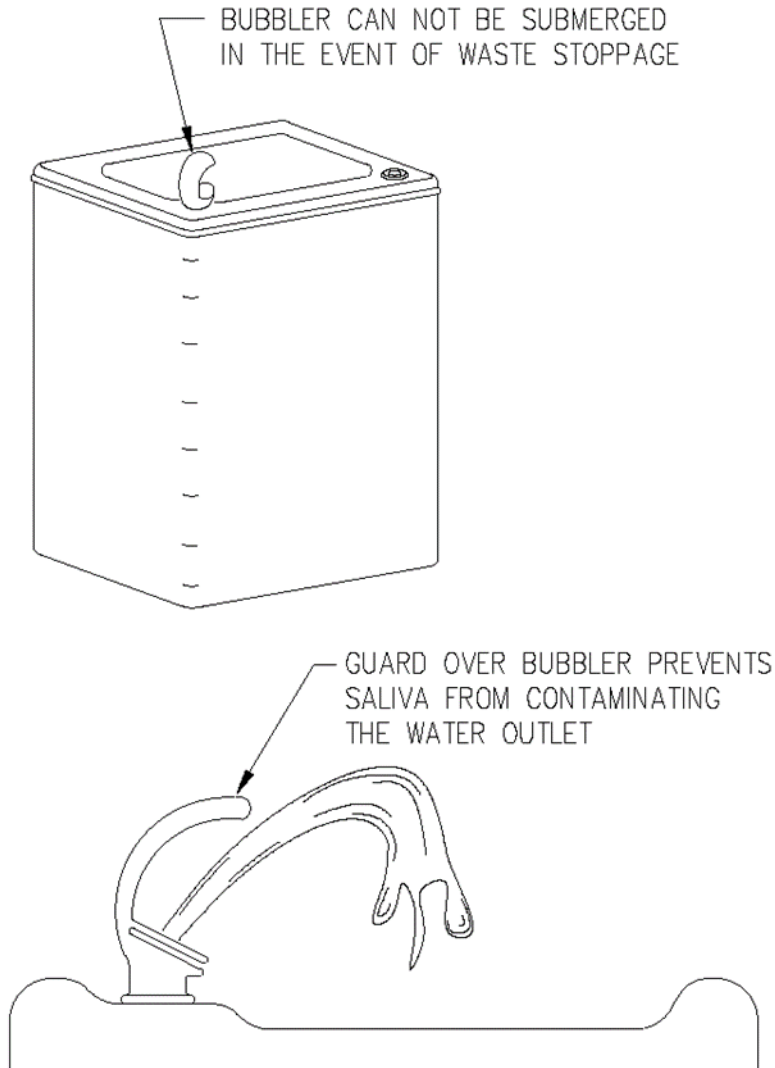
(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)



**Section 890.APPENDIX F Illustrations for Subpart F**

**Section 890.ILLUSTRATION E Protective Guard**

(Referenced in Section 890.720(a))

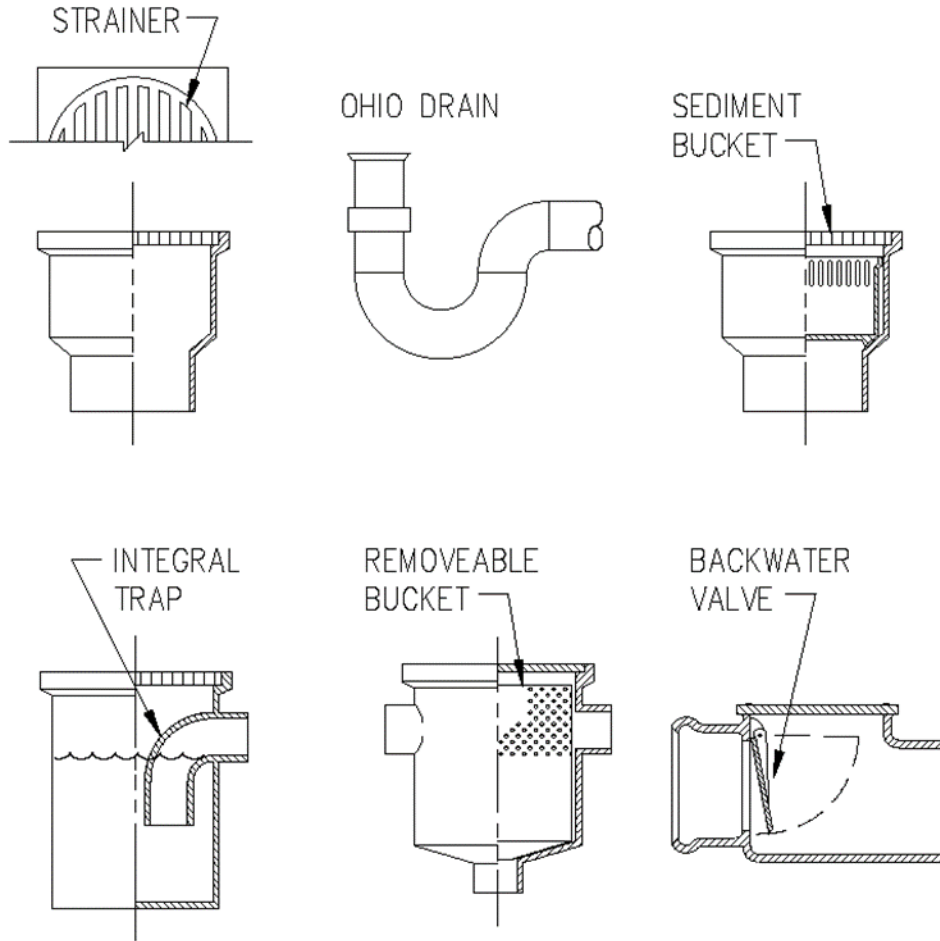


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX F Illustrations for Subpart F**

**Section 890.ILLUSTRATION F Trap and Strainer**

(Referenced in Section 890.730)

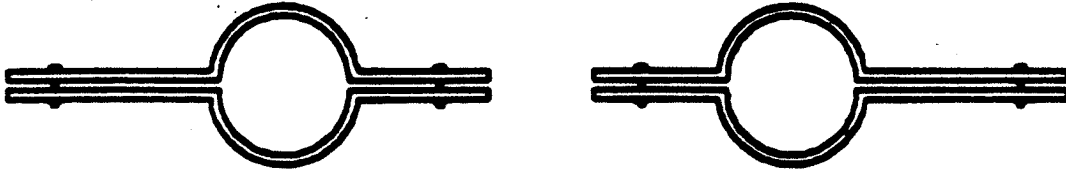


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX G Illustrations for Subpart G**

**Section 890.ILLUSTRATION A Cast Iron Soil Pipe Support #1**

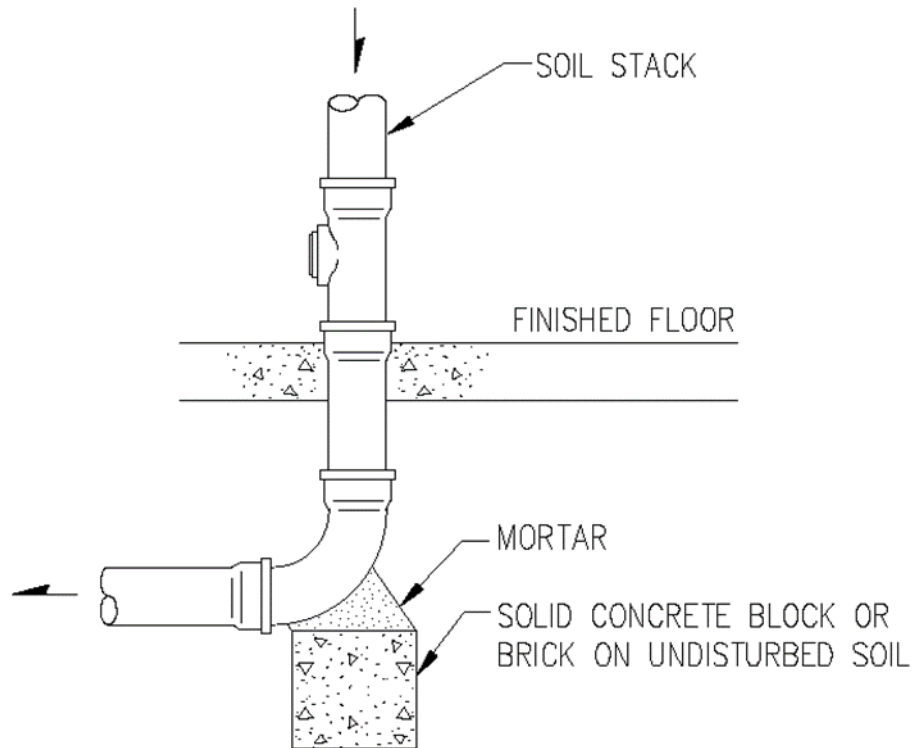
(Referenced in Section 890.920)



**Section 890.APPENDIX G Illustrations for Subpart G**

**Section 890.ILLUSTRATION B Cast Iron Soil Pipe Support #2**

(Referenced in Section 890.920)



(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX G Illustrations for Subpart G****Section 890.ILLUSTRATION C Horizontal Piping Support (Repealed)**

(Source: Repealed at 28 Ill. Reg. 4215, effective February 18, 2004)

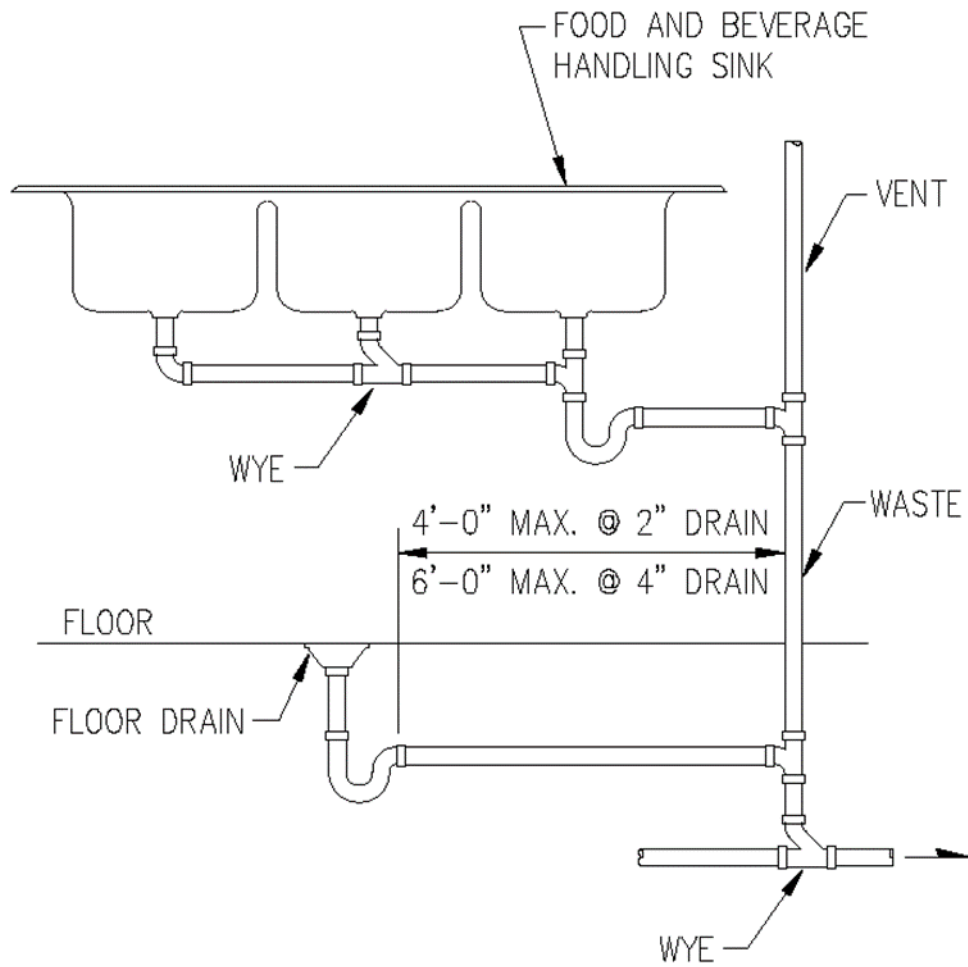
**Section 890.APPENDIX G Illustration for Subpart G****Section 890.ILLUSTRATION D Cast Iron Soil Support Stack (Repealed)**

(Source: Repealed at 28 Ill. Reg. 4215, effective February 18, 2004)

**Section 890.APPENDIX H Illustrations for Subpart H**

**Section 890.ILLUSTRATION A Indirect Waste Piping #1**

(Referenced in Section 890.1010(a))

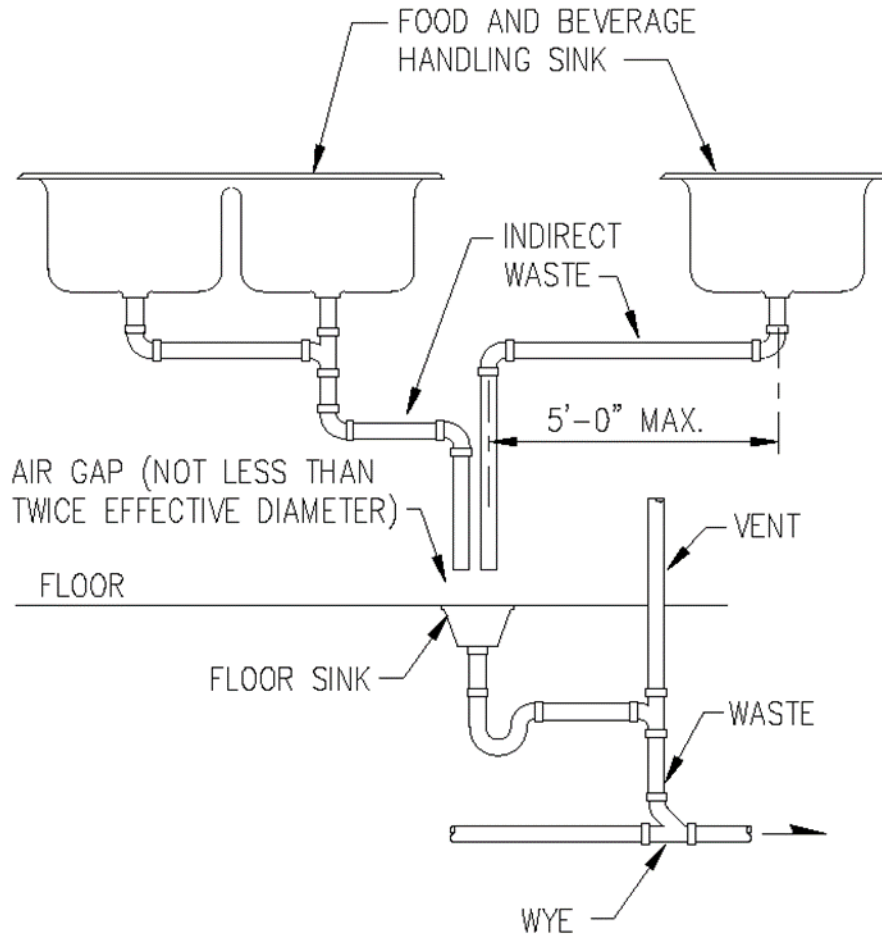


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX H Illustrations for Subpart H**

**Section 890.ILLUSTRATION B Indirect Waste Piping #2**

(Referenced in Section 890.1010(a))



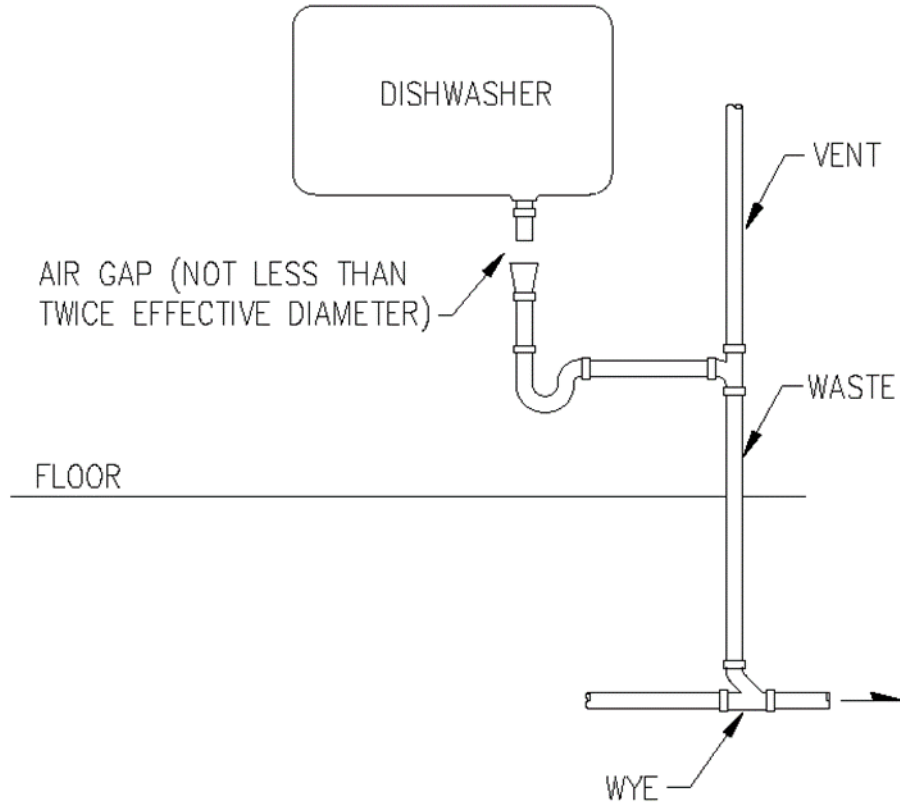
(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)



**Section 890.APPENDIX H Illustrations for Subpart H**

**Section 890.ILLUSTRATION C Indirect Waste Piping #3**

(Referenced in Section 890.1010(a))

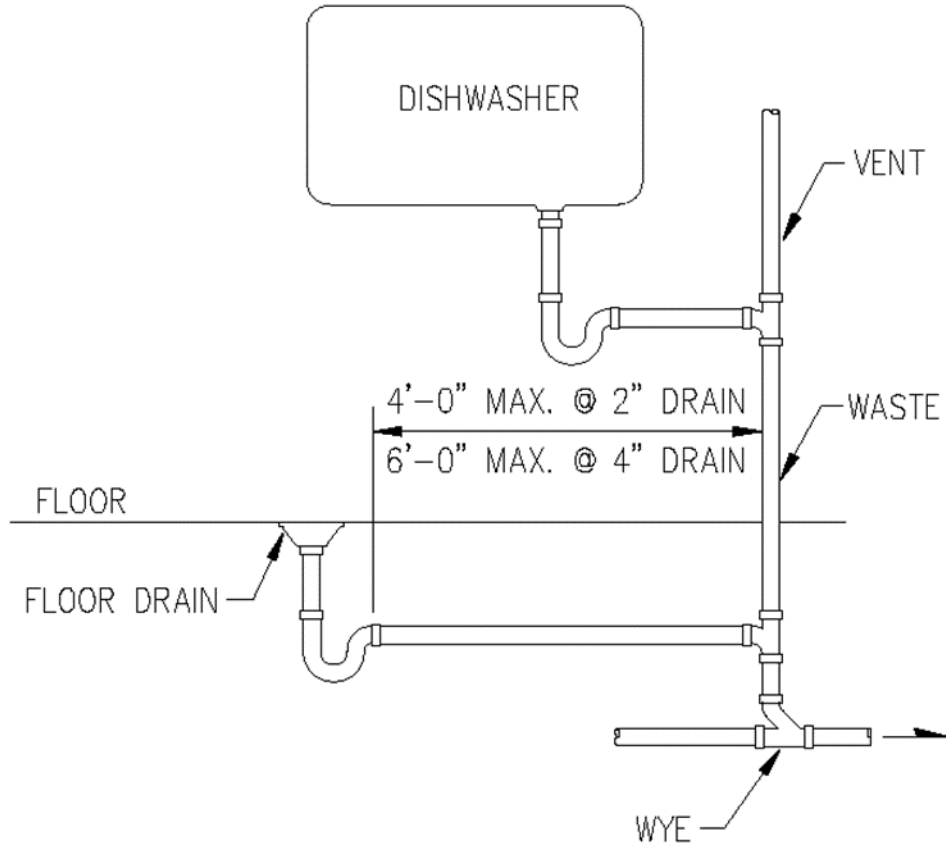


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX H Illustrations for Subpart H**

**Section 890.ILLUSTRATION D Indirect Waste Piping #4**

(Referenced in Section 890.1010(a))

