

Study Session

3

2018 IPC Sections 308 through 316 General Regulations II

OBJECTIVE: To develop an understanding of those general provisions regarding plumbing systems that are not specifically addressed in other chapters of the code. To develop an understanding of the provisions that apply to materials in all plumbing applications

REFERENCE: Sections 308 through 316, 2018 *International Plumbing Code*

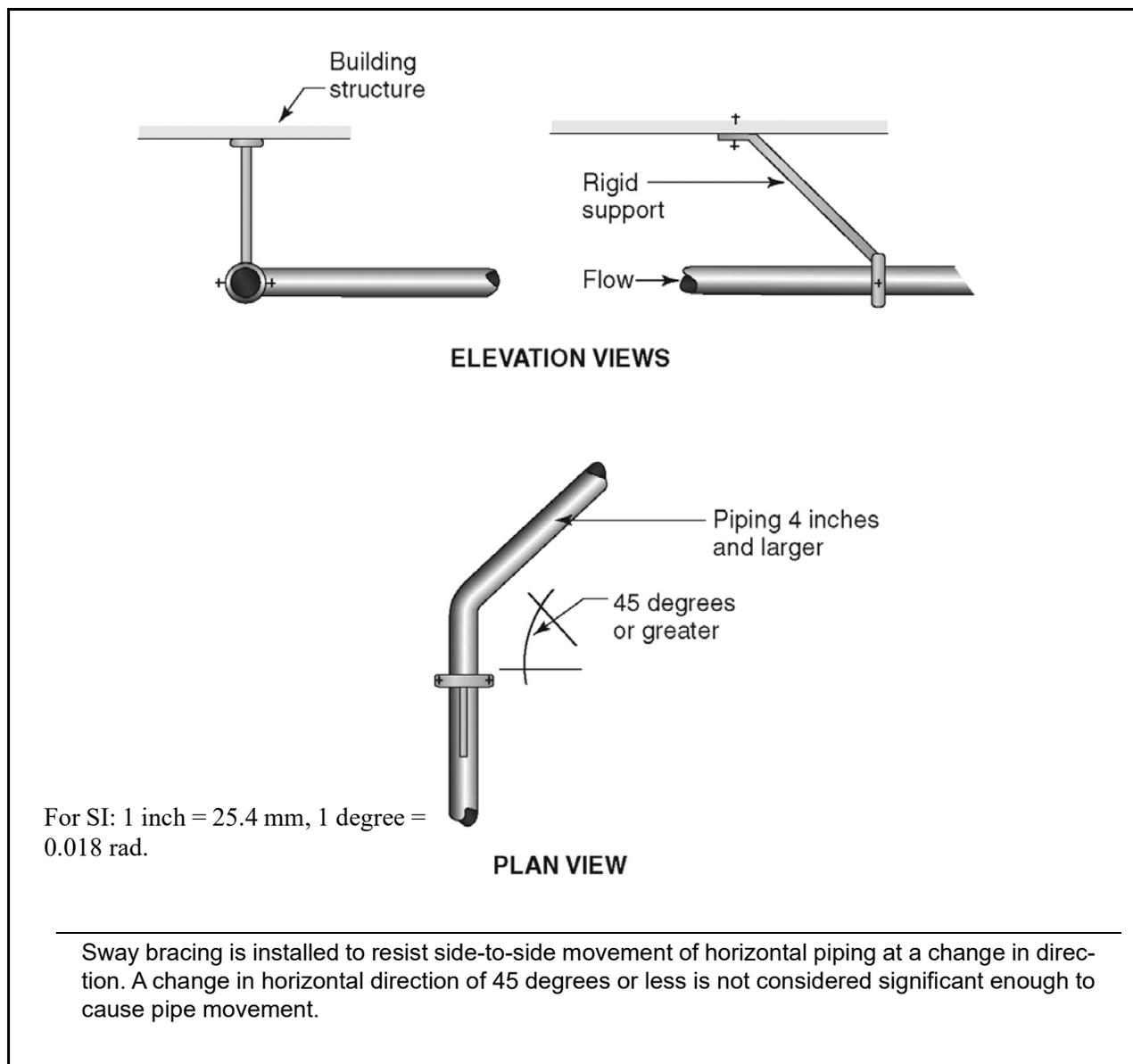
KEY POINTS:

