Part VII—Plumbing

Chapter 25: Plumbing Administration

User note: Code change proposals to this chapter will be considered by the IRC – Plumbing and Mechanical Code Development Committee during the 2015 (Group A) Code Development Cycle.

General Comments

Chapter 25 contains administrative requirements that apply to the installation of plumbing systems and to the ensuing plumbing related chapters of the code. Chapter 25 refers the user to the applicable provisions of Chapter 1 and addresses the code requirements' applicability to additions, alterations and repairs. This chapter also outlines the building official's authority and discretion regarding existing construction that is used in conjunction with new construction.

Chapter 25 lists the types and phases of various inspections as well as detailing the permit holder's responsibilities for scheduling and performing tests.

Purpose

The requirements of Chapter 25 do not supersede the administrative provisions of Chapter 1. Rather, the administrative guidelines of Chapter 25 pertain to plumbing installations that are best referenced and located within the plumbing chapters. This chapter addresses how to apply the plumbing provisions of this code to specific types or phases of construction. This chapter also outlines the responsibilities of the applicant, the installer and the inspector with regard to testing plumbing installations.

SECTION P2501 GENERAL

P2501.1 Scope. The provisions of this chapter shall establish the general administrative requirements applicable to plumbing systems and inspection requirements of this code.

❖ This section states that the provisions of Chapter 25 set forth the general administration requirements for plumbing systems.

P2501.2 Application. In addition to the general administration requirements of Chapter 1, the administrative provisions of this chapter shall also apply to the plumbing requirements of Chapters 25 through 32.

❖ Section P2501.2 refers to the applicability of the administrative requirements of Chapter 1 and of plumbing Chapters 25 through 33.

SECTION P2502 EXISTING PLUMBING SYSTEMS

P2502.1 Existing building sewers and building drains. Where the entire sanitary drainage system of an existing building is replaced, existing *building drains* under concrete slabs and existing *building sewers* that will serve the new system shall be internally examined to verify that the piping is sloping in the correct direction, is not broken, is not obstructed and is sized for the drainage load of the new plumbing drainage system to be installed.

❖ A home could be so significantly damaged from fire or wind that the home must be completely removed in order for another home to be constructed. Or, the repair of an older home might be so cost prohibitive that it is more cost effective to tear it down and build a new home on the same lot. The routing of the existing building sewer might be complicated by existing driveways, trees or accessory buildings. In some jurisdictions, the homeowner is responsible for their building sewer as it passes into a right-of-way, such as crossing a street en route to the public sewer main on the other side. In other situations, the homeowner's building sewer might cross another owner's property.

Another situation might be that a concrete slab-on-grade building is completely replaced using the existing slab as the foundation for the new building. The existing building drain system could still be intact and in good condition such that the slab would not have to be cut up to replace the building drain.

Although the code does not specifically state that new-built homes must be served by a new building sewer (and a new building drain), some code officials might interpret the code as requiring an all new building drain and building sewer. In the scenarios given in the previous two paragraphs, replacement of building drains and building sewers might be very costly. Furthermore, the replacement might be completely unnecessary. Why tear out good, serviceable building drains and building sewers just for sake of replacing with new material? The only way to know if existing building drains and existing building sewers are serviceable is to internally examine the piping for problems. The only way to properly examine this piping is by an internal video camera survey.

Video pipe surveys can identify reverse slopes, sags, breaks, tree root intrusions, illegal taps, diameter changes and the overall condition of the piping so that an evaluation can be made as to whether to repair or replace the piping.

P2502.2 Additions, alterations or repairs. Additions, *alterations*, renovations or repairs to any plumbing system shall conform to that required for a new plumbing system without requiring the existing plumbing system to comply with the requirements of this code. Additions, *alterations* or repairs shall not cause an existing system to become unsafe, insanitary or overloaded.

Minor additions, *alterations*, renovations and repairs to existing plumbing systems shall be permitted in the same manner and arrangement as in the existing system, provided that such repairs or replacement are not hazardous and are *approved*.

❖ Simply stated, new work must comply with current code requirements. Any alteration or addition to an existing system involves some new work, and therefore is subject to the requirements of the code. Additions or alterations to an existing system can place additional loads or different demands on the system, which could necessitate changing all or part of the existing system. For example, the addition of plumbing fixtures to an existing system may necessitate an increase in drain piping size and water distribution piping size. Additions and alterations must not cause an existing system to be any less in compliance with the code than it was before the changes.