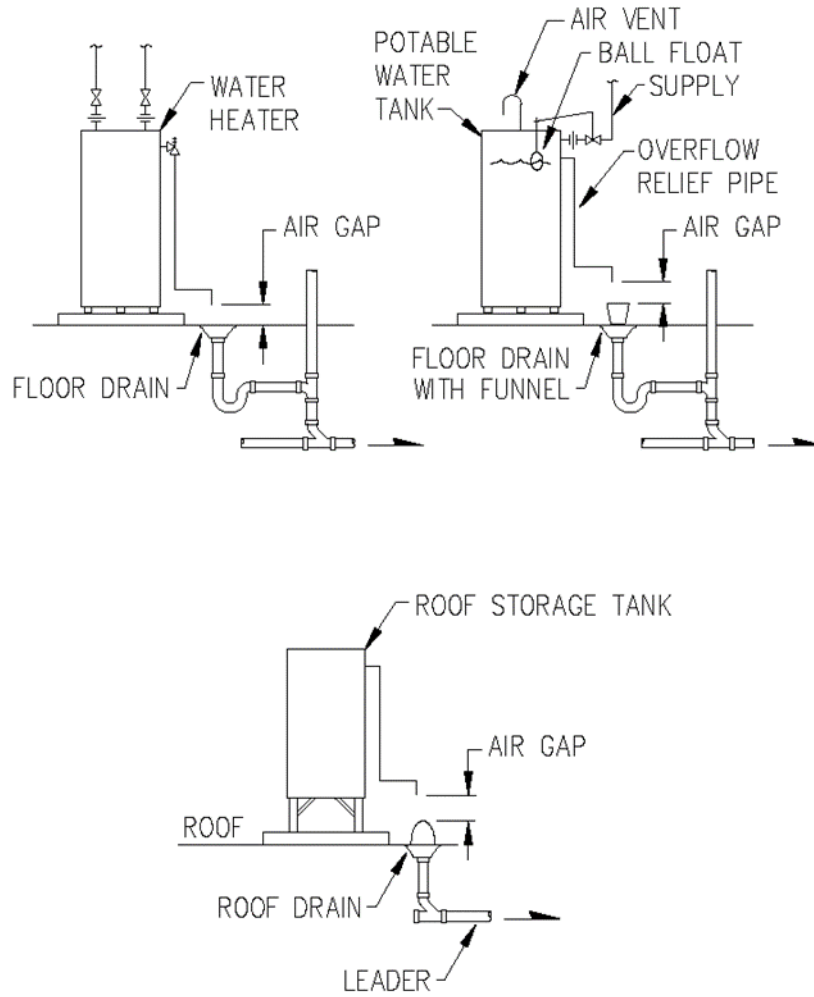


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX H Illustrations for Subpart H**

**Section 890.ILLUSTRATION E Indirect Waste Connection**

(Referenced in Section 890.1010(b))

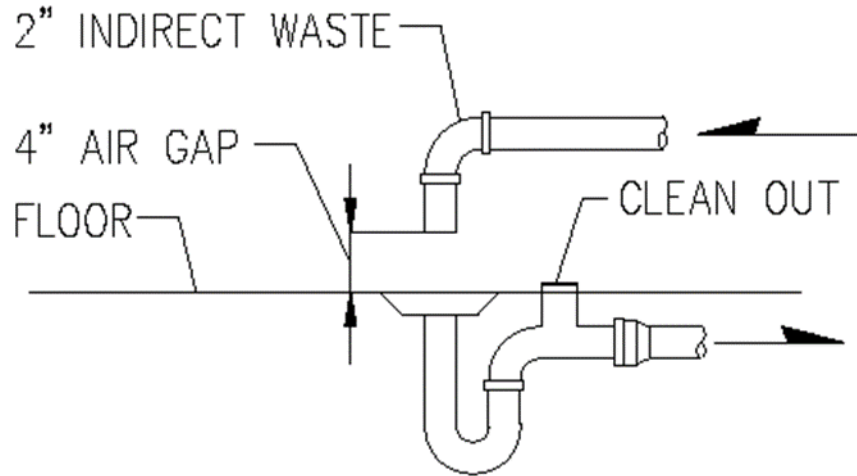


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX H Illustrations for Subpart H**

**Section 890.ILLUSTRATION F Air Gaps**

(Referenced in Section 890.1040)

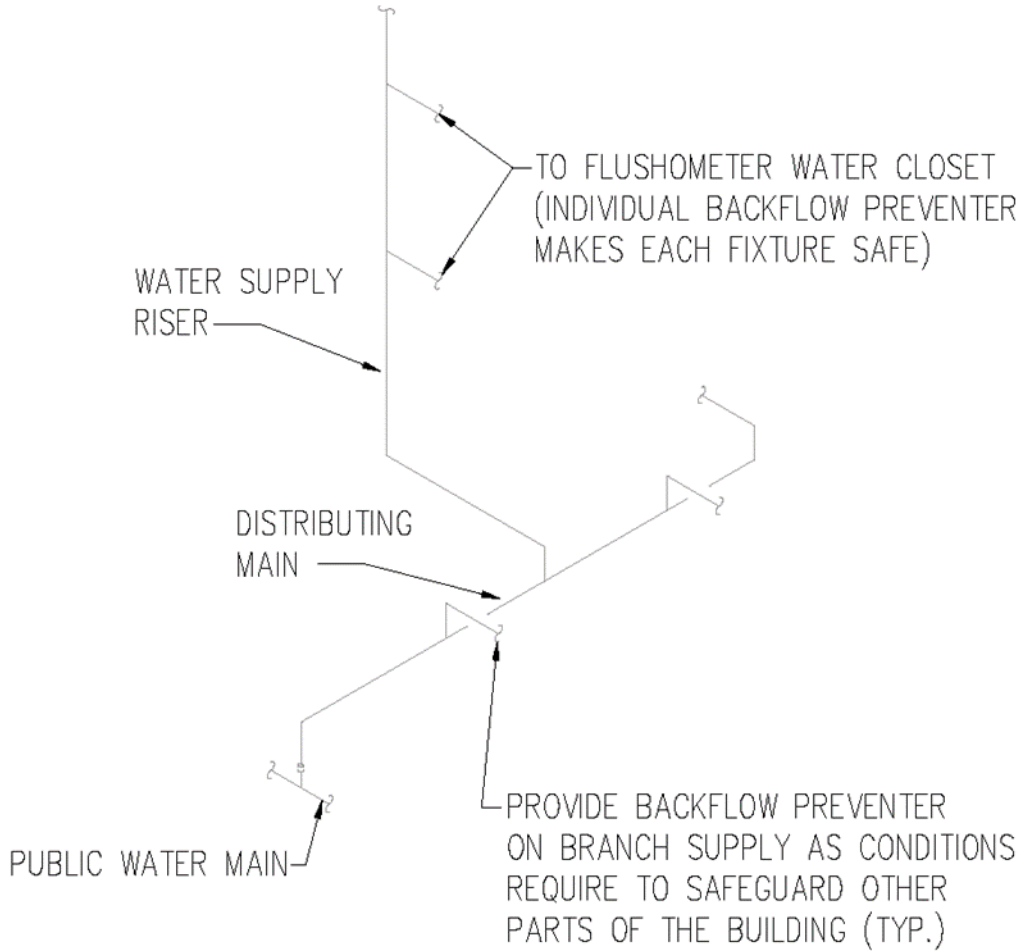


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX I Illustrations for Subpart I**

**Section 890.ILLUSTRATION A Cross-Connection #1**

(Referenced in Section 890.1130(a))

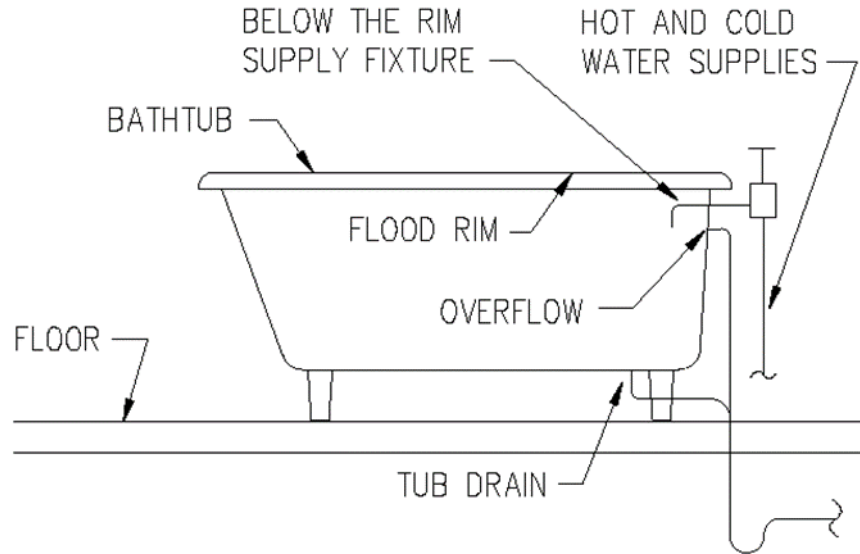


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX I Illustrations for Subpart I**

**Section 890.ILLUSTRATION B Cross-Connection #2**

(Referenced in Section 890.1130(a))

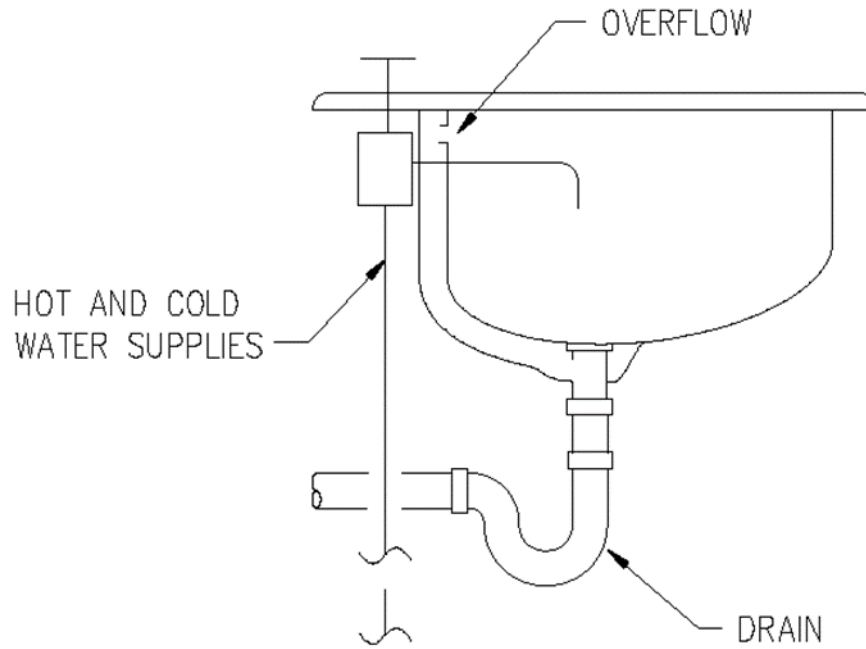


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX I Illustrations for Subpart I**

**Section 890.ILLUSTRATION C Cross-Connection #3**

(Referenced in Section 890.1130(a))

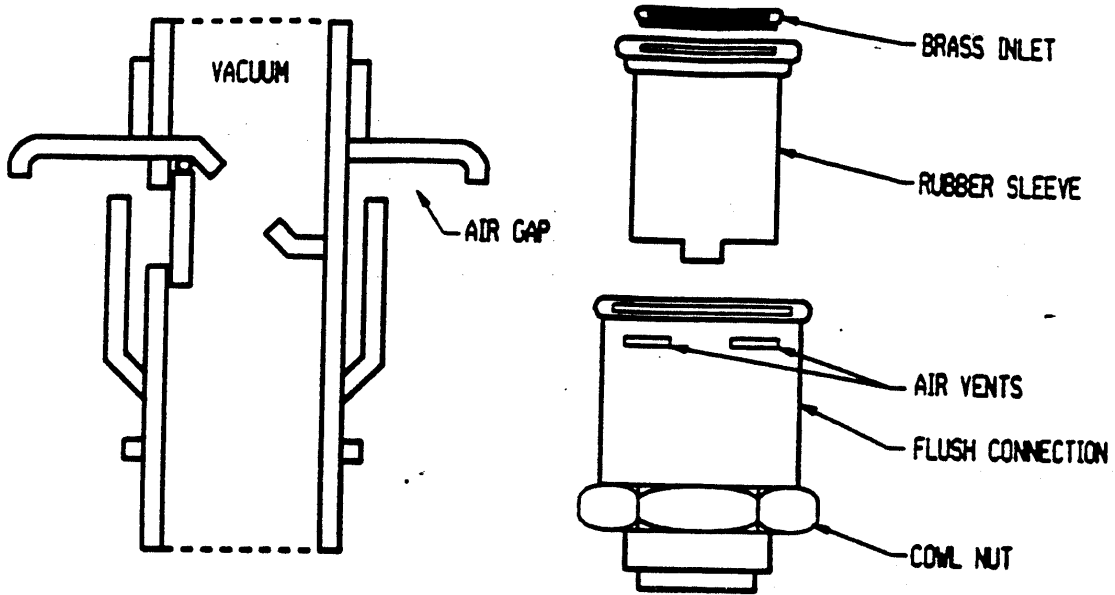


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX I Illustrations for Subpart I**

**Section 890.ILLUSTRATION D Flushometer Valve**

(Referenced in Section 890.1140(b))

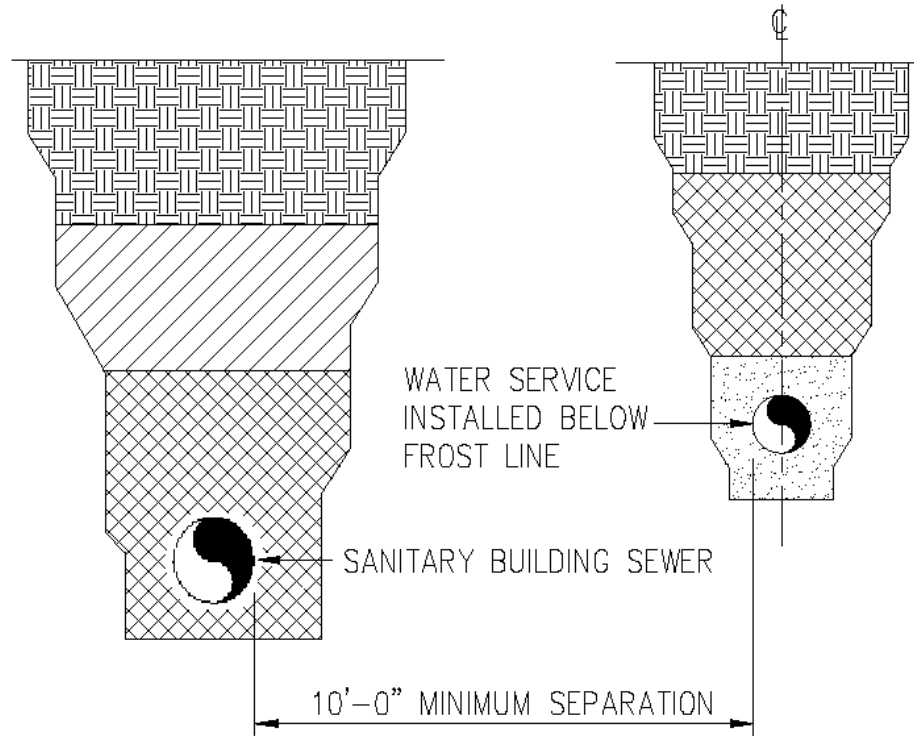




**Section 890.APPENDIX I Illustrations for Subpart I**

**Section 890.ILLUSTRATION E Underground Water Piping #1**

(Referenced in Section 890.1150(a)(1))

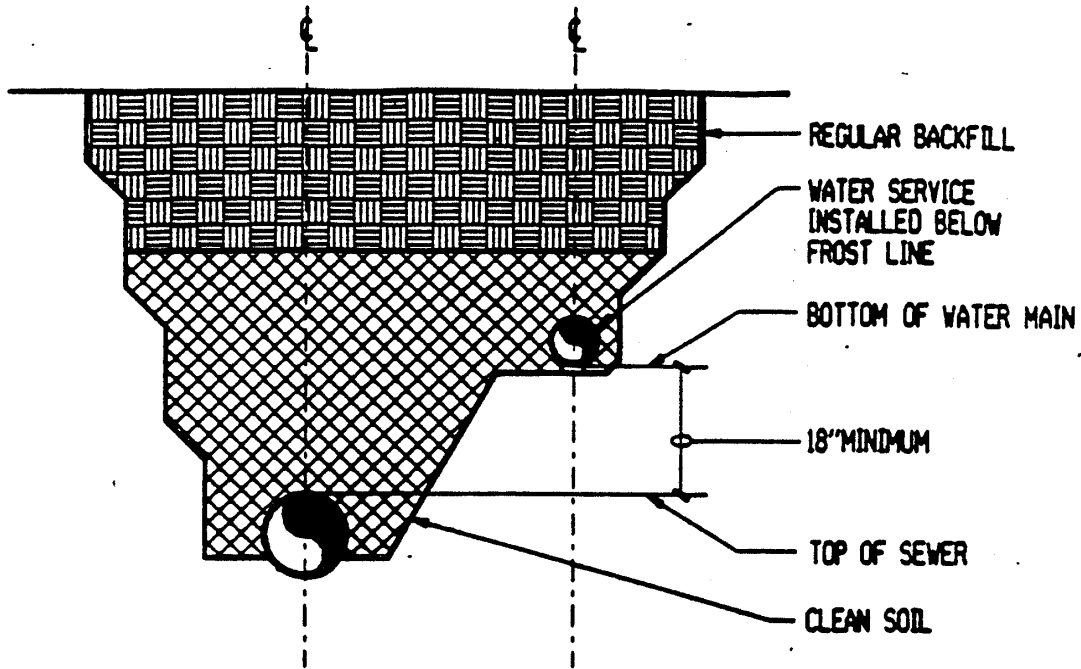


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX I Illustrations for Subpart I**

**Section 890.ILLUSTRATION F Underground Water Piping #2**

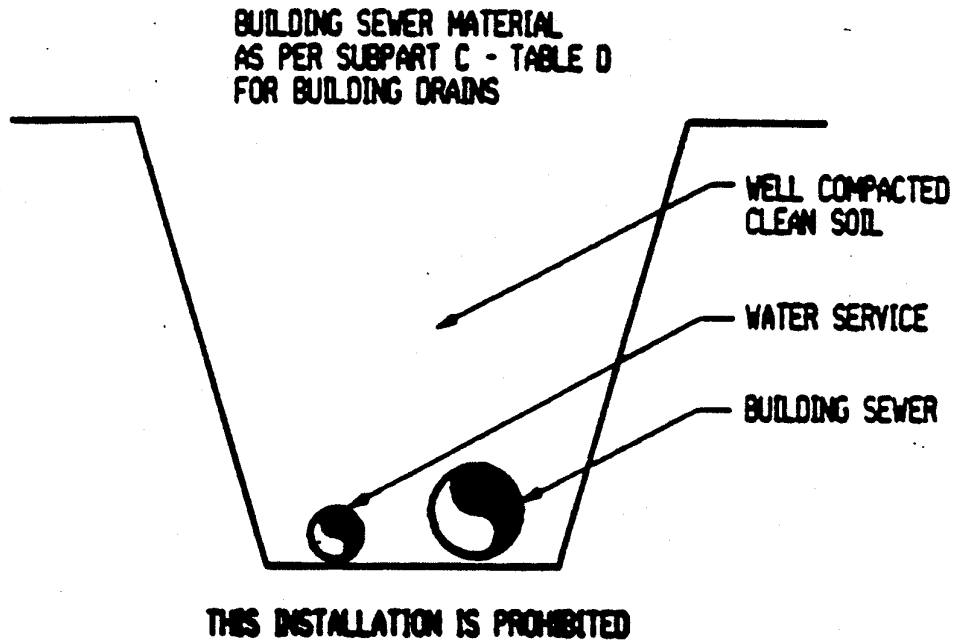
(Referenced in Section 890.1150(a)(2))



**Section 890.APPENDIX I Illustrations for Subpart I**

**Section 890.ILLUSTRATION G Underground Water Piping #3**

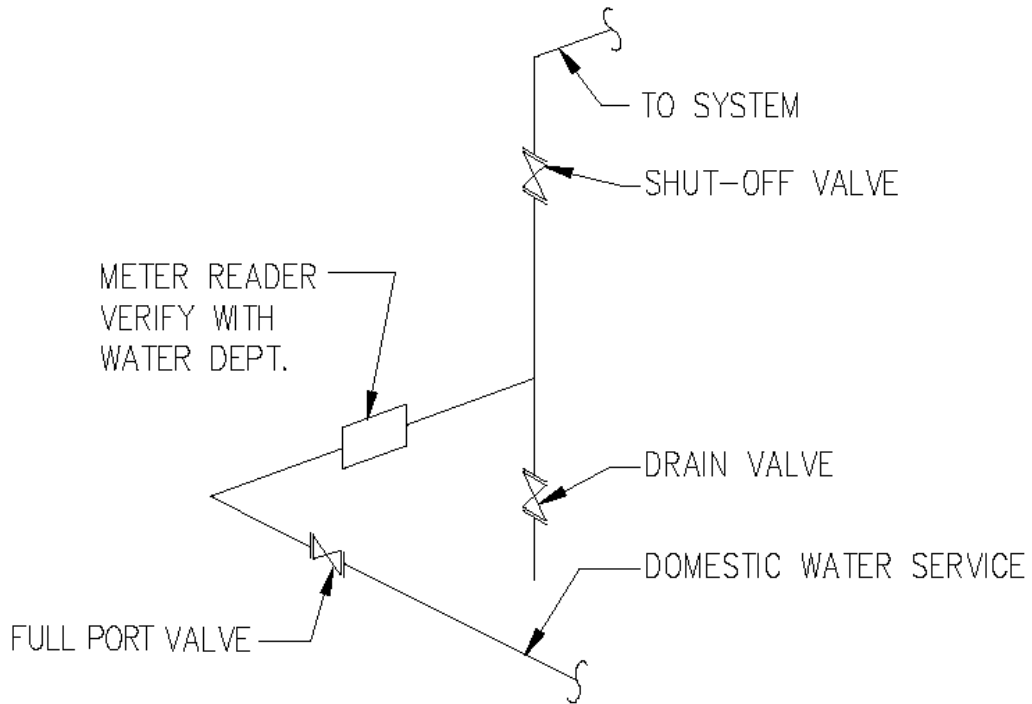
(Referenced in Section 890.1150(b)(2))



