Chapter ILHR 84

PLUMBING FIXTURES AND MATERIALS

ILHR 84.01 Scope. The provisions of this chapter govern the quality of all materials, fixtures and equipment used in the alteration, repair or installation of plumbing.

History: Cr. Register, February, 1985, No. 350, eff. 3-1-85.

ILHR 84.03 Penalties. Penalties for violations of this chapter shall be assessed in accordance with ss. 145.12 and 145.25, Stats.

History: Cr. Register, February, 1985, No. 350, eff. 3-1-85.

ILHR 84.10 Department approval. No plumbing fixture, material or device may be sold or installed, unless it is of an approved type conforming to the applicable standards referenced in ch. ILHR 82 or this chapter.

(1) Plumbing fixtures, materials and devices submitted to the department for approval shall be accompanied by sufficient data and information for the department to judge if the item and its performance meets the requirements of chs. ILHR 82 to 84.

(2) The department may impose specific conditions in granting the approval for a plumbing fixture, material or device, including an expiration date for the approval. Violations of those conditions under which an approval is granted shall constitute a violation of this chapter.

(3) The department may require testing of a plumbing fixture, material or device to be made or repeated, if, anytime, there is reason to believe that the item no longer conforms to the requirements of chs. ILHR 82 to 84 and the conditions of approval.

(4) The department may revoke any approval issued under this section for any false statements or misrepresentation of facts on which the approval was based.

(5) An approval of a plumbing fixture, material or device by the department shall not be construed, as an assumption of any responsibility for defects in design or construction of any item nor for any damages that may result.

(6) Plumbing products submitted with all applicable engineering information and complying with nationally accepted standards shall be approved or rejected by the department within 30 business days of receipt of the required information.

History: Cr. Register, February, 1985, No. 350, eff. 3-1-85.

ILHR 84.11 Identification of fixtures and materials. Each length of pipe and each fitting, trap, fixture material and device used in a plumbing

system shall have cast, embossed, stamped, or indelibly marked on it the maker's mark or name, the weight and quality of the product or shall be identified in accordance with the applicable approved standard. All materials and devices used in the construction of a plumbing system or parts thereof shall be marked and identified in a manner satisfactory to the department.

History: Cr. Register, February, 1985, No. 350, eff. 3-1-85.

ILHR 84.12 Existing installations. In existing buildings or premises in which plumbing installations are to be altered, repaired or renovated, the department may permit deviation from the provisions of this chapter provided that such a proposal to deviate is first submitted to the department for proper determination and approval in accordance with the procedures of s. ILHR 82.20 (12).

History: Cr. Register, February, 1985, No. 350, eff. 3-1-85.

ILHR 84.13 Penetrations of fire resistive assemblies. Penetrations of fire-resistive assemblies, such as walls and floor-ceiling systems, by plumbing systems or plumbing materials shall be protected in accordance with requirements of chs. ILHR 50 to 64.

Note: See Appendix for further explanatory material.

History: Cr. Register, February, 1985, No. 350, eff. 3-1-85.

ILHR 84.20 Plumbing fixtures. (1) CONSTRUCTION AND DESIGN. All plumbing fixtures, applicances, equipment, devices and appurtenances shall be of such design, materials and construction as to comply with applicable standards listed in s. ILHR 84.60, to insure durability, proper service, sanitation, and so as to not entail undue efforts in keeping them clean and in proper operating condition.

(a) All plumbing fixtures shall connect directly to the sanitary plumbing system, except as otherwise specified.

(b) Blowout type fixtures may only be installed upon approval of the department.

(2) WATER CONSERVING FIXTURES. Pursuant to s. 145.25, Stats., all water closets, lavatory faucets, urinals and shower heads shall be of an approved water conserving type, except as permitted in par. (d).

(a) *Design.* Test data for water conserving fixtures submitted for department approval shall be based on 50 pounds per square inch water pressure.

(b) *Prohibitions.* 1. All buildings. No person may sell at retail or install in or cause to be installed in any building:

a. A water closet which uses more than 4 gallons of water per flush; and

b. A shower head which uses more than 3 gallons of water per minute.

2. Public restrooms. No person may install or cause to be installed in any public restroom:

a. Any urinal intended for use by male persons which is operated by an automatic urianl flushometer valve or hand-operated flushometer valve which uses more than 1.5 gallons of water per flush per fixture use;

b. Any automatic siphon urinal flush tanks; or

c. Any lavatory faucet which allows more than one gallon of water to flow through the faucet after the handle is released.

Note: Cr. The force required to activate a lavatory faucet to be used by a handicapped person is not to exceed 5 pounds.

3. Dwelling units. No person may install or cause to be installed any faucet connected to a lavatory in any dwelling unit which allows more than 3 gallons of water per minute to flow through the faucet.

(c) *Listing of water conserving fixtures.* 1. Water closets. The department shall publish a list of water closet models which have been certified by the manufacturer to use no more than 4 gallon per flush.

2. Shower heads. The department shall publish a list of shower heads which have been manufactured, tested and certified by the manufacturers to permit not more than 3 gallons per minute to flow through the head.

3. Urinals and urinal flushing devices. The department shall publish a list of all urinals and urinal flushing devices which have been manufactured, tested and certified by the manufacturer to permit not more than 1.5 gallons per flush per fixture use to flow through the valve or fixture.

4. Lavatory faucets. a. The department shall publish a list of all lavatory faucets which have been manufactured, tested and certified by the manufacturers to permit not more than one gallon of water to flow through the faucet after release of the handle.

b. The department shall publish a list of all faucets which have been manufactured, tested and certified by the manufacturer to permit not more than 3 gallons of water per minute to flow through the faucet.

6. Flow control and flow restrictor devices. a. Flow control or restricting devices shall be installed on the water inlet side of the faucet or shall be an integral part of the faucet. A flow controlling or restricting aerator shall be considered as an integral part of a faucet.

b. All flow control and flow restrictive devices manufactured, tested and certified by the manufacturer shall limit the flow through the unit to the test and certification rate. The device shall not be removable without special knowledge or effort.

7. Identification. All water conserving fixtures and devices shall be permanently marked for identification as required in s. ILHR 84.11.

8. Manufacturer's responsibilities. A manufacturer desiring to have a product included on the department's published lists of water conserving fixtures and devices shall submit for each water conserving fixture or device laboratory test data, engineering data, or certification by the manufacturer that a fixture or device meets the provisions of this chapter and a copy of the sales brochure.

(d) *Exemptions.* 1. Availability. When a water conserving device or fixture is not available from 2 or more manufacturers, compliance with this subsection may be waived by the department.

2. Waiver. The department, upon request, may waive compliance with flushing requirements established by s. 145.25, Stats., and this subsection, if the following conditions prevail:

a. Existing buildings. Any building in existence or under construction on or before January 1, 1979, if its drain system design or installation requires a greater quantity of water to function properly.

b. Public sewer design. If any building is served by a public sewer which requires a greater quantity of water to maintain flow.

(3) GENERAL REQUIREMENTS. (a) *Fixture outlets.* 1. The outlet passageway of a fixture shall be free from impairments and of sufficient size to insure proper discharge of the fixture contents under normal conditions.

2. Outlet connections which are directly connected to the plumbing system shall be such that a permanent air and watertight joint can be readily made between the fixture and drainage system.

(b) *Installation of fixtures.* 1. Access for cleaning. Plumbing fixtures shall be so installed as to afford easy access for cleaning both the fixture and the area around it.

2. Watertight joints. Joints formed where fixtures come in contact with walls or floors shall be sealed.

3. Securing wall mounted fixtures. Wall mounted fixtures shall be rigidly supported by a concealed hanger which is attached to structural members so that the load is not transmitted to the fixture drain connection or any other part of the plumbing system. The hanger shall conform to ANSI A112.6.

