Minnesota Plumbing Board

Proposed Permanent Rules Adopting the 2018 Uniform Plumbing Code with Amendments

4714.0050 TITLE; INCORPORATION BY REFERENCE.

Chapters 2 to 11, ~~14~~ 16, and 17 of the ~~2012~~ 2018 edition of the Uniform Plumbing Code (UPC) as promulgated by the International Association of Plumbing and Mechanical Officials (IAPMO), Ontario, California, and UPC appendices A, B, C, and I, ~~except for IS 12-2006, IS 13-2006, IS 26-2006, SIS 1-2003, and SIS 2-2003 of appendix I,~~ are incorporated by reference and made part of the Minnesota Plumbing Code except as qualified by the applicable provisions in chapter 1300, and as amended in this chapter. The UPC is not subject to frequent change and a copy of the UPC, with amendments for use in Minnesota, is available in the office of the commissioner of labor and industry. Portions of this chapter reproduce text and tables from the UPC, reproduced with permission. The UPC is copyright ~~2012~~ 2018 by the IAPMO. All rights reserved.

4714.0204 TERMS DEFINED BEGINNING WITH B.

Subpart 1. **Added definition.** UPC section 204.0 is modified by adding the following definition:

Barometric Loop - Means a section of pipe in the shape of an inverted "u" located upstream and rising a minimum of 35 feet above the highest fixture it supplies.

Subp. 2. **Amended definition.** UPC section 204.0 is modified by amending the following definition:

Building Supply - Means the pipe carrying potable water from the municipal water supply or source of water supply to a building water meter, pressure tank, or other point of use or distribution on the lot.

4714.0207 TERMS DEFINED BEGINNING WITH E.

UPC section 207.0 is modified by adding the following definition:

Emergency Floor Drain - Means floor drains that do not serve as a receptor that are located in restrooms, under emergency eyewash/shower equipment, and in laundry rooms.

4714.0214 TERMS DEFINED BEGINNING WITH L.

UPC section 214.0 is modified by adding the following definition:

Low Pressure Water Dispenser - Means a terminal fitting located downstream of a pressure-reducing valve that dispenses hot drinking water above 160 degrees Fahrenheit (71 degrees Celsius) or cold water or both at a pressure of 15 psi (105 kPa) or less.

4714.0220 TERMS DEFINED BEGINNING WITH R.

UPC section 220.0 is modified by adding the following definition:

Registered Design Professional ~~Engineer~~ - For purposes of this code, "registered design professional ~~engineer~~," "engineer," or "registered professional engineer" means a person practicing professional engineering as described in Minnesota Statutes, section 326.02, subdivision 3, and who is licensed in the state of Minnesota as a professional engineer by the Board of Architecture, Engineering, Land Surveying, Landscape Architecture, Geoscience, and Interior Design under Minnesota Statutes, section 326.10.

4714.0225 TERMS DEFINED BEGINNING WITH W.

UPC section 225.0 is modified by adding the following definition:

Water Conditioning Equipment or Water Treating Equipment - Means any appliance, appurtenance, or fixture, or any combination thereof, designed to treat potable water, so as to alter, modify, add, or remove any minerals, chemicals, or bacteria contained in the water. Water conditioning equipment and water treating equipment includes but is not limited to ion exchange water softeners, backwashing water filters, oxidizing water filters, cartridge

filters, chemical feed cartridges, ultraviolet lights, and equipment for reverse osmosis, ultrafiltration, nanofiltration, pH adjustment, nitrate and arsenic removal, and adsorption onto activated carbon.

4714.0301 SECTION 301.0 ~~MATERIALS - STANDARDS AND ALTERNATIVES~~ GENERAL.

Subpart 1. **Section ~~301.1~~ 301.2.5 Existing Buildings.** UPC ~~section 301.1 is amended to read as follows:~~ subsection 301.2.5 is deleted in its entirety.

~~**301.1 Minimum Standards.** Pipe, pipe fittings, traps, fixtures, material, and devices used in a plumbing system shall:~~

~~(1) be listed or labeled (third-party certified) by a listing agency (accredited conformity assessment body);~~

~~(2) comply with the approved applicable recognized standards referenced in this code; and~~

~~(3) be free from defects.~~

~~Plastic pipe and the fittings used for plastic pipe shall meet the requirements of NSF 14. Unless otherwise provided for in this code, materials, fixtures, or devices used or entering into the construction of plumbing systems, or parts thereof, shall be submitted to the Authority Having Jurisdiction for approval.~~

~~**301.1.1 Marking.** Each length of pipe and each pipe fitting, trap, fixture, material, and device used in a plumbing system shall have cast, stamped, or indelibly marked on it the manufacturer's mark or name, which shall readily identify the manufacturer to the end user of the product. Where required by the approved standard that applies, the product shall be marked with the weight and the quality of the product. Materials and devices used or entering into the construction of plumbing and drainage systems, or parts thereof, shall be marked and identified in a manner satisfactory to the Authority~~

~~Having Jurisdiction. The marking shall be done by the manufacturer. Field markings shall not be acceptable.~~

~~**301.1.2 Standards.** Standards listed or referred to in this chapter or other chapters cover materials that shall conform to the requirements of this code, where used in accordance with the limitations imposed in this or other chapters thereof and their listing. Where a standard covers materials of various grades, weights, quality, or configurations, the portion of the listed standard that is applicable shall be used. Design and materials for special conditions or materials not provided for herein shall be permitted to be used only by special permission of the Authority Having Jurisdiction after the Authority Having Jurisdiction has been satisfied as to their adequacy. A list of accepted plumbing material standards is referenced in Table 1401.1.~~

Subp. 2. **Section ~~301.2~~ 301.3.** UPC section ~~301.2~~ 301.3 is amended to read as follows:

~~301.2~~ 301.3 Alternate Materials and Methods of Construction Equivalency. Nothing in this code is intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety over those prescribed by this code. Prior to installation, technical documentation shall be submitted to the Authority Having Jurisdiction to demonstrate equivalency. Unless prohibited by this code or by law, the Authority Having Jurisdiction shall have the authority to approve or disapprove the system, method, or device for the intended purpose.

However, the exercise of this discretionary approval by the Authority Having Jurisdiction shall have no effect beyond the jurisdictional boundaries of the Authority Having Jurisdiction. An alternate material or method of construction so approved shall not be considered as in accordance with the requirements, intent, or both of this Code for a purpose other than that granted by the Authority Having Jurisdiction where the submitted data does not prove equivalency.

UPC subsections 301.2.1, 301.2.1.1, and 301.2.1.2 are preserved without amendment.

Subp. 3. **Section ~~301.4.6~~ 301.5.6.** UPC section ~~301.4.6~~ 301.5.6 is amended to read as follows:

~~301.4.6~~ 301.5.6 Inspection and Testing. The alternative engineered design shall be tested and inspected in accordance with the submitted testing and inspection plan and the requirements of this code. Prior to the final plumbing inspection, the registered professional engineer shall provide written certification to the administrative authority that the system has been visually inspected by the registered professional engineer or the registered professional engineer's designee, and the installation has been properly implemented according to the certified plans, calculations, and specifications.

4714.0313 HANGERS AND SUPPORTS.

Subpart 1. **Section 313.** Table 313.3 is amended to read as follows:

TABLE 313.3

HANGERS AND SUPPORTS

MATERIALS	TYPES OF JOINTS	HORIZONTAL	VERTICAL
Cast	Lead and Oakum	5 feet, except 10 feet where 10 foot lengths are installed[1,2,3]	Base and each floor, not to exceed 15 feet
	Compression Gasket	Every other joint, unless over 4 feet then support each joint[1,2,3]	Base and each floor, not to exceed 15 feet
Cast-Iron Hubless	Shielded Coupling	Every other joint, unless over 4 feet then support each joint[1,2,3]	Base and each floor, not to exceed 15 feet
Copper & Copper Alloys	Soldered, Brazed, Threaded, or Mechanical	1-1/2 inches and smaller, 6 feet; 2 inches and larger, 10 feet	Each floor, not to exceed 10 feet[5]
Steel Pipe for Water or DWV	Threaded or Welded	3/4 inch and smaller, 10 feet; 1 inch and larger, 12 feet	Every other floor, not to exceed 25 feet[5]

Steel Pipe for Gas	Threaded or Welded	1/2 inch, 6 feet; 3/4 inch and 1 inch, 8 feet; 1-1/4 inches and larger, 10 feet	1/2 inch, 6 feet; 3/4 inch and 1 inch, 8 feet; 1-1/4 inches every floor level
Schedule 40 PVC and ABS DWV	Solvent Cemented	All sizes, 4 feet; allow for expansion every 30 feet[3,6]	Base and each floor; provide mid-story guides; provide for expansion every 30 feet[6]
CPVC	Solvent Cemented	1 inch and smaller, 3 feet; 1-1/4 inches and larger, 4 feet	Base and each floor; provide mid-story guides
CPVC-AL-CPVC	Solvent Cemented	1/2 inch, 5 feet; 3/4 inch, 65 inches; 1 inch, 6 feet	Base and each floor; provide mid-story guides
Lead	Wiped or Burned	Continuous Support	Not to exceed 4 feet
Steel	Mechanical	In accordance with standards acceptable to the Authority Having Jurisdiction	
PEX	Cold Expansion, Insert, and Compression	1 inch and smaller, 32 inches; 1-1/4 inches and larger, 4 feet	Base and each floor; provide mid-story guides
PEX-AL-PEX	Metal Insert and Metal Compression	1/2 inch; 3/4 inch; 1 inch All sizes 98 inches	Base and each floor; provide mid-story guides
PE-AL-PE	Metal Insert and Metal Compression	1/2 inch; 3/4 inch; 1 inch All sizes 98 inches	Base and each floor; provide mid-story guides
PE-RT	Insert and Compression	1 inch and smaller, 32 inches; 1-1/4 inches and larger, 4 feet	Base and each floor; provide mid-story guides
Polypropylene (PP)	Fusion Weld (socket, butt, saddle, electrofusion), Threaded (metal threads only), or Mechanical	1 inch and smaller, 32 inches; 1-1/4 inches and larger, 4 feet	Base and each floor; provide mid-story guides

For SI units: 1 inch = 25.4 mm, 1 foot = 304.8 mm

Notes:

[1] Support adjacent to joint, not to exceed 18 inches (457 mm).

[2] Brace not to exceed 40-foot (12,192 mm) intervals to prevent horizontal movement.

[3] Support at each horizontal branch connection.

[4] Hangers shall not be placed on the coupling.

[5] Vertical water lines shall be permitted to be supported in accordance with recognized engineering principles with regard to expansions and contraction, where first approved by the Authority Having Jurisdiction.

[6] For expansion loops, see Table 313.3.1.

Subp. 2. **Section 313.** Table 313.3.1 is added to read as follows:

TABLE 313.3.1

Schedule 40 PVC and ABS DWV and Storm Pipe Expansion Table

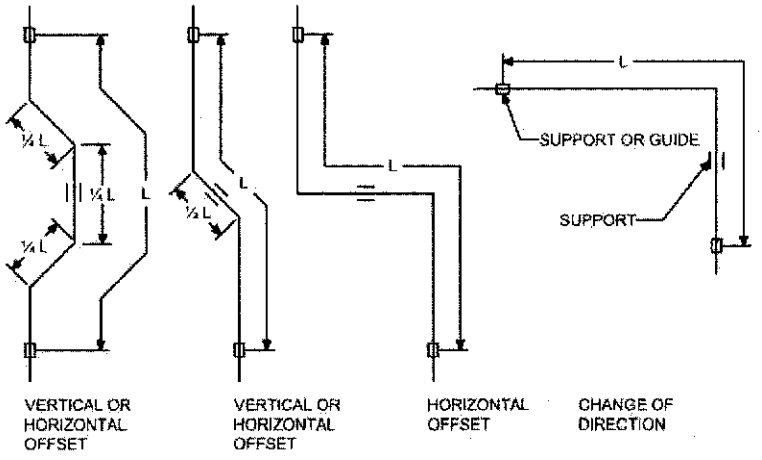
Inside the building thermal envelope

	Length of Run (ft.)		
	10	20	30
Pipe Size	Expansion loop length (in.) = L		
1.5"	20	28	34
2"	22	31	38
3"	27	38	46
4"	30	43	52
6"	37	52	63
8"	42	59	72
10"	47	66	80
12"	51	72	88

Outside the building thermal envelope

	Length of Run (ft.)		
	10	20	30

Pipe Size	Expansion loop length (in.) = L		
1.5"	26	36	44
2"	29	41	50
3"	35	49	60
4"	40	56	68
6"	48	68	83
8"	55	77	94
10"	61	86	105
12"	66	94	114



Subp. 3. **Section 313.7.** UPC section 313.7 is deleted in its entirety.