- What piping is required to be supported? What seismic requirements apply?
- What types of materials are permitted to be used for hangers, anchors and supports?
- How is the interval of support for both horizontal and vertical piping determined?
- When is sway bracing required?
- When are piping restraints required, and what methods are acceptable?
- What requirements apply to hot and cold water piping installed in bundles?
- What regulations apply to plumbing systems and equipment installed in flood hazard areas?
- What plumbing systems are required to be located above the designated flood elevation?
- What plumbing systems are permitted to be located below the designated flood elevation?
- What light, ventilation and interior finish requirements apply to washrooms and toilet rooms?
- What plumbing facilities are required for construction workers?
- When is testing required for piping systems? What are the methods for testing?
- What criteria apply to the maximum increments in test gauges?
- When is pressure air testing not permitted?
- What test requirements apply to shower liners?
- What components of a plumbing system require annual inspection and testing?

- KEY POINTS:**
- (Cont'd)**
- What requirements apply to the collection and disposal of condensate wastes?
 - When are auxiliary systems required for the disposal of condensate wastes?
 - When are traps required for condensate piping systems?
 - When are pipe penetrations required to be sealed? What materials are approved for sealing around the pipes?
 - How are pipe penetrations of fire-resistance-rated assemblies regulated?
 - What specific design, submittal, documentation and inspection requirements apply to alternative engineered designs?

Code Text: *Where horizontal pipes 4 inches (102 mm) and larger convey drainage or waste, and where a pipe fitting in that piping changes the flow direction greater than 45 degrees (0.79 rad), rigid bracing or other rigid support arrangements shall be installed to resist movement of the upstream pipe in the direction of pipe flow. A change of flow direction into a vertical pipe shall not require the upstream pipe to be braced.*

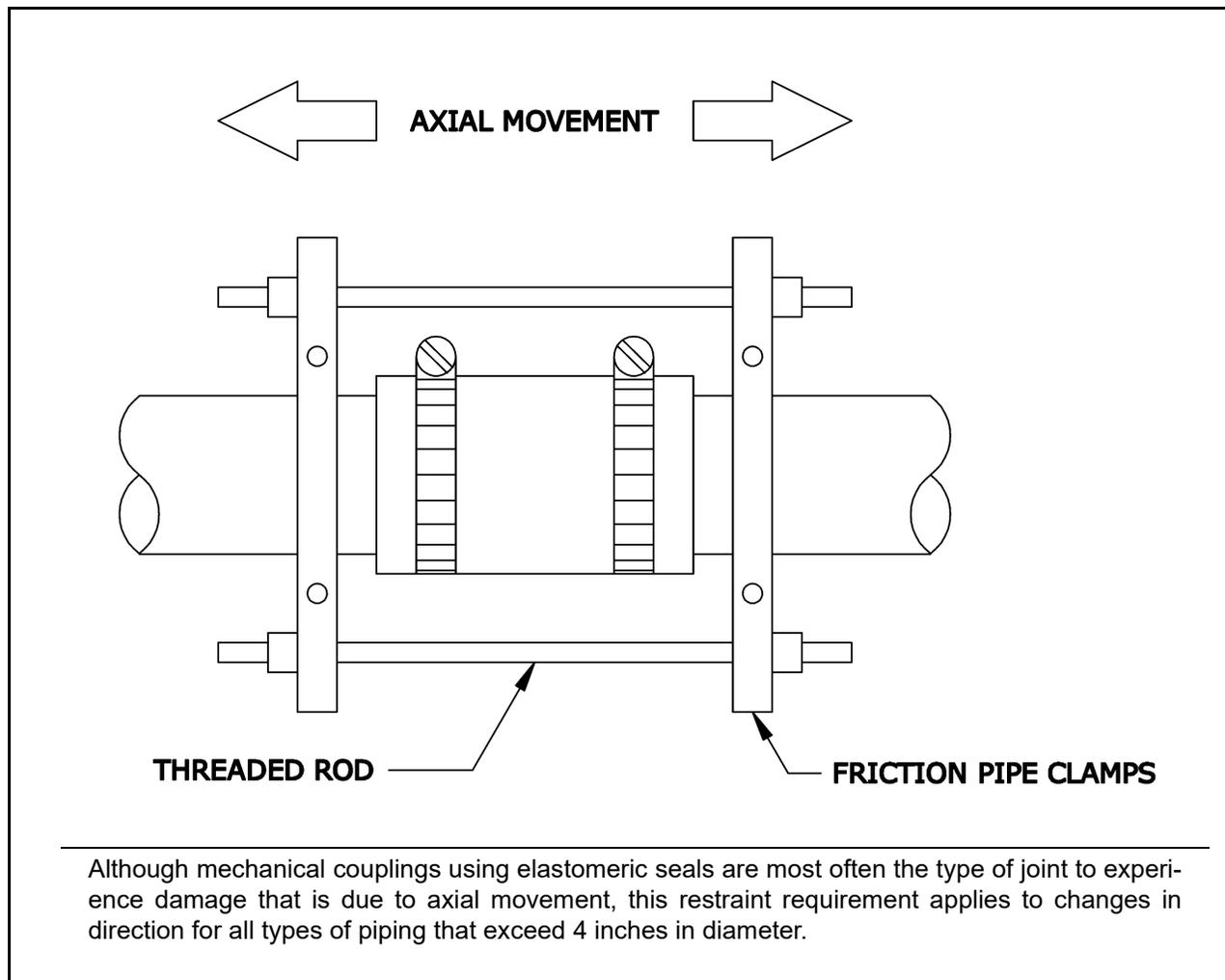
Discussion and Commentary: For larger pipes, hangers alone may not be sufficient to resist the forces created by water movement within horizontal piping at a change in direction. To maintain alignment and prevent damage to the piping system adjacent to the elbow fitting, rigid sway bracing is required when the horizontal change in direction exceeds 45 degrees and the piping is 4 inches or greater in diameter.