4. Water supply protection. The water supply pipes and fittings for every plumbing fixture shall be so installed as to prevent backflow.

5. Design of overflow. A fixture which is provided with an overflow outlet shall be designed and installed so that standing water in the fixture cannot rise in the overflow when the fixture's stopper is closed, nor shall any water remain in the overflow when the fixture is empty.

6. Connection of overflows. The overflow from any fixture shall discharge into the drainage system on the inlet or fixture side of the trap.

7. Overflows in flush tanks. Flush tanks shall be provided with overflows discharging to the fixture served and shall be of sufficient size to prevent flooding the tank at the maximum rate at which the tanks are supplied with water. The opening of the overflow pipe shall be located above the flood level rim of the fixture served.

8. Strainers. All plumbing fixtures other than water closets, clinic sinks, trap standard service sinks with flush rims, and siphon action or washdown urinals shall be provided with strainers, cross bars or pop-up stoppers which restrict the clear opening of the waste outlet.

9. Flushometer valves. Flushometer valves shall be equipped with vacuum breakers which conform to ASSE 1001. Flushometer valves shall not be used where the water pressure is insufficient to properly operate them. When the valve is operated, it shall complete the cycle of operation automatically, opening fully and closing positively under the water

line pressure. Each flushometer shall be provided with a means for regulating the flow through it.

10. Safing. All shower stalls, shower rooms, floor setting service sinks or receptors, sunken bathtubs or other similar fixtures shall be provided with 4 pound sheet lead asphaltum coated, compotite, copper, chloraloy or other approved safing material beneath the entire fixture or room and upward along the sides to a minimum of 6 inches above the curb or maximum water level of the fixture. The corners shall be safed to a height of 6 feet and at least 3 inches in each direction from the corners. The safing shall be properly drained. Prefabricated fixtures and installations directly over an unexcavated portion of a building are exempt from safing requirements.

Note: Chapters ILHR 50 to 64 contain provisions for toilet rooms and sanitary facilities, for public buildings and places of employment concerning toilet facilities for the handicapped, fixture compartments, number of fixtures for the different types of occupancies and toilet room finishes.

Note: See Appendix for further explanatory material.

(4) PLUMBING FIXTURES. (a) *Water closets.* 1. Water closets shall conform to ANSI A112.19.2M or ANSI Z124.4.

2. Water closets in public buildings and places of employment shall have elongated bowls and hinged, open-front seats without covers.

3. Water closets in individual living units, day care centers, individual executive offices, and sleeping units of hotels and motels may be of the round bowl type, provided with a hinged, closed-front seat, with or without a cover.

4. In nurseries, schools and other similar places where plumbing fixtures are provided for the use of children under 6 years of age, water closets may be of a size and height suitable for the children's use.

5. All water closet seats shall be of smooth nonabsorbent material.

6. Each water closet shall be individually equipped with an acceptable flush tank and fittings or with an approved flushometer valve. All flush tanks and flushometer valves shall be readily accessible for maintenance and repair. Ballcocks shall be of the anti-siphon type and shall conform to ASSE 1002. The ballcock backflow preventer shall be located at least 1 inch above the full opening of the overflow pipe.

7. A water closet shall not be located closer than 15 inches from its center to any side wall, partitions, vanity, or other obstruction, nor closer than 30 inches center to center, between toilets. There shall be at least 24 inches clearance in front of the water closet to any wall, fixture or door.

Note: See Appendix for further explanatory material.

8. It shall be prohibited to install or maintain pan, plunger, offset washout, washout, long hopper, frostproof and other types of water closets having invisible seals or unventilated spaces or walls not thoroughly cleansed at each flushing.

(b) *Urinals.* 1. Urinals shall conform to ANSI A112.19.2M.

2. A urinal shall not be located closer than 16 inches from its center to any side wall, partition, vanity or other obstruction, nor closer than 30

inches center to center, between urinals. When the space between stall type urinals or a stall type urinal and a side wall is less than 12 inches, such a space shall be filled flush with the front and top of the urinal with nonabsorbent material.

Note: See Appendix for further explanatory material.

3. Stall type urinals shall be set into the floor and the floor shall be graded toward the fixture.

(c) *Bidets.* Bidets shall conform to the material requirements in ANSI A112.19.2M.

1. A bidet shall not be located closer than 15 inches from its center to any side wall, partition, vanity or other obstruction, nor closer than 30 inches center to center from a water closet.

2. Bidets submerged inlet fittings shall be protected by vacuum breakers which conform to ASSE 1001.

(d) *Lavatories.* 1. Lavatories shall conform to a ANSI A112.19.1M, ANSI A112.19.2M, ANSI A112.19.3, ANSI A112.19.4 or ANSI Z124.3.

2. Cultured marble vanity tops with an integral lavatory shall conform to ANSI Z124.3.

3. Lavatories shall have waste outlets not less than 1¼ inches in diameter.

(e) *Bathtubs.* 1. Bathtubs shall conform to ANSI A112.19.1M, ANSI A112.19.4 or ANSI Z124.1.

2. Bathtubs shall have waste outlets and overflows at least 1½ inches in diameter. A pop-up stopper or other closing device shall be provided on the waste outlet.

(f) *Showers.* 1. Prefabricated showers and shower compartments shall conform to ANSI Z124.2.

2. Every water supply riser from the shower valve to the shower head outlet, whether exposed or not, shall be securely attached to the structure.

3. Except for combination bathtub-shower units, waste outlets serving showers shall be at least 2 inches in diameter and shall have removable strainers not less than 3 inches in diameter having strainer openings not less than ¼ inch in minimum dimension.

4. Where a waste outlet serves more than one shower space or shower head, the waste outlet shall be at least 2 inches in diameter and the waste outlet shall be so located and the floor so pitched, that waste water from one shower does not flow over the floor area serving another shower.

5. All shower compartments, regardless of shape, shall have a minimum finished interior of 900 square inches and shall be capable of encompassing a 30 inch circle. The minimum required area and dimension shall be measured at an height 24 inches above the top of the threshold and at a point tangent to its centerline. The minimum area and dimensions shall be maintained to a point 70 inches above the shower waste outlet with no

protrusions other than the fixture valve or valves, showerheads, soap dishes and safety grab bars or rails.

Note: See Appendix for further explanatory material.

(g) *Sinks.* 1. Sinks shall conform to ANSI A112.19.1M, ANSI A112.19.2M, ANSI A112.19.3 or ANSI A112.19.4.

2. Sinks shall be provided with waste outlets not less than 1½ inches in diameter. Sinks on which a food grinder is installed shall have a waste opening not less than 3¼ inches in diameter.

(h) *Food waste grinders.* 1. Domestic food waste grinders shall conform to ASSE 1008. Commercial food waste grinders shall conform to ASSE 1009.

2. Domestic food waste grinders shall be connected to a drain of not less than 1½ inches in diameter.

3. Commerical food waste grinders shall be connected to a drain of sufficient size to serve the unit, but not less than 2 inches in diameter. Commercial food waste grinders shall be connected and trapped separately from any other fixtures or sink compartments.

4. All food waste grinders shall be provided with an adequate supply of cold water at a sufficient flow rate in insure proper functioning of the unit.

(i) *Dishwashing machines.* Domestic dishwashing machines shall conform to ASSE 1006. Commerical dishwashing machines shall conform to ASSE 1004.

(j) *Automatic clothes washers.* Domestic automatic clothes washers shall conform to ASSE 1007.

(k) *Laundry trays.* 1. Laundry trays shall conform to ANSI A112.19.1M or ANSI A112.19.3.

2. Each compartment of a laundry tray shall be provided with a waste outlet not less than 1½ inches in diameter.

(l) *Floor drains.* 1. Floor drains shall conform to ANSI A112.21.1.