4714.0403 [Renumbered 4714.0412]

~~4714.0403~~ 4714.0412 WATER-CONSERVING FIXTURES AND FITTINGS.

UPC ~~section 403.3~~ subsection 412.1.1 is amended to read as follows:

~~**403.3 Urinals.** Urinals shall have an average water consumption not to exceed 1 gallon (4 L) of water per flush.~~

~~403.3.1~~ 412.1.1 Nonwater Urinals. Nonwater urinals shall be listed and comply with the applicable standards referenced in Table ~~1401.1~~ 1701.1. Nonwater urinals shall have a barrier liquid sealant to maintain a trap seal. Nonwater urinals shall permit the

uninhibited flow of waste through the urinal to the sanitary drainage system. Nonwater urinals shall be cleaned and maintained in accordance with the manufacturer's instructions after installation. Where a nonwater urinal is installed, a water-supplied fixture shall be installed upstream of the nonwater urinal at the end of that same drainage branch.

~~4714.0406~~ 4714.0405 PROHIBITED FIXTURES.

UPC section ~~406.3~~ 405.3 is deleted in its entirety.

4714.0406 [Renumbered 4714.0405]

4714.0407 LAVATORIES.

Subpart 1. **UPC section 407.3.** UPC section 407.3 is amended as follows:

407.3 Limitation of Hot Water Temperature for Public Lavatories. Hot water delivered from public-use lavatories shall be limited to a maximum temperature of 110 degrees Fahrenheit (43 degrees Celsius). The maximum temperature shall be regulated by one of the following means:

(1) a limiting device conforming to ASSE 1070/ASME A112.1070/CSA B125.70; or

(2) a water heater conforming to ASSE 1084.

Subp. 2. UPC section 407.4 is deleted in its entirety.

4714.0408 SHOWERS.

Subpart 1. UPC section 408.3 is amended to read as follows:

408.3 Individual Shower and Tub/Shower Combination Control Valves. Showers and tub/shower combinations shall be provided with individual control valves of the pressure balance, thermostatic, or combination pressure balance/thermostatic mixing valve type that provide scald and thermal shock protection for the rated flow rate of the installed showerhead. These valves shall be installed at the point of use and in accordance with ASSE 1016/ASME

A112.1016/CSA B125.16 or ASME A112.18.1/CSA B125.1. Gang showers, where supplied with a single temperature-controlled water supply pipe, shall be controlled by a mixing valve that is in accordance with ASSE 1069. Handle position stops shall be provided on such valves. The maximum water temperature discharging from an individual showerhead shall be limited to 120 degrees Fahrenheit (49 degrees Celsius) by one of the following methods:

(1) a shower or tub/shower combination valve conforming to ASSE 1016/ASME A112.1016/CSA B125.16 or ASME A112.18.1/CSA B125.1 where either:

(a) the valve is field adjusted to the required maximum temperature; or

(b) the handle position stop is set in accordance with the manufacturer's instructions to the required maximum temperature;

(2) for gang showers supplied by a single water supply pipe, a mixing valve that conforms to ASSE 1069 that is field-adjusted to the required maximum temperature;

(3) a limiting device conforming to either ASSE 1070/ASME A112.1070/CSA B125.70 or CSA B125.3; or

(4) a water heater conforming to ASSE 1084.

Subp. 2. UPC section 408.7 is amended to read as follows:

408.7 Lining for Showers and Receptors. Shower receptors built onsite shall be watertight and shall be constructed from approved-type dense, nonabsorbent, and noncorrosive materials. Each such receptor shall be adequately reinforced; shall be provided with an approved flanged floor drain designed to make a watertight joint on the floor; and shall have smooth, impervious, and durable surfaces. Unless the shower receptor is poured on the ground as part of a slab, an approved shower liner must be provided in accordance with the requirements of this section.

Shower receptors shall have the subfloor and rough side of walls to a height of not less than 3 inches (76 mm) above the top of the finished dam or threshold shall be first lined with sheet plastic, lead, or copper, or shall be lined with other durable and watertight materials. Showers that are provided with a built-in place, permanent seat or seating area that is located within the shower enclosure, shall be first lined with sheet plastic, lead, copper, or shall be lined with other durable and watertight materials that extend not less than 3 inches (76 mm) above horizontal surfaces of the seat or the seating area.

Lining materials shall be pitched 1/4 inch per foot (20.8 mm/m) to weep holes in the subdrain of a smooth and solidly formed subbase. Such lining materials shall extend upward on the rough jambs of the shower opening to a point not less than 3 inches (76 mm) above the horizontal surfaces of the seat or the seating area, the top of the finished dam or threshold and shall extend outward over the top of the permanent seat, permanent seating area, or rough threshold and be turned over and fastened on the outside face of both the permanent seat, permanent seating area, or rough threshold and the jambs.

Nonmetallic shower subpans or linings shall be permitted to be built up on the job site of not less than three layers of standard-grade 15-pound (6.8 kg) asphalt-impregnated roofing felt. The bottom layer shall be fitted to the formed subbase and each succeeding layer thoroughly hot-mopped to that below. Corners shall be carefully fitted and shall be made strong and watertight by folding or lapping, and each corner shall be reinforced with suitable webbing hot-mopped in place.

Folds, laps, and reinforcing webbing shall extend not less than 4 inches (102 mm) in all directions from the corner, and webbing shall be of approved type and mesh, producing a tensile strength of not less than 50 pounds per square foot (lb/ft^2) (244 kg/m^2) in either direction. Nonmetallic shower subpans or linings shall be permitted to consist of multilayers of other approved equivalent materials suitably reinforced and carefully fitted in place on the job site as elsewhere required in this section.

Linings shall be properly recessed and fastened to the approved backing so as not to occupy the space required for the wall covering, and shall not be nailed or perforated at a point that is less than 1 inch (25.4 mm) above the finished dam or threshold. An approved type subdrain shall be installed with a shower subpan or lining. Each such subdrain shall be of the type that sets flush with the subbase and shall be equipped with a clamping ring or other device to make a tight connection between the lining and the drain. The subdrain shall have weep holes into the waste line. The weep holes located in the subdrain clamping ring shall be protected from clogging.

UPC subsections 408.7.1 through 408.7.5 are maintained without amendment.

4714.0409 BATHTUBS AND WHIRLPOOL BATHTUBS.

Subpart 1. UPC section 409.1 is amended to read as follows:

409.1 Application. ~~Bathtubs and whirlpool bathtubs shall comply with the applicable standards referenced in Table 1401.1.~~ Bathtubs shall comply with ASME A112.19.1/CSA B45.2, ASME A112.19.2/CSA B45.1, ASME A112.19.3/CSA B45.4, CSA B45.5/IAPMO Z124, or CSA B45.12/IAPMO Z402. Whirlpool bathtubs shall comply with ASME A112.19.7/CSA B45.10. Pressure sealed doors within bathtubs ~~and~~ or whirlpool bathtub enclosures shall comply with ~~the applicable standards referenced in Table 1401.1~~ ASME A112.19.15. Whirlpool pedicure tubs shall comply with general requirements and water retention sections of ASME A112.19.7/CSA B45.10, Hydromassage Bathtub ~~Appliances, or IAPMO IGC 155, Pipeless Whirlpool Bathtub Appliances~~ Systems.

Subp. 2. UPC section 409.4 is amended to read as follows:

409.4 Limitation of Hot Water Temperature in Bathtubs and Whirlpool Bathtubs. The maximum hot water temperature discharging from the bathtub and whirlpool bathtub filler shall be limited to 120 degrees Fahrenheit (49 degrees Celsius). The maximum temperature shall be regulated by one of the following means:

(1) a limiting device conforming to either ASSE 1070/ASME A112.1070/CSA B125.70 or CSA B125.3; or

(2) a water heater conforming to ASSE 1084.

4714.0410 BIDETS.

UPC section 410.3 is amended **to read** as follows:

410.3 Limitations of Water Temperature in Bidets. The maximum hot water temperature discharging from a bidet shall be limited to 110 degrees Fahrenheit (43 degrees Celsius). The maximum temperature shall be regulated by one of the following means:

(1) a limiting device conforming to either ASSE 1070/ASME A112.1070/CSA B125.70 or CSA B125.3; or

(2) a water heater conforming to ASSE 1084.

4714.0414 DISHWASHING MACHINES.

UPC section 414.3 is amended to read as follows:

414.3 Drainage Connection. Domestic dishwashing machines shall discharge indirectly through an air gap fitting in accordance with section 807.3 into a waste receptor, a wye branch fitting on the tailpiece of a kitchen sink, or dishwasher connection of a food waste disposer; or run the discharge line as high as possible under the countertop, securely fastened. Commercial dishwashing machines shall discharge indirectly through an air break or direct connection. The indirect discharge for commercial dishwashing machines shall be in accordance with section 807.1, and the direct discharge shall be in accordance with section 704.3.

4714.0416 EMERGENCY EYEWASH AND SHOWER EQUIPMENT.

UPC section 416.2 is amended to read as follows:

416.2 Water Supply. Emergency eyewash and shower equipment shall not be limited in the water supply flow rates. Where hot and cold water is supplied to an emergency shower or eyewash station, the temperature of the water supply shall be controlled by a temperature actuated mixing valve complying with ASSE 1071. Where water is supplied directly to an emergency shower or eyewash station from a water heater, the water heater shall comply with ASSE 1085. Flow rate, discharge pattern, and temperature of flushing fluids shall be provided in accordance with ISEA Z358.1 based on the hazardous material.

4714.0417 FAUCETS AND FIXTURE FITTINGS.

UPC section 417 is amended by adding subsection 417.6 to read as follows:

417.6 Low-Pressure Water Dispenser. Beverage faucets shall comply with ASME A112.18.1/CSA B125.1. Low-pressure water dispensers that dispense electrically heated water and have a reservoir vented to the atmosphere shall comply with ASSE 1023. Electric devices that heat water shall comply with UL 499.

4714.0418 FLOOR DRAINS.

Subpart 1. **Section 418.4.** UPC section 418.4 is amended to read as follows:

418.4 Food Storage Areas. Where drains are provided in storerooms, walk-in freezers, walk-in coolers, refrigerated equipment, or other locations where food is stored, the drains shall have indirect waste piping. Separate waste pipes shall be run from each food storage area, each with an indirect connection to the building sanitary drainage system. Traps shall be provided in accordance with section ~~801.2.2~~ 801.3.2 and shall be vented.

Indirect drains shall be permitted to be located in freezers or other spaces where freezing temperatures are maintained, provided that traps, where supplied, shall be located where the seal will not freeze. Otherwise, the floor of the freezer shall be sloped to a floor drain located outside of the storage compartment.

Subp. 2. **Section 418.** UPC section 418 is amended by adding the following subsections.

418.6 Elevator Pit Drain. An elevator pit drain shall discharge to the sanitary sewer using an indirect connection that precludes the possibility of sewage backup into the pit. If a sump is used, it shall be outside the pit with a dry pan drain flowing to it.

418.7 Garage and Parking Area Floor Drains. Floor area drains in open parking areas, including open areas of parking ramps, shall discharge to the storm sewer or to a place of disposal satisfactory to the sewer authority. Floor drains in parking areas that are enclosed, and floor drains in areas open or enclosed that are used for maintenance or as vehicle wash bays, shall discharge to the sanitary sewer if a municipal sewer is available. An oil and flammable liquid interceptor shall comply with section 1017 and shall be provided if required by ~~section 1017~~ sections 1009.1, 1011.1, and 1017.1.

Exception: Floor drains in private garages serving one- and two-family dwellings may discharge to daylight if approved by the administrative authority.

4714.0420 SINKS.

UPC section ~~420.3~~ 420.4 is amended to read as follows:

~~420.3~~ 420.4 Waste Outlet. Kitchen and laundry sinks shall have a waste outlet and fixture tailpiece not less than 1-1/2 inches (40 mm) in diameter, except commercial pot and scullery sinks shall be provided with waste outlets not less than 2 inches (50 mm) in diameter. Service sinks shall have a waste outlet and fixture tailpiece not less than 2 inches (50 mm) in diameter. Fixture tailpieces shall be constructed from the materials specified in Section 701.1 for drainage piping, provided, however, that the connections where exposed or accessible shall be permitted to be of seamless drawn brass not less than No. 20 B & S Gauge (0.032 inches) (0.81 mm). Waste outlets shall be provided with an approved strainer.