Sway bracing is installed to resist side-to-side movement of horizontal piping at a change in direction. A change in horizontal direction of 45 degrees or less is not considered significant enough to cause pipe movement.

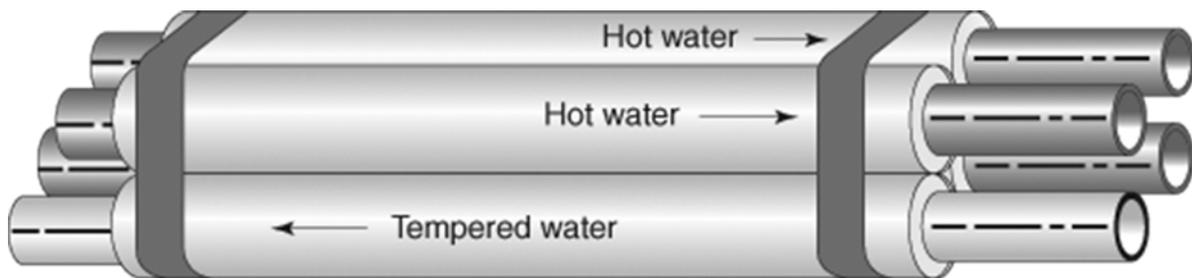
Code Text: *Anchorage shall be provided to restrain drainage piping from axial movement. For pipe sizes greater than 4 inches (102 mm), restraints shall be provided for drain pipes at all changes in direction and at all changes in diameter greater than two pipe sizes. Braces, blocks, rodding and other suitable methods as specified by the coupling manufacturer shall be utilized.*

Discussion and Commentary: This section requires a method of resisting axial movement of piping systems in order to prevent joint separation, regardless of the type of fittings or connections used. In particular, mechanical couplings using an elastomeric seal (typically hubless piping systems) have a limited ability to resist axial movement (pulling apart); therefore, pipe restraints must be provided to prevent joint separation. Section 308.7.1 requires axial restraints for pipe sizes greater than 4 inches at each change in direction and at each location with a change greater than two pipe sizes. Such joints also have a limited ability to resist shear forces. The hanger and support system must, therefore, prevent the couplings and connections from being subjected to shear forces that can damage the joint.