2. Floor drain traps shall have a minimum water seal of 2 inches and shall be provided with removable strainers. The floor drain shall be so constructed that it can be readily cleaned, and the drain inlet shall be readily accessible at all times.

3. Floor drains shall be of a size to efficiently serve their intended purpose. The outlet pipe shall not be less than 2 inches in diameter.

(m) *Drinking fountains.* 1. Drinking fountains and water coolers shall conform to ARI 1010 or ANSI, A112.19.2M.

2. Drinking fountains shall not be installed in public restrooms or private bathrooms.

3. The water supply for drinking fountains shall be provided with an adjustable valve fitted with a loose key or an automatic self-closing valve permitting regulation of the rate of flow of water. The water supply issuing from the nozzle shall be of sufficent volume and height so that persons

using the fountain need not come in direct contact with the nozzle or orifice.

(n) *Water softeners.* Water softeners shall conform to WQA S-100.

(5) FAUCETS AND FIXTURE FITTINGS. (a) *Approval.* Faucets and fixture fittings shall conform to ANSI A112.18.1M.

(b) *Hose spray.* Sink faucets with flexible hose and spray assembly shall conform to ASSE 1025.

(c) *Hand showers.* Hand held showers shall conform to ASSE 1014.

History: Cr. Register, February, 1985, No. 350, eff. 3-1-85.

ILHR 84.30 Plumbing materials. (1) SANITARY DRAIN AND VENT SYSTEMS. Sanitary drain systems and vent systems shall be of such material and workmanship as set forth in this subsection.

(a) *Above ground drain and vent pipe.* Except as provided in s. ILHR 82.33 (2), drain pipe and vent pipe to be installed above ground shall conform to one of the standards listed in Table 84.30-1.

Table 84.30-1
ABOVE GROUND DRAIN AND VENT PIPE

Material	Standard
Acrylonitrile butadiene styrene (ABS) plastic pipe[a]	ASTM D2661; ASTM F628
Brass pipe	ASTM B43
Cast iron pipe	ASTM A74; CISPI 301
Copper pipe	ASTM B42; ASTM B302
Copper tubing; Types K, L, M, and DWV	ASTM B75; ASTM B88; ASTM B251; ASTM B306
Galvanized steel pipe	ASTM A53; ASTM A120
Lead pipe	FS-WW-P-325B
Polyvinyl chloride (PVC) plastic pipe[a]	ASTM D2665
Synthetic rubber hose[b]	AHAM DW-1

Note a: Plastic pipe used for drain or vent stacks shall not be installed more than 45 feet below the top of the vent terminal serving the stack.

Note b: The installation of synthetic rubber hose is limited in use to indirect waste piping or local waste piping from dishwashers in accordance with s. ILHR 82.33 (9) (d).

(b) *Underground drain and vent pipe.* Drain pipe and vent pipe to be installed underground shall conform to one of the standards listed in Table 84.30-2.

Table 84.30-2
UNDERGROUND DRAIN AND VENT PIPE

Material	Standard
Acrylonitrile butadiene styrene (ABS) plastic pipe	ASTM D2661; ASTM F628
Cast iron pipe	ASTM A74; CISPI 301
Copper tubing; Types K and L	ASTM B75; ASTM B88; ASTM B251
Polyvinyl chloride (PVC) plastic pipe	ASTM D2665
Vitrified clay pipe	ASTM C4; ASTM C700

(c) *Sanitary building sewer pipe.* Sanitary building sewer pipe shall conform to one of the standards listed in Table 84.30-3.

1. Building Sewer Pipe in Trench with Water Service. When a building sewer is installed in the same trench as the water service in accordance

with s. ILHR 82.40 (2) (d) 1., the building sewer pipe shall conform to one of the standards for acrylonitrile butadiene styrene plastic pipe, cast iron pipe, copper tube, or polyvinyl chloride plastic pipe listed in Table 84.30-3.

2. Building Sewer Pipe on Filled Ground. Where a building sewer is installed on filled or unstable ground, the building sewer pipe shall conform to one of the standards for acrylonitrile butadiene styrene plastic pipe, cast iron pipe, copper tube, or polyvinyl chloride plastic pipe listed in Table 84.30-3.

Table 84.30-3
SANITARY BUILDING SEWER PIPE

Material	Standard
Acrylonitrile butadiene styrene (ABS) plastic pipe[a]	ASTM D2661; ASTM D2751; ASTM F628
Acrylonitrile butadiene styrene composite pipe	ASTM D2680
Asbestos cement pipe	ASTM C428
Cast iron pipe	ASTM A74; CISPI 301
Concrete pipe	ASTM C14; ASTM C76
Copper tubing; Types K and L	ASTM B75; ASTM B88; ASTM B251
Polyvinyl chloride (PVC) plastic pipe[a]	ASTM D2665; ASTM D3033; ASTM D3034
Vitrified clay pipe	ASTM C4; ASTM C700

Note a: Thermoplastic sewer pipe shall be installed in accordance with ASTM D2321.

(d) *Chemical drain and vent pipe.* Drain systems and vent systems for chemical wastes shall be of approved corrosion resistant material. The manufacturer of the pipe shall indicate to the department the material's suitability for the concentrations of chemicals involved.

(e) *Catch basins, interceptors and sumps.* Catch basins, interceptors and sumps shall be constructed in a watertight manner of precast reinforced concrete, reinforced monolithic concrete, brick or block, cast iron, coated 12 gauge steel, vitrified clay, fiberglass, or other approved materials.

(f) *Manholes.* Manholes shall be constructed in a watertight manner of precast reinforced concrete, reinforced monolithic concrete, brick or block, fiberglass or other approved materials. Fiberglass manholes may be approved for use in high traffic areas provided the top section of the manhole is not made of fiberglass.

(2) STORM AND CLEAR WATER DRAIN SYSTEMS. Storm and clear water drain systems shall be of such material and workmanship as set forth in this subsection.

(a) *Above ground drain and vent pipe.* Drain and vent pipe installed above ground and inside a building shall conform to one of the standards listed in Table 84.30-1, except black iron or steel pipe conforming to ASTM A53 or ASTM A120 may be used for storm water conductors. Black iron and steel conductors shall not be embedded in concrete or masonry.

(b) *Underground drain and vent pipe.* Drain and vent pipe to be installed underground shall conform to one of the standards listed in Table 84.30-2.

(c) *Storm building sewer pipe.* Storm building sewer pipe shall conform to one of the standards listed in Table 84.30-4 and the provisions of sub. (1) (c) 2.

(d) *Subsoil drain pipe.* Subsoil drains shall be open jointed, horizontally split, or perforated pipe conforming to one of the standards listed in Table 84.30-5.

(e) *Roof drains.* Roof drains shall conform to ANSI A112.21.2.

(f) *Area drain inlets.* Area drain inlets shall be constructed in a watertight manner of precast concrete, reinforced monolithic concrete, brick or block, cast iron, coated 12 gauge steel, vitrified clay, fiberglass or other approved materials.

Table 84.30-4
STORM BUILDING SEWER PIPE

Material	Standard
Acrylonitrile butadiene styrene (ABS) plastic pipe[a]	ASTM D2661; ASTM D2751; ASTM F628
Acrylonitrile butadiene styrene composite pipe	ASTM 2680
Asbestos cement pipe	ASTM C428
Cast iron pipe	ASTM A74; CISPI 301
Concrete pipe	ASTM C14; ASTM C76
Copper tubing; Types K and L	ASTM B75; ASTM B88; ASTM B251
Corrugated steel pipe[b]	FS-WW-P-405a
Polyvinyl chloride (PVC) plastic pipe[a]	ASTM D2665; ASTM D3033; ASTM D3034
Vitrified clay pipe	ASTM C4; ASTM C700

Note a: Thermoplastic sewer pipe shall be installed in accordance with ASTM D2321.