4714.0423 TRENCH DRAINS.

UPC section 423 is added as follows:

423.0 Trench Drains.

423.1 Trench Drains. Trench drains shall comply with ASME A112.6.3, ASME A112.3.1, or be constructed of watertight material and watertight joints, and be tested for watertightness by filling with water to the level of the flood rim of the trench drain.

4714.0501 GENERAL.

UPC section 501.1 is amended to read as follows:

501.1 Applicability. The regulations of this chapter ~~as amended in this code~~ shall govern the construction, location, and installation of fuel-burning and other water heaters heating potable water. The minimum capacity for storage water heaters shall be in accordance with the first hour rating listed in Table ~~501.1~~ 501.1(2). ~~Design, construction, and workmanship shall be in accordance with accepted engineering practices, manufacturer's instructions, and applicable standards and shall be of such character as to secure the results sought to be obtained by this code.~~ No water heater shall be hereinafter installed that does not comply with the type and model of each size thereof approved by the Authority Having Jurisdiction. A list of accepted water heater appliance standards is referenced in Table 501.1(1). Listed appliances shall be installed in accordance with the manufacturer's installation instructions. Unlisted water heaters shall be permitted in accordance with section 504.3.2.

4714.0504 WATER HEATER REQUIREMENTS.

Subpart 1. **Sections 504.1 to 504.2.** UPC sections 504.1 to 504.2 are deleted in their entirety.

Subp. 2. **Section 504.6.** UPC section 504.6 is amended to read as follows:

504.6 Temperature, Pressure, and Vacuum Relief Devices. The installation of temperature, pressure, and vacuum relief devices, or combinations thereof, shall be installed in accordance with the terms of their listings and the manufacturer's installation instructions. A shutoff valve shall not be placed between the relief valve and the water heater or on discharge pipes between the valves and the atmosphere. The hourly British thermal units (Btu) (kW h) discharge capacity or the rated steam relief capacity of the device shall be not less than the input rating of the water heater. ~~[NFPA 54:10.28.5]~~ Discharge piping shall be installed in accordance with section 608.5.

4714.0507 OTHER WATER HEATER INSTALLATION REQUIREMENTS.

Subpart 1. **Sections 507.6 to 507.11 and 507.14 to 507.23.** UPC sections 507.6 to 507.11 and 507.14 to 507.23 are deleted in their entirety.

Subp. 2. [See repealer.]

4714.0508 APPLIANCES ON ROOFS.

UPC sections ~~508.0~~ 508.1 to ~~508.4~~ 508.3.3 are deleted in their entirety.

4714.0509 VENTING OF APPLIANCES.

UPC sections 509.0 to ~~509.14~~ 509.15, including all tables and figures, are deleted in their entirety.

4714.0601 HOT AND COLD WATER REQUIRED.

UPC section ~~601.1~~ 601.2 is amended to read as follows:

~~601.1~~ 601.2 General. Each plumbing fixture shall be provided with an adequate supply of potable running water piped to it in an approved manner, so arranged as to flush and keep the fixture in a clean and sanitary condition without danger of backflow or cross-connection. Water closets and urinals shall be flushed by means of an approved flush tank or flushometer valve.

Exception: Listed fixtures that do not require water for their operation and are not connected to the water supply.

~~**601.1.1**~~ **601.2.1 Hot Water Required.** In occupancies where plumbing fixtures are installed for private use, hot water shall be required for bathing, washing, laundry, cooking purposes, dishwashing, and maintenance. In occupancies where plumbing fixtures are installed for public use, hot water shall be required for bathing and washing purposes. This requirement shall not supersede the requirements for individual temperature control limitations for public lavatories, bidets, bathtubs, whirlpool bathtubs, and shower control valves.

~~**601.1.2**~~ **601.2.2 Hot Water Recirculation.** Hot water supply systems in four-story buildings or higher, or buildings where the developed length of hot water piping from the source of hot water supply to the farthest fixture supplied exceeds 100 feet, shall be of the return circulation type.

4714.0603 CROSS-CONNECTION CONTROL.

[For text of subparts 1 to 3, see Minnesota Rules]

Subp. 4. **Section ~~603.5.18~~ 603.5.17.** UPC section ~~603.5.18~~ 603.5.17 is amended to read as follows:

~~**603.5.18**~~ **603.5.17 Potable Water Outlets and Valves.** Potable water outlets, freeze-proof yard hydrants, combination stop-and-waste valves, or other fixtures that incorporate a stop-and-waste feature that drains into the ground shall not be installed underground except for a freeze-proof yard hydrant that is located at least two feet above the water table and at least ten feet from any sewer or similar source of contamination.

Subp. 5. **Section 603.5.** UPC section 603.5 is amended by adding the following subsections:

603.5.22 Barometric Loop. A barometric loop is an acceptable method of protection of water connections where an actual or potential backsiphonage hazard exists that is not subject to backpressure.

603.5.23 Installation of Testable Backflow Prevention Assembly. Testable backflow prevention assemblies meeting ASSE Standard 1013, 1015, 1020, 1047, 1048, or 1056 shall be installed, tested, maintained, and removed in accordance with sections 603.5.23.1 through 603.5.23.4.

603.5.23.1 Notification of Installation. The administrative authority shall be notified before installation of a testable backflow prevention assembly. The public water supplier shall be notified of the installed testable backflow preventer assembly within 30 days following installation on a community public water system.

603.5.23.2 Testing and Maintenance. The installation of a testable backflow prevention assembly is permitted only when a periodic testing and inspection program conducted by qualified personnel is provided by an agency acceptable to the administrative authority. Inspection intervals shall not exceed one year. The administrative authority may require more frequent testing if deemed necessary to ensure protection of the potable water. A testable backflow prevention assembly shall be inspected after initial installation to ensure that it has been properly installed and that debris resulting from the piping installation has not interfered with the functioning of the assembly.

603.5.23.3 Inspection and Records. A test and inspection tag shall be affixed to the testable backflow prevention assembly. The tester shall date and sign the tag and include the tester's backflow prevention tester certification number. Written records of testing and maintenance shall be maintained and submitted to the administrative authority, and to the public water supplier, within 30 days of testing if installed on a community public water system.

603.5.23.4 Notification of Removal. The Authority Having Jurisdiction, in addition to the public water supplier, shall be notified within 30 days following removal of a testable backflow prevention assembly from a community public water system.

4714.0607 POTABLE WATER SUPPLY TANKS.

Subpart 1. **Section 607.3.** UPC section 607.3 is amended to read as follows:

607.3 Venting. Tanks used for potable water shall be tightly covered and vented in accordance with manufacturer's installation instructions. Such vent shall open downward and be screened with a corrosion-resistant material of not less than number 24 mesh. The vent opening shall not be located in an environment that can contaminate the water supply.

Subp. 2. **Section 607.4.** UPC section 607.4 is amended to read as follows:

607.4 Overflow. Tanks shall have an overflow that opens downward and is screened with a corrosion-resistant material of not less than number 24 mesh. The overflow pipe shall be of sufficient diameter to permit waste of water in excess of the maximum filling rate. The overflow pipe shall discharge through an air gap.

4714.0608 WATER PRESSURE, PRESSURE REGULATORS, PRESSURE RELIEF VALVES, AND VACUUM RELIEF VALVES.

UPC section 608.5 is amended to read as follows:

~~**608.5 Drains.** Relief valves located inside a building shall be provided with: (1) a drain that is not smaller than the relief valve outlet and piping and fittings made of galvanized steel, hard-drawn copper, CPVC, or PP; or (2) a listed relief valve drain tube with fittings. The drain and drain tube shall not reduce the internal bore of the pipe or tubing (straight lengths as opposed to coils) and shall terminate to a safe place of disposal or within 18 inches of the floor.~~

~~Relief valve drains shall not terminate in a building's crawl space. No part of a drain pipe shall be trapped or subject to freezing. The terminal end of the drain pipe shall not be threaded.~~

608.5 Discharge Piping. The discharge piping serving a temperature relief valve, pressure relief valve, or combination of both shall have no valves, obstructions, or means of isolation and shall:

(1) be equal to the size of the valve outlet and shall discharge full size to the flood level of the area receiving the discharge and pointing down;

(2) consist of materials rated at not less than the operating temperature of the system and shall be approved for such use or comply with ASME A112.4.1;

(3) discharge independently by gravity through an air gap to a safe place of disposal or within 18 inches of the floor. Relief valve drains shall not terminate in a building's crawl space;

(4) discharge in such a manner that does not cause personal injury or structural damage;

(5) not consist of any part that may be trapped or subject to freezing;

(6) not consist of a threaded terminal end of the pipe; and

(7) not discharge from a relief valve into a water heater pan.

4714.0609 INSTALLATION, TESTING, UNIONS, AND LOCATION.

Subpart 1. **Section 609.1.** UPC section 609.1 is amended to read as follows:

609.1 Installation. Water piping shall be adequately supported in accordance with Table 313.3. Burred ends shall be reamed to the full bore of the pipe or tube. Changes in directions shall be made by the appropriate use of fittings, except that changes in direction in copper or copper alloy tubing shall be permitted to be made with bends, provided that such bends are made with bending equipment that does not deform or create a loss in the cross-sectional

area of the tubing. Changes in direction are allowed with flexible pipe and tubing without fittings in accordance with the manufacturer's instructions. Provisions shall be made for expansion in hot-water piping. Piping, equipment, appurtenances, and devices shall be installed in a workmanlike manner in accordance with the provisions and intent of this code. Building supply and yard piping shall be located not less than 12 inches (305 mm) below the maximum local frost depth, in accordance with Section 312.6, or an alternative approved by the Authority Having Jurisdiction. The cover shall be not less than 12 inches (305 mm) below finish grade.

Subpart 1. [Renumbered subp 2]

~~Subpart 1~~ Subp. 2. **Section 609.6.** UPC section 609.6 is amended to read as follows:

609.6 Location. Except as provided in section 609.7, no building supply shall be located in a lot other than the lot that is the site of the building or structure served by the building supply.

609.6.1 Water Supply Near Sources of Contamination. Potable water supply pipes shall not be located in, under, or above cesspools, septic tanks, septic tank drainage fields, seepage pits, soil treatment systems, contaminated soil, sewer manholes, catch basins, storm water storage tanks, buried tanks containing chemicals or petroleum products, or any other source of contamination that in the judgment of the administrative authority might contaminate the potable water supply. A horizontal separation of ten feet shall be maintained between the outer edge of the water supply pipe and the outer edge of the contamination source.

Subp. 2. [Renumbered subp 4]

Subp. 3. **Section 609.10.** UPC section 609.10 is amended to read as follows:

609.10 Water Hammer. Building supply systems where water hammer occurs shall be provided with water hammer arrestors to absorb the resulting high pressures. Water hammer

arrestors shall be approved mechanical devices that comply with ASSE 1010 or PDI-WH-201 and shall be installed as close as possible to quick-acting valves.

Subsection 609.10.1 Mechanical Devices is not amended.

Subp. ~~2~~ 4. **Section 609.** UPC section 609 is amended by adding the following subsection:

~~**609.11**~~ **609.12 Water Meters.** Water meters shall be located in an approved location inside a building as close as possible to the point of entrance of the potable water supply pipe, installed at least 12 inches above the finished floor, and readily accessible. All water meter installations shall be rigidly supported with a permanent support in order to prevent the meter from vibrating when the water is passing through it.

Exceptions: Where installation inside a building is not possible, the water meter may be installed in an enclosed structure not subject to flooding, high groundwater, or surface drainage runoff, provided the meter is protected from freezing. Provisions shall be made to install the meters above grade when possible. When installed below grade, the top of the structure shall be located at least 12 inches above the finished grade, be secured, and be accessible. This structure shall not be connected to any storm or sanitary sewer system.