Repair of an existing nonconforming plumbing system is permitted without having to completely replace the nonconforming portion. This typically occurs when repairing a fixture or piping. Although some types of fixtures or piping arrangements are no longer permitted, existing fixtures or piping can be repaired and remain in service if a health hazard or insanitary condition is not maintained or created. This section distinguishes between alterations (subject to applicable provisions of the code) and ordinary repairs (maintenance activities not requiring a permit). The intent of this section is to allow the continued use of existing plumbing systems and equipment that might not be designed and constructed as required for new installations.

Existing plumbing systems and equipment will normally require repair and component replacement to remain operational. This section permits repair and component replacements without requiring the redesign, alteration or replacement of the entire system. In other words, the plumbing system is allowed to stay as it was if it is not hazardous. It is important to note that the word "minor" in this section is intended to modify "additions," "alterations," "renovations" and "repairs." It is not the intent of this section to waive code requirements for the replacement of all or major portions of systems under the guise of repair. Any work other than minor repairs or replacement of minor portions of a system must be considered as new work subject to all applicable provisions of the code. Repairs and minor component replacements are permitted in a manner that is consistent with the existing system if those repairs or replacements are approved by the code official; are not hazardous; do not cause the system or equipment to be any less in compliance with the code than before; and are, to the extent practicable, in compliance with the provisions of the code applicable to new work.

SECTION P2503
INSPECTION AND TESTS

P2503.1 Inspection required. New plumbing work and parts of existing systems affected by new work or *alterations* shall be inspected by the *building official* to ensure compliance with the requirements of this code.

❖ This section establishes the building official's authority to conduct inspections of plumbing work to determine code compliance. The code requires inspection and approval of new work and existing systems that could be affected by new work. This provision allows the building official to inspect existing systems as part of the overall approval process.

P2503.2 Concealment. A plumbing or drainage system, or part thereof, shall not be covered, concealed or put into use until it has been tested, inspected and *approved* by the *building official*.

❖ It is the responsibility of the contractor, the builder, the owner or other authorized party to arrange for the required inspections and to coordinate them to prevent work from being concealed or put into use before the work is inspected, tested and approved by the authority having jurisdiction.

P2503.3 Responsibility of permittee. Test equipment, materials and labor shall be furnished by the permittee.

❖ The permit holder is responsible for supplying all of the labor, equipment and apparatus necessary to conduct such tests. The code official only observes the tests being performed.

P2503.4 Building sewer testing. The *building sewer* shall be tested by insertion of a test plug at the point of connection with the public sewer, filling the *building sewer* with water and pressurizing the sewer to not less than 10-foot (3048 mm) head of water. The test pressure shall not decrease during a period of not less than 15 minutes. The *building sewer* shall be watertight at all points.

A forced sewer test shall consist of pressurizing the piping to a pressure of not less than 5 psi (34.5 kPa) greater than the pump rating and maintaining such pressure for not less than 15 minutes. The forced sewer shall be water tight at all points.

❖ This section requires that the gravity building sewer be plugged at the point of connection to the public sewer and tested with 10 feet (3048 mm) of water for 15 minutes without leaking. Even though such a test applies a relatively small amount of pressure [approximately 5 pounds per square inch (psi) (34 kPa)], it is sufficient for unpressurized piping applications.