Note b: Corrugated steel pipe may be used for storm building sewers subject to the following conditions:

1. The pipe shall be sized according to ch. ILHR 82 with adjustments considered to allow for flow characteristics and configuration of the pipe; and

2. The corrugated steel building storm sewer shall not be installed closer than 10 feet from a building's exterior wall or foundation.

Table 84.30-5
SUBSOIL DRAIN PIPE

Material	Standard
Asbestos cement pipe	ASTM C508
Cast iron pipe	ASTM A74; CISPI 301
Polyethylene (PE) plastic pipe	ASTM F405
Polyvinyl chloride (PVC) plastic pipe	ASTM D2729 (Perforated only)
Styrene rubber (SR) pipe	ASTM D3298
Vitrified clay pipe	ASTM C4; ASTM C700

(3) WATER SERVICE AND DISTRIBUTION SYSTEMS. Water service and distribution systems shall be of such material and workmanship as set forth in this subsection.

(a) *Water service pipe.* 1. When selecting the material and size for water service supply pipe, tube, or fittings, due consideration shall be given to the action of the water on the interior of the pipe and of the soil, fill or other materials on the exterior of the pipe.

2. Water service pipe shall conform to one of the standards listed in Table 84.30-6. Water service pipe and tubing shall have a minimum working pressure of 160 pounds per square inch gage at 73.4 degrees F. Plastic water service piping shall not extend more than 5 feet horizontally from the inside of the foundation.

Table 84.30-6
WATER SERVICE PIPE

Material	Standard
Acrylonitrile butadiene styrene (ABS) plastic pipe[a]	ASTM D1527; ASTM D2282
Asbestos cement pipe	ASTM C296
Brass pipe	ASTM B43
Cast iron pipe	ASTM A377; AWWA C151/A21.51
Copper or copper alloy pipe and tubing; Types K and L	ASTM B42; ASTM B302; ASTM B75; ASTM B88; ASTM B251
Ductile iron pipe	AWWA C151/A21.51
Galvanized steel pipe	ASTM A53; ASTM A120
Polybutylene (PB) plastic pipe and tubing[a]	ASTM D2662; ASTM D2666; ASTM D3309
Polyethylene (PE) plastic pipe and tubing[a]	ASTM D2239; ASTM D2737
Polyvinyl chloride (PVC) plastic pipe[a]	ASTM D1785; ASTM D2241; ASTM D2672

Note a: Plastic water service systems shall be installed in accordance with ASTM D2774.

(b) *Water distribution pipe.* 1. Water distribution pipe to be installed underground shall conform to one of the standards for brass, cast iron, copper or copper alloy, ductile iron or galvanized steel listed in Table 84.30-6.

2. Water distribution pipe to be installed above ground shall conform to one of the standards listed in Table 84.30-7.

3. All hot water distribution pipe and tubing shall have a minimum pressure rating of 80 pounds per square inch gage at 180 degrees F.

(c) *Existing water service.* Existing metallic water service piping or water distribution piping used for electrical grounding shall not be replaced with nonmetallic pipe or tubing until other approved electrical grounding means are provided.

Table 84.30-7
WATER DISTRIBUTION PIPE

Material	Standard
Brass pipe	ASTM B43
Copper pipe-rigid	ASTM B42; ASTM B302
Copper tubing-rigid; Types K, L, and M	ASTM B75; ASTM B88; ASTM B251
Galvanized steel pipe	ASTM A53; ASTM A120

(4) PIPE FITTINGS AND VALVES. (a) *Fittings.* Pipe fittings shall conform to the pipe material standards listed in this chapter or one of the standards listed in Table 84.30-8. Threaded drain pipe fittings shall be of the recessed drainage type.

(b) *Water supply valves.* All valves for water supply systems shall be of an approved type in accordance with s. ILHR 82.40, and shall be compatible with the type of piping material used in accordance with s. ILHR 84.40.

Table 84.30-8
PIPE FITTINGS

Material	Standard
Cast iron	ANSI B16.4; ANSI B16.12
Copper or copper alloy	ANSI B16.15; ANSI B16.18; ANSI B16.22; ANSI B16.23; ANSI B16.26; ANSI B16.29; ANSI B16.32; ANSI B16.43
Gray iron and ductile iron	AWWA C110/A21.10
Malleable iron	ANSI B16.3
Plastic	ASTM D2464; ASTM D2465; ASTM D2466; ASTM D2467; ASTM D2468; ASTM D2469; ASTM 2609; ASTM D3311; ASTM F409
Steel	ANSI B16.9; ANSI B16.11; ANSI B16.28

(c) *Special fittings and valves.* 1. Water hammer arrestors shall conform to ANSI A112.26.1.

2. Relief valves and automatic gas shutoff devices for hot water supply systems shall conform to ANSI Z21.22.

3. Water pressure reducing valves for domestic supply systems shall conform to ASSE 1003.

4. Water heater drain valves shall conform to ASSE 1005.

5. Hose connection vacuum breakers shall conform to ASSE 1011.

6. Backflow preventers with intermediate atmospheric vents shall conform to ASSE 1012.

7. Reduced pressure principle backflow preventers shall conform to ASSE 1013.

8. Backwater valves shall conform to ANSI A112.14.1.

(5) SPECIAL MATERIALS. (a) *Sheet lead.* Sheet lead for the following uses shall weigh not less than indicated in subds. 1. to 4. and shall conform to FS QQ-L-210f-2:

1. General use, 4 pounds per square foot;

2. Safe pans, 4 pounds per square foot;

3. Flashings for vent pipes, 3 pounds per square foot; and

4. Prefabricated flashings for vent pipes, 2½ pounds per square foot.

(b) *Lead bends and traps.* The walls of lead bends and traps shall be at least ⅛ inch thick, and shall conform to FS WW-P-325B.

(c) *Traps and tail piece fittings.* Copper or tubular brass traps and tail piece fittings shall be at least 20 gage material, and shall conform to the requirements of ANSI A112.18.1M.

(d) *Sheet copper.* Sheet copper for the following uses shall weigh not less than indicated in subds. 1. to 4. and shall conform to ASTM B152:

1. General use, 12 oz. per square foot;

2. Flashing for vent pipes, 8 oz. per square foot; and

3. Flush tank linings, 10 oz. per square foot.

(e) *Caulking ferrules.* Caulking ferrules shall be of red brass and shall be in accordance with Table 84.30-9.

Table 84.30-9
CAULKING FERRULE SPECIFICATIONS

Pipe Sizes Inches	Inside Diameter Inches	Length Inches	Minimum Weight Each
2	2¼	4½	1 lb. 0 oz.
3	3¼	4½	1 lb. 12 oz.
4	4¼	4½	2 lb. 8 oz.

(f) *Soldering bushings.* Soldering bushings shall be of red brass in accordance with Table 84.30-10.

Table 84.30-10
SOLDERING BUSHING SPECIFICATIONS

Pipe Sizes Inches	Minimum Weight Each
1¼	6 oz.
1½	8 oz.
2	14 oz.
2½	1 lb. 6 oz.
3	2 lb. 0 oz.
4	3 lb. 8 oz.

(g) *Closet flanges.* 1. Closet flanges for water closets or similar fixtures shall be not less than ⅛ inch thick for brass; ¼ inch thick for plastic; and shall not be less than 2 inch caulking depth for cast iron or galvanized malleable iron.

2. Closet flanges of hard lead shall weigh not less than 1 lb. 9 oz. and shall be composed of lead alloy with not less than 7.75 percent antimony by weight.

3. Flanges shall be soldered to lead bends, or shall be caulked, soldered or threaded into other metal piping. Flanges shall be solvent cemented to plastic piping.