4714.0611 WATER CONDITIONING EQUIPMENT.

Subpart 1. **Section 611.** UPC sections 611.0 to 611.3 are amended to read as follows:

611.0 Water Conditioning Equipment.

611.1 Application. Water conditioning equipment shall comply with the requirements in this section.

~~**611.1.1 Definition.** "Water conditioning equipment" means any appliance, appurtenance, or fixture, or any combination thereof, designed to treat potable water, so as to alter,~~

~~modify, add, or remove any minerals, chemicals, or bacteria contained in water. Water conditioning equipment includes but is not limited to ion exchange water softeners, backwashing water filters, oxidizing water filters, cartridge filters, chemical feed cartridges, ultraviolet lights, and equipment for reverse osmosis, ultrafiltration, nanofiltration, pH adjustment, nitrate and arsenic removal, and adsorption onto activated carbon.~~

611.1.2 Manufacture and Assembly. Water conditioning equipment shall: (1) be manufactured as a complete system; or (2) be assembled as a complete system by a licensed plumbing contractor or licensed water conditioning contractor, using various types of water conditioning equipment. Wetted surface materials used in water conditioning equipment shall comply with ANSI/NSF 61 standards, or the equipment shall comply with the applicable NSF standards as listed in Table ~~1401.1~~ 1701.1.

Exception: Water conditioning equipment that treats water for nonpotable uses that are protected by an approved backflow device, assembly, or method as required in Chapter 6, as amended.

611.1.3 Labeling. All conditioning equipment shall be labeled by:

(1) the manufacturer of equipment manufactured as a complete system; or

(2) the licensed plumbing contractor or licensed water conditioning contractor who assembled the complete system

so as to clearly identify the type of equipment and the name and address of the manufacturer, licensed plumbing contractor, or licensed water conditioning contractor.

611.2 Airgap Discharge. Any discharge from water conditioning equipment shall enter the drainage system through an airgap in accordance with Table 603.3.1 or an airgap device in accordance with Table 603.2, NSF 58, or IAPMO PS 65.

611.3 Connection Tubing. The tubing to and from water conditioning units shall be of a size and material as recommended by the manufacturer. The tubing shall comply with the requirements of NSF 14, NSF 42, NSF 44, NSF 53, NSF 55, NSF 58, NSF 62, or the appropriate material standards referenced in Table ~~1401.1~~ 1701.1.

Subp. 2. **Section 611.5.** Section 611.5 is added.

611.5 Isolation and Bypass. Every water conditioning installation shall include the installation of isolation valves and a bypass valve which would allow the equipment to be serviced or removed without the need for shutting off the water service completely.

4714.0701 MATERIALS.

UPC section ~~701.1~~ 701.2 is amended to read as follows:

~~**701.1**~~ **701.2 Drainage Piping.** Materials for drainage piping shall be in accordance with one of the referenced standards in Table ~~701.1~~ 701.2 except that:

(1) Galvanized wrought-iron and galvanized steel pipe shall not be used underground and shall be kept not less than 6 inches (152 mm) aboveground.

(2) ABS and PVC DWV piping installations shall be installed in accordance with applicable standards referenced in Table ~~1401.1~~ 701.2.

(3) No vitrified clay pipe or fittings shall be used aboveground or where pressurized by a pump or ejector. They shall be kept not less than 12 inches (305 mm) belowground.

(4) Copper tube for drainage and pipe venting shall have a weight of not less than that of copper drainage tube type DWV.

(5) Stainless steel 304 pipe and fittings shall not be installed underground and shall be kept not less than 6 inches (152 mm) aboveground.

(6) Cast-iron soil pipe and fittings shall be listed and tested in accordance with standards referenced in Table ~~1401.1~~ 701.2. Such pipe and fittings shall be marked with country of

origin and identification of the original manufacturer in addition to markings required by referenced standards.

UPC Table ~~701.1~~ 701.2 is ~~not~~ amended~~.~~ as follows:

TABLE 701.2

Materials for Drain, Waste, Vent Pipe, and Fittings

Material	Underground Drain, Waste, Vent Pipe, and Fittings	Aboveground Drain, Waste, Vent Pipe, and Fittings	Building Sewer Pipe and Fittings	Referenced Standard(s) Pipe	Referenced Standard(s) Fittings
ABS (Schedule 40)	x	x	x	ASTM D2661, ASTM D2680[1]	ASTM D2661, ASTM D2680[1]
Cast-Iron	x	x	x	ASTM A74, ASTM A888, CISPI 301	ASME B16.12, ASTM A74, ASTM A888, CISPI 301
Co-Extruded ABS (Schedule 40)	x	x	x	ASTM F628	ASTM D2661, ASTM D2680[1]
Co-Extruded Composite (Schedule 40)	x	x	x	ASTM F1488	ASTM D2661, ASTM D2665, ASTM F794[1], ASTM F1336[1], ASTM F1866
Co-Extruded PVC (Schedule 40)	x	x	x	ASTM F891, ASTM F1760	ASTM D2665, ASTM F794[1], ASTM F1336[1], ASTM F1866

Copper and Copper Alloys (Type DWV)	x	x	x	ASTM B43, ASTM B75, ASTM B251, ASTM B302, ASTM B306	ASME B16.23, ASME B16.29
Galvanized Malleable Iron	--	x	--	--	ASME B16.3
Galvanized Steel	--	x	--	ASTM A53	--
Polyethylene	--	--	x	ASTM F714, ASTM F894, ASTM F2306[2,3], ASTM F2648[3,4]	--
Polypropylene	--	--	x	ASTM F2736[3], ASTM F2764[3], ASTM F2881[2]	ASTM F2736[3], ASTM F2764[3]
PVC (Schedule 40)	x	x	x	ASTM D1785, ASTM D2665, ASTM F794[1]	ASTM D2665, ASTM F794[1], ASTM F1866
PVC (Sewer and Drain)	--	--	x	ASTM D2729	ASTM D2729
PVC PSM	--	--	x	ASTM D3034	ASTM D3034
Reinforced Concrete Pipe	--	--	x	ASTM C76[2]	ASTM C443
Stainless Steel 304	--	x	--	ASME A112.3.1	ASME A112.3.1
Stainless Steel 316L	x	x	x	ASME A112.3.1	ASME A112.3.1
Vitrified Clay (Extra Strength)	--	--	x	ASTM C700	ASTM C700

[1]For building sewer applications.

[2]For storm sewer application only.

[3]With no change in direction and deflection **testing** for pipe sizes 12 inches and larger per Section 1107.2.4.

[4]For yard drainage only.

4714.0707 CLEANOUTS.

UPC section 707.4 is amended ~~by adding a new subsection~~ to read as follows:

~~**707.4.1 Back-to-Back.** A cleanout shall be provided on a common vertical fixture drain or common vent serving two fixture traps that connect to a vertical drain at the same level. The cleanout shall be the same nominal pipe size as the drain serving the fixtures. Where the vertical drain is accessible through the trap opening, the cleanout may be eliminated.~~

707.4 Location. Each horizontal drainage pipe shall be provided with a cleanout at its upper terminal and each run of piping that is more than 100 feet (30,480 mm) in total developed length shall be provided with a cleanout for each 100 feet (30,480 mm), or fraction therof, in length of such piping. An additional cleanout shall be provided in a drainage line for each aggregate horizontal change in direction exceeding 135 degrees (2.36 rad). A cleanout shall be installed above the fixture connection fitting, serving each urinal, regardless of the location of the urinal in the building.

Exceptions:

(1) Cleanouts shall be permitted to be omitted on a horizontal drain line less than 5 feet (1,524 mm) in length unless such line is serving sinks or urinals.

(2) Cleanouts shall be permitted to be omitted on a horizontal drainage pipe installed on a slope of 72 degrees (1.26 rad) or less from the vertical angle (one-fifth bend).

(3) Excepting the building drain, its horizontal branches, kitchen sinks, and urinals, a cleanout shall not be required on a pipe or piping that is above the floor level of the lowest floor of the building.

(4) An approved type of two-way cleanout fitting, installed inside the building wall near the connection between the building drain and the building sewer or installed outside of a building at the lower end of a building drain and extended to grade, shall be permitted to be substituted for an upper terminal cleanout.

4714.0710 DRAINAGE OF FIXTURES LOCATED BELOW THE NEXT UPSTREAM MANHOLE OR BELOW THE MAIN SEWER LEVEL.

Subpart 1. **Section 710.10.** UPC section 710.10 is amended to read as follows:

710.10 Sump and Receiving Tank Covers and Vents. Sumps and receiving tanks shall be provided with substantial covers having a bolt-and-gasket-type manhole or equivalent opening to permit access for inspection, repairs, and cleaning. The top shall be provided with a vent pipe that shall extend separately through the roof or, where permitted, be combined with other vent pipes. The vent pipe shall be large enough to maintain atmospheric pressure within the sump under normal operating conditions and in no case shall be less in size than that required by Table 703.2 for the number and type of fixtures discharging into the sump, nor less than 1-1/2 inches (40 mm) in diameter. Where the preceding requirements are met and the vent, after leaving the sump, is combined with vents from fixtures discharging into the sump, the size of the combined vent need not exceed that required for the total number of fixtures discharging into the sump. No vent from an air-operating sewage ejector shall combine with other vents.

Exception: Vents serving sumps connected to elevator pit drains or swimming pool deck drains need not extend through the roof and must not connect to any other vent pipe.

Subpart 1. [Renumbered subp 2]

~~Subpart 1~~ Subp. 2. **Section 710.12.** UPC section 710.12 is amended to read as follows:

710.12 Grinder Pump Ejector. Grinder pumps shall be permitted to be used. The sump basin storage volume and the pump capacity shall be sized adequately to prevent overloading and shall at a minimum accommodate water demand peak flow from all fixtures.

710.12.1 Discharge Piping. The discharge piping shall be sized in accordance with the manufacturer's installation instructions and shall be not less than 1 1/4 inches (32 mm) in diameter. A check valve and fullway-type shutoff valve shall be located within the discharge line.

Subp. 2. [Renumbered subp 3]

Subp. ~~2~~ 3. **Section 710.13.** UPC section 710.13 is amended to read as follows:

710.13 Macerating Toilet Systems. Listed macerating toilet systems shall be permitted as an alternate to a sewage pump system only in one- or two-family dwellings when gravity flow is not possible. Not more than one bathroom group is permitted to discharge into a macerating toilet system. One bathroom group consists of: a toilet; a lavatory; and a shower or bathtub. Components of macerating toilet systems shall be accessible.

710.13.1 Sumps. The sump shall be watertight and gastight.

710.13.2 Discharge Piping. The discharge piping shall be sized in accordance with the manufacturer's instructions and shall be not less than 3/4-inch (20 mm) in diameter. The developed length of the discharge piping shall not exceed the manufacturer's instructions. A check valve and fullway-type shutoff valve shall be located within the discharge line or internally within the device.

710.13.3 Venting. The plumbing fixtures that discharge into the macerating device shall be vented in accordance with this code. The sump shall be vented in accordance with the manufacturer's instructions and the vent shall be permitted to connect to the fixture venting.

4714.0712 TESTING (update referenced section number)

4714.0717 SIZE OF BUILDING SEWERS.

UPC section 717, Table 717.1, is amended to read as follows:

TABLE 717.1

Maximum/Minimum Fixture Unit Loading on Building Sewer Piping

	SLOPE (inches per foot)		
Size of Pipe (inches)	**1/16**	**1/8**	**1/4**
6 and smaller	(As specified in Table 703.2/No minimum loading)		
8	1950/1500	2800/625	3900/275
10	3400/1600	4900/675	6800/300
12	5600/1700	8000/725	11 200/325

*Loadings less than the listed minimums must be approved by the Authority Having Jurisdiction.

For SI units: 1 inch = 25 mm, 1 inch per foot = 83.3 mm/m

4714.0719 CLEANOUTS.

UPC section 719.6 is amended to read as follows:

719.6 Manholes. Approved manholes shall be permitted to be installed in lieu of cleanouts, where first approved by the Authority Having Jurisdiction. The maximum distance between manholes shall not exceed 300 feet (91,400 mm). Connections to manhole and similar structures must be provided as follows:

1. The inlet and outlet connections shall be made by the use of a flexible compression joint not less than 12 inches (305 mm) and not exceeding 3 feet (914 mm) from the manhole. No flexible compression joints shall be embedded in the manhole base.

2. Approved resilient rubber joints must be used to make watertight connections to manholes, catch basins, and other structures.

4714.0724 RECREATIONAL VEHICLE ~~SANITARY DISPOSAL STATION~~.

UPC chapter 7 is amended by adding the following sections:

724.0 Recreational Vehicle Sanitary Disposal Station.

724.1 Construction. Each recreational vehicle sanitary disposal (dump) station shall have a concrete slab with the drainage system located as to be on the road (left) side of the recreational vehicle. The slab shall be not less than 3 feet by 3 feet (914 mm by 914 mm), not less than 3-1/2 inches (89 mm) thick, and properly reinforced. The slab surface shall be troweled to a smooth finish and sloped from each side inward to a drainage system inlet.