**Section 890.APPENDIX I Illustrations for Subpart I**

**Section 890.ILLUSTRATION H Water Supply Control**

(Referenced in Section 890.1190(a) & (b))

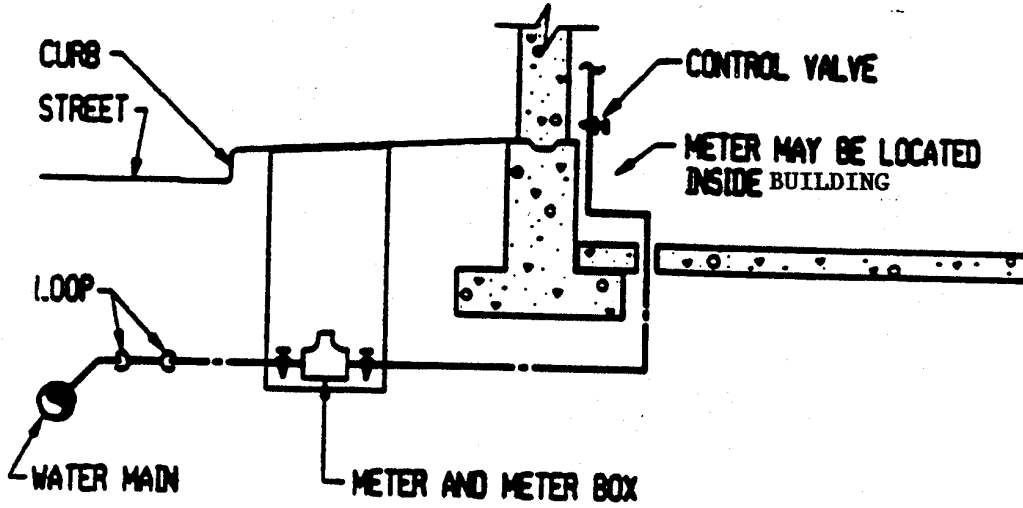


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX I Illustrations for Subpart I**

**Section 890.ILLUSTRATION I Shut-Off Valve at Meter**

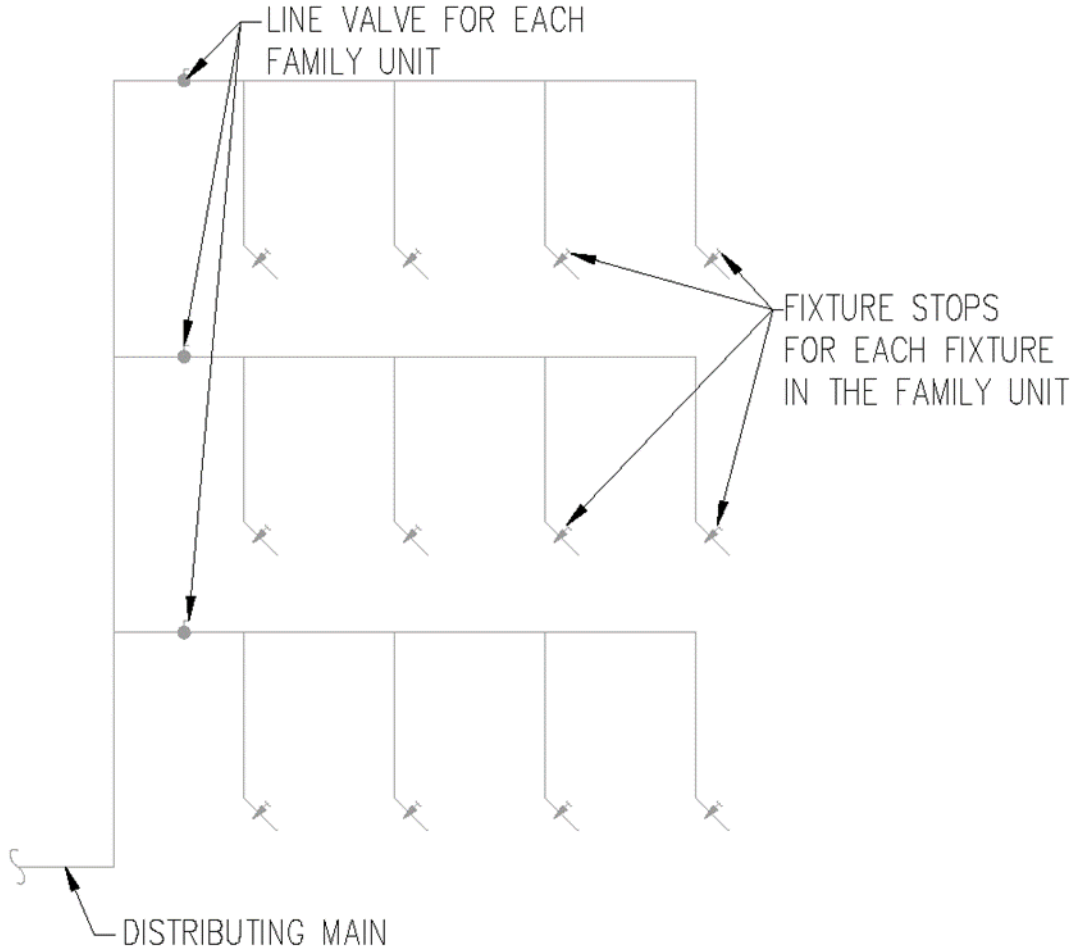
(Referenced in Section 890.1190(b))



**Section 890.APPENDIX I Illustrations for Subpart I**

**Section 890.ILLUSTRATION J Separate Controls for Each Family Unit**

(Referenced in Section 890.1190(e))

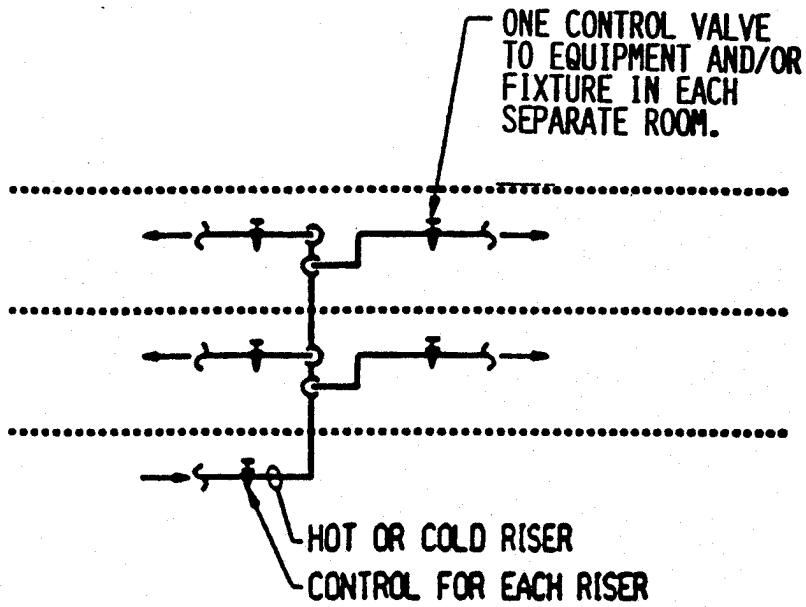


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX I Illustrations for Subpart I**

**Section 890.ILLUSTRATION K Shut-Off Valves in Buildings Other Than Dwellings**

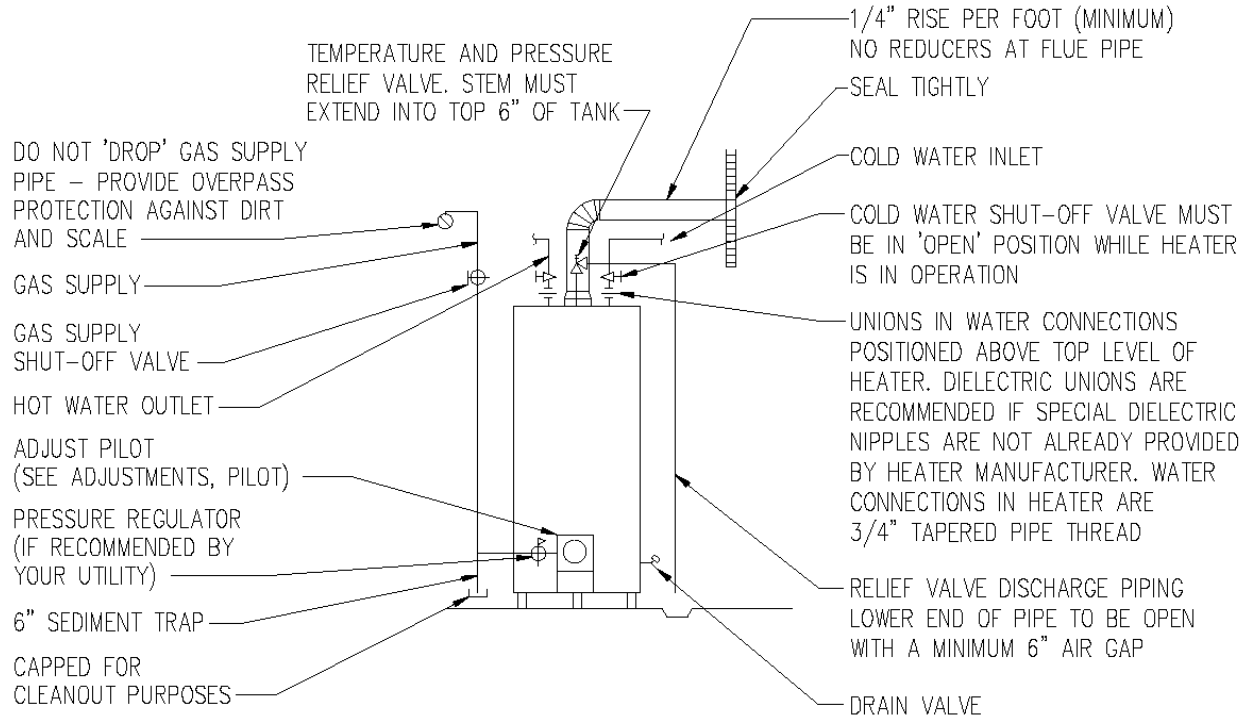
(Referenced in Section 890.1190(f))



**Section 890.APPENDIX I Illustrations for Subpart I**

**Section 890.ILLUSTRATION L Typical Gas Water Heater**

(Referenced in Section 890.1220(a))



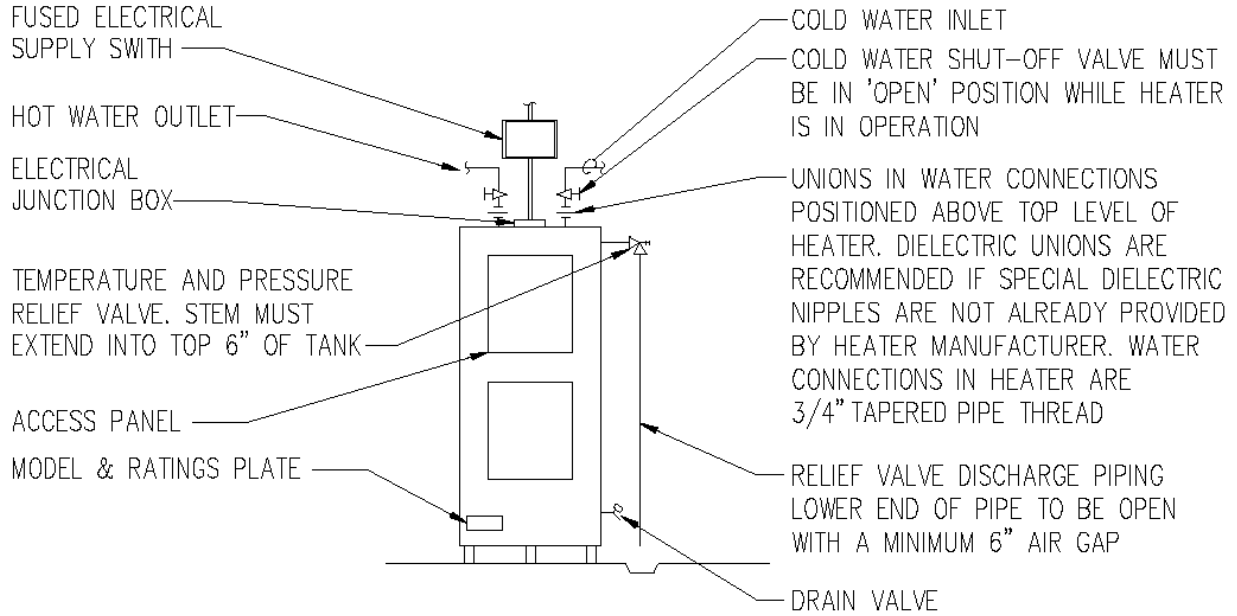
(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)



**Section 890.APPENDIX I Illustrations for Subpart I**

**Section 890.ILLUSTRATION M Typical Electric Water Heater**

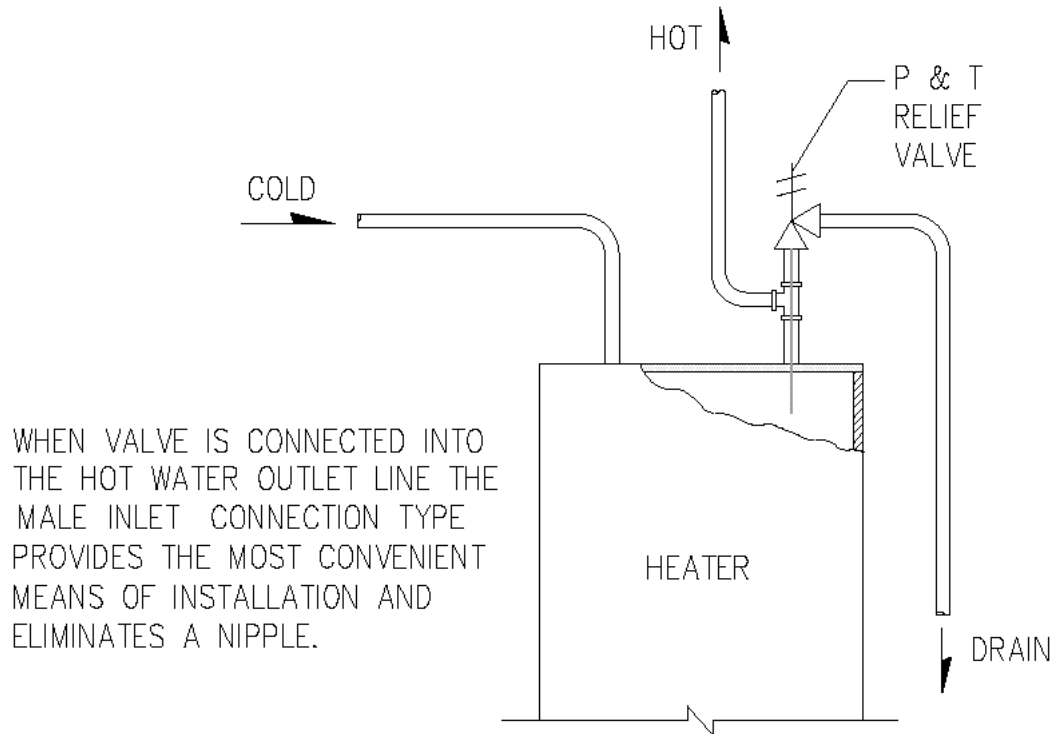
(Referenced in Section 890.1220(a))



(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX I Illustrations for Subpart I****Section 890.ILLUSTRATION N P & T Valve Installed in Hot Outlet Line**

(Referenced in Section 890.1230(c)(2))



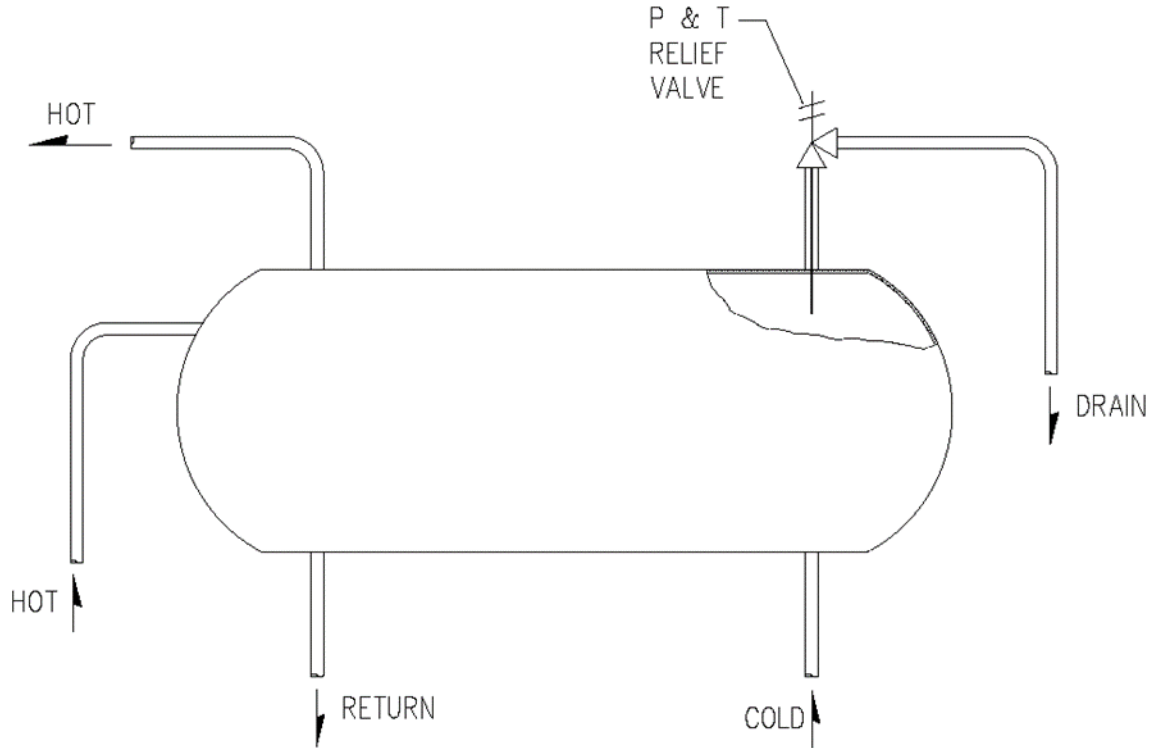
ANSI Z21.22/CSA 4.4 P & T VALVE INSTALLED  
IN HOT OUTLET LINE

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX I Illustrations for Subpart I**

**Section 890.ILLUSTRATION O P & T Relief Valve**

(Referenced in Section 890.1230(c)(2))