Code Text: *Piping bundles for manifold systems shall be supported in accordance with Table 308.5. Support at changes in direction shall be in accordance with the manufacturer's instructions. Where hot water piping is bundled with cold or hot water piping, each hot water pipe shall be insulated.*

Discussion and Commentary: Typically, manifold systems distribute individual water supply lines to each fixture using PEX or some other semirigid plastic piping or tubing. The individual lines may be bundled together, and such bundles are treated as a single unit for determining hanger spacing. Installation also must comply with the manufacturer's installation instructions, which include the required supports at changes in direction to maintain a smooth transition without damaging, deforming or reducing the cross-sectional area of the piping.

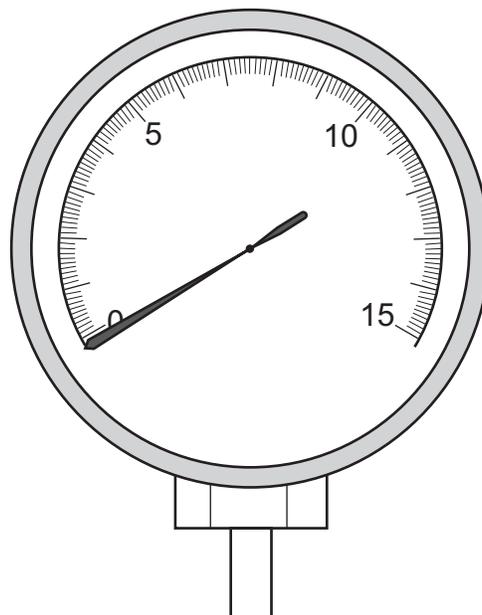


To prevent thermal transfer, the code requires each hot water pipe to be insulated when hot water piping is bundled with other piping. Bundles of PEX piping typically are held together loosely with plastic ties to allow for expansion and contraction of the individual pipes.

Code Text: *Gauges used for testing shall be as follows:*

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

Discussion and Commentary: A test gauge must be chosen to accurately measure the air pressure and clearly indicate any drop in pressure so as to detect a leak in the piping system. For example, a test gauge with increments of 1 or 2 psi will not provide the necessary accuracy when testing a piping system with only 5 psi of air pressure. In such a case, a small drop in pressure would not be noticeable on the gauge.