The drainage system inlet shall consist of a 4-inch (102 mm), self-closing, foot-operated hatch of materials meeting these rules with the cover milled to fit tight. The hatch body shall be set in the concrete of the slab with the lip of the opening flush with its surface to facilitate the cleansing of the slab with water. The hatch shall be properly connected to a drainage system inlet, which shall discharge to a public or private sewer meeting the ~~standards of this section~~ same requirements as provided in this code for building sewers.

724.2 Flushing Device. The recreational vehicle sanitary disposal station flushing device shall consist of a supported riser terminating not less than 2 feet (610 mm) above the ground surface, with a 3/4-inch (20 mm) valved outlet adaptable for a flexible hose. The flexible hose shall be designed such that it cannot lie on the ground. The water supply to the flushing device shall be protected from backflow by means of a listed vacuum breaker or backflow prevention device located downstream from the last shutoff valve. A pressure-type vacuum breaker backflow device must be provided if a shut-off valve is installed downstream of the backflow device. Direct connections between:

(1) the water piping and sewer-connected waste piping; and

(2) **the water piping and** the recreational vehicle holding tank;

are not allowed to exist under any condition with or without backflow protection.

Adjacent to the recreational vehicle sanitary disposal station shall be posted a sign of durable material not less than 2 feet by 2 feet (610 mm by 610 mm) in size. Inscribed on the sign in clearly legible letters shall be the following:

"DANGER - NOT TO BE USED FOR DRINKING OR DOMESTIC PURPOSES."

724.3 Drainage Pipe Sizes. The minimum pipe diameters of drainage pipes serving recreational vehicle sites shall be in accordance with Table 724.3.

TABLE 724.3

DRAINAGE PIPE SIZES

Maximum Number of Recreational Vehicles Served	Minimum Pipe Sizes (Inches)
36	4
71	5
120	6
440	8

4714.0801 INDIRECT WASTES.

Subpart 1. **Section ~~801.2.2~~ 801.3.2.** UPC section ~~801.2.2~~ 801.3.2 is amended to read as follows:

~~801.2.2~~ 801.3.2 Walk-In Coolers. Floor drains shall not be located inside walk-in coolers unless they are specifically required by the licensing authority. Where required, floor drains shall be connected to a separate drainage line discharging into an outside receptor. The flood-level rim of the receptor shall not be less than 6 inches (152 mm) lower than the lowest floor drain. The floor drains shall be trapped and individually vented. Cleanouts shall be provided at 90 degree (1.57 rad) turns and shall be accessibly located. The waste shall discharge through an air gap or air break into a trapped and vented receptor, except that a full-size air gap is required where the indirect waste pipe is under vacuum.

Subp. 2. **Section ~~801.2.3~~ 801.3.3.** UPC section ~~801.2.3~~ 801.3.3 is amended to read as follows:

~~801.2.3~~ 801.3.3 Food-Handling Fixtures. Cooking ranges, steam kettles, potato peelers, ice cream dipper wells, and similar equipment shall be indirectly connected to the drainage system by means of an air gap. Bins, cooling counters, compartments, and other equipment having drainage connections and used for the storage of unpackaged ice used for human ingestion, or used in direct contact with ready-to-eat food, shall be indirectly connected to the drainage system by means of an air gap. Each indirect waste pipe from food-handling fixtures, storage or holding compartments, or equipment shall be separately trapped and piped to the indirect waste receptor and shall not combine with other indirect waste pipes. The piping from the equipment to the receptor shall be not less than the drain on the unit, and in no case less than 3/4 inch (20 mm).

Subp. 3. **Section ~~801.3~~ 801.4.** UPC section ~~801.3~~ 801.4 is deleted in its entirety.

4714.0807 APPLIANCES.

UPC section 807.3 is amended to read as follows:

807.3 Domestic Dishwashing Machine. No domestic dishwashing machine shall be directly connected to a drainage system or food waste disposer without the use of an approved dishwasher air gap fitting on the discharge side of the dishwashing machine or run the discharge line as high as possible under the countertop, securely fastened. Listed air gaps shall be installed with the flood level (FL) marking at or above the flood level of the sink or drainboard, whichever is higher.

4714.0810 STEAM AND HOT WATER DRAINAGE CONDENSERS AND SUMPS.

UPC section 810 is amended to read as follows:

810.0 Steam and Hot Water Drainage Condensers and Sumps.

810.1 High-Temperature Discharge. No steam pipe shall be directly connected to a plumbing or drainage system, nor shall water having a temperature above 140°F (60°C) be discharged under pressure directly into a drainage system.

4714.0813 SWIMMING POOLS.

UPC section 813.1 is amended to read as follows:

813.1 General. Pipes carrying wastewater from swimming or wading pools, including pool drainage and backwash from filters, water from scum gutter drains and pool deck drains, shall be installed as an indirect waste. Pool deck drains need not be trapped and vented per section 803.1. Pool deck drain piping must be pitched at a minimum of 1/8-inch per foot for pipe sizes 3 inches and larger. Where a pump is used to discharge waste pool water to the drainage system, the pump discharge shall be installed as an indirect waste.

4714.0814 CONDENSATE WASTES AND CONTROL.

Subpart 1. **Section 814.1.** UPC section 814.1 is amended to read as follows:

814.1 Condensate Disposal. ~~Condensate from air washers, air-cooling coils, fuel-burning condensing appliances, the overflow from evaporative coolers, and similar water-supplied equipment or similar air-conditioning equipment shall be collected and discharged to an approved plumbing fixture or disposal area.~~ Where discharged into the drainage system, equipment shall drain by means of an indirect waste pipe. ~~The waste pipe shall have a slope of not less than 1/8 inch per foot (10.4 mm/m) or 1 percent slope and shall be made of an approved corrosion-resistant material.~~

Subp. 2. **Table ~~814.1~~ 814.3.** UPC Table ~~814.1~~ 814.3 is deleted.

Subp. 3. **Section ~~814.2~~ 814.3.** UPC section ~~814.2~~ 814.3 is deleted in its entirety.

Subp. 4. **Section ~~814.3~~ 814.5.** UPC section ~~814.3~~ 814.5 is amended to read as follows:

~~814.3~~ 814.5 Point of Discharge. Air-conditioning condensate waste pipes shall connect indirectly to the interior drainage system through an air gap or air break to: (1) properly trapped and vented receptors; (2) the tailpiece of an approved plumbing fixture; or (3) an exterior place of disposal approved by the Minnesota Pollution Control Agency.

Condensate waste shall not drain over a public way or in areas causing a nuisance.

4714.0903 MATERIALS.

UPC section 903.1 is amended to read as follows:

903.1 Applicable Standards. Vent pipes and fittings shall comply with the applicable standards referenced in Table ~~701.1~~ 701.2, except that:

(1) Galvanized steel or 304 stainless steel pipe shall not be installed underground and shall be not less than 6 inches (152 mm) aboveground.

(2) ABS and PVC DWV piping installations shall be in accordance with the applicable standards referenced in Table ~~1401.1~~ 1701.1.

4714.1001 TRAPS REQUIRED.

UPC section ~~1001.1~~ 1001.2 is amended to read as follows:

~~1001.1~~ 1001.2 Where Required. Each plumbing fixture shall be separately trapped by an approved type of liquid seal trap. This section shall not apply to fixtures with integral traps. Not more than one trap shall be permitted on a trap arm. Food waste disposal units installed with a set of restaurant, commercial, or industrial sinks shall be connected to a separate trap. Each domestic clothes washer and each laundry tub shall be connected to a separate and independent trap, except that a laundry tub shall be permitted to also receive the waste from a clothes washer set adjacent thereto. The vertical distance between a fixture outlet and the trap weir shall be as short as practicable, but in no case shall the tailpiece from a fixture exceed 24 inches (610 mm) in length. One trap shall be permitted to serve a set of not more than three single compartment sinks or laundry tubs of the same depth or three lavatories

immediately adjacent to each other and in the same room where the waste outlets are not more than 30 inches (762 mm) apart and the trap is centrally located where the three compartments are installed.

4714.1002 TRAPS PROTECTED BY VENT PIPES.

UPC section 1002.2 is amended to read as follows:

1002.2 Fixture Traps. Each fixture trap shall have a protecting vent located so that the developed length of the trap arm from the trap weir to the inner edge of the vent shall be within the distance given in Table 1002.2 but in no case less than two times the diameter of the trap arm.

Exception: Emergency floor drains, tell tale floor drains, and floor drains not used as waste receptors installed within 25 feet of a vented branch or main.

4714.1006 FLOOR DRAIN TRAPS.

UPC section 1006.1 is amended to read as follows:

1006.1 General. Floor drains shall connect into a trap constructed so that the trap can be readily cleaned and be of a size to efficiently serve the purpose for which the trap is intended. The drain inlet shall be located so that it is in full view. Where subject to the reverse flow of sewage or liquid waste, such drains shall be equipped with an approved backwater valve.

Exception: Floor drains or trench drains that connect to sand interceptors or oil and flammable liquid interceptors do not need to be trapped.

4714.1009 ~~INDUSTRIAL~~ INTERCEPTORS (CLARIFIERS) AND SEPARATORS.

Subpart 1. UPC section 1009.2 is amended to read as follows:

1009.2 Approval. The size, type, and location of each interceptor (clarifier) or separator shall meet the requirements of this chapter.

Exception: Interceptors or separators that are engineered and manufactured and are documented by the manufacturer and the project registered professional engineer to be properly designed and sized for the specific project, and are approved by the Authority Having Jurisdiction.

No wastes other than those requiring treatment or separation shall be discharged into an interceptor (clarifier) or separator unless specifically permitted elsewhere in this code.

Subp. 2. Section 1009.4 is amended to read as follows:

1009.4 Relief Vent. Interceptors (clarifiers) shall be so designed that they will not become air-bound where closed covers are used. Each interceptor (clarifier) shall be properly vented. Interceptor (clarifier) and neutralization tank vent ports shall be located above the highest liquid flow level.

4714.1016 SAND INTERCEPTORS.

UPC section 1016.4 is amended to read as follows:

1016.4 Separate Use. Sand and similar interceptors shall be so designed and located as to be readily accessible for cleaning, have a water seal of not less than 6 inches (152 mm), and be vented.

Exception: Sand interceptors connecting to oil and flammable liquid interceptors meeting the requirements of section 1017 do not require a water seal or vent.

4714.1017 OIL AND FLAMMABLE LIQUID INTERCEPTORS.

Subpart 1. **Section 1017.1.** UPC section 1017.1 is amended to read as follows:

1017.1 Interceptors Required. Repair garages and gasoline stations with grease racks or grease pits, parking garages over 1,000 square feet, vehicle wash facilities, and factories that have oily waste, flammable waste, or both as a result of manufacturing, storage, maintenance, repair, or testing processes, shall be provided with an oil or flammable liquid

interceptor that shall be connected to necessary floor drains. The separation or vapor compartment shall be independently vented to the outer air. Where two or more separation or vapor compartments are used, each shall be vented to the outer air or shall be permitted to connect to a header that is installed at a minimum of 6 inches (152 mm) above the spill line of the lowest floor drain and vented independently to the outer air. The minimum size of a flammable vapor vent shall be not less than 2 inches (51 mm) and, where vented through a sidewall, the vent shall be not less than 10 feet (3,048 mm) above the adjacent level at an approved location. The interceptor shall be vented on the sewer side and shall not connect to a flammable vapor vent. Oil and flammable interceptors shall be provided with gastight cleanout covers that shall be readily accessible. Drains discharging into interceptors must not be designed to retain liquid waste. The waste line shall be not less than 3 inches (80 mm) in diameter with a full-size cleanout to grade. Where an interceptor is provided with an overflow, it shall be provided with an overflow line, not less than 2 inches (50 mm) in diameter, to an approved waste oil tank having a minimum capacity of 550 gallons (2,082 L) and meeting the requirements of the Authority Having Jurisdiction. The waste oil from the separator shall flow by gravity or shall be pumped to a higher elevation by an automatic pump. Pumps shall be adequately sized and accessible. Waste oil tanks shall have a 2 inch (50 mm) minimum pumpout connection at grade and a 1-1/2 inch (38 mm) minimum vent to atmosphere at an approved location not less than 10 feet (3,048 mm) above grade.