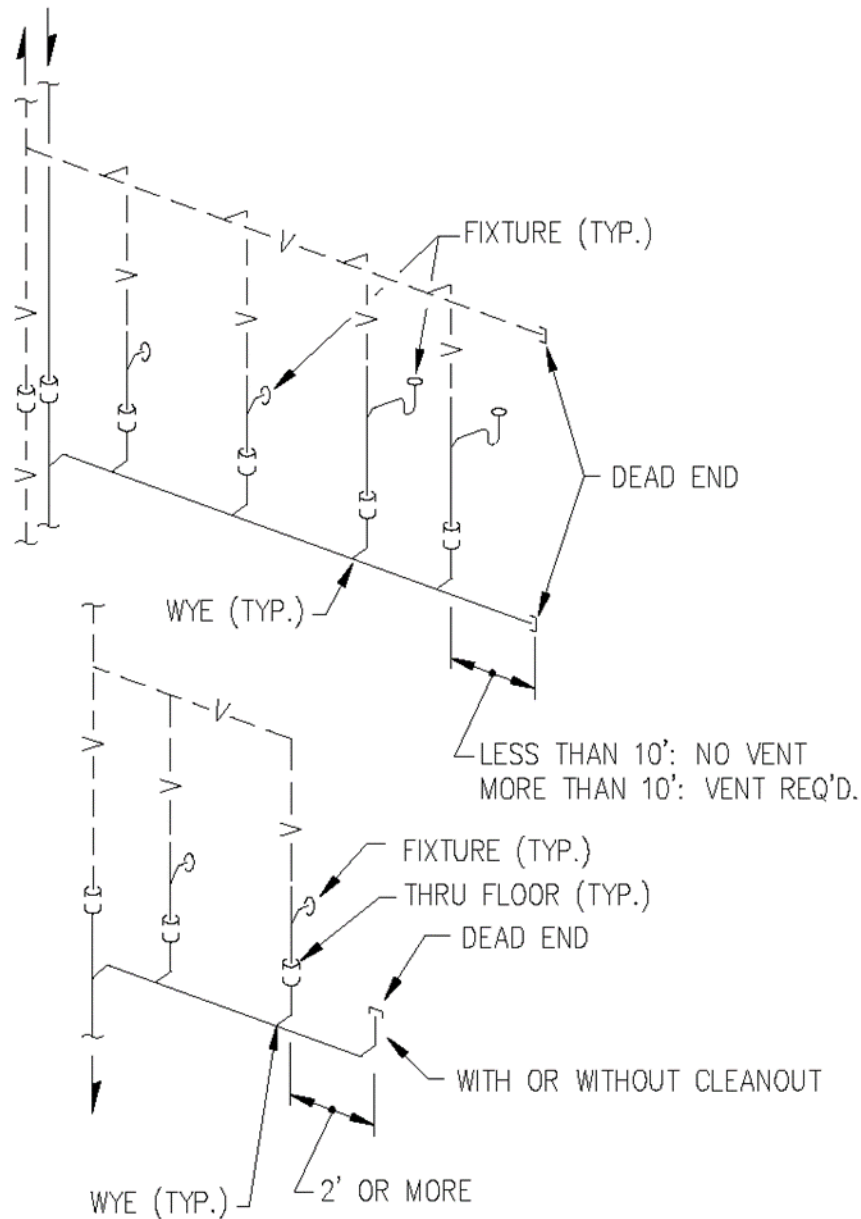


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX J Illustrations for Subpart J**

**Section 890.ILLUSTRATION A Dead Ends**

(Referenced in Section 890.1320(d))

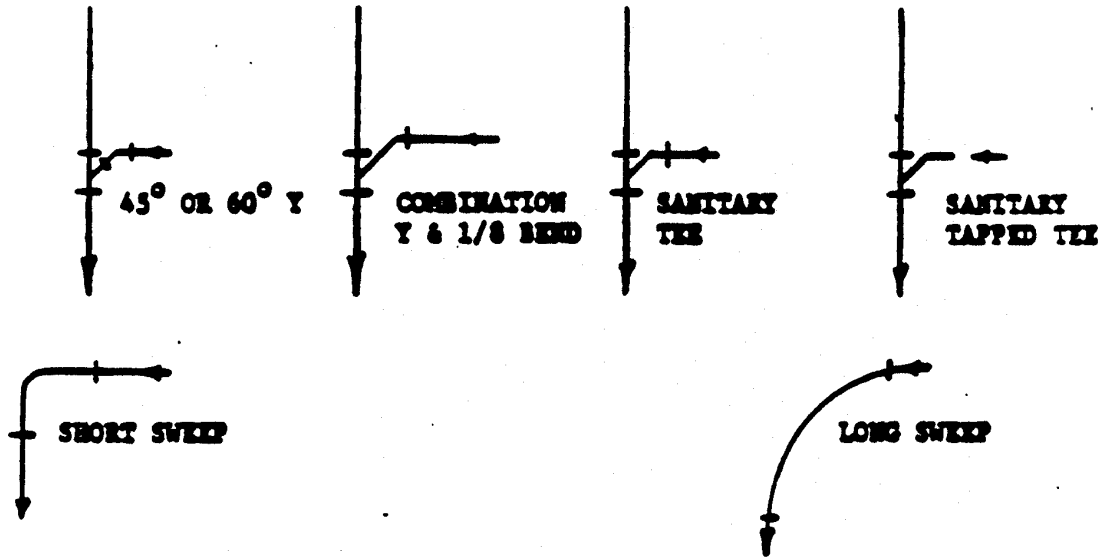


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX J Illustrations for Subpart J**

**Section 890.ILLUSTRATION B Horizontal to Vertical Change of Direction**

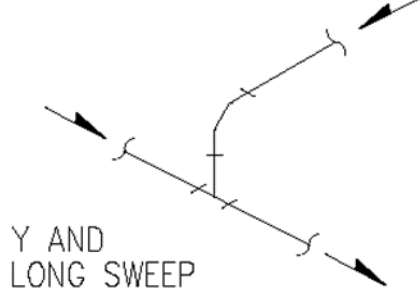
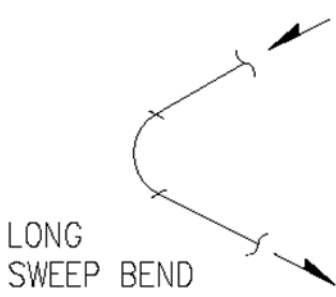
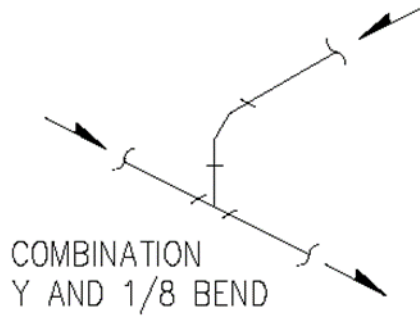
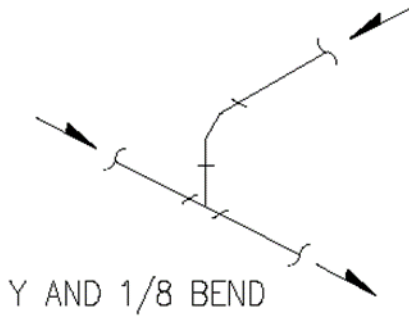
(Referenced in Section 890.1320(i))



**Section 890.APPENDIX J Illustrations for Subpart J**

**Section 890.ILLUSTRATION C Horizontal to Horizontal Change of Direction**

(Referenced in Section 890.1320(i))

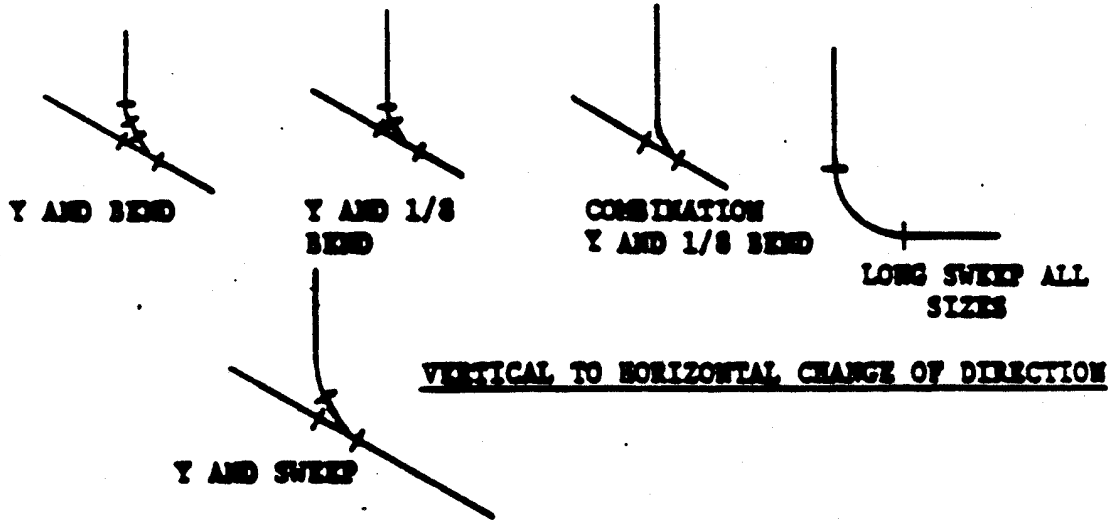


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX J Illustrations for Subpart J**

**Section 890.ILLUSTRATION D Vertical to Horizontal Change of Direction**

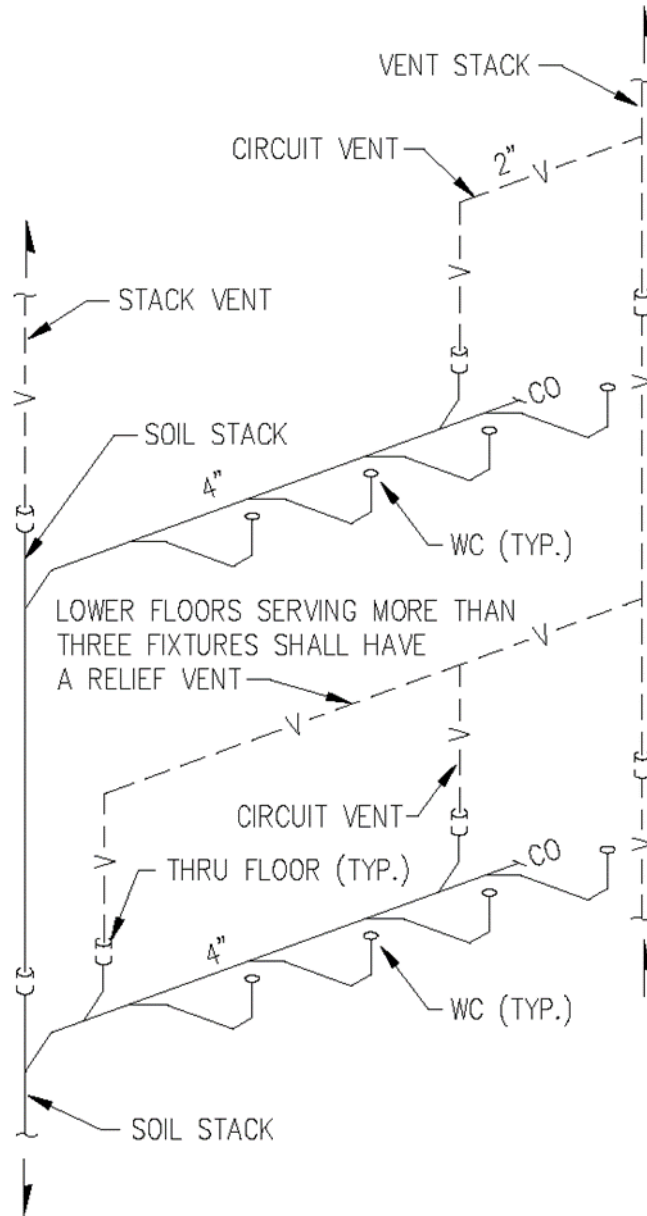
(Referenced in Section 890.1320(i))



**Section 890.APPENDIX J Illustrations for Subpart J**

**Section 890.ILLUSTRATION E Fixture Connections**

(Referenced in Section 890.1320(1))



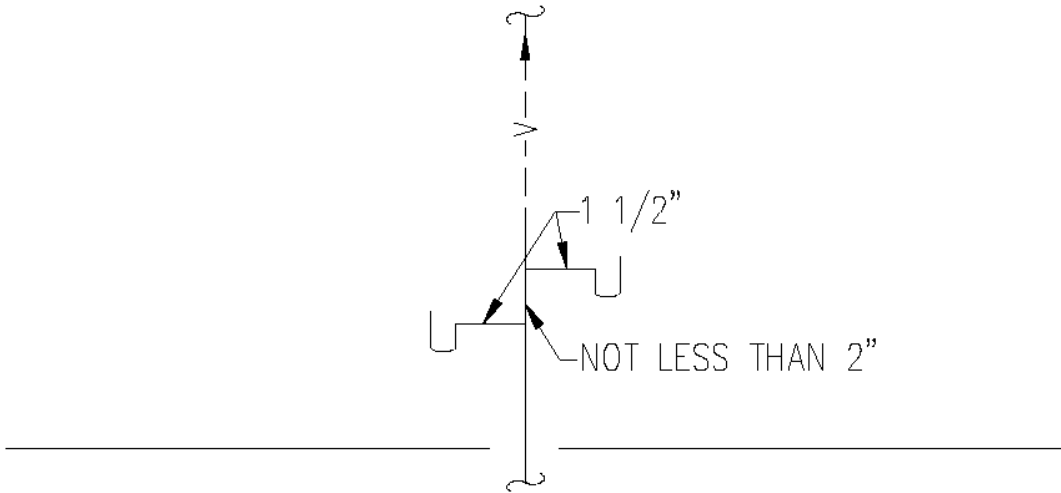
(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)



**Section 890.APPENDIX J Illustrations for Subpart J**

**Section 890.ILLUSTRATION F Waste Stacks**

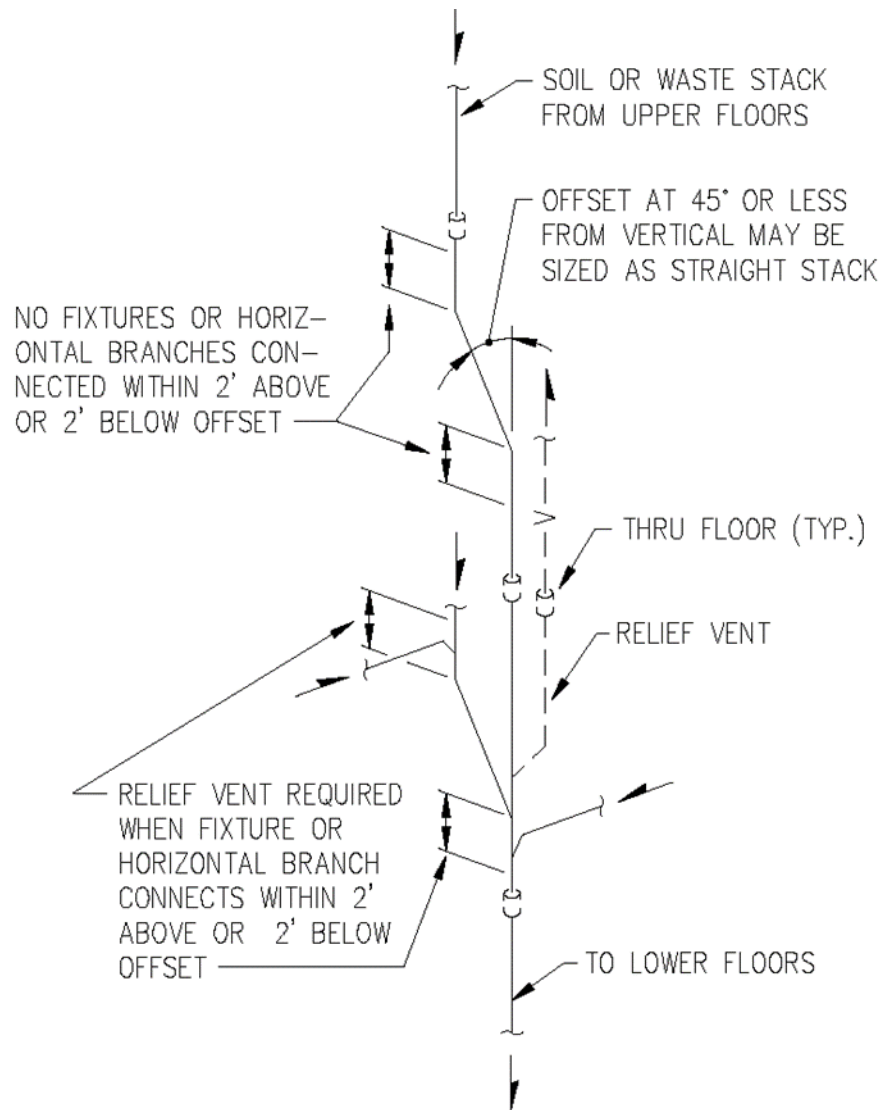
(Referenced in Section 890.1340(d))



(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX J Illustrations for Subpart J****Section 890.ILLUSTRATION G Offsets on Drainage Piping**

(Referenced in Section 890.1350(a))

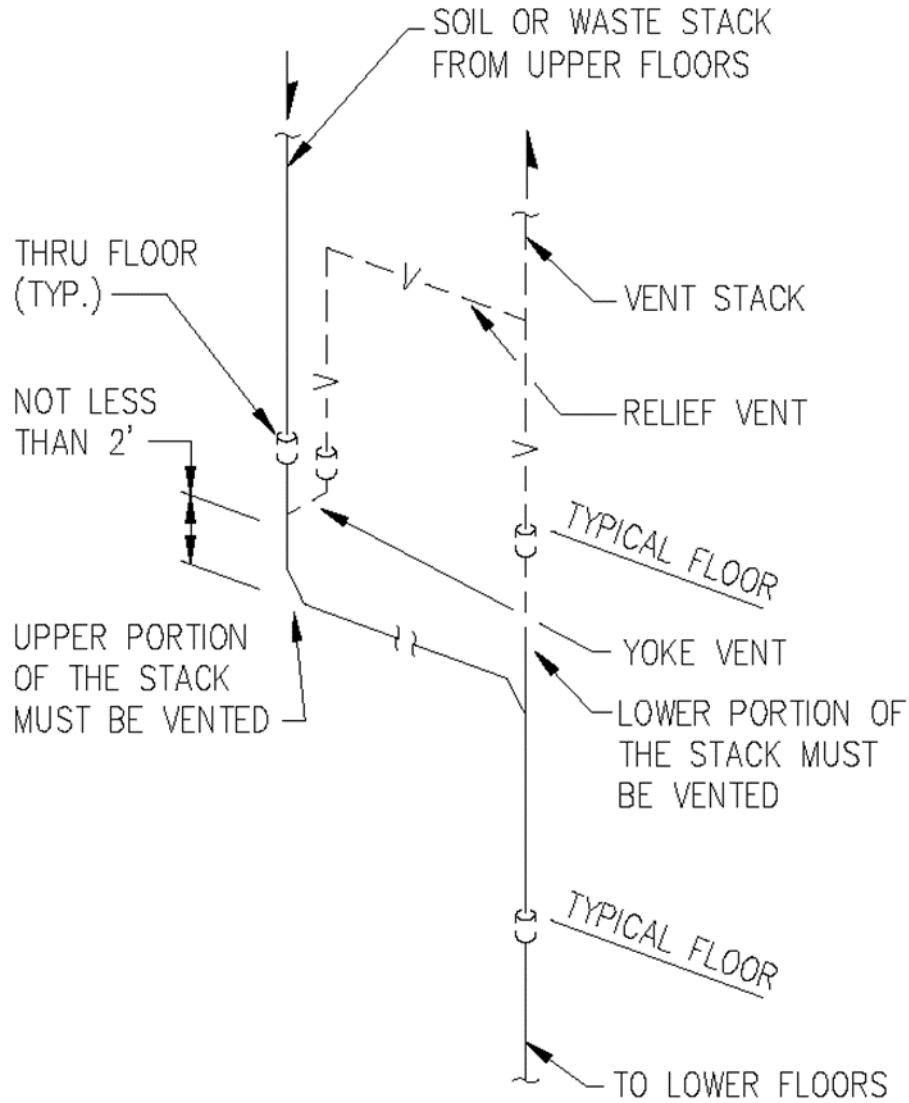


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX J Illustrations for Subpart J**

**Section 890.ILLUSTRATION H Relief Vent**

(Referenced in Section 890.1350(b)(4))

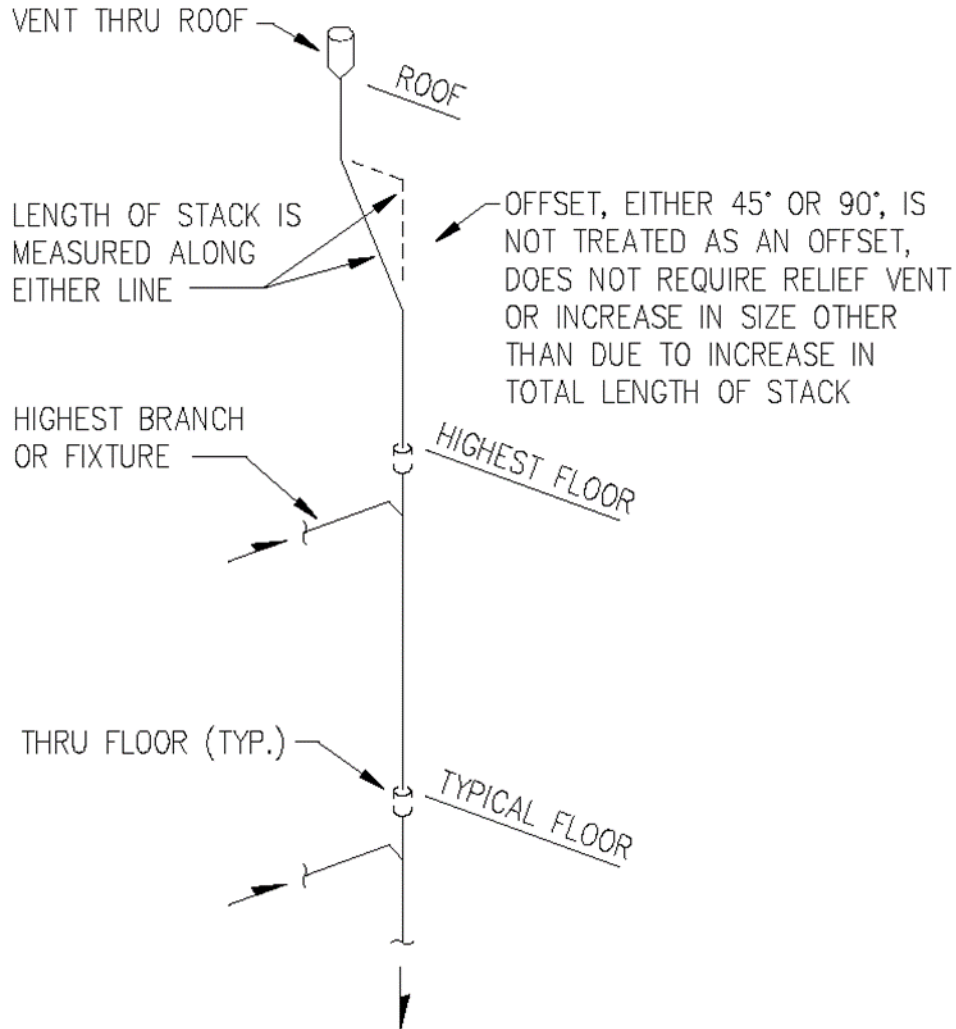


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX J Illustrations for Subpart J**