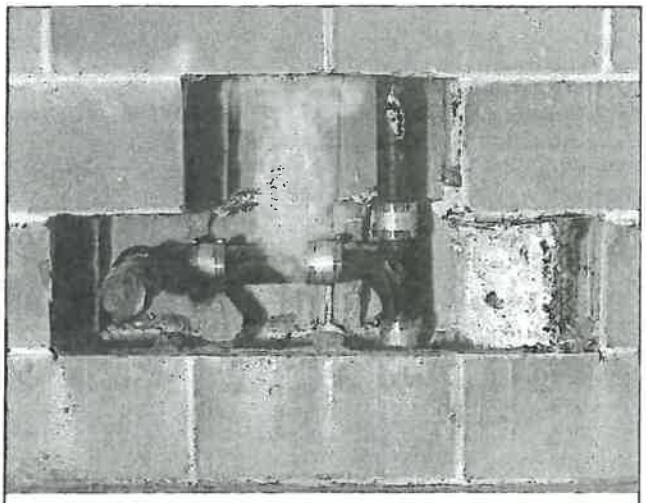


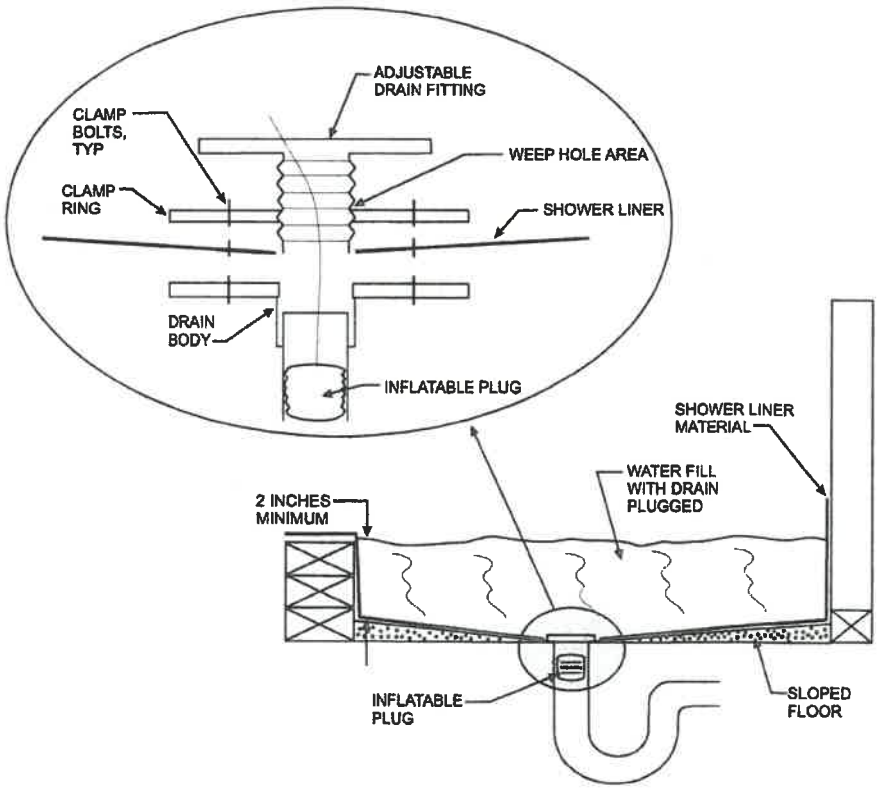
Figure P2503.5.2(2)
SMOKE INDICATING PRESENCE OF LEAK
(Photo courtesy of Hurco Technologies, Inc.)

P2503.6 Shower liner test. Where shower floors and receptors are made water tight by the application of materials required by Section P2709.2, the completed liner installation shall be tested. The pipe from the shower drain shall be plugged water tight for the test. The floor and receptor area shall be filled with potable water to a depth of not less than 2 inches (51 mm) measured at the threshold. Where a threshold of not less than 2 inches (51 mm) in height does not exist, a temporary threshold shall be constructed to retain the test water in the lined floor or receptor area to a level not less than 2 inches (51 mm) in depth measured at the threshold. The water shall be retained for a test period of not less than 15 minutes and there shall not be evidence of leakage.

❖ The resulting water damage, increased difficulty in making repairs and the additional expense involved associated with discovering a leak after a building has been completed requires that field-fabricated shower liners be tested at the rough-in stage.

This section clearly spells out how to perform the test. The evidence of leakage could be either the lowering of the water level from the full threshold level or water drips/seepage outside of the receptor area [see Commentary Figures P2503.6(1) and P2503.6(2)].

P2503.7 Water-supply system testing. Upon completion of the water-supply system or a section of it, the system or portion completed shall be tested and proved tight under a water pressure of 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 (345 kPa). This pressure shall be held for not



For SI: 1 inch = 25.4 mm.