Subp. 2. **Section 1017.2.** UPC section 1017.2 is amended to read as follows:

1017.2 Design of Interceptors. Each manufactured interceptor that is rated shall be stamped or labeled by the manufacturer with an indication of its full discharge rate in gpm (L/s). The full discharge rate of such an interceptor shall be determined at full flow. Each interceptor shall be rated equal to or greater than the incoming flow and shall be provided with an overflow line to an underground tank.

Interceptors not rated by the manufacturer shall have a depth of not less than 2 feet (610 mm) below the invert of the discharge drain. The outlet opening shall have not less than an 18 inch (457 mm) water seal and shall have a minimum capacity as follows: Where not more than three motor vehicles are serviced, stored, or both, interceptors shall have a minimum capacity of 6 cubic feet and 1 cubic foot of capacity shall be added for each vehicle up to 10 vehicles. Above 10 vehicles, each interceptor shall have a holding capacity of not less than 35 cubic feet. Where vehicles are serviced and not stored, interceptor capacity shall be based on a net capacity of 1 cubic foot (0.03 m^3) for each 100 square feet (9.29 m^2) of the surface to be drained into the interceptor, with a minimum of 6 cubic feet (0.2 m^3).

1017.2.1 Maintenance. Service and maintenance records shall be kept by the owner and available for viewing by the Authority Having Jurisdiction upon request. The service and maintenance records shall demonstrate periodic removal of accumulated substances in the oil and flammable liquid interceptor based on the interceptor's capacity as required by the manufacturer's recommended maintenance instructions. Where the Authority Having Jurisdiction determines that an interceptor is not being properly cleaned or maintained, the Authority Having Jurisdiction shall have the authority to mandate a maintenance program.

4714.1101 GENERAL.

Subpart 1. **Section ~~1101.1~~ 1101.2.** UPC section ~~1101.1~~ 1101.2 is amended to read as follows:

~~1101.1~~ 1101.2 Where Required. Roofs, paved areas, yards, courts, courtyards, vent shafts, light wells, or similar areas having rainwater, shall be drained into a separate storm sewer system or into a combined sewer system where a separate storm sewer system is not available, or to some other place of disposal satisfactory to the Authority Having Jurisdiction. In no case shall water from roofs or any building roof drainage flow onto the public sidewalk. In the case of one- and two-family dwellings, storm water shall be permitted to be discharged

on flat areas, such as lawns, so long as the storm water shall flow away from the building and away from adjoining property and shall not create a nuisance.

Subp. 2. **Section ~~1101.2~~ 1101.3.** UPC section ~~1101.2~~ 1101.3 is amended to read as follows:

~~1101.2~~ 1101.3 Storm Water Drainage to Sanitary Sewer Prohibited. Storm water shall not be drained into sewers intended for sanitary drainage unless approved by the municipal sewer authority or stated elsewhere in this code.

Subp. 3. **Section ~~1101.3~~ 1101.4.** UPC section ~~1101.3~~ 1101.4 is amended to read as follows:

~~1101.3~~ 1101.4 Material Uses. Rainwater piping placed within the interior of a building or run within a vent or shaft shall be of cast-iron, galvanized steel, wrought iron, brass, copper, lead, Schedule 40 ABS DWV, Schedule 40 PVC DWV, stainless steel 304 or 316L [stainless steel 304 pipe and fittings shall not be installed underground and shall be kept not less than 6 inches (152 mm) aboveground], or other approved materials. Changes in direction shall be in accordance with Section 706.0. ABS and PVC DWV piping installations shall be installed in accordance with ~~IS 5 and IS 9~~ applicable standards referenced in Table 1701.1.

UPC subsections 1101.4.1 through 1101.4.6 are maintained without amendment.

Subp. 4. **Section ~~1101.11~~ 1101.12.** UPC section ~~1101.11~~ 1101.12 is amended to read as follows:

~~1101.11~~ 1101.12 Roof Drainage.

~~1101.11.1~~ 1101.12.1 Primary Roof Drainage. When roof areas of a building are drained by roof drains, the location and sizing of the drains shall be coordinated with the structural design and pitch of the roof in accordance with section 1106 or as permitted elsewhere in this code. The roof drainage system shall be sized on a basis of a rate of rainfall of at minimum 4 inches per hour.

~~1101.11.2~~ 1101.12.2 Secondary Drainage. Secondary (emergency) roof drainage shall be provided in accordance with Minnesota Rules, chapter 1305.

1101.12.2.1 Location. Unless roof design is certified by a Registered Design Professional specializing in Structural Engineering for the maximum possible depth of water that will pond in accordance with Minnesota Rules, chapter 1305, secondary roof drainage shall be located 2 inches above the lowest point of the roof surface.

1101.12.2.2 Engineered System. Engineered siphonic roof drainage systems must not be utilized in the design of a secondary roof drainage system.

UPC Table ~~1101.11~~ 1103.1 is not amended.

Subp. 5. **Sections ~~1101.11.2.1~~ 1101.12.2.1, ~~1101.11.2.2~~ 1101.12.2.2, ~~1101.2.2 (A)~~ 1101.12.2.2.1, and ~~1101.11.2.2 (B)~~ 1101.12.2.2.2.** UPC subsections ~~1101.11.2.1~~ 1101.12.2.1, ~~1101.11.2.2~~ 1101.12.2.2, ~~1101.11.2.2 (A), and 1101.11.2.2 (B)~~ 1101.12.2.2.1, and 1101.12.2.2.2 are deleted in their entirety.

4714.1106 [Renumbered 4714.1103]

~~4714.1106~~ 4714.1103 SIZE OF LEADERS, CONDUCTORS, AND STORM DRAINS.

~~UPC section 1106.3 is amended to read as follows:~~

UPC sections 1103.1, 1103.2, and 1103.3 are amended to read as follows:

1103.1 Vertical Conductors and Leaders. Vertical conductors and leaders shall be sized by the maximum projected roof area and Table 1103.1. For sizes not listed under Table 1103.1, a minimum rainfall rate of 4 inches per hour must be used to size the rainwater piping.

1103.2 Size of Horizontal Storm Drains and Sewers. The size of building storm drains, or building storm sewers or their horizontal branches shall be based on the maximum

projected roof or paved area to be handled and Table 1103.2. For sizes not listed under Table 1103.1, a minimum rainfall rate of 4 inches per hour must be used to size the rainwater piping.

~~**1106.3**~~ **1103.3 Reduction in Size Prohibited.** Except for siphonic roof drainage systems, storm drain piping shall not reduce in size in the direction of flow, including changes in direction from horizontal to vertical.

4714.1108 [Renumbered 4714.1105]

~~**4714.1108**~~ **4714.1105 CONTROLLED-FLOW ROOF DRAINAGE.**

UPC section ~~1108.1~~ 1105.1 is amended to read as follows:

~~**1108.1**~~ **1105.1 Application.** The controlled-flow roof drainage system shall be sized on the basis of controlled flow and storage of the storm water on the roof, provided the design is based on a minimum of 4 inches per hour and the following conditions are met:

(1) The water from a 25-year-frequency storm shall not be stored on the roof for more than 24 hours.

(2) During the storm, the water depth on the roof shall not exceed the depths specified in Table ~~1108.1 (2)~~ 1105.1(1).

(3) Not less than two drains shall be installed in roof areas of 10,000 square feet (929 m^2) or less, and not less than one additional drain shall be installed for each additional 10,000 square feet (929 m^2) or less of roof area.

(4) Each roof drain shall have a precalibrated, fixed (nonadjustable), and proportional weir (notched) in a standing water collar inside the strainer. No mechanical devices or valves shall be allowed.

(5) Pipe sizing shall be based on the precalibrated rate of flow (gpm) (L/s) of the precalibrated weir for the maximum allowable water depth, and Tables ~~1101.7~~ 1103.1 and ~~1101.11~~ 1103.2.

(6) The height of stones or other granular material above the waterproofed surface shall not be considered in water depth measurement, and the roof surface in the vicinity of the drain shall not be recessed to create a reservoir.

(7) Roof design, where controlled-flow roof drainage is used, shall be such that the design roof live load is not less than 40 lb/ft^2.

(8) Scuppers shall be provided in parapet walls. The distance of scupper bottoms above the roof level at the drains shall not exceed the maximum distances specified in Table ~~1108.1(8)~~ 1105.1(2).

(9) Scupper openings shall be not less than 4 inches (102 mm) high and have a width equal to the circumference of the roof drain required for the area served, sized in accordance with Table ~~1101.11~~ 1103.1.

(10) Flashings shall extend above the top of the scuppers.

(11) At a wall or parapet, 45-degree (0.79 rad) cants shall be installed.

(12) Separate storm and sanitary drainage systems shall be provided within the building.

(13) Calculations for the roof drainage system shall be submitted, along with the plans, to the Authority Having Jurisdiction for approval.

UPC Table ~~1108.1(2)~~ 1105.1(1) and Table ~~1108.1(8)~~ 1105.1(2) are not amended.

4714.1109 [Renumbered 4714.1107]

~~4714.1109~~ 4714.1107 TESTING.

Subpart 1. **Section ~~1109.1~~ 1107.1.** UPC section ~~1109.1~~ 1107.1 is amended to read as follows:

~~1109.1~~ 1107.1 Testing Required. Building storm drainage systems that are new and parts of existing systems that have been altered, extended, or repaired shall be tested in accordance with section 712 to disclose leaks and defects, except as provided in section ~~1109.2~~ 1107.2.3.

Any section of the building storm sewer that passes through contaminated soils or contaminated water must be air tested in accordance with section 712.3.

Subp. 2. **Section ~~1109.2~~ 1107.2.3.** UPC ~~section 1109.2~~ subsection 1107.2.3 is amended to read as follows:

~~1109.2~~ 1107.2.3 Exceptions.

~~**1109.2.1**~~ **(A)** Testing is not required for:

(1) outside leaders;

(2) perforated or open drain tile; or

(3) portions of storm drainage system and sewers that are located more than ten feet from buildings, more than ten feet from buried water lines, and more than 50 feet from water wells, and that do not pass through soil or water identified as being contaminated.

~~**1109.2.2**~~ **(B)** Building storm sewers shall be tested in accordance with section 712 or the Hydrostatic Test Method from the City Engineers Association of Minnesota. The Hydrostatic Test Method, provisions E2 and E3, as specified in Standard Utilities Specifications for Watermain and Service Line Installation and Sanitary Sewer and Storm Sewer Installation, written and published by the City Engineers Association of Minnesota, 2013 edition, is incorporated by reference, is not subject to frequent change, and is available in the office of the commissioner of labor and industry.

1107.2.4 Deflection Testing.

A. Perform deflection tests on entire length of installed thermoplastic pipeline. Test at least 30 days after backfilling and all fill placement. It may be necessary to clean or flush all lines prior to testing.

B. Use a mandrel or laser profiler to ensure pipe deflection does not exceed five percent of the actual inside diameter of the pipe, unless prescribed differently in ASTM.

(1) Mandrel (Standard)

(a) Pull 9 arm deflection mandrel, with pulling rings on each end and complying with applicable ASTM Standards, through the sewer by hand. This is a pass or fail test. The mandrel shall be rigid, nonadjustable, engraved with the nominal pipe size and mandrel outside diameter (OD). Proving rings shall be used to verify the mandrel OD.

(b) A failed mandrel test shall indicate deflection exceeded five percent.

(2) Laser Profiler

(a) Inspect the interior of the pipe with laser profiling equipment. Utilize low barrel distortion video equipment for pipe sizes 48 inches or less. Use a camera in the pipe both vertically and horizontally. The camera with a suitable lighting to allow a clear picture of the entire periphery of the pipe interior. Center the camera in the pipe both vertically and horizontally. The camera must be able to pan and tilt to a 90-degree angle with the axis of the pipe rotating 360 degrees. Use equipment to move the camera through the pipe that will not obstruct the camera's view or interfere with proper documentation of the pipe's condition. The video image shall be clear, focused, and relatively free from roll static or other image distortion qualities that would prevent the reviewer from evaluating the condition of the pipe.

(b) For initial post-installation inspections for pipe sizes larger than 48 inches, a visual inspection shall be completed of the pipe diameter.

C. When deflection readings exceed allowable deflection of the actual inside diameter of the pipe, remove and replace with new pipe. Retest 30 days after completing backfill and leakage testing.

D. Inspection Reporting.

(1) Provide a copy of the documented inspection to the administrative authority upon completion of the tests. Include photo of the mandrel, line detail including

direction of pull, date line was installed, date line was tested, engineer approval to deviate from design, and any other project information.