**Section 890.ILLUSTRATION I Above Highest Branch**

(Referenced in Section 890.1350(c))

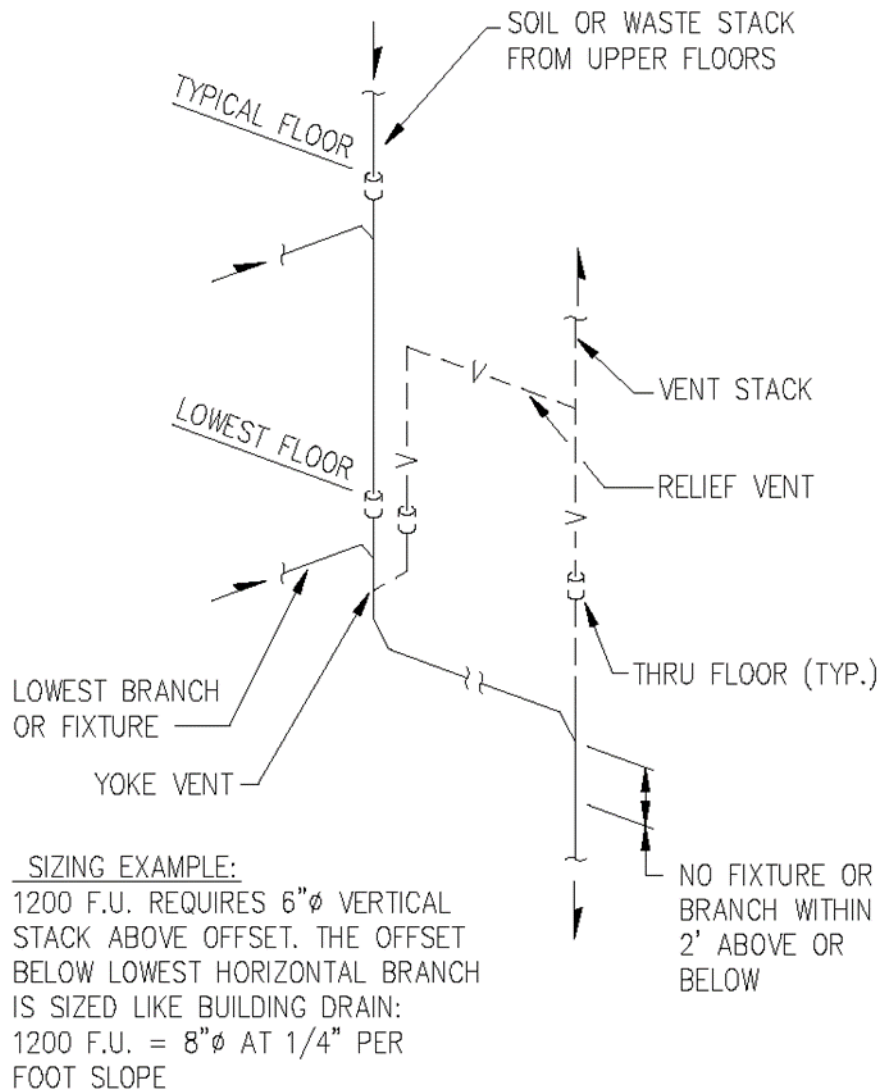


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

## Section 890.APPENDIX J Illustrations for Subpart J

### Section 890.ILLUSTRATION J Below Lowest Branch

(Referenced in Section 890.1350(d))

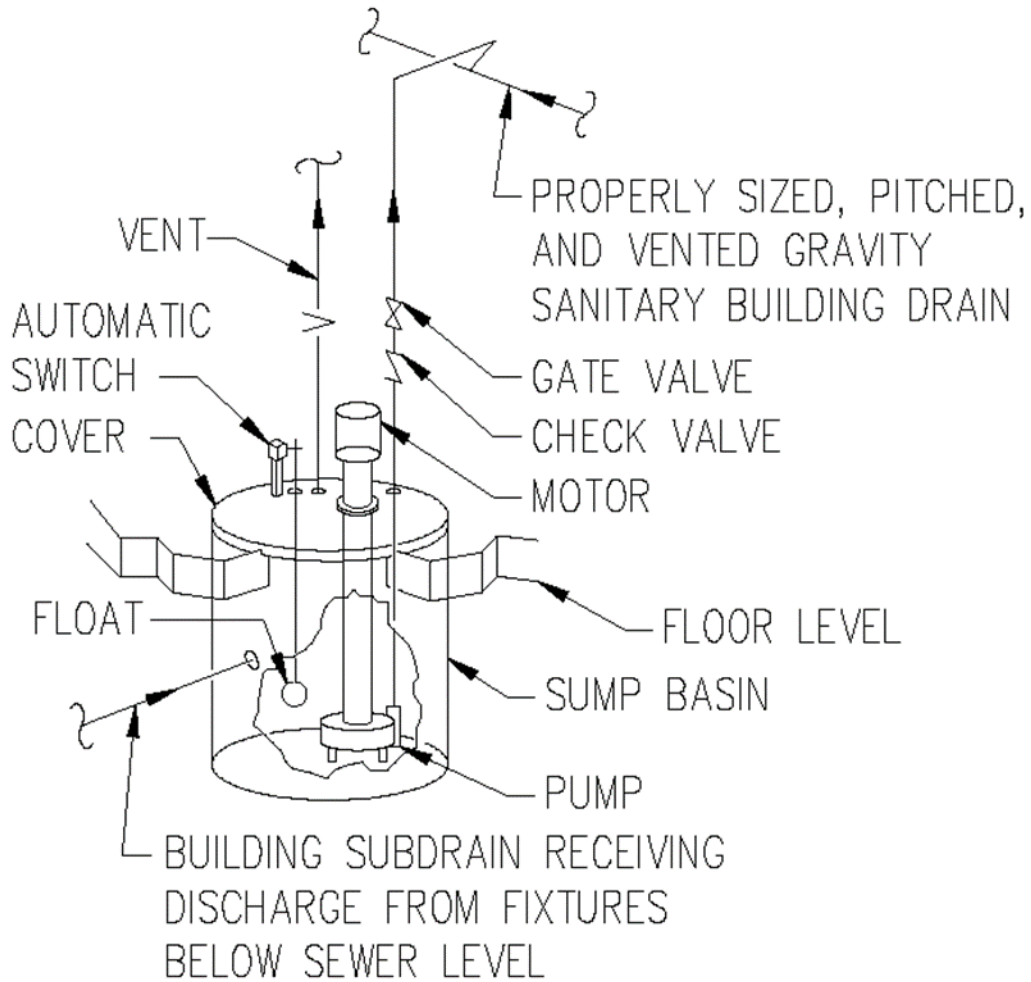


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX J Illustrations for Subpart J**

**Section 890.ILLUSTRATION K Drainage Below Sewer Level**

(Referenced in Section 890.1360(a)(1))



(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

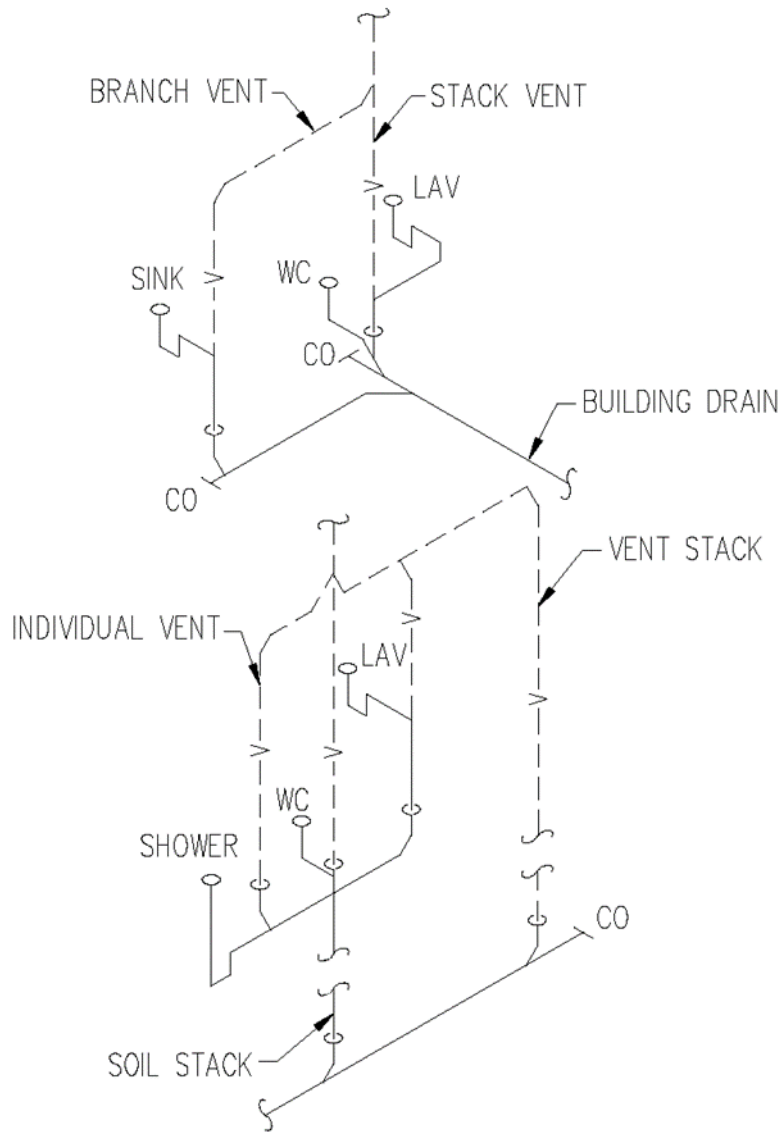
**Section 890.APPENDIX J Illustrations for Subpart J****Section 890.ILLUSTRATION L Sanitary Wastes Below Sewer (Repealed)**

(Source: Repealed at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX K Illustrations for Subpart K**

**Section 890.ILLUSTRATION A Installation of Vent Stack or Main Vent**

(Referenced in Section 890.1420(b))



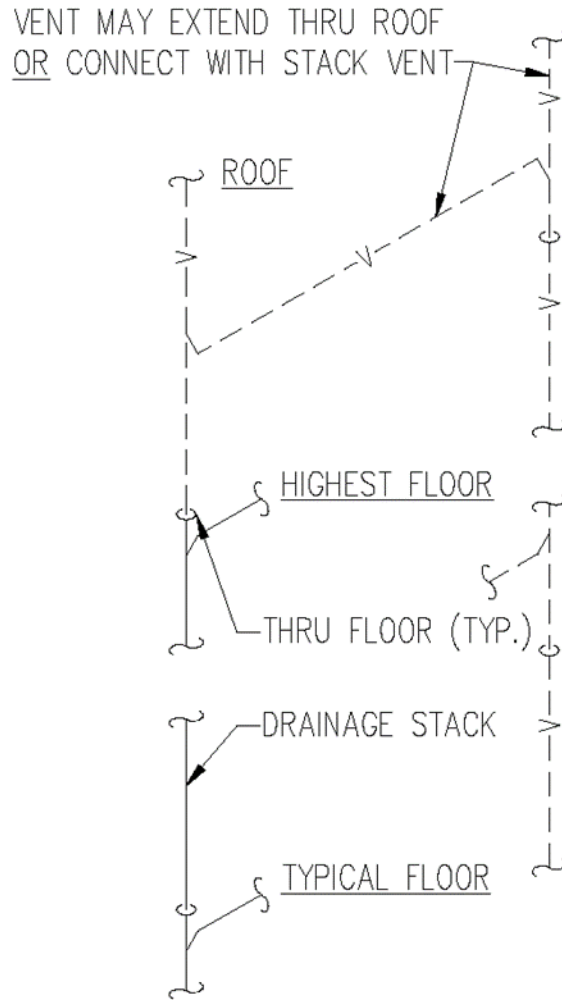
(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)



**Section 890.APPENDIX K Illustrations for Subpart K**

**Section 890.ILLUSTRATION B Vent Terminal**

(Referenced in Section 890.1430(a))

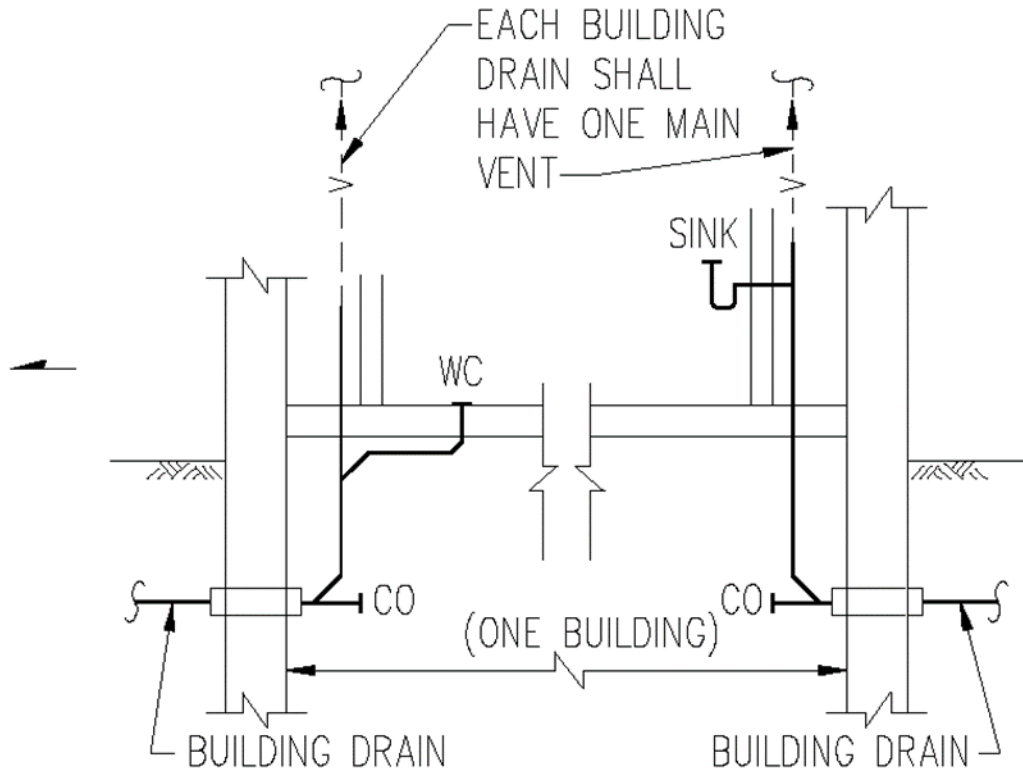


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX K Illustrations for Subpart K**

**Section 890.ILLUSTRATION C Main Vent**

(Referenced in Section 890.1420(c))

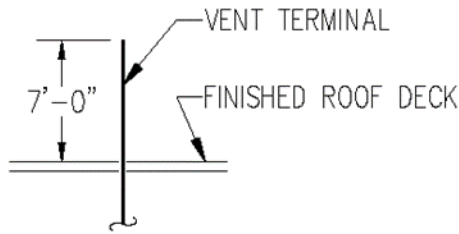


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

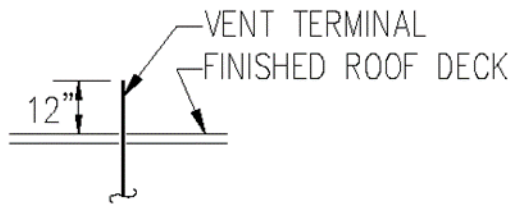
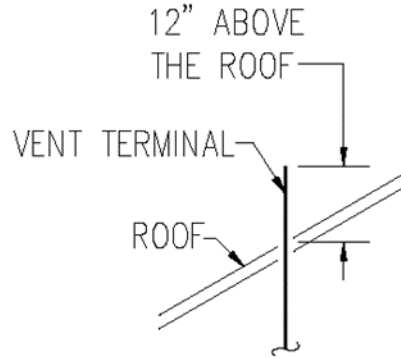
**Section 890.APPENDIX K Illustrations for Subpart K**

**Section 890.ILLUSTRATION D Roof Extensions**

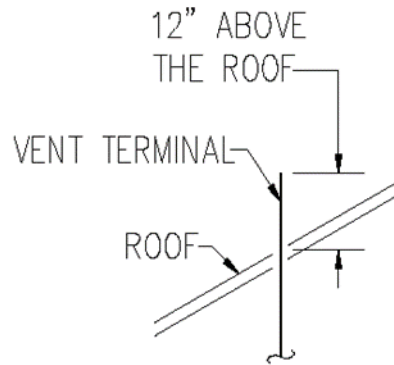
(Referenced in Section 890.1430(b))



WHEN ROOF IS INTENDED FOR SUN DECK OR OTHER SIMILAR PURPOSES, THE VENT TERMINAL SHOULD BE EXTENDED



WHEN ROOF IS USED FOR WEATHER PROTECTION ONLY

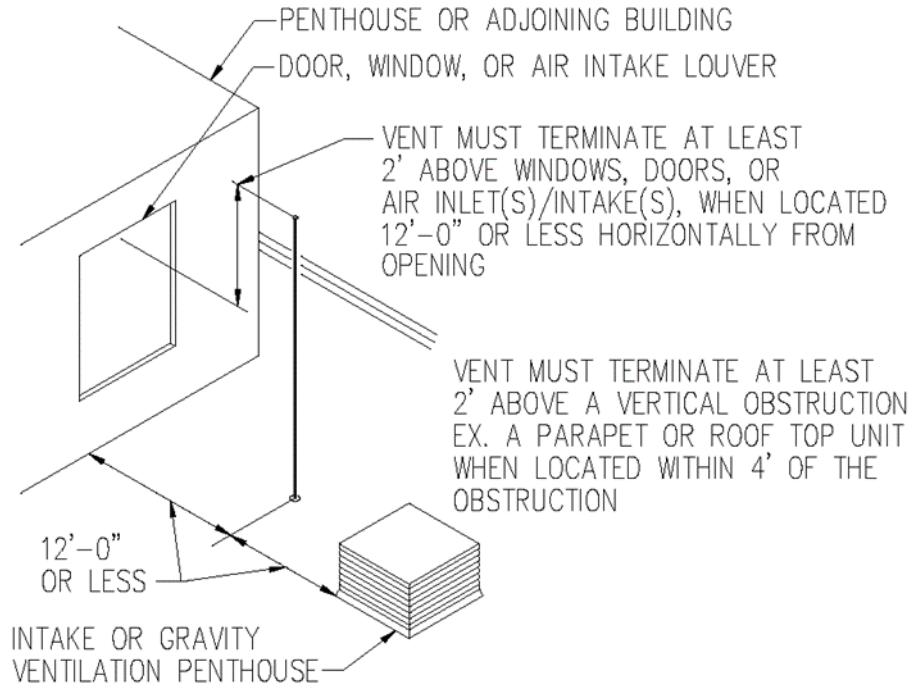


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

## Section 890.APPENDIX K Illustrations for Subpart K

### Section 890.ILLUSTRATION E Location of Vent Terminal

(Referenced in Section 890.1430(d))