Figure P2503.6(1)
TESTING OF FIELD-FABRICATED SHOWER LINER

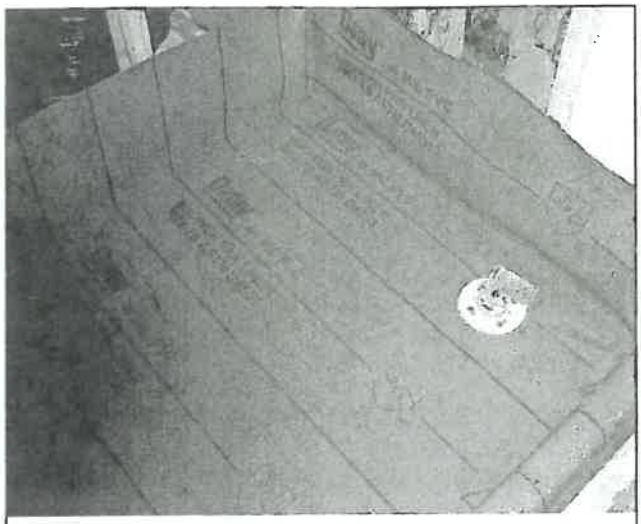


Figure P2503.6(2)
INSTALLED SHOWER LINER READY FOR TESTING

less than 15 minutes. The water used for tests shall be obtained from a potable water source.

❖ The water supply system consists of piping from the water meter at the curb, the stop valve at the curb or the well system to the ends of the water distribution piping in the building.

The term "working pressure" is not defined in the code. It is understood to be the maximum pressure in a water supply system under normal operating conditions. The working pressure can be different depending on where the pressure is measured in a system. For example, the working pressure in a water service line from the curb stop valve to the entry point into the building might be 120 psi (827 kPa). As this pressure is greater than 80 psi (551 kPa), in accordance with Section P2903.3.1, a pressure-reducing valve must be installed to limit the pressure in the building's water distribution system to no greater than 80 psi (551 kPa). Therefore, the working pressure in the water distribution system portion of the water supply system is 80 psi (551 kPa).

The phrase "the system shall be proved tight," although a somewhat archaic expression, means that by visual inspection, no evidence of leakage from the piping system is observed. Evidence of leakage is typically determined by attaching a pressure gauge to the system, pressurizing the system to the test pressure and, without further addition of test water or air to the system, verifying after 15 minutes that the pressure gauge indication has not changed from the reading taken at the beginning of the test (note the test gauge requirements of Section P2503.9). Where minor repairs or modifications are made to a water-supply system and the system is tested with water, the pressure gauge method is not necessary as evidence of leakage could be simply determined by observing each piping connection for the presence of leaking water.

If air is used to test a water supply system of other than plastic material, the test pressure need only be 50 psi (344 kPa). Where testing with compressed air, it is advisable to allow the system under test pressure to thermally stabilize before the start of the observation period. Warm air from a compressor introduced into cold piping will cool and result in a decrease in the test pressure, falsely indicating a leak. Gaskets and O-rings in shower mixing valves are intended to seal against water pressure and typically do not initially seat or seal well when first pressurized with air. In most cases, leaks from these locations will eventually cease after a "seating in" period of time. Adjustments for changes in pressure resulting from ambient temperature fluctuations or the seating of gaskets must be made prior to the start of the 15-minute test period.

Air testing of water supply systems of plastic material is prohibited by the code and many plastic piping manufacturers due to the risk of personal injury caused by flying shards of plastic should the piping rupture. Compressed air stores potential energy not unlike a compressed coil spring stores energy. If the piping ruptures, the stored potential energy becomes kinetic energy that can propel plastic pieces with great force and velocity.

Sections P2503.5.1 and P2503.5.2 specify two general construction stages that require inspection: (1) rough-in, including underground and above ground and (2) final (completion of plumbing work). Depending on the size and required sequence of a project, multiple inspections may be necessary for each stage. The intent of this section is to ensure that all under-ground and above-ground water supply system piping is tested prior to concealment so that any leaks can be readily located and repaired. The final inspection and "test" (see Section P2503.5.2) provides for visual inspection to find leaks in exposed water supply system connections, such as water heater piping, stop valves, supply tube connections and fixture/faucet assemblies.

P2503.8 Inspection and testing of backflow prevention devices. Inspection and testing of backflow prevention devices shall comply with Sections P2503.8.1 and P2503.8.2.