(2) Retest request may be made within seven business days of submitted report.

4714.1110 [Renumbered 4714.1106]

~~4714.1110~~ 4714.1106 SIPHONIC ROOF DRAINAGE SYSTEM.

UPC chapter 11 is amended by adding a new section and subsections as follows:

~~1110.0~~ 1106.0 Siphonic Roof Drainage System.

~~1110.1~~ 1106.1 General Requirements. Siphonic roof drainage systems shall be designed as an engineered siphonic roof drainage system when allowed by the administrative authority. The engineered siphonic roof drainage system shall meet the requirements of sections ~~1110.2~~ 1106.2 and ~~1110.3~~ 1106.3.

~~1110.2~~ 1106.2 Design Criteria. The siphonic roof drainage system shall be designed and certified by a registered professional engineer.

~~1110.2.1~~ 1106.2.1 Sizing. The system shall be sized on the basis of a minimum rate of rainfall of 4 inches per hour.

~~1110.2.2~~ 1106.2.2 Design. The drainage system shall be designed according to ASPE Standard 45, Siphonic Roof Drainage, and according to the manufacturer's recommendations and requirements. Manufacturer design software shall be in accordance with ASPE Standard 45.

~~1110.2.3~~ 1106.2.3 Roof Drain Bodies. Roof drains shall meet ASME A112.6.9, Siphonic Roof Drains.

~~1110.2.4~~ **1106.2.4 Water Accumulation.** When designed for water accumulation, the roof shall be designed for the maximum possible water accumulation according to section ~~1108.1~~ 1105.1 (7), as amended in this code, and Minnesota Rules, chapter 1305.

~~1110.2.5~~ **1106.2.5 Pipe Size and Cleanouts.** Minimum pipe size shall be 1-1/2 inches. All pipe sizes and cleanouts in the drainage system shall be designed and installed according to ASPE Standard 45.

~~1110.2.6~~ **1106.2.6 Horizontal Pipes.** Horizontal pipe size shall not reduce in the direction of flow.

~~1110.2.7~~ **1106.2.7 Plans and Specifications.** The plans and specifications for the drainage system shall indicate the siphonic roof drainage system as an engineered method used for the design.

~~1110.2.8~~ **1106.2.8 Markings.** The installed drainage system shall be permanently and continuously marked as a siphonic roof drainage system at approved intervals and clearly at points where piping passes through walls and floors. Roof drains shall be marked in accordance with ASME A112.6.9.

~~1110.2.9~~ **1106.2.9 Transition Locations.** The transition locations from the siphonic roof drainage system to a gravity system shall be determined by the registered professional engineer at a location approved by the administrative authority. The design, sizing, and venting of the transition location shall be in accordance with ASPE Standard 45. The gravity portion of the building storm sewer system receiving the siphonic roof drainage system shall be sized for the design rate but not less than a rainfall rate of 4 inches per hour and in accordance with section ~~1106.0~~ 1103.0.

~~1110.2.10~~ **1106.2.10 Required Submissions.** All plans, specifications, and calculations shall be signed and sealed by the registered professional engineer and submitted to the administrative authority. The submitted calculations shall include performance data

for the drainage system for the required rainfall rate, including the minimum and maximum calculated operating pressures and velocities verifying that the design solution is within the operating parameters required by the design standard. All performance data shall be reported as the extreme maximum and minimum calculations and shall not be presented as averaged data.

~~**1110.3**~~ **1106.3 Proof of Suitability.** Upon completion of the project: proper tests, inspections, and certification of the siphonic roof drainage system shall be performed according to items ~~1110.3.1~~ 1106.3.1 and ~~1110.3.2~~ 1106.3.2:

~~**1110.3.1**~~ **1106.3.1 Testing.** Testing shall be performed according to ASPE Standard 45.

~~**1110.3.2**~~ **1106.3.2 Written Certification.** Prior to the final plumbing inspection, the registered professional engineer shall provide written certification to the administrative authority that the system has been visually inspected by the registered professional engineer or the registered professional engineer's designee and the installation has been properly implemented according to the certified design, plans, calculations, and specifications. The submitted written certification shall include any field modification from the initial design involving dimensions, location, or routing of the siphonic roof drainage system that shall be reapproved and recertified by the registered professional engineer and be accompanied by a final as-built design of the altered system and supported by calculated data to show that the overall system remains in accordance with ASPE Standard 45.

4714.1401 [Renumbered 4714.1701]

4714.1605 INSPECTION AND TESTING.

UPC section 1605.3 is amended to read as follows:

1605.3 Cross-Connection Inspection and Testing. The potable and rainwater catchment water systems shall be isolated from each other and independently inspected and tested to ensure there is no cross-connection in accordance with sections 1605.3.1 through 1605.3.4.

1605.3.1 Visual System Inspection. Prior to commencing the cross-connection testing and annually thereafter, a dual system inspection shall be conducted as follows:

Pumps, equipment, equipment room signs, and exposed piping in an equipment room shall be inspected for visible cross-connections, proper operation, and damage.

1605.3.2 Cross-Connection Test. The following procedure shall be followed by the plumbing contractor in the presence of the Authority Having Jurisdiction to determine whether a cross-connection has occurred:

(1) The potable water system shall be activated and pressurized. The rainwater catchment water system shall be shut down and completely drained.

(2) The potable water system shall remain pressurized while the rainwater catchment water system is completely drained. The minimum period the rainwater catchment water system is to remain completely drained shall be determined based on the size and complexity of the potable water system and rainwater catchment water distribution system, but in no case shall that period be less than one hour.

(3) Fixtures, potable water, and rainwater, shall be tested and inspected for flow. Flow from a rainwater catchment water system outlet indicates a cross-connection. No flow from a potable water outlet indicates that it is connected to the rainwater catchment water system.

(4) The drain on the rainwater catchment water system shall be checked for flow during the test and at the end of the testing period.

(5) The potable water system shall then be completely drained.

(6) The rainwater catchment water system shall then be activated and pressurized.

(7) The rainwater catchment water system shall remain pressurized for a minimum time specified by the Authority Having Jurisdiction while the potable water system is completely drained. The minimum period the potable water system is to remain completely drained shall be based on the size and complexity of the potable water system and rainwater catchment water distribution system but in no case shall that period be less than one hour.

(8) Fixtures, potable and rainwater catchment, shall be tested and inspected for flow. Flow from a potable water system outlet indicates a cross-connection. No flow from a rainwater catchment water outlet indicates that it is connected to the potable water system.

(9) The drain on the potable water system shall be checked for flow during the test and at the end of the testing period.

(10) Where there is no flow detected in the fixtures that would indicate a cross-connection, the potable water system shall be repressurized.

1605.3.3 Discovery of Cross-Connection. In the event that a cross-connection is discovered, the following procedure, in the presence of the Authority Having Jurisdiction, shall be activated immediately:

(1) Rainwater catchment water piping to the building shall be shut down at the meter and the rainwater water riser shall be drained.

(2) Potable water piping to the building shall be shut down at the meter.

(3) The cross-connection shall be uncovered and disconnected.

(4) The building shall be retested following procedures listed in sections 1605.3.**1** and 1605.3.2.

(5) The potable water system shall be chlorinated with 50 ppm chlorine for 24 hours.

(6) The potable water system shall be flushed after 24 hours, and a standard bacteriological test shall be performed. Where test results are acceptable, the potable water system shall be permitted to be recharged.

1605.3.4 Inspection. An annual inspection of the rainwater catchment water system, following the procedures in Section 1605.3.1, shall be required. Cross-connection testing, following the procedures listed in section 1605.3.2, shall be required every five years.

Alternate testing requirements shall be permitted by the Authority Having Jurisdiction.

~~4714.1401~~ 4714.1701 REFERENCED STANDARDS.

Subpart 1. UPC Table ~~1401.1~~ 1701.1 is ~~amended~~ modified to add the following:

STANDARD NUMBER	STANDARD TITLE	APPLICATION	REFERENCED SECTIONS
ASTM C76	Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe	Piping, Nonmetallic	Table 701.2
ASTM F2306			Table 701.2
ASTM F2736-13e1	6 to 30 in. (152 to 762 mm) Polypropylene (PP) Corrugated Single Wall Pipe and Double Wall Pipe	Piping, Plastic	Table 701.2
ASTM F2764/F2764M-11ae2	30 to 60 in. (750 to 1500 mm) Polypropylene (PP) Triple Wall Pipe and Fittings for Non-pressure Sanitary Sewer Applications	Piping, Plastic	Table 701.2

ASTM F2881				Table 701.2
ASSE 1084-2018	Water Heaters with Temperature Limiting Capacity	Appliances		407.3, 409.4, 410.3
ASSE 1085-2018	Water Heaters for Emergency Equipment	Appliances		416.2
ASTM Standards C1214-13	Concrete Pipe Sewerlines by Negative Air Pressure (Vacuum) Test Method			712.4
ASTM Standards C1244-11	Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill			712.4
CSA B125.3-2018	Plumbing Fittings	Fittings		408.3, 409.4, 410.3
Hydrostatic Test Method (City Engineers Association of Minnesota) - 2013	Standard Utilities Specifications for Watermain and Service Line Installation and Sanitary Sewer and Storm Sewer Installation	Storm Drainage		1107.2.3**(A) and 1107.2.3(B)**

~~ASPE Standard 45, Siphonic Roof Drainage, and applies to roof drainage referenced in sections 1110.2.5~~ 1106.2.5~~, 1110.2.9~~ 1106.2.9~~, 1110.3.1~~ 1106.3.1~~, and 1110.3.2~~ 1106.3.2~~.~~

~~ASTM Standards C1214-13 referenced in section 712.4.~~

~~ASTM Standards C1244-11 referenced in section 712.4.~~

~~IAPMO IGC 155-2008, Pipeless Whirlpool Bathtub Appliances referenced in section 409.1.~~

~~Standard Utilities Specifications for water main and service line installation and sanitary sewer and storm sewer installation referenced in section 1109.2.2 sections 1107.2.3(A) and 1107.2.3(B).~~

Subp. 2. UPC Table 1701.1 is modified by amending the following:

STANDARD NUMBER	STANDARD TITLE	APPLICATION	REFERENCED SECTIONS
ASME A112.18.1 - 2018 / CSA B125.1 - 2018	Plumbing Supply Fittings	Fittings	408.3, 417.1, 417.2, 417.3, 417.4, 603.5.19
ASPE Standard 45	Siphonic Roof Drainage	Roof Drainage	1106.2.5, **1106.2.9,** 1106.3.1
ASSE 1023-2019	Electrically Heated or Cooled Water Dispensers	Appliances	417.6 1106.3.2

Unless amended above, all other entries in UPC Table 1701.1 are not amended.

Subp. 3. UPC Table 1701.2 is modified to delete the following:

STANDARD NUMBER	STANDARD TITLE	APPLICATION
ASSE 1023-1979	Hot Water Dispensers Household Storage Type - Electrical	Appliances

Subp. 4. UPC Table 1701.2 is modified by adding the following:

STANDARD NUMBER	STANDARD TITLE	APPLICATION
ASSE 1082-2018	Water Heaters with Integral Temperature Control Devices for Hot Water Distribution Systems	Appliances

4714.1701 [Renumbered 4714.1601]

~~4714.1701~~ 4714.1601 GENERAL.

Subpart 1. **Section 1601.1.** UPC section ~~1701.1~~ 1601.1 is amended to read as follows:

~~**1701.1**~~ **1601.1 Applicability.** The provisions of this chapter shall apply to the installation, construction, alteration, and repair of rainwater catchment systems for nonpotable applications listed in section ~~1702.1~~ 1602.1.

~~**1701.1.1**~~ **1601.1.1 Irrigation.** Rainwater catchment systems used for lawn irrigation are not covered under this chapter.

~~**1701.1.2**~~ **1601.1.2 Combination Systems.** Rainwater catchment systems used for lawn irrigation in combination with any uses listed in section ~~1702.1~~ 1602.1 shall meet the requirements of this chapter. The irrigation system shall be separated by an air gap or proper backflow protection as required for potable water.

Subp. 2. **Section 1601.11.** UPC section 1601.11 is amended to read as follows:

1601.11 Abandonment. All rainwater catchment systems that are no longer in use and fail to be maintained in accordance with section 1601.5 shall be considered abandoned. Abandoned rainwater catchment systems are subject to sections 1601.11.1 and 1601.11.2.