**NOTE:**

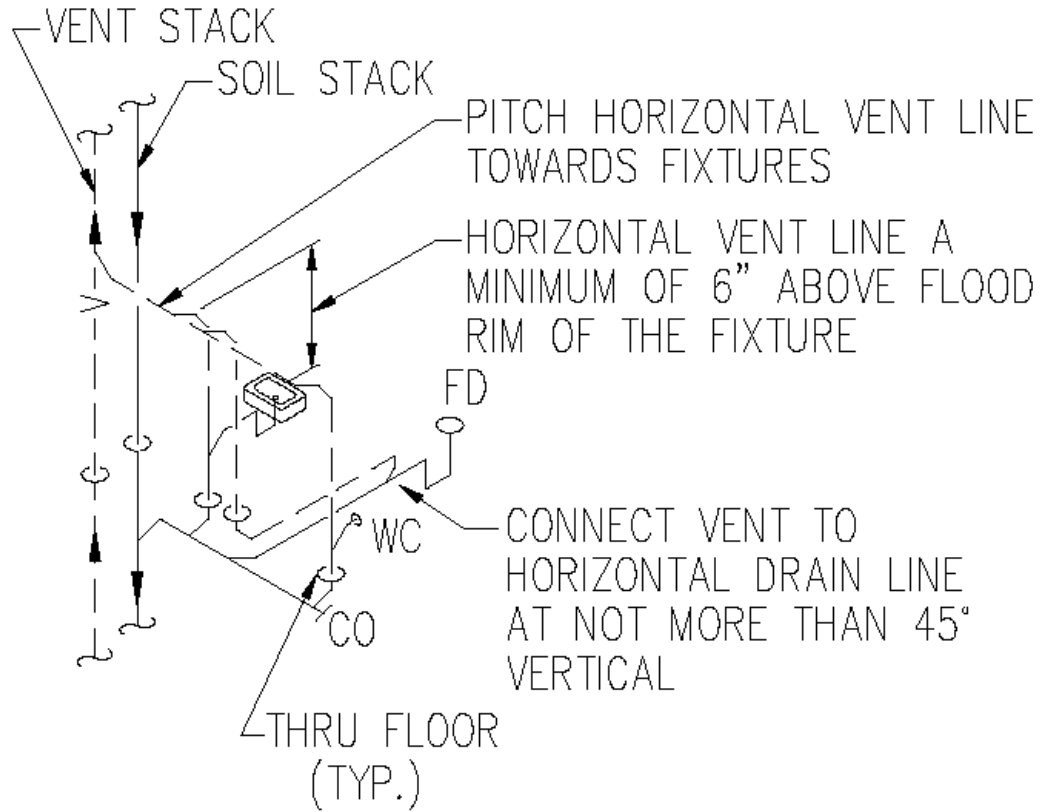
THE DISTANCE REQUIRED BY THE CODE IS THE MINIMUM. WHEN A VENT TERMINAL IS LOCATED NEAR A HIGH VELOCITY AIR INTAKE, GREATER HORIZONTAL OR VERTICAL DISTANCES SHOULD BE ALLOWED.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX K Illustrations for Subpart K**

**Section 890.ILLUSTRATION F Vent Grade and Vertical Rise**

(Referenced in Section 890.1450(a) and (b))

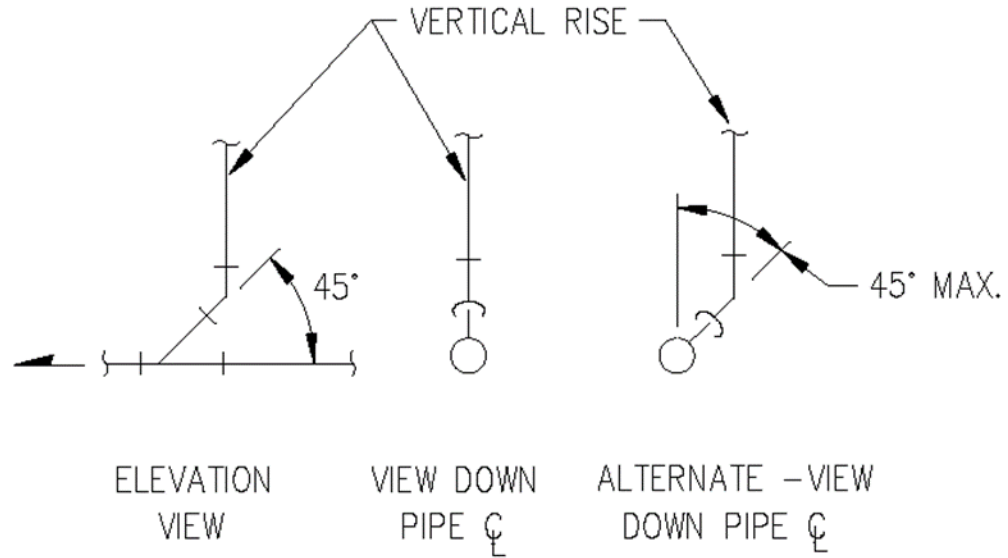


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX K Illustrations for Subpart K**

**Section 890.ILLUSTRATION G Vertical Rise**

(Referenced in Section 890.1450(b))

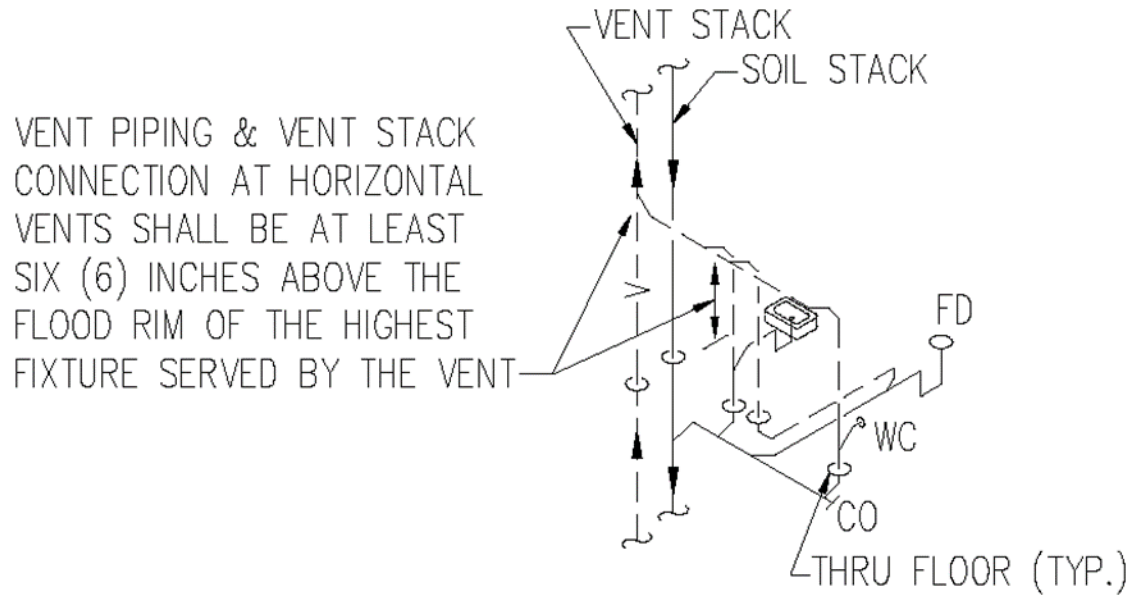


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX K Illustrations for Subpart K**

**Section 890.ILLUSTRATION H Height Above Fixtures**

(Referenced in Section 890.1450(c))

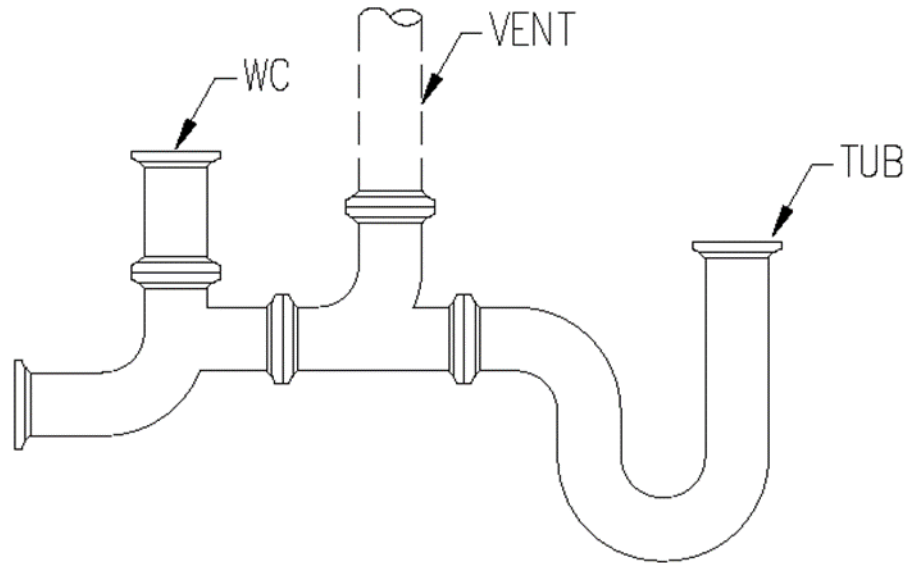
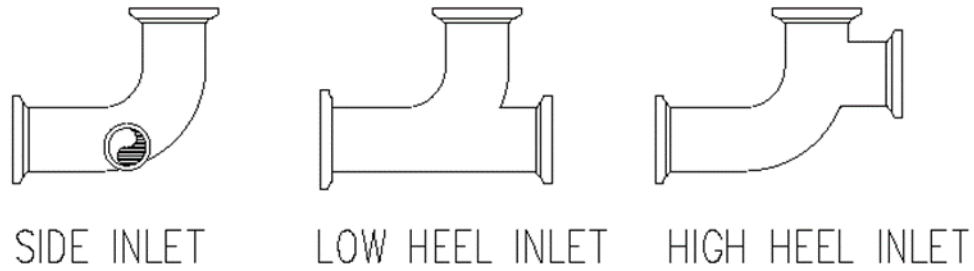


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX K Illustrations for Subpart K**

**Section 890.ILLUSTRATION I Heel or Side Inlet**

(Referenced in Section 890.1450(d))



(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)



**Section 890.APPENDIX K Illustrations for Subpart K****Section 890.ILLUSTRATION J Heel or Side-Inlet (Repealed)**

(Source: Repealed at 38 Ill. Reg. 9940, effective April 24, 2014)

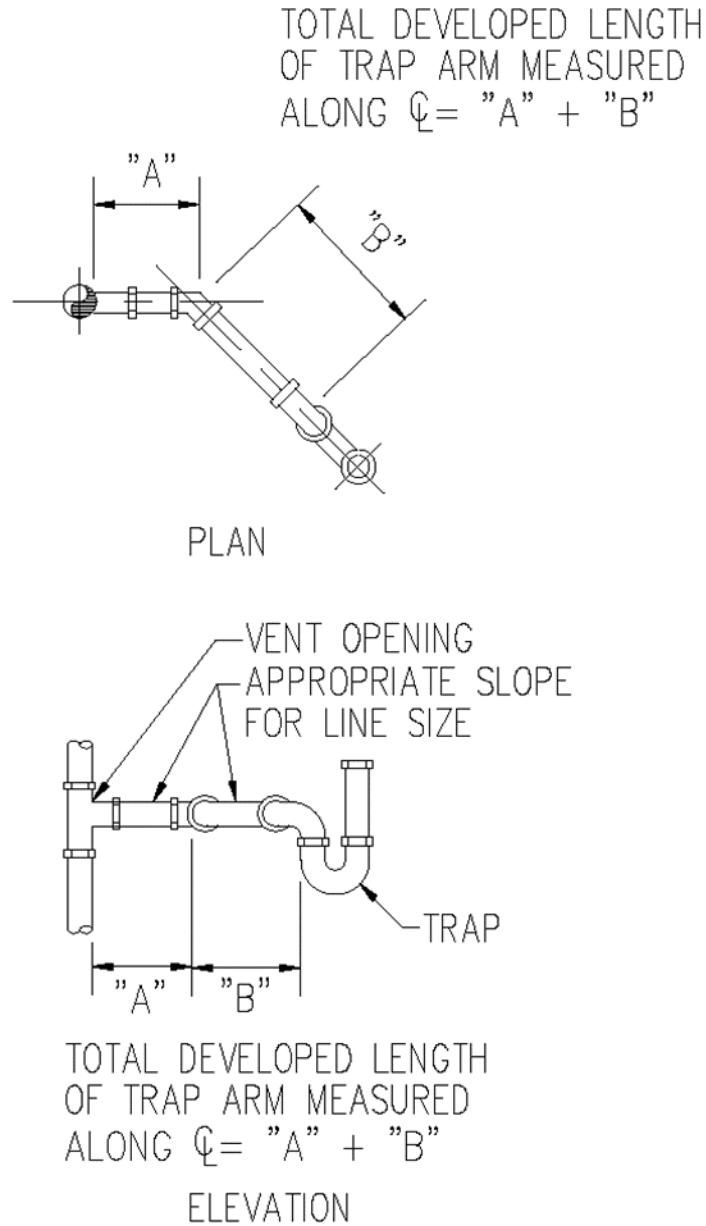
**Section 890.APPENDIX K Illustrations for Subpart K****Section 890.ILLUSTRATION K Fixtures Back-to-Back and Side-by-Side (Repealed)**

(Source: Repealed at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX K Illustrations for Subpart K**

**Section 890.ILLUSTRATION L Distance from Trap to Vent**

(Referenced in Section 890.1470(a))

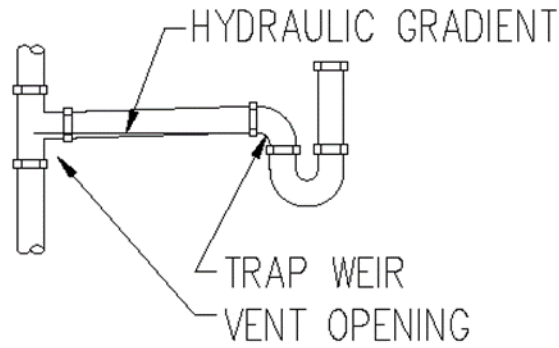


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

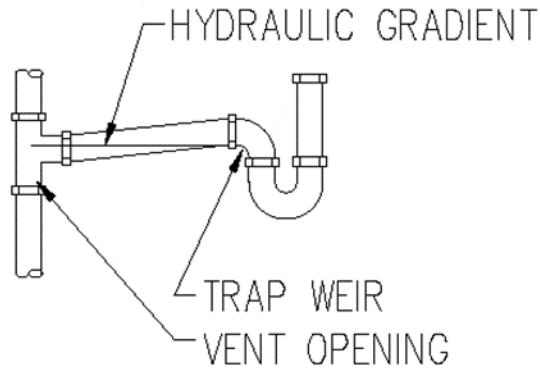
**Section 890.APPENDIX K Illustrations for Subpart K**

**Section 890.ILLUSTRATION M Trap Vent**

(Referenced in Section 890.1470(c))



SATISFACTORY INSTALLATION



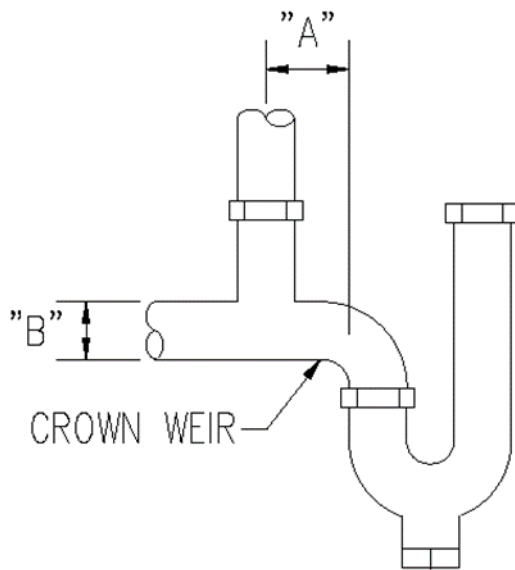
UNSATISFACTORY INSTALLATION

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX K Illustrations for Subpart K****Section 890.ILLUSTRATION N Trap Weir/Hydraulic Gradient**

(Referenced in Section 890.1470(b) and (d))

TRAP IS CROWN VENTED WHEN  
DISTANCE "A" IS LESS THAN TWO  
PIPE DIAMETERS "B" FROM CROWN  
WEIR OF TRAP

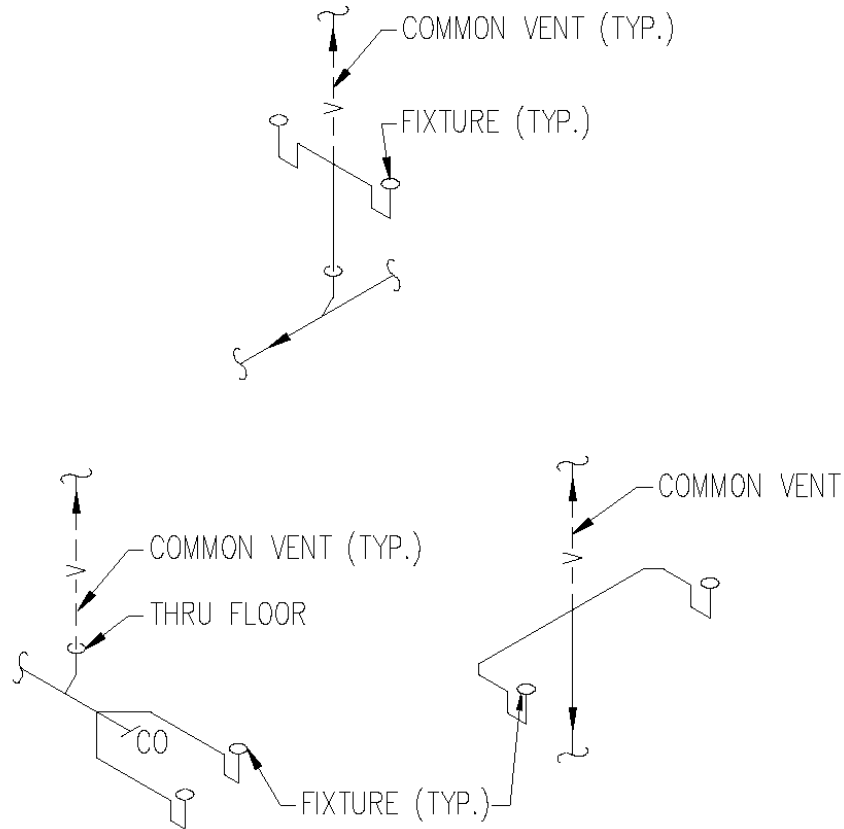


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX K Illustrations for Subpart K**

**Section 890.ILLUSTRATION O Common Vent**

(Referenced in Section 890.1480(b))

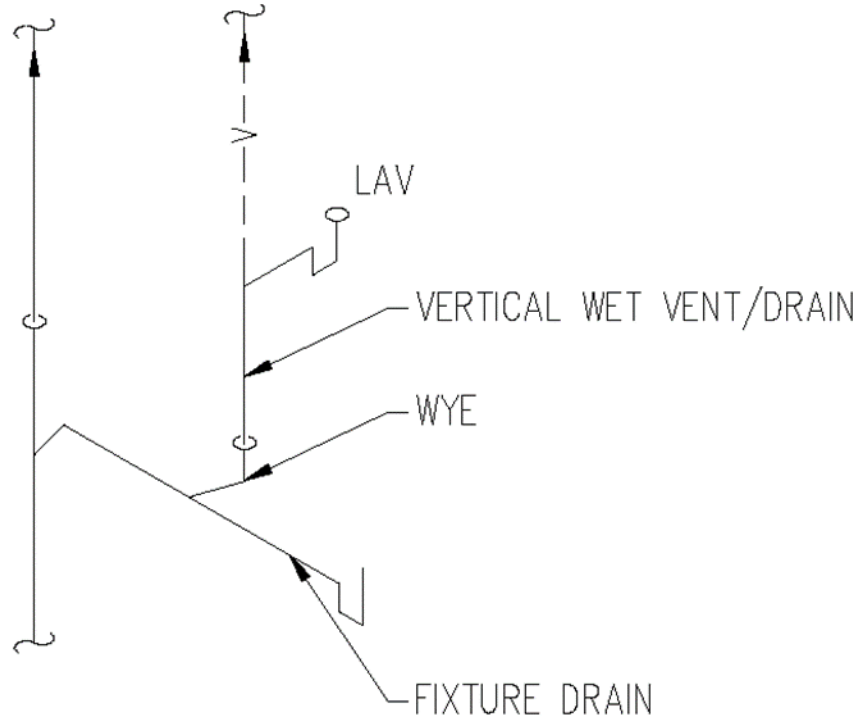


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX K Illustrations for Subpart K**

**Section 890.ILLUSTRATION P Vertical Wet Vent**

(Referenced in Section 890.1500(c))

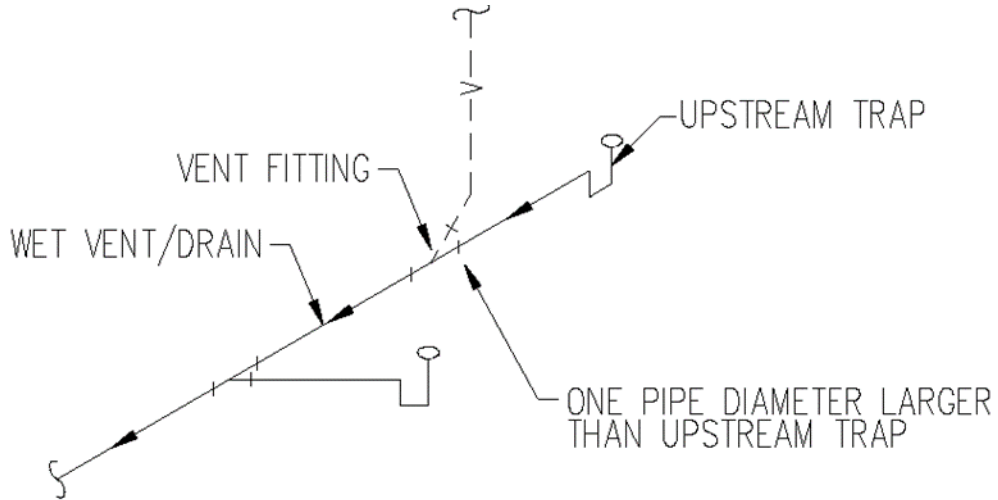


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX K Illustrations for Subpart K**