4. Water closet screws and bolts shall be brass or other approved materials.

(h) *Cleanout plugs.* Cleanout plugs shall be of brass or plastic. Brass cleanout plugs shall be used with metallic piping only, and shall conform to ASTM A74. Plastic cleanout plugs shall conform to the requirements of sub. (4) (a). Plugs shall have raised square, countersunk square or slotted heads. Countersunk heads shall be used where raised heads may be a hazard.

(i) *Flush pipes and fittings.* Flush pipes and fittings shall be of nonferrous material and shall conform to ANSI A112.19.5.

(j) *Safing materials.* Safing materials made from chlorinated polyethylene shall conform to ASTM D4068.

(6) FIXTURE MATERIALS. (a) *Quality of fixtures.* Plumbing fixtures shall be constructed from approved materials, have smooth, impervious surfaces, be free from defects and concealed fouling surfaces and shall conform to standards cited in this chapter.

(b) *Materials for special use fixtures.* Materials for special use fixtures not otherwise covered in this chapter may be stainless steel, soapstone or

chemical stoneware, plastic, or may be lined with lead, copper base alloy, nickel copper alloy, corrosion resisting steel, or other materials especially suited to the use for which the fixture is intended.

History: Cr. Register, February, 1985, No. 350, eff. 3-1-85.

ILHR 84.40 Joints and connections. (1) GENERAL. (a) *Tightness.* Joints and connections in the plumbing system shall be watertight and gastight for the pressure required by test or the system design, whichever is greater, with the exception of perforated or open joint piping which is installed for the purpose of collecting and conveying groundwater.

Note: The testing requirements for tightness are in s. ILHR 82.21.

(b) *Approval.* All joints and connections shall be of an approved type in accordance with this section.

(c) *Preparation of pipe ends.* All pipe shall be cut square, reamed, chamfered and free of all burrs and obstructions. Pipe ends shall have full bore openings and shall not be undercut.

(2) ABS PLASTIC PIPE. Joints between acrylonitrile butadiene styrene plastic pipe or fittings shall be installed in accordance with pars. (a) to (c).

(a) *Mechanical joints.* Mechanical joints may be installed where approved by the department and shall be installed in accordance with the department's approval and the manufacturer's instructions.

1. Drain and vent systems. Mechanical push-on joints for drain and vent systems shall conform to ASTM D3212.

2. Water supply systems. Mechanical push-on joints and mechanical compression type joints for water supply systems shall conform to ASTM D3139.

(b) *Solvent cemented joints.* Solvent cemented joints shall be made in accordance with ASTM D2235 and its appendix, ASTM D2661 or ASTM F628.

1. Joint surfaces shall be clean and free of moisture.

2. Solvent cement conforming to ASTM D2235 shall be applied to all joints, surfaces and the joint shall be made while the cement is wet.

3. Solvent cement shall be handled in accordance with ASTM F402.

(c) *Threaded joints.* Threaded joints shall only be used on pipes of schedule 80 or heavier. Threaded joints shall conform to ANSI B2.1. The pipe shall be threaded with dies specifically designed for plastic pipe. Thread lubricant or tape approved for such use shall be applied to the male threads only.

(3) ASBESTOS CEMENT PIPE. Joints between asbestos cement pipe or fittings shall be made with a sleeve coupling of the same composition as the pipe, sealed with an elastomeric ring conforming to ASTM D1869.

(4) BLACK IRON PIPE. Joints between black iron pipe or fittings shall be in accordance with pars. (a) to (d).

(a) *Threaded joints.* Threaded joints shall conform to ANSI B2.1. Pipe joint compound or tape shall be used on the male threads only.

(b) *Mechanical joints.* Mechanical joints may be installed where approved by the department and shall be installed in accordance with the department's approval and the manufacturer's instructions.

(c) *Caulked joints.* Caulked joints for hub and spigot piping and fittings shall be firmly packed with oakum or hemp. Molten lead shall be poured in one operation not less than one inch deep and not to extend more than ⅛ inch below the rim of the pipe, and caulked tight. Paint, varnish or other coatings shall not be permitted on the joining material until after the joint has been tested and approved.

(d) *Welded joints.* Joints between black iron pipe or fittings may be welded.

(5) BRASS PIPE. Joints between brass pipe or fittings shall be in accordance with the provisions of pars. (a) to (c).

(a) *Brazed joints.* All joints surfaces to be brazed shall be cleaned by approved procedure. An approved flux shall be applied when required. Brazing filler metal conforming to AWS A5.8 shall be applied. The joint shall be made by heating to the proper temperature.

(b) *Mechanical joints.* Mechanical joints may be installed where approved by the department and shall be installed in accordance with the department approval and the manufacturer's instructions. Mechanical push-on joints and mechanical compression type joints for supply systems shall conform to ASTM D3139.

(c) *Threaded joints.* Threaded joints shall conform to ANSI B2.1. Pipe joint compound or tape shall be used on the male threads only.

(6) CAST IRON PIPE. Joints between cast iron pipe or fittings shall be installed in accordance with pars. (a) and (b).

(a) *Caulked joints.* 1. Drain and vent systems. Caulked joints for hub and spigot pipe of drain and vent systems shall be firmly packed with oakum or hemp. Molten lead shall be poured in one operation not less than one inch deep and not to extend more than ⅛ inch below the rim of the pipe, and caulked tight. Paint, varnish or other coatings shall not be permitted on the joining material until after the joint has been tested and approved.

2. Water supply systems. Joints for bell and spigot pipe of water systems shall be firmly packed with clean asbestos rope or treated paper rope. Molten lead shall be poured in one operation to a depth of 2½ inches.

(b) *Mechanical joints.* 1. Drain and vent systems. a. Mechanical push-on joints for drain and vent systems shall have gaskets which conform to ASTM C564.

b. Mechanical sleeve joints for drain and vent systems shall have an elastomeric sealing sleeve conforming to ASTM C564 or CISPI 310. Where a stainless steel band assembly is used, the band assembly shall conform to CISPI 310. Mechanical joints shall be installed in accordance with the department's approval and with manufacturer's instructions.

2. Water supply systems. Mechanical push-on joints and mechanical compression type joints for water supply systems shall conform to AWWA C111/A21.11.

(7) CONCRETE PIPE. Joints between concrete pipe or fittings shall be made by use of an elastomeric seal conforming to ASTM C443.

(8) COPPER OR COPPER ALLOY PIPE AND TUBING. Joints between copper or copper alloy pipe, tubing or fittings shall be installed in accordance with pars. (a) to (d).

(a) *Brazed joints.* All joint surfaces to be brazed shall be cleaned by approved procedure. An approved flux shall be applied when required. Brazing filler metal conforming to AWS A5.8 shall be applied. The joint shall be made by heating to the proper temperature.

(b) *Flared joints.* Flared joints may be used only on tubing for water supply systems and shall be made by the use of a tool designed for that operation.

(c) *Mechanical joints.* Mechanical joints may be installed where approved by the department and shall be installed in accordance with the department's approval and the manufacturer's instructions. Mechanical push-on joints and mechanical compression type joints for water supply systems shall conform to ASTM D3139.

(d) *Soldered joints.* All joint surfaces to be soldered shall be cleaned by approved procedure. An approved flux shall be applied to all joint surfaces. Solder conforming to ASTM B32 shall be applied. The joint shall be made by heating to the proper temperature.

(9) DUCTILE IRON PIPE. Mechanical push-on joints and mechanical compression type joints for water supply systems shall conform to AWWA C111/A21.11.

(10) Galvanized steel pipe. Joints between galvanized steel pipe or fittings or between galvanized steel pipe and cast iron fittings shall be installed in accordance with pars. (a) to (c).

(a) *Threaded joints.* Threaded joints shall conform to ANSI B2.1. Pipe joint compound or tape shall be used on the male threads only.