❖ A device must be tested in accordance with Section P2503.8.2 to determine whether it is operating properly. A visual inspection will determine whether the unit is installed according to its listing and the manufacturer's instructions (see commentary, Section P2902).

P2503.8.1 Inspections. Inspections shall be made of backflow prevention assemblies to determine whether they are operable.

❖ This section requires inspection of all backflow assemblies to determine whether they are installed correctly and are operating in accordance with the manufacturer's instructions. The commentary for Section P2902 provides further discussion of installation.

P2503.8.2 Testing. Reduced pressure principle, double check, double check detector and pressure vacuum breaker backflow preventer assemblies shall be tested at the time of installation, immediately after repairs or relocation and every year thereafter.

❖ Four types of assemblies require testing: reduced-pressure principle backflow prevention assemblies; double-check-valve backflow prevention assemblies; double-detector check-valve backflow prevention assemblies and pressure vacuum breaker assemblies (see commentary, Section P2902). Other backflow prevention devices, such as atmospheric vacuum breakers and air gaps, are used within a water distribution system to protect against cross contamination. For the purpose of testing their adequacy under certain working conditions, the four assemblies referenced in this section are equipped with test cocks (or ports) that are used in conjunction with specific testing equipment and procedures. These tests are required at the time of installation, repair and relocation, and at least annually thereafter.

P2503.9 Test gauges. Gauges used for testing shall be as follows:

1. Tests requiring a pressure of 10 psi or less shall utilize a testing gauge having increments of 0.10 psi (0.69 kPa) or less.
2. Tests requiring a pressure higher than 10 psi (0.69 kPa) but less than or equal to 100 psi (690 kPa) shall use a testing gauge having increments of 1 psi (6.9 kPa) or less.
3. Tests requiring a pressure higher than 100 psi (690 kPa) shall use a testing gauge having increments of 2 psi (14 kPa) or less.

❖ It is common to see test gauges with 1-, 2-, 5- or even 10-psi (0.1, 0.2, 0.5 or 1.0 kg/cm^2) increments being used in a DWV inspection that requires only a 5-psi (34.5 kPa) test. These gauges are difficult to read and interpret and lack the resolution necessary to detect all but the largest of leaks.

In each case, the user needs to ensure that the proper pressure gauge is selected with respect to indicating range and design (see Commentary Figure P2503.9). Most standard dial-type mechanical pressure gauges use a bourdon tube sensing element generally made of a copper alloy (brass) or stainless steel. The construction is simple, and operation does not require any additional power source. The C-shaped or spiral wound bourdon tube flexes when pressure is applied, producing a rotational movement that in turn causes the pointer to indicate the measured pressure. Installation of shut-off devices between the measuring point and the pressure gauge is recommended. This will allow an exchange of the pressure gauge and checks on the gauge's zero setting while the system remains under pressure.

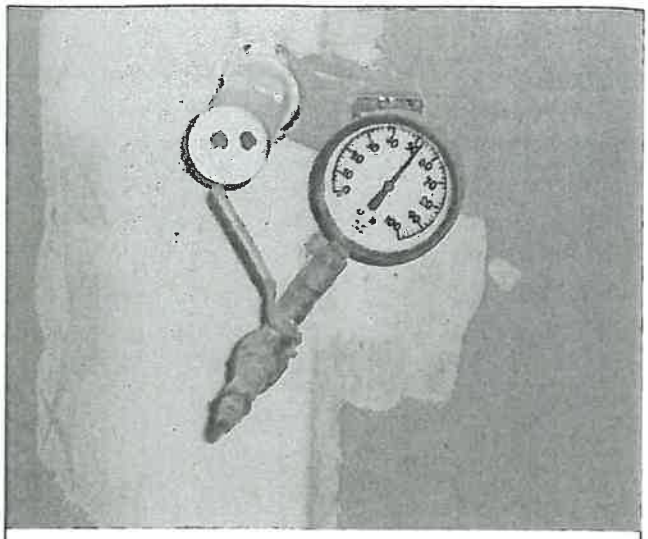


Figure P2503.9
IMPROPER GAUGE FOR TEST
(DIAL INCREMENTS TOO LARGE)