**Section 890.ILLUSTRATION Q Horizontal Wet Vent**

(Referenced in Section 890.1500(d))



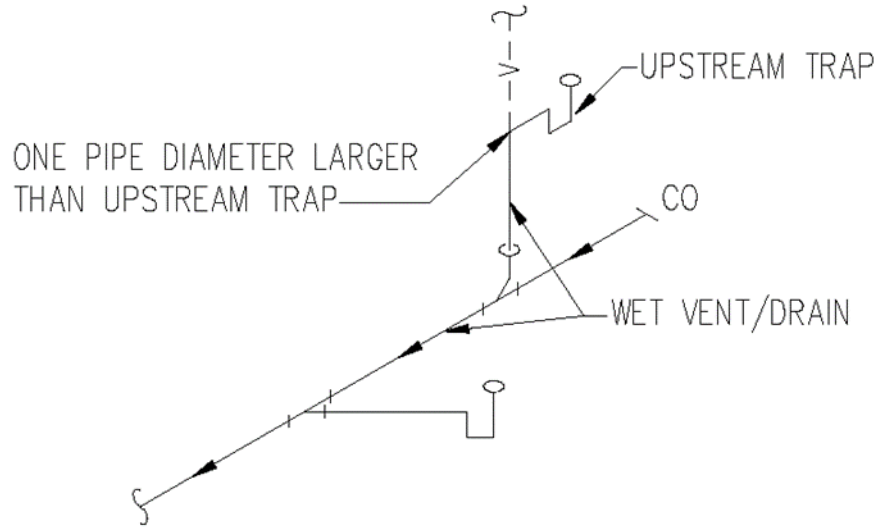
(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)



**Section 890.APPENDIX K Illustrations for Subpart K**

**Section 890.ILLUSTRATION R Vertical/Horizontal Wet Vent**

(Referenced in Section 890.1500(e))

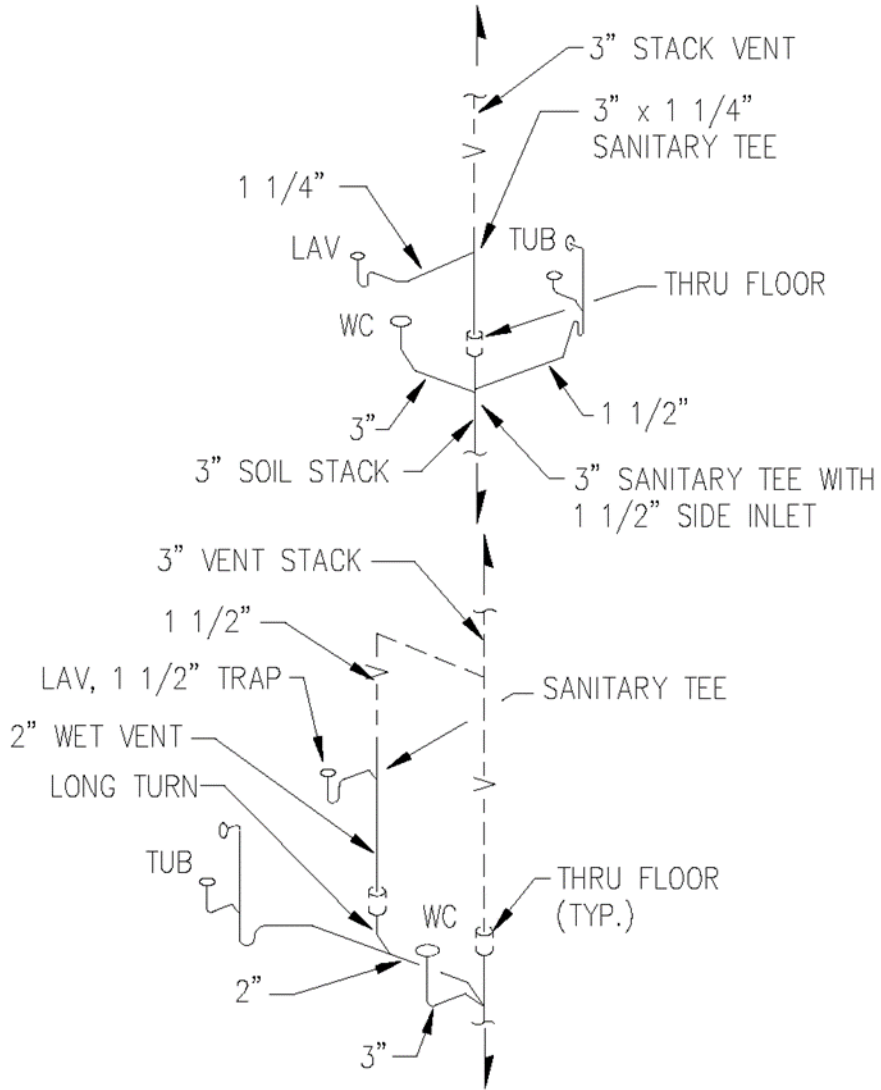


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX K Illustrations for Subpart K**

**Section 890.ILLUSTRATION S Single Bathroom Group Venting**

(Referenced in Section 890.1500(f)(2))

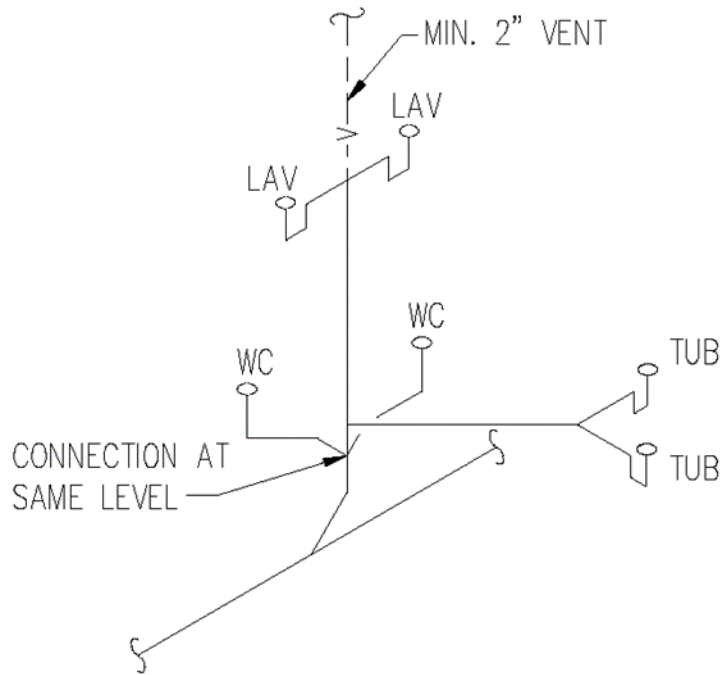


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX K Illustrations for Subpart K**

**Section 890.ILLUSTRATION T Bathroom Group Back to Back**

(Referenced in Section 890.1500(g)(1) through (4))

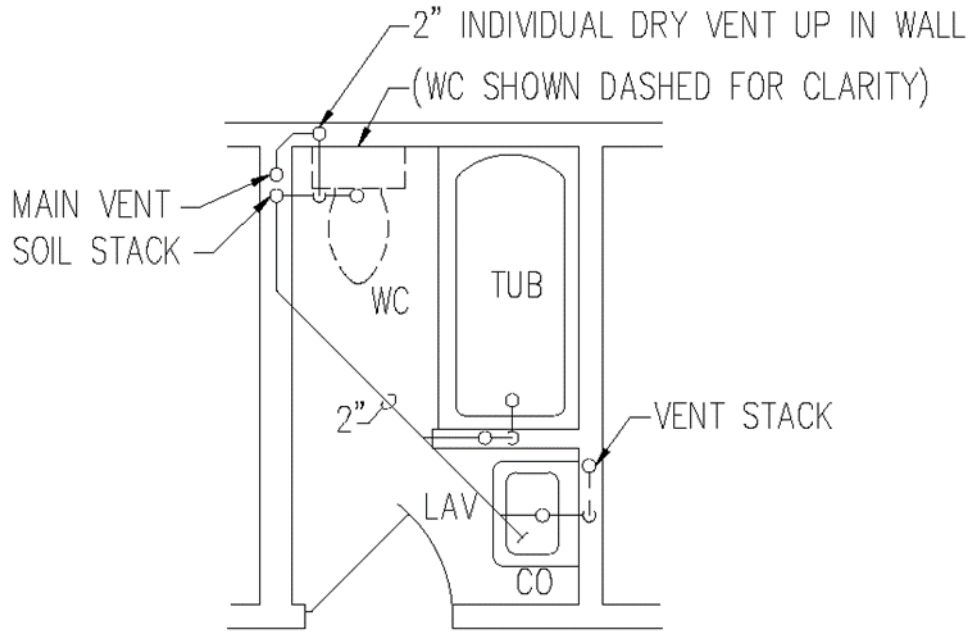


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX K Illustrations for Subpart K**

**Section 890.ILLUSTRATION U Bathroom Groups – Plan**

(Referenced in Section 890.1500(h)(3))

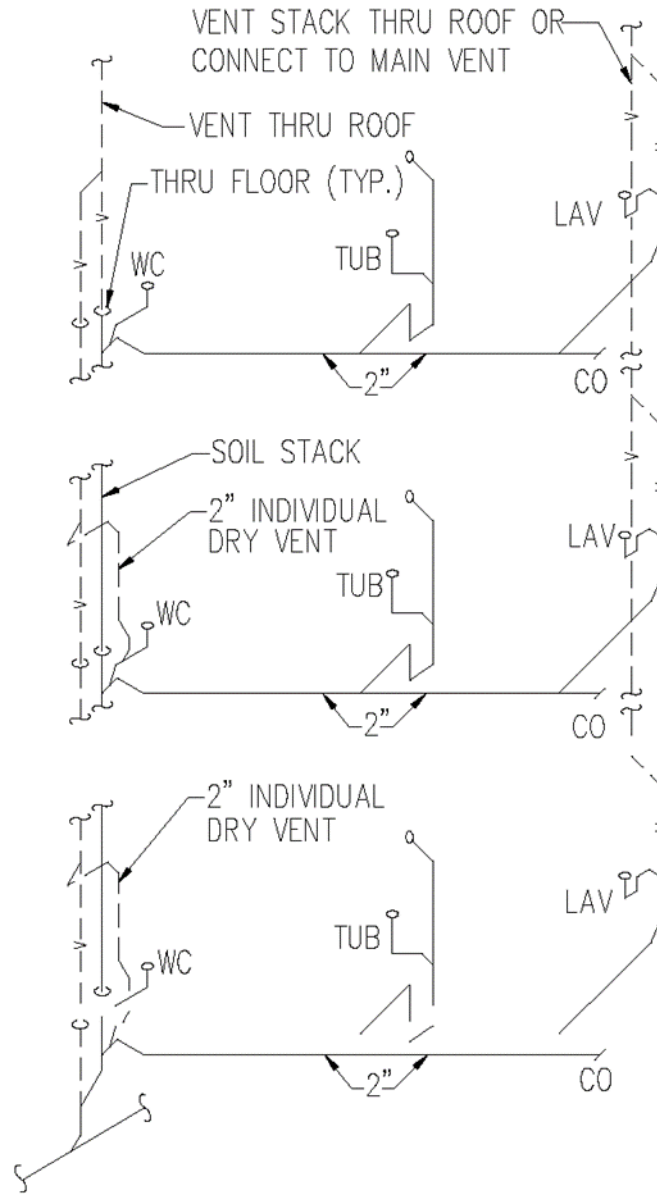


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX K Illustrations for Subpart K**

**Section 890.ILLUSTRATION V Bathroom Groups – Elevation**

(Referenced in Section 890.1500(h)(3))

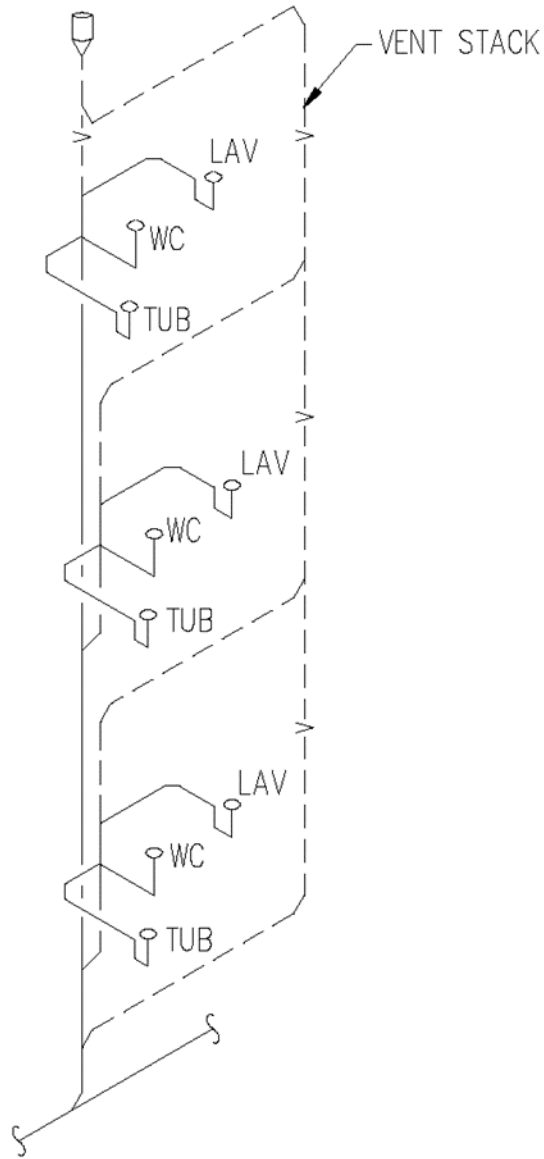


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX K Illustrations for Subpart K**

**Section 890.ILLUSTRATION W One Bathroom Group – Plan**

(Referenced in Section 890.1500(j)(3))



(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

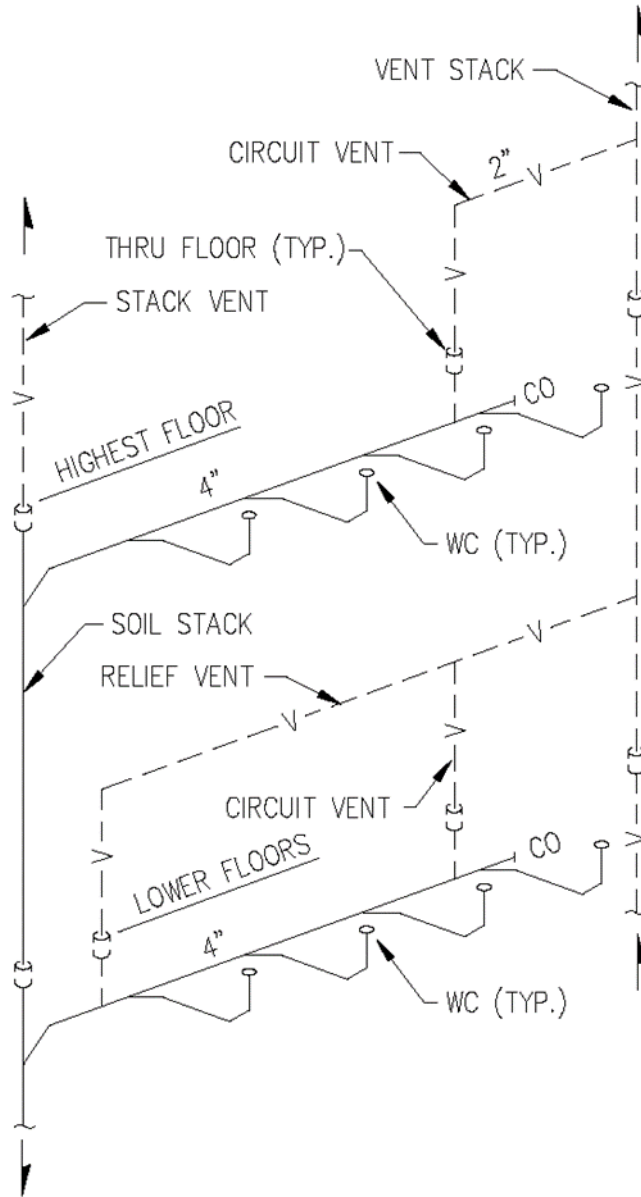
**Section 890.APPENDIX K Illustrations for Subpart K****Section 890.ILLUSTRATION X One Bathroom Group – Elevation (Repealed)**

(Source: Repealed at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX K Illustrations for Subpart K**

**Section 890.ILLUSTRATION Y Battery Venting**

(Referenced in Section 890.1520(a) and (e))



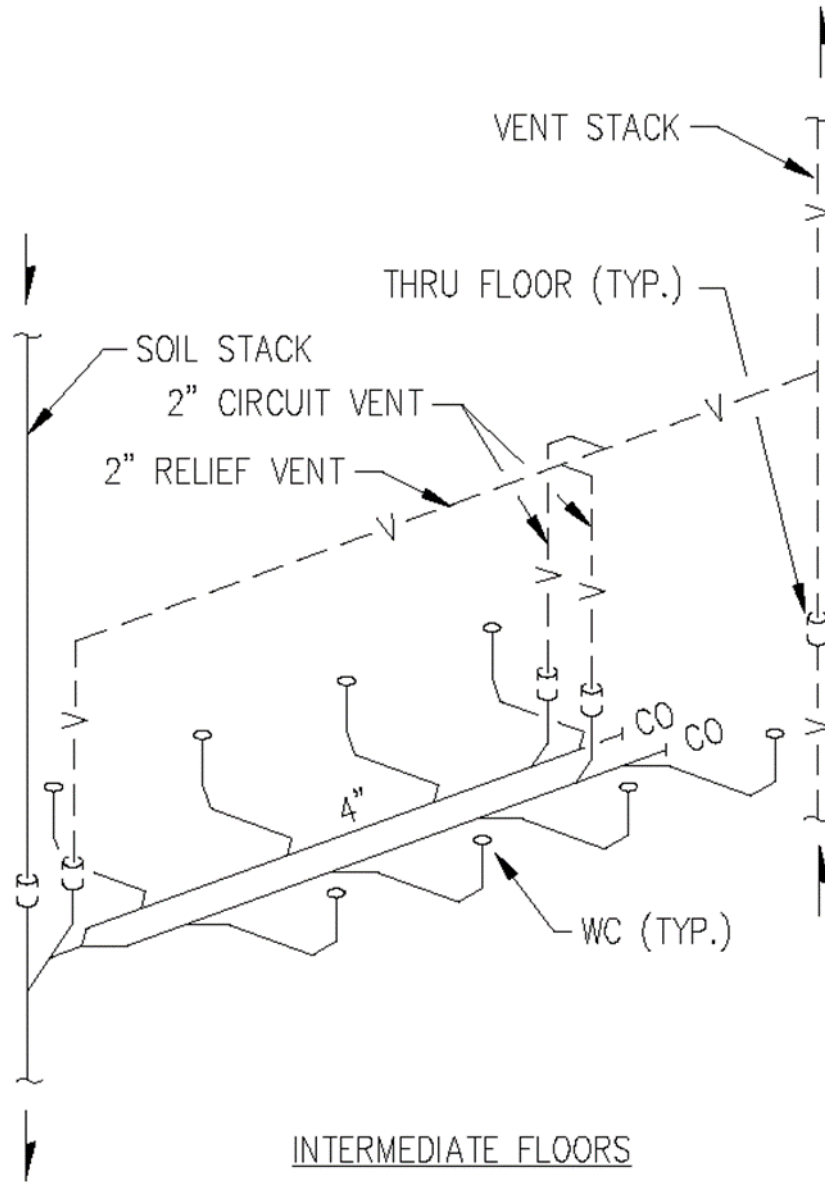
(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)



**Section 890.APPENDIX K Illustrations for Subpart K**

**Section 890.ILLUSTRATION Z Dual Branches**

(Referenced in Section 890.1520(b))