(b) *Mechanical joints.* Mechanical joints may be installed where approved by the department and shall be installed in accordance with the department's approval and the manufacturer's instructions.

(c) *Caulked joints.* Caulked joints shall only be used for drain or vent piping. Caulked joints for hub and spigot piping and fittings shall be firmly packed with oakum or hemp. Molten lead shall be poured in one operation not less than one inch deep and not to extend more than ⅛ inch below the rim of the pipe, and caulked tight. Paint, varnish or other coatings shall not be permitted on the joining material until after the joint has been tested and approved.

1. Caulked joints for drain piping shall be used only for piping in a vertical position.

2. Caulked joints for vent piping may be used for piping in a vertical or horizontal position.

(11) LEAD PIPE. Joints between lead pipe or fittings shall be installed in accordance with pars. (a) and (b).

(a) *Burned joints.* Burned joints shall be uniformly fused together into one continuous piece. The thickness of the joint shall be at least as thick as the lead being joined. The filler metal shall be of the same material as the pipe.

(b) *Wiped joints.* Wiped joints shall be full wiped, having an exposed surface on each side of the joint not less than ¾ inch. The joint shall be at least ⅝ inch thick at the thickest point.

(12) PB PLASTIC PIPE AND TUBING. Joints between polybutylene plastic pipe and tubing or fittings shall be installed in accordance with pars. (a) to (c).

(a) *Flared joints.* Flared joints shall be made by use of a tool designed for that operation. Flared joints shall be made in accordance with ASTM D3140.

(b) *Heat fusion joints.* Heat fusion joints shall be made in accordance with ASTM D2657 and ASTM D3309. Heat fusion joints shall be of the socket fusion type.

1. Joint surfaces to be fused shall be clean and free of moisture.

2. All joint surfaces shall be heated to melt temperature and joined.

3. The joint shall be undisturbed until cool.

(c) *Mechanical joints.* Mechanical joints may be installed where approved by the department and shall be installed in accordance with the department's approval and the manufacturer's instructions. Mechanical push-on joints and mechanical compression type joints shall conform to ASTM D3139.

(13) PE PLASTIC PIPE AND TUBING. Joints between polyethylene plastic pipe, tubing or fittings shall be in accordance with pars. (a) to (c).

(a) *Flared joints.* Flared joints shall be made by use of a tool designed for that operation. Flared joints shall be made in accordance with ASTM D3140.

(b) *Heat fusion joints.* Heat fusion joints shall be made in accordance with ASTM D2657. Heat fusion joints shall be of the socket fusion type.

1. Joint surfaces to be fused shall be clean and free of moisture.

2. All joint surfaces shall be heated to melt temperature and joined.

3. The joint shall be undisturbed until cool.

(c) *Mechanical joints.* Mechanical joints may be installed where approved by the department and shall be installed in accordance with the department's approval and the manufacturer's instructions. Mechanical push-on joints and mechanical compression type joints shall conform to ASTM D3139.

(14) PVC PLASTIC PIPE. Joints between polyvinyl chloride plastic pipe or fittings shall be installed in accordance with pars. (a) to (c).

(a) *Mechanical joints.* Mechanical joints may be installed where approved by the department and shall be installed in accordance with the department's approval and the manufacturer's instructions.

1. Drain and vent systems. Mechanical push-on joints for drain and vent systems shall conform to ASTM D3212.

2. Water supply systems. Mechanical push-on joints and mechanical compression type joints for water supply systems shall conform to ASTM D3139.

(b) *Solvent cemented joints.* Solvent cemented joints shall be made in accordance with ASTM D2855.

1. Joint surfaces shall be clean and free of moisture. A primer conforming to ASTM F656 shall be applied to all joint surfaces.

2. Solvent cement conforming to ASTM D2564 shall be applied to all joint surfaces and the joint shall be made while the cement is wet.

3. Solvent cement shall be handled in accordance with ASTM F402.

(c) *Threaded joints.* Threaded joints shall only be used on pipes of schedule 80 or heavier. Threaded joints shall conform to ANSI B2.1. The pipe shall be threaded with dies specifically designed for plastic pipe. Thread lubricant or tape approved for such use shall be applied to the male threads only.

(15) STEEL PIPE. Joints between nongalvanized steel pipe or fittings shall be in accordance with pars. (a) to (d).

(a) *Threaded joints.* Threaded joints shall conform to ANSI B2.1. Pipe joint compound or tape shall be used on the male threads only.

(b) *Mechanical joints.* Mechanical joints may be installed where approved by the department and shall be installed in accordance with the department's approval and the manufacturer's instructions.

(c) *Caulked joints.* Caulked joints shall only be used for drain or vent piping. Caulked joints for hub and spigot piping and fittings shall be firmly packed with oakum or hemp. Molten lead shall be poured in one operation not less than one inch deep and not to extend more than ⅛ inch below the rim of the pipe, and caulked tight. Paint, varnish or other coatings shall not be permitted on the joining material until after the joint has been tested and approved.

1. Caulked joints for drain piping shall be used only in a vertical position.

2. Caulked joints for vent piping may be used for piping in a vertical or horizontal position.

(d) *Welded joints.* Joints between steel pipe or fittings may be welded.

(16) VETRIFIED CLAY PIPE. Joints between vitrified clay pipe or fittings shall be made by use of an elastomeric seal conforming to ASTM C425.

(17) JOINTS BETWEEN PIPE AND FITTINGS OF DIFFERENT MATERIALS. (a) *General.* Joints between different piping materials shall be made with a mechanical joint of the compression or mechanical sealing type, unless otherwise permitted in this chapter.

1. Connectors of adaptors shall have an elastomeric seal conforming to ASTM C425, ASTM C443, ASTM C564, ASTM D1869 or ASTM F477.

2. Joints shall be installed in accordance with the department approval and the manufacturer's instructions.

3. Joints and connections between different piping materials in the water supply system shall be accessible.

(b) *Copper or copper alloy pipe to cast iron hub pipe.* Joints between copper or copper alloy pipe and cast iron hub pipe shall be made by use of a brass ferrule. The copper or copper alloy tubing shall be properly soldered to the ferrule, and the ferrule shall be joined to the cast iron hub by a caulked joint or mechanical compression joint.

(c) *Copper or copper alloy pipe to galvanized steel pipe.* Joints between copper or copper alloy pipe and galvanized steel pipe shall be made by the use of a brass converter fitting or dielectric fitting. The copper tubing shall be properly soldered to the fitting, and the fitting shall be screwed to the threaded pipe.

(d) *Cast iron pipe to steel, black iron or brass pipe.* Joints between cast iron and galvanized or nongalvanized steel, black iron or brass pipe shall be made by means of either caulked or threaded joints, or by the use of an approved adapter fitting.

(e) *Plastic pipe or tubing to other piping material.* Joints between different grades of plastic pipe, or between plastic pipe and other piping material shall be made by the use of a threaded fitting or an approved adapter fitting. Joints between plastic pipe and cast iron pipe shall be made by a caulked joint or an approved mechanical compression joint.

(f) *Lead pipe to other piping material.* Joints between lead pipe and other piping material shall be made by wiped joint to a caulking ferrule, soldering nipple, bushing or by use of an approved adapter fitting.

(18) PROHIBITED JOINTS AND CONNECTIONS. Unless otherwise approved by the department, the types of joints and connections specified in pars. (a) to (e) shall be prohibited:

(a) Cement or concrete joints;

(b) Mastic or hot pour bituminous joints;

(c) The use of fittings not approved for the specific type of installation;

(d) Elastomeric rolling 0-rings between different diameter pipe; and

(e) Solvent cement joints between different types of plastic pipe.