1601.11.1 General. Every abandoned rainwater catchment system or part thereof covered under the scope of this chapter, as amended in this code, shall be disconnected from any remaining systems, drained, plugged, and capped per the requirements of this code. Abandoned systems must comply with chapter 11, Storm Drainage, as amended.

1601.11.2 Underground Tank. Every underground water storage tank that has been abandoned or otherwise discontinued from use in a rainwater catchment system covered under the scope of this chapter, as amended in this code, shall be completely drained and filled with earth, sand, gravel, or concrete or removed in a manner approved by the administrative authority.

4714.1702 NONPOTABLE RAINWATER CATCHMENT SYSTEMS.

Subpart 1. **[Renumbered 4714.1602 subpart 1]**

Subp. 2. **[Renumbered 4714.1602 subp 2]**

Subp. 3. **[Renumbered 4714.1602 subp 3]**

Subp. 4. **[Renumbered 4714.1602 subp 4]**

Subp. 5. **[Renumbered 4714.1602 subp 5]**

Subp.6. **[Renumbered 4714.1602 subp 6]**

Subp.7. **[Renumbered 4714.1602 subp 7]**

Subp.8. **[Renumbered 4714.1602 subp 8]**

Subp. 9. **[Renumbered 4714.1603 subpart 1]**

Subp. 10. **[Renumbered 4714.1603 subp 2]**

Subp. 11. **[Renumbered 4714.1603 subp 3]**

Subp. 12. **[Renumbered 4714.1603 subp 4]**

Subp. 13. **[Renumbered 4714.1603 subp 5]**

Subp. 14. **[Renumbered 4714.1603 subp 6]**

Subp. 15. **[Renumbered 4714.1603 subp 7]**

Subp. 16. **[Renumbered 4714.1604]**

Subp. 17. [Renumbered 4714.1605]

Subp. 18. [See repealer.]

Subp. 19. [See repealer.]

Subp. 20. [See repealer.]

Subp. 21. [See repealer.]

Subp. 22. [Renumbered 4714.1601 subp 2]

~~4714.1702~~ 4714.1602 NONPOTABLE RAINWATER CATCHMENT SYSTEMS.

Subpart 1. **Section ~~1702.1~~ 1602.1.** UPC section ~~1702.1~~ 1602.1 is amended to read as follows:

~~1702.1~~ 1602.1 General. The installation, construction, alteration, and repair of rainwater catchment systems intended to supply uses such as water closets, urinals, trap primers for floor drains and floor sinks, industrial processes, water features, vehicle washing facilities, cooling tower makeup, and similar uses shall be approved by the commissioner.

Subp. 2. **Section ~~1702.2~~ 1602.2.** UPC section ~~1702.2~~ 1602.2 is amended to read as follows:

~~1702.2~~ 1602.2 Plumbing Plan Submission. No permit for a rainwater catchment system shall be issued until complete plumbing plans have been submitted and approved by the commissioner in accordance with Minnesota Rules, part 1300.0215, subpart 6.

Subp. 3. **Section ~~1702.4~~ 1602.4.** UPC section ~~1702.4~~ 1602.4 is amended to read as follows:

~~1702.4~~ 1602.4 Connections to Potable or Reclaimed (Recycled) Water Systems. Rainwater catchment systems shall have no direct connection to a potable water supply or alternate water source system. Potable or reclaimed (recycled) water is permitted to be used as makeup water for a rainwater catchment system provided the potable or reclaimed (recycled) water supply connection is protected by an air gap or reduced-pressure principle backflow preventer in accordance with this code. An automatic means to supply the rainwater catchment system with makeup water shall be installed when there is insufficient rainwater to meet the required demand or due to system failure.

Subp. 4. **Section ~~1702.5~~ 1602.5.** UPC section ~~1702.5~~ 1602.5 is amended to read as follows:

~~1702.5~~ 1602.5 Initial Cross-Connection Test. Where a portion of a rainwater catchment system is installed within a building, a cross-connection test is required in accordance with section ~~1702.11.2~~ 1605.3, as amended. Before the building is occupied or the system is activated, the plumbing contractor shall perform the initial cross-connection test in the presence of the Authority Having Jurisdiction. The test shall be ruled successful before final approval is granted.

Subp. 5. **Section ~~1702.7~~ 1602.7.** UPC section ~~1702.7~~ 1602.7 is amended to read as follows:

~~1702.7~~ 1602.7 Rainwater Catchment System Materials. Rainwater catchment system materials shall comply with sections ~~1702.7.1~~ 1602.7.1 through ~~1702.7.4~~ 1602.7.4.

~~1702.7.1~~ 1602.7.1 Water Supply and Distribution Materials. Rainwater catchment water supply and distribution materials shall comply with Chapter 6, as amended in this code, and the requirements of this code for potable water supply and distribution systems, unless otherwise provided for in this section.

~~1702.7.2~~ 1602.7.2 Rainwater Catchment System Drainage Materials. Materials used in rainwater catchment drainage systems, including gutters, downspouts, conductors, and leaders shall be in accordance with Chapter 11, as amended in this code, and the requirements of this code for storm drainage.

~~1702.7.3~~ 1602.7.3 Storage Tanks. Rainwater storage tanks shall comply with section ~~1702.9.5~~ 1603.1, as amended in this code.

~~1702.7.4~~ 1602.7.4 Collection Surfaces. The collection surface shall be constructed of a hard, impervious material.

Subp. 6. **Section ~~1702.9~~ 1602.9.** UPC ~~section 1702.9.3 is~~ sections 1602.9.3 and 1602.9.5 are amended to read as follows:

~~1702.9.3~~ 1602.9.3 Collection Surfaces. Rainwater catchment systems shall collect rainwater only from roof surfaces. Rainwater catchment systems shall not collect rainwater from:

(1) vehicular parking surfaces;

(2) surface water runoff;

(3) bodies of standing water; or

(4) similar nonroof surfaces.

~~1702.9.3.1~~ 1602.9.5 Prohibited Discharges. Overflows and bleed-off pipes from roof-mounted equipment and appliances, condensate, and other waste disposal shall not discharge onto roof surfaces that collect rainwater for rainwater catchment systems.

Subp. 7. **Section ~~1702.9~~ 1602.9.** UPC section ~~1702.9.4~~ 1602.9.6 is amended to read as follows:

~~1702.9.4~~ 1602.9.6 Minimum Water Quality. The minimum water quality for rainwater catchment systems shall meet the applicable water quality recommendations in Table ~~1702.9.4~~ 1602.9.6.

Subp. 8. **~~Section 1702.9.4~~ Table 1602.9.6.** UPC ~~section 1702.9.4~~ Table 1602.9.6 is amended ~~by adding the following table~~ to read as follows:

TABLE ~~1702.9.4~~ 1602.9.6

Measure	**Limit**
~~Turbidity (NTU)~~	~~<1~~
E. coli (MPN/100 mL)	2.2
Odor	Non-offensive

Temperature (degrees Celsius)	MR
Color	MR
pH	MR

MR = measured and recorded only

Treatment:

~~5 micron~~ 100-micron or smaller ~~absolute~~ filter

Minimum ~~.5-log inactivation~~ 3.5-log reduction of ~~viruses~~ bacteria

Subp. 17. [Renumbered 4714.1605]

Subp. 18. [See repealer.]

Subp. 19. [See repealer.]

Subp. 20. [See repealer.]

Subp. 21. [See repealer.]

Subp. 22. [Renumbered 4714.1601 subp 2]

4714.1603 RAINWATER STORAGE TANKS.

~~Subp. 9.~~ Subpart 1. **Section ~~1702.9.5~~ 1603.2.** UPC ~~subsection 1702.9.5.1~~ section 1603.2 is amended to ~~read as follows~~ add the following:

~~1702.9.5.1~~ 1603.2 Construction. Rainwater storage shall be constructed of solid, durable materials not subject to excessive corrosion or decay, watertight, and suitable for rainwater storage.

Subp. ~~10~~ 2. **Section ~~1702.9.5~~ 1603.7.** UPC section ~~1702.9.5.6 (A)~~ 1603.7 is amended to ~~read as follows~~ add the following:

~~1702.9.5.6 (A)~~ 1603.7 Animals and Insects. Rainwater tank openings shall be protected to prevent the entrance of insects, birds, or rodents into the tank and

piping system. Screen installed on vent pipes, inlets, and overflow pipes shall be corrosion-resistant and have an aperture of not greater than 1/16 inch (1.6 mm) and shall be close-fitting.

Subp. ~~11~~ 3. **Section ~~1702.9.5~~ 1603.9.** UPC section ~~1702.9.5~~ 1603.9 is amended ~~by adding a new subsection~~ to read as follows:

~~1702.9.5.8~~ 1603.9 Storage Tank Venting. A vent shall be installed on each tank. The vent shall extend from the top of the tank and terminate a minimum of 12 inches above grade, shall be a minimum of 1-1/2 inches in diameter, and shall be turned downward.

Subp. ~~12~~ 4. **Section ~~1702.9.6~~ 1603.10.** UPC section ~~1702.9.6~~ 1603.10 is amended to read as follows:

~~1702.9.6~~ 1603.10 Pumps. Pumps serving rainwater catchment systems shall be listed. Pumps supplying water to water closets, urinals, and trap primers shall be capable of delivering not less than 15 pounds-force per square inch (psi) (103 kPa) residual pressure at the highest and most remote outlet served. Where the water pressure in the rainwater supply system within the building exceeds 80 psi (552 kPa), a listed pressure-reducing valve reducing the pressure to 80 psi (552 kPa) or less to water outlets in the building shall be installed in accordance with this code.

Subp. ~~13~~ 5. **Section ~~1702.9.7~~ 1603.11.** UPC section ~~1702.9.7~~ 1603.11 is amended to read as follows:

~~1702.9.7~~ 1603.11 Roof Drains. Primary and secondary roof drain systems shall be designed and installed in accordance with Chapter 11, as amended in this code. Secondary roof drains shall be equipped with a working alarm.

Subp. ~~14~~ 6. **Section ~~1702.9.8~~ 1603.12.** UPC section ~~1702.9.8~~ 1603.12 is amended to read as follows:

~~1702.9.8~~ 1603.12 Water Quality Devices and Equipment. The rainwater catchment system shall include filtration and disinfection to maintain the minimum water quality requirements in Table ~~1702.9.4~~ 1602.9.6. At a minimum, a ~~5-micron~~ 100-micron absolute filter shall be provided along with disinfection to provide a ~~0.5-log inactivation~~ 3.5-log reduction of ~~viruses~~ bacteria. Devices and equipment used to treat rainwater shall be suitable for rainwater catchment system applications, properly designed, sized, and documented for the specific project by a Minnesota registered professional engineer.

Subp. ~~15~~ 7. **Sections ~~1702.9.11~~ 1603.15 and ~~1702.9.12~~ 1603.16.** UPC sections ~~1702.9.11~~ 1603.15 and ~~1702.9.12~~ 1603.16 are deleted in their entirety.

4714.1604 SIGNS.

~~Subp. 16.~~ **~~Section 1702.10.~~** UPC section ~~1702.10.1~~ 1604.2 is amended to read as follows:

~~1702.10.1~~ 1604.2 Commercial, Industrial, and Institutional Restroom Signs. A sign shall be installed in restrooms in commercial, industrial, and institutional occupancies using nonpotable rainwater for water closets, urinals, or both. Each sign shall contain 1/2-inch (12.7 mm) letters of a highly visible color on a contrasting background. The location of the sign(s) shall be such that the sign(s) shall be visible to users. Each sign shall contain one of the following texts as determined by the application:

~~1702.10.1~~ 1604.2 (A) TO CONSERVE WATER, THIS BUILDING USES RAINWATER TO FLUSH TOILETS AND URINALS.

~~1702.10.1~~ 1604.2 (B) TO CONSERVE WATER, THIS BUILDING USES RAINWATER TO FLUSH TOILETS.

~~1702.10.1~~ 1604.2 (C) TO CONSERVE WATER, THIS BUILDING USES RAINWATER TO FLUSH URINALS.

~~1702.10.1~~ 1604.2 (D) TO CONSERVE WATER, THIS BUILDING USES RAINWATER TO *_____*

_____ shall indicate the rainwater usage.

REPEALER. Minnesota Rules, parts 4714.0314; 4714.0507, subpart 2; 4714.0511; 4714.0604; 4714.0705; and 4714.1702, subparts 18, 19, 20, and 21, are repealed.