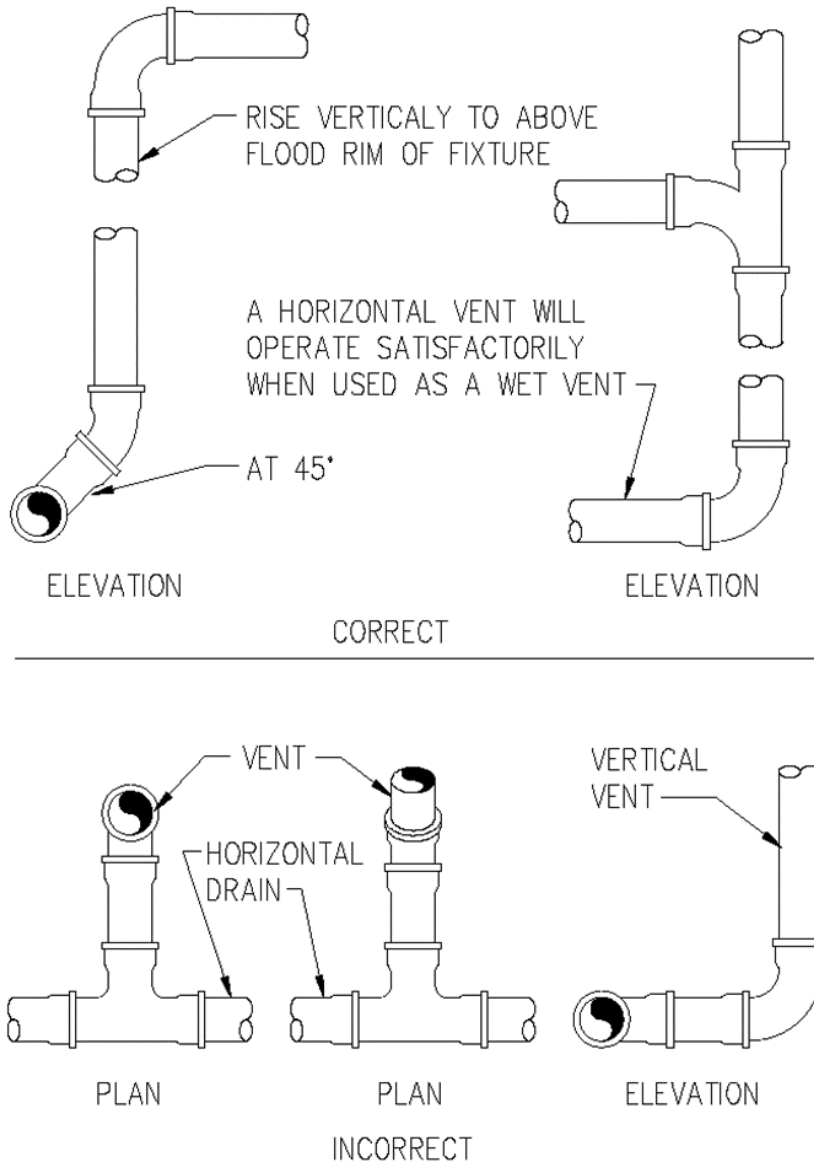


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX K Illustrations for Subpart K**

**Section 890.ILLUSTRATION AA Right and Wrong Vent Connections**

(Referenced in Sections 890.1450(b) and 890.1520(c))

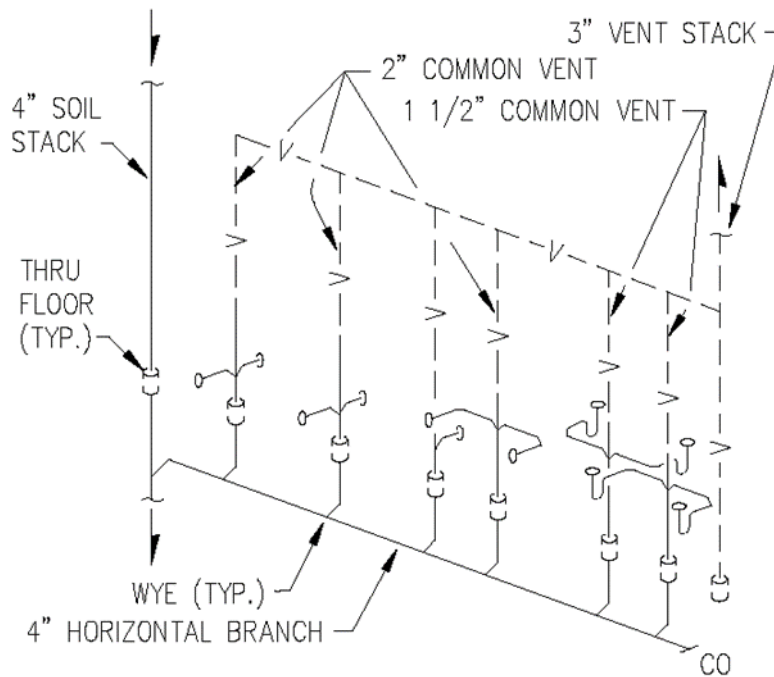
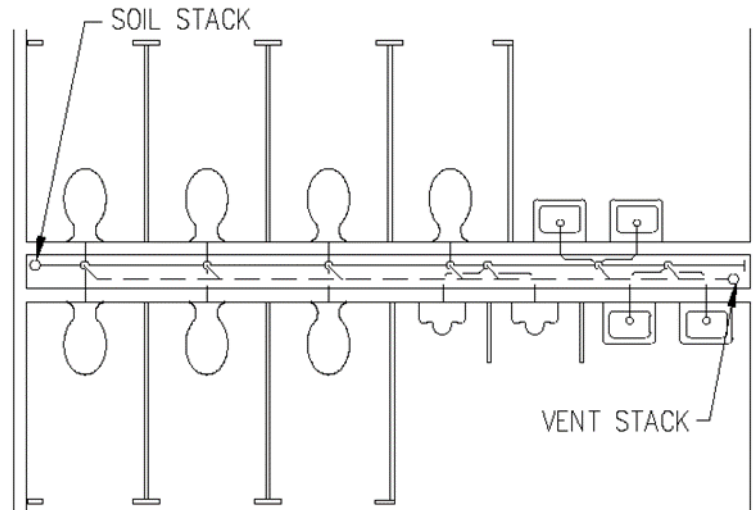


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX K Illustrations for Subpart K**

**Section 890.ILLUSTRATION BB Fixtures Back-to-Back in Battery**

(Referenced in Section 890.1520(d))

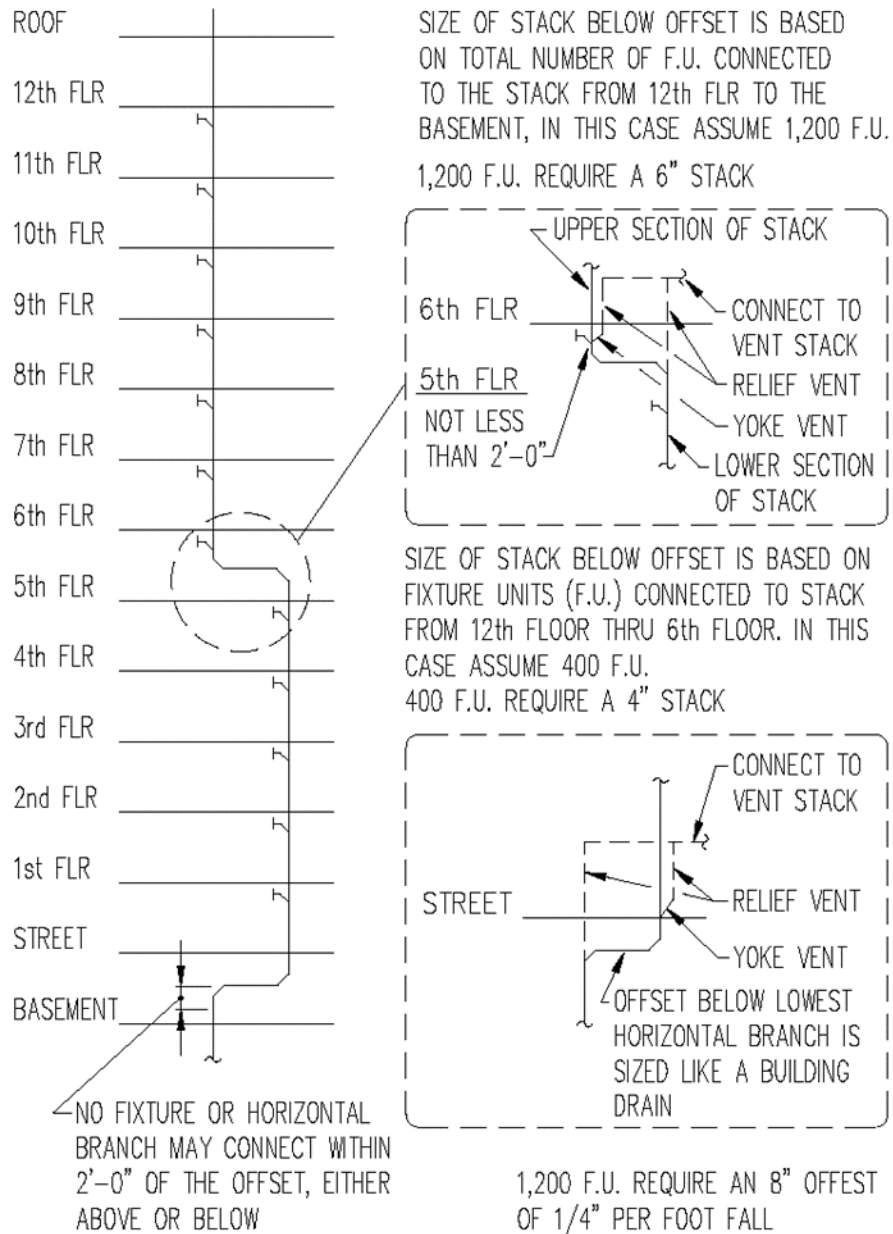


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX K Illustrations for Subpart K**

**Section 890.ILLUSTRATION CC Fixture Connections-Offset Vents**

(Referenced in Sections 890.1520(e) & 890.1550(a))

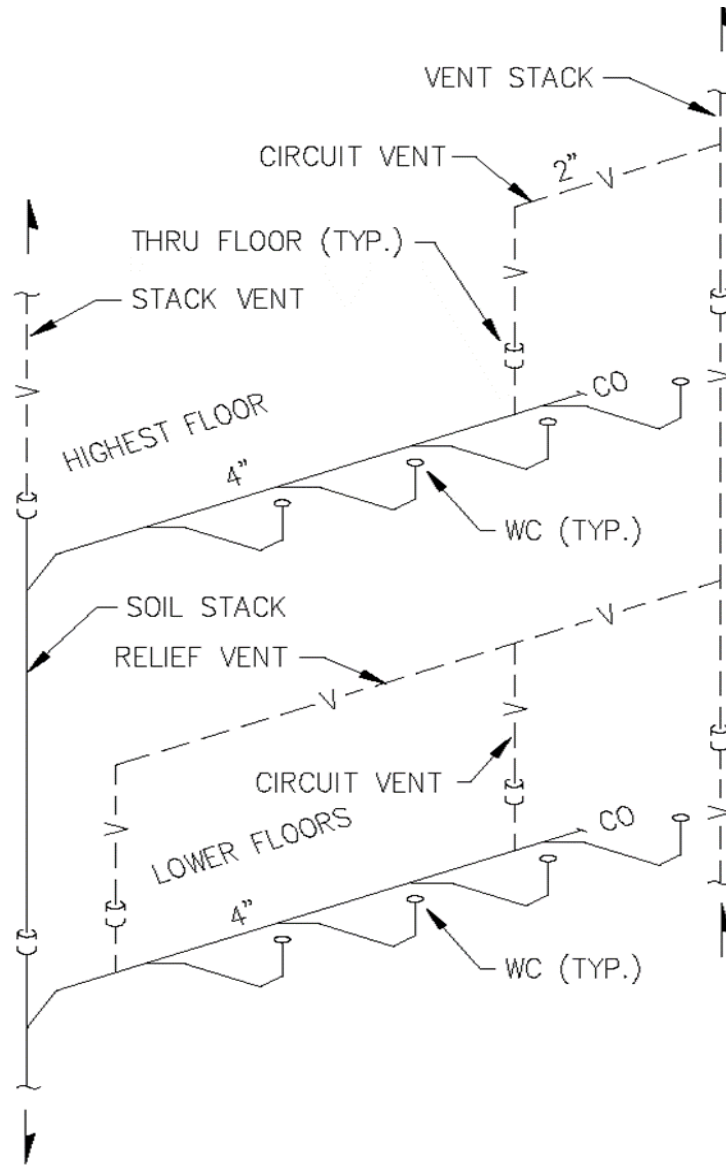


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX K Illustrations for Subpart K**

**Section 890.ILLUSTRATION DD Circuit Vented Fixtures**

(Referenced in Section 890.1520(f))

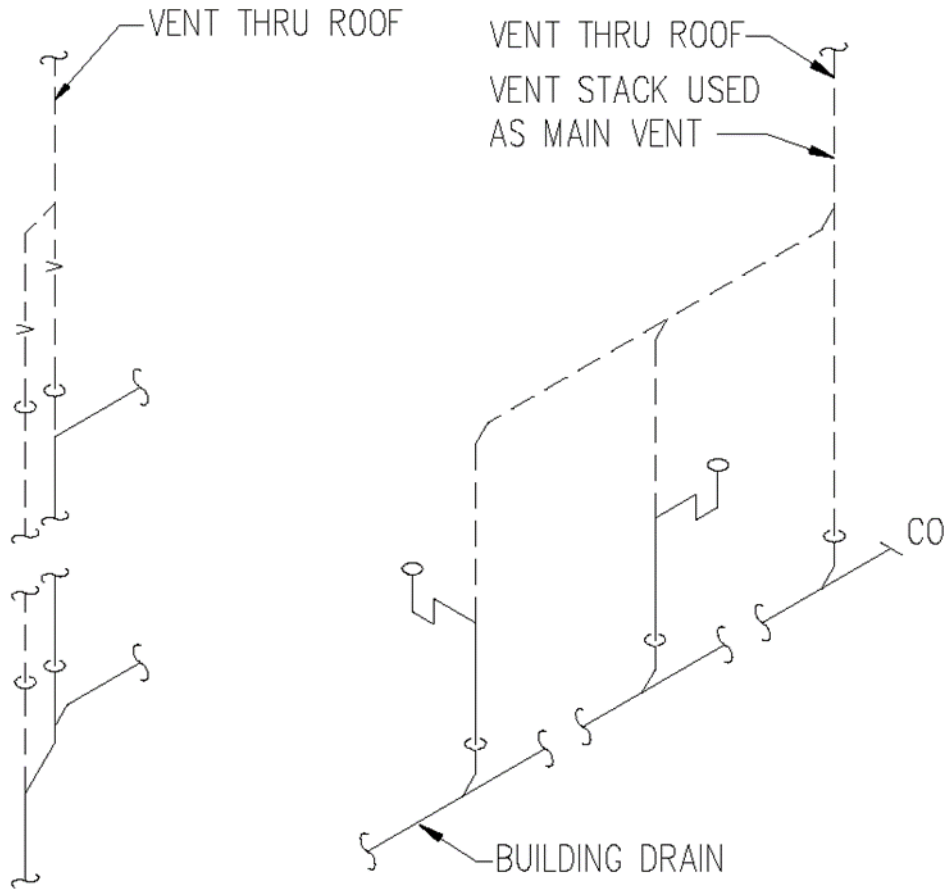


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX K Illustrations for Subpart K**

**Section 890.ILLUSTRATION EE Vent Stacks**

(Referenced in Section 890.1450(e))

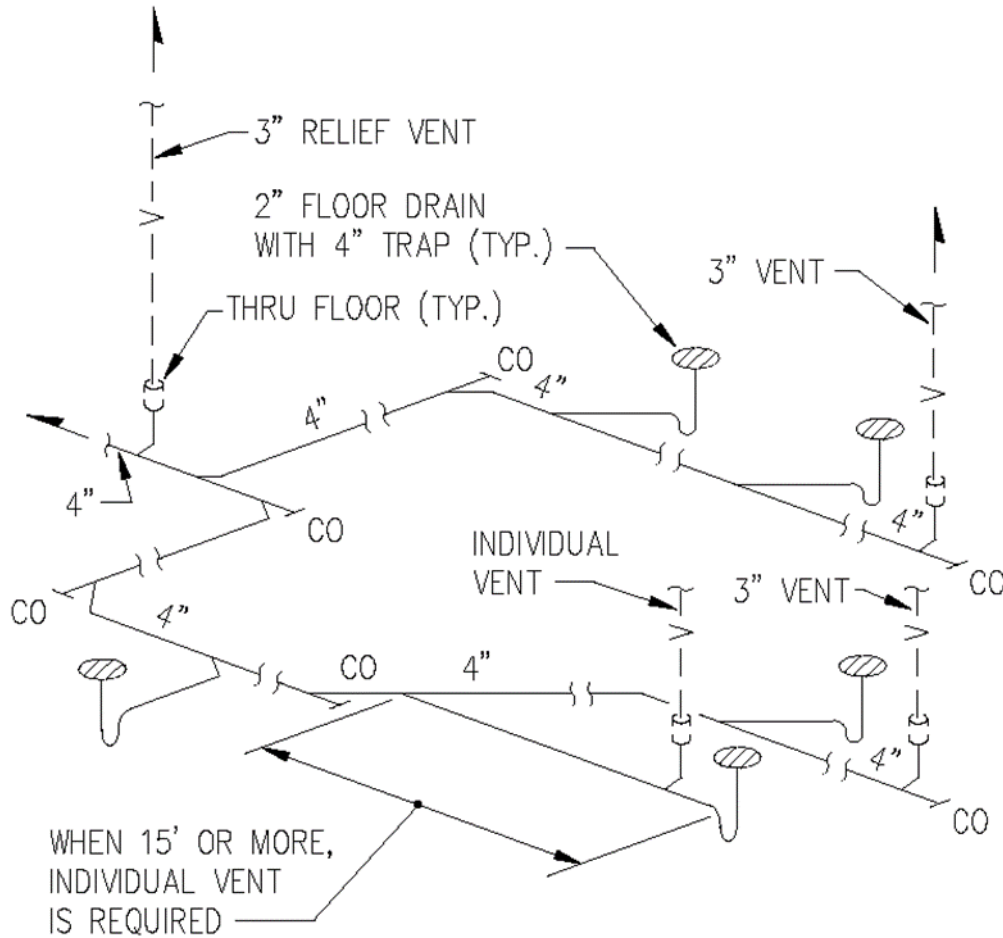


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX K Illustrations for Subpart K**

**Section 890.ILLUSTRATION FF Combination Waste and Vent**

(Referenced in Section 890.1590(d))

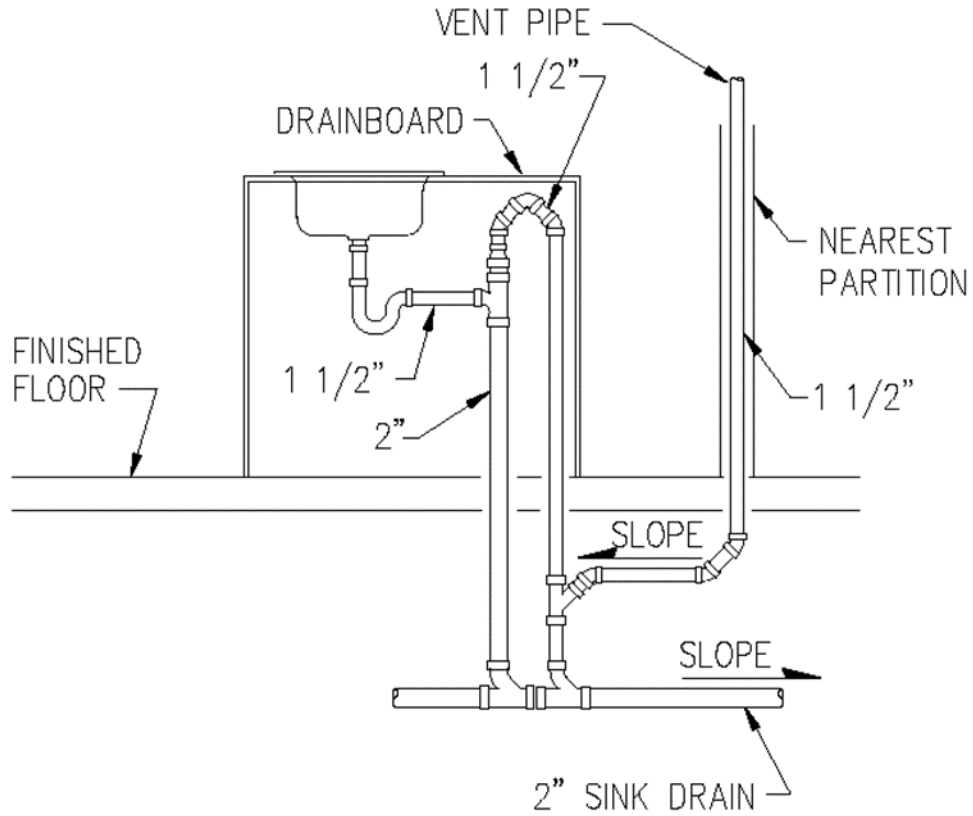


(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)

**Section 890.APPENDIX K Illustrations for Subpart K**

**Section 890.ILLUSTRATION GG Special Venting for Island Fixtures**

(Referenced in Section 890.1600(b))



(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)