(19) CONNECTION OF FIXTURES. (a) *Flanged drain connections.* 1. Floor outlet fixtures. Connections between the drain system and floor outlet, flanged fixtures with integral traps shall be made by the use of a closet flange. The flange shall be joined to the drain and fastened to the structure. The fixture shall be fastened with brass bolts or other approved materials to the closet flange and the joint shall be sealed with an approved elastromeric gasket or setting compound conforming to FS TT-P-1536a.

2. Floor mounted, wall outlet fixtures. Connections between the drain system and floor mounted, wall outlet, flanged fixtures with integral traps shall be made as specified for floor outlet fixtures in subd. 1. or by the use of an approved carrier type fitting and gasket or seal.

3. Wall mounted, wall outlet fixtures. Connections between the drainage system and wall mounted, wall outlet, flanged fixtures with integral traps shall be made by the use of an approved carrier type fitting and gasket or seal.

(b) *Drain slip joints.* 1. Slip joints for drain piping and fittings shall be made by the use of an approved plastic or metal slip joint gasket. Slip joints may be used on the trap inlet, trap outlet or within the trap seal.

2. An access panel, utility space or other convenient access shall be provided to fixtures with concealed slip joint connections so as to make the connection accessible for inspection and repair.

(c) *Ground joints.* Brass or copper ground faced ferrule type connections which allow adjustment of tubing but provide a rigid joint when made up may be used on a fixture water supply and on the discharge side of a brass tube trap, but may not be concealed.

(d) *Ground faced unions.* Ground faced unions of drainage pattern may be used in waste piping but may not be concealed.

(20) EXPANSION JOINTS. Expansion joint fittings shall be of an approved type for the piping material being joined.

History: Cr. Register, February, 1985, No. 350, eff. 3-1-85.

ILHR 84.50 Alternate, experimental materials and engineered plumbing systems. (1) ALTERNATE AND EXPERIMENTAL MATERIALS. The provisions of chs. ILHR 82 and 84 are not intended to prevent the use of any alternate plumbing material or alternate method of plumbing installation provided the alternative has been first approved by the department. The department shall review and make a determination on an application for approval of alternate and experimental materials or methods within 3 months of receipt of all information required to complete the review.

(c) An alternate material submitted for approval shall be at least equivalent to standards specified in this chapter for the intended use. Alternate methods of installation submitted for approval shall conform to acceptable nationally recognized plumbing standards.

1. Tests for alternate materials and methods of installation shall be made in accordance with standards or procedures specified by the department.

2. The department may require tests to be made or repeated if, at any time, there is reason to believe that an alternate material no longer conforms to the requirements on which its approval was based.

(2) ENGINEERED PLUMBING SYSTEMS. The provisions of this subsection shall control the design, installation and supervision of the engineered plumbing systems.

(a) *Plans and specifications.* Plans and specifications for all engineered plumbing systems shall be submitted in accordance with s. ILHR 82.20.

1. The plans, specifications and all pertinent data shall indicate the nature and extent of the proposed system before an approval is granted.

2. Plans, specifications and data shall include complete plans indicating the fixture arrangements and the locations of drain stacks, vertical drain pipes and horizontal drains. Plans shall show the complete drain

and vent systems, showing all piping in proper sequence, identifying the load value of each in drainage fixture units, the direction of flow, pipe size, grade of horizontal piping, support, and the supply fixture unit load for the water system and any branch supplies which serve more than one plumbing fixture, appliance or hose outlet.

4. When requested, additional details and data pertaining to the design, installations and materials of an engineered plumbing system shall be submitted to the department.

(b) *Inspections.* The registered architect, engineer, plumbing designer or master plumber responsible for the design of the engineered plumbing system shall provide on-site supervision of the installation.

1. Upon completion of the installation, the registered architect, engineer, plumbing designer or master plumber shall certify in writing to the department that the installation is in compliance with the approve plans, specifications and data.

2. The department may require periodic inspections of the system by the registered architect, engineer, plumbing designer or master plumber after the installation is completed to monitor the performance of the system.

Note: See Appendix for further explanatory material.

History: Cr. Register, February, 1985, No. 350, eff. 3-1-85.

ILHR 84.60 Incorporation of standards by reference. (1) CONSENT. Pursuant to s. 227.025, Stats., the attorney general and the revisor of statutes have consented to the incorporation by reference of the standards listed in sub. (4).

(2) COPIES. Copies of the adopted standards are on file in the offices of the department, the secretary of state and the revisor of statutes. Copies also may be purchased through the respective organizations.

(3) INTERIM AMENDMENTS. Interim amendments of the adopted standards shall have no effect in the state until such time as this section is correspondingly revised to reflect the changes.

(4) ADOPTION OF STANDARDS. The following standards are hereby incorporated by reference into this chapter.

History: Cr. Register, February, 1985, No. 350, eff. 3-1-85.

AHAM	Association of Home Appliance Manufacturers 20 North Wacker Drive Chicago, Illinois 60606
Standard Reference Number	Title
DW-1-82	Household Dishwashers
ANSI	American National Standards Institute, Inc. 1430 Broadway New York, New York 10018

Standard Reference Number	Title
A112.6.1M-79	Supports for Off-the-Floor Plumbing Fixtures for Public Use
A112.14.1-75	Backwater Valves
A112.18.1M-79	Finished and Rough Brass Plumbing Fixture Fittings
A112.19.1M-79	Enameled Cast Iron Plumbing Fixtures
A112.19.2M-82	Vitreous China Plumbing Fixtures
A112.19.3-76	Stainless Steel Plumbing Fixtures (Designed for Residential Use)
A112.19.4-77	Porcelain Enameled Formed Steel Plumbing Fixtures
A112.19.5-79	Trim for Water Closet Bowls, Tanks and Urinals (Dimensional Standards)
A112.21.1M-80	Floor Drains
A112.21.2-71	Roof Drains
A112.26.1-69(R1975)	Water Hammer Arrestors
B1.20.1-83	Pipe Threads, General Purpose (Inch)
B16.3-77	Malleable Iron Threaded Fittings, Class 150 and 300
B16.4-77	Cast Iron Threaded Fittings, Class 125 and 250
B16.9-78	Factory-Made Wrought Steel Buttwelding Fittings
B16.11-80	Forged Steel Fittings, Socket-Welded and Threaded
B16.12-83	Cast Iron Threaded Drainage Fittings
B16.15-78	Cast Bronze Threaded Fittings, Class 125 and 250
B16.18-78	Cast Copper Alloy Solder-Joint Pressure Fittings
B16.22-80	Wrought Copper and Copper Alloy Solder Joint Pressure Fittings
B16.23-76	Cast Copper Alloy Solder Joint Drainage Fittings (DWV)
B16.26-83	Cast Copper Alloy Fittings for Flared Copper Tubes
B16.28-78	Wrought Steel Buttwelding Short Radius Elbows and Returns
B16.29-80	Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings (DWV)
B16.32-79	Cast Copper Alloy Solder Joint Fittings for Sovent Drainage Systems
B16.43-82	Wrought Copper and Copper Alloy Solder Joint Fittings for Sovent Drainage Systems
Z21.22-79	Relief Valves and Automatic Gas Shutoff Devices for Hot Water Supply Systems
Z124.1-80	Plastic Bathtub Units
Z124.2-80	Plastic Shower Receptors and Shower Stalls
Z124.3-80	Plastic Lavatories
Z124.4-83	Plastic Water Closet Bowls and Tanks