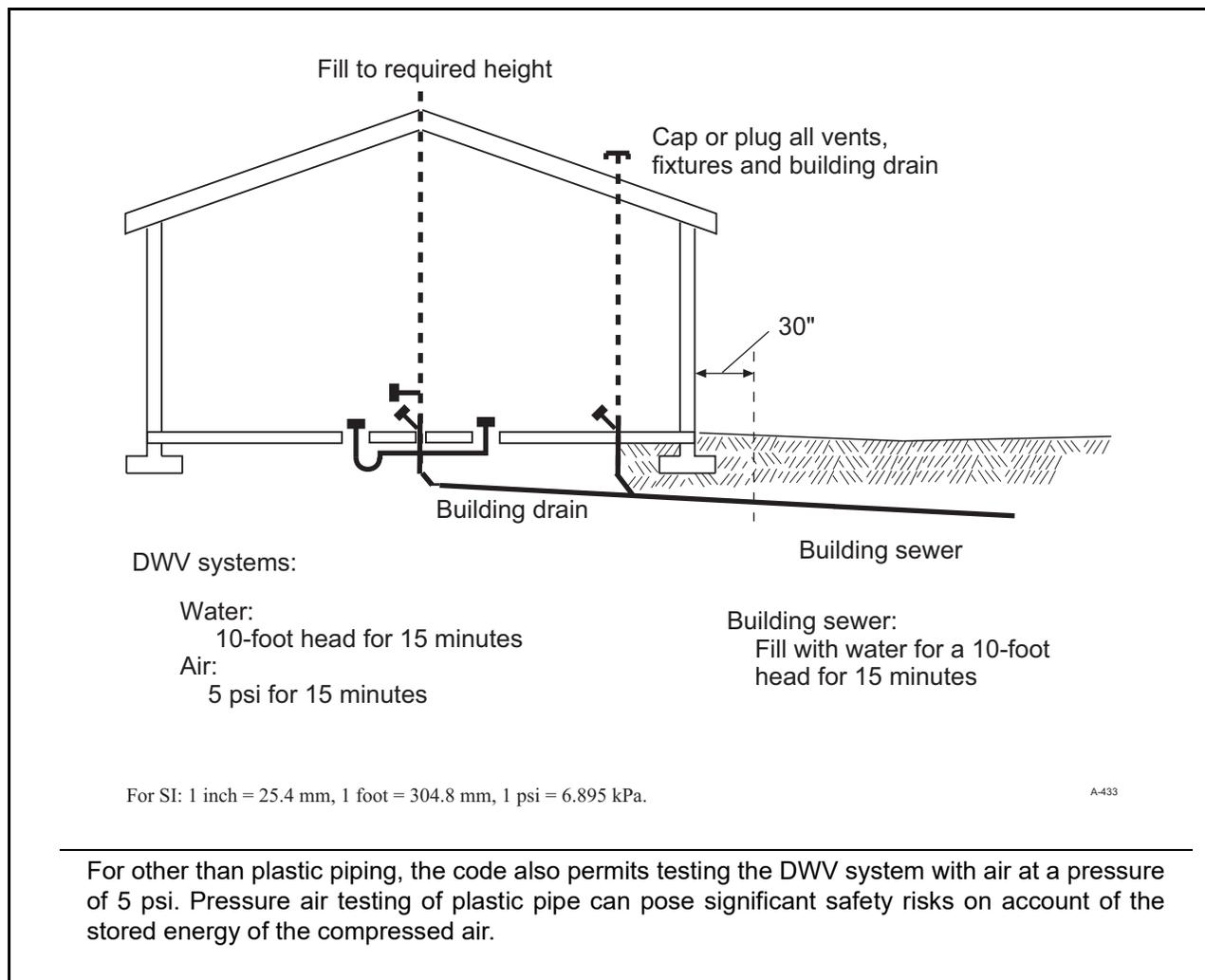


PRESSURE GAUGE WITH
0.10 PSI INCREMENTS FOR
TESTING AT 10 PSI OR LESS

The permit holder is responsible for performing the tests and giving reasonable advance notice to the code official that the system is ready for inspection and observation of the testing.

Code Text: *A water test shall be applied to the drainage system either in its entirety or in sections. In testing successive sections, at least the upper 10 feet (3048 mm) of the next preceding section shall be tested so that no joint or pipe in the building, except the uppermost 10 feet (3048 mm) of the system, shall have been submitted to a test of less than a 10-foot (3048 mm) head of water. This pressure shall be held for not less than 15 minutes. The system shall then be tight at all points.*

Discussion and Commentary: All drain, waste and vent (DWV) piping must be tested in an appropriate manner to verify that there are no leaks in the system. For a water test (the most common method of testing the DWV system) all portions of the system are filled with water, including 10 feet of water-filled vertical pipe above all piping being tested. The uppermost 10 feet of the system that includes the highest vent through the roof only needs to be filled with water and does not require 10 feet of head pressure.



Code Text: *Upon completion of a section of or the entire water supply system, the system, or portion completed shall be tested and proved tight under a water pressure not less than the working pressure of the system; or, for piping systems other than plastic, by an air test of not less than 50 psi (344 kPa). This pressure shall be held for not less than 15 minutes. The water utilized for tests shall be obtained from a potable source of supply. The required tests shall be performed in accordance with this section and Section 107.*

Discussion and Commentary: Water piping typically is tested by capping the outlets and connecting to the domestic potable water supply. In cases where the water supply is not yet available or to test isolated portions of the system, the code also permits testing of copper water piping with air at a pressure of 50 psi.



Testing with air is not permitted on plastic piping systems because of the hazards of a sudden release of energy, which could cause a separated piece of piping or a fitting to become a projectile causing serious injury.