Standard Reference Number	Title
ARI	Air-Conditioning and Refrigeration Institute 1815 North Fort Myer Drive Arlington, Virginia 22209
ARI-1010-82	Drinking-Fountains and Self-Contained, Mechanically-Refrigerated Drinking-Water Coolers
ASSE	American Society of Sanitary Engineering P.O. Box 9712 Bay Village, Ohio 44140
Standard Reference Number	Title
1001-82	Pipe Applied Atmospheric Type Vacuum Breakers
1002-79	Water Closet Flush Tank Ball Cocks
1003-81	Water Pressure Reducing Valves for Domestic Water Supply Systems
1004-67	Commercial Dishwashing Machines
1005-67	Water Heater Drain Valves, ¾" Iron Pipe Size
1006-79	Household Dishwashers
1007-79	Home Laundry Equipment
1008-79	Household Food Waste Disposer Units
1009-70	Commerical Food Waste Disposer Units
1011-81	Hose Connection Vacuum Breakers
1012-78	Backflow Preventers with Intermediate Atmospheric Vent
1013-80	Reduced Pressure Principle Backflow Preventers, Including Appendix
1014-79	Handheld Showers
1018-78	Trap Seal Primer Valves
1025-78	Diverters for Plumbing Faucets with Hose Spray, Anti-Siphon Type, Residential Applications
ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, Pennsylvania 19103
Standard Reference Number	Title
A53-82	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless, Specification for
A74-82	Cast Iron Soil Pipe and Fittings, Specification for
A120-82	Pipe, Steel, Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless, for Ordinary Uses, Specification for
A377-79	Gray Iron and Ductile Iron Pressure Pipe, Specification for
B32-76	Solder Metal, Specification for

Standard Reference Number	Title
B42-83	Seamless Copper Pipe, Standard Sizes, Specification for
B43-80	Seamless Red Brass Pipe, Standard Sizes, Specification for
B75-81a	Seamless Copper Tube, Specification for
B88-83	Seamless Copper Water Tube, Specification for
B152-83	Copper Sheet, Strip, Plate, and Rolled Bar, Specification for
B251-81	General Requirements for Wrought Seamless Copper and Copper-Alloy Tube, Specification for
B302-81	Threadless Copper Pipe, Specification for
B306-81	Copper Drainage Tube (DWV), Specification for
C4-62(R1981)	Clay Drain Tile, Specification for
C14-82	Concrete Sewer, Storm Drain, and Culvert Pipe, Specification for
C76-83	Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe, Specification for
C296-83	Asbestos-Cement Pressure Pipe, Specification for
C425-77(R1982)	Compression Joints for Vitrified Clay Pipe and Fittings, Specification for
C428-81	Asbestos-Cement Nonpressure Sewer Pipe, Specification for
C443-79	Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets, Specification for
C508-83	Asbestos-Cement Underdrain Pipe, Specification for
C564-70(R1982)	Rubber Gaskets for Cast Iron Soil Pipe and Fittings, Specification for
C700-78a(R1983)	Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated, Specification for
D1527-77(R1982)	Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe, Schedules 40 and 80, Specification for
D1785-83	Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120, Specification for
D1869-78	Rubber Rings for Asbestos-Cement Pipe, Specification for
D2235-81	Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings, Specification for
D2239-83	Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter, Specification for
D2241-83	Poly (Vinyl Chloride) (PVC) Plastic Pipe (SDR-PR), Specification for
D2282-82	Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe (SDR-PR), Specification for
D2321-74(R1980)	Underground Installation of Flexible Thermoplastic Sewer Pipe, Recommended Practice for

Standard Reference Number	Title
D2464-76	Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80, Specification for
D2465-73(R1979)	Threaded Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe Fittings, Schedule 80, Specification for
D2466-78	Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40, Specification for
D2467-76a	Socket-Type Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80, Specification for
D2468-80	Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe Fittings, Schedule 40, Specification for
D2469-76	Socket-Type Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe Fittings, Schedule 80, Specification for
D2564-80	Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings, Specification for
D2609-74	Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe, Specification for
D2657-79	Heat Joining of Polyolefin Pipe and Fittings, Specification for
D2661-82	Acrylonitrile-Butadiene-Styrene (ABS) Plastic Drain, Waste, and Vent Pipe and Fittings, Specification for
D2662-83	Polybutylene (PB) Plastic Pipe (SIDR-PR), Based on Controlled Inside Diameter, Specification for
D2665-82	Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings, Specification for
D2666-83	Polybutylene (PB) Plastic Tubing, Specification for
D2672-80	Bell-End Poly (Vinyl Chloride) (PVC) Pipe, Specification for
D2680-80	Acrylonitrile-Butadiene-Styrene (ABS) Composite Sewer Piping
D2729-83	Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings, Specification for
D2737-83	Polyethylene (PE) Plastic Tubing, Specification for
D2751-83a	Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings, Specification for
D2774-72(R1978)	Underground Installation of Thermoplastic Pressure Piping, Recommended Practice for
D2855-83	Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings, Recommended Practice for
D3033-83	Type PSP Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings, Specification for
D3034-83	Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings, Specification for

Standard Reference Number	Title
D3139-77	Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals, Specification for
D3140-72(R1977)	Flaring Polyolefin Pipe and Tubing, Recommended Practice for
D3212-81	Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals, Specification for
D3298-81	Perforated Styrene-Rubber (SR) Plastic Drain Pipe, Specification for
D3309-81b	Polybutylene (PB) Plastic Hot-and Cold-Water Distribution Systems, Specification for
D3311-82	Drain, Waste, and Vent (DWV) Plastic Fittings Patterns, Specification for
F402-80	Safe Handling of Solvent Cements and Primers Used for Joining Thermoplastic Pipe and Fittings, Practice for
F405-82a	Corrugated Polyethylene (PE) Tubing and Fittings, Specification for
F409-81	Thermoplastic Accessible and Replaceable Plastic Tube and Tubular Fittings, Specification for
F477-76(R1981)	Elastomeric Seals (Gaskets) for Joining Plastic Pipe, Specification for
F628-81	Acrylonitrile-Butadiene-Styrene (ABS) Plastic Drain, Waste, and Vent Pipe Having a Foam Core, Specification for
F656-80	Primers for Use in Solvent Cement Joints of Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings, Specification for

AWS	American Welding Society 2501 N.W. 7th Street Miami, Florida 33125

Standard Reference Number	Title
AWS A5.8-81	Brazing Filler Metal, Specification for

CISPI	Cast Iron Soil Pipe Institute 1499 Chain Bridge Road, Suite 203 McLean, Virginia 22101

Standard Reference Number	Title
301-82	Cast Iron Soil Pipe and Fittings for Hubless Cast Iron Systems for Drain, Waste or Vent, Sewer, Rainwater or Storm Drain Systems, Specification for
310-82	CISPI's Patented Joints for Use in Connection with Cast Iron Systems for Drain, Waste or Vent, Sewer, Rainwater or Storm Drain Systems, Specification for

AWWA	American Water Works Association Data Processing Department 6666 West Quincy Avenue Denver, Colorado 80235
Standard Reference Number	Title
C110/A21.10-82	American National Standard for Ductile- and Gray-Iron Iron Fittings, 3 in. through 48 in., for Water and Other Liquids
C111/A21.11-80	American National Standard for Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings
C151/A21.51-81	American National Standard for Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids
FS	Federal Specifications* National Bureau of Standards Office of Engineering Standards U.S. Department of Commerce Washington, D.C. 20234 *Standards are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402
Standard Reference Number	Title
TT-P-1536A	Plumbing Fixture Setting Compound, July 1975
QQ-L-201f	Lead Sheet, November 1965 with Amendment 2, November 1970
WW-P-325B	Lead Pipe, Bends, Traps, Caps and Plugs (for Industrial Pressure, and Soil and Waste Applications), June 1976
WW-P-405a	Corrugated Pipe (Iron or Steel, Zinc Coated), September 1968, with Amendment 1, September 1970
WQA	Water Quality Association 477 East Butterfield Road Lombard, Illinois 60148
Standard Reference Number	Title
S-100-81	Household, Commercial and Portable Exchange Water Softeners