

### 6.3.1.1. Requirement for Venting

(1) Except as provided in Articles 6.3.1.2. and 6.3.1.3., the products of combustion from solid fuel-burning *appliances* shall be vented in conformance with the requirements in the applicable *appliance* installation standards listed in Article 6.2.1.4.

### 6.3.1.2. Masonry or Concrete Chimneys

(1) Rectangular *masonry or concrete chimneys* not more than 12 m in height shall conform to Part 9 if they serve,

(a) *appliances* with a combined total rated heat output of 120 kW or less, or

(b) fireplaces.

(2) *Masonry or concrete chimneys* other than those described in Sentence (1) shall be designed and installed in conformance with the appropriate requirements in NFPA 211, “Chimneys, Fireplaces, Vents and Solid Fuel-Burning Appliances”.

### 6.3.1.3. Metal Smoke Stacks

(1) Single wall metal smoke stacks shall be designed and installed in conformance with NFPA 211, “Chimneys, Fireplaces, Vents and Solid Fuel-Burning Appliances”.

### 6.3.1.4. Reserved

### 6.3.1.5. Access Ladders

(1) Access ladders for *chimneys*, when provided, shall consist of steel or bronze rungs, built into the walls of the *chimneys*.

(2) Rungs for external ladders shall begin at not less than 2 500 mm from ground level.

O. Reg. 332/12, Division B, Part 6; O. Reg. 361/13, ss. 35-38; O. Reg. 191/14, ss. 60-63; O. Reg. 139/17, ss. 49-53; O. Reg. 88/19, s. 129-144.

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## Section 7.1. General

### 7.1.1. Scope

#### 7.1.1.1. Scope

(1) The scope of this Part shall be as described in Subsection 1.1.2. of Division A.

### 7.1.2. Application

#### 7.1.2.1. Application

(1) Except as provided in Sentence (2), this Part applies to the design and *construction of plumbing*.

(2) This Part does not apply to industrial process systems unless the industrial process system is interconnected with the *plumbing system*, in which case the interconnection shall be so designed and installed so that the *plumbing system* is protected against contamination or malfunction that may be caused by the industrial system.

### 7.1.3. Definitions

#### 7.1.3.1. Definitions

(1) In this Part,

*Storey* means the interval between two successive floor levels including *mezzanine* floors that contain *plumbing* or between a floor level and roof.

### 7.1.4. Plumbing Facilities

#### 7.1.4.1. Facilities Required

(1) *Plumbing* facilities shall be provided in accordance with Subsection 3.7.4. and Section 9.31.

#### 7.1.4.2. Floor Drains

(1) Where gravity drainage to a *sanitary drainage system* is possible, a floor drain shall be installed in a basement forming part of a *dwelling unit*.

(2) Where gravity drainage to a *sanitary drainage system* is not possible, the floor drain required by Sentence (1) may be connected to a *storm drainage system*, dry well or drainage ditch provided it is located where it can receive only *clear water waste* or *storm sewage*.

(3) A floor drain shall be provided in a public laundry room, garbage room, incinerator room, *boiler* or heating room that is not located within a *dwelling unit*.

#### **7.1.5. Service Connections**

##### **7.1.5.1. Sanitary Drainage Systems**

(1) Every *sanitary drainage system* shall be connected to a public *sanitary sewer*, a public combined sewer or a *private sewage disposal system*.

(2) A combined *building drain* or a combined *building sewer* shall not be installed.

##### **7.1.5.2. Storm Drainage Systems**

(1) Every *storm drainage system* shall be connected to a public *storm sewage works*, a public combined *sewage works* or a designated storm water disposal location but shall not be connected to a *sanitary sewage works*.

##### **7.1.5.3. Water Distribution Systems**

(1) Except as provided in Sentence (2), every *water distribution system* shall be connected,

- (a) to a watermain that is part of a *municipal drinking water system*, or
- (b) to a *drinking water system*, if a watermain described in Clause (a) is not available.

(2) *Storm sewage* or *greywater* that is free of solids and treated to conform to Article 7.7.4.1. is permitted to be used as a water supply for,

- (a) water closets,
- (b) urinals,
- (c) sub-surface irrigation, or
- (d) the priming of *traps*.

(3) *Rainwater* that is free of solids and treated to conform to Article 7.7.4.1. is permitted to be used as a water supply for,

- (a) clothes washers,
- (b) laundry trays,
- (c) mop sinks,
- (d) bedpan washers,
- (e) water closets,
- (f) urinals,
- (g) hose bibbs,
- (h) sub-surface irrigation, or
- (i) the priming of *traps*.

(4) Piping conveying the non-potable water described in Sentence (2) shall be installed in conformance with Section 7.7.

##### **7.1.5.4. Separate Services**

(1) Except as provided in Sentences (2) and (3), piping in any *building* shall be connected to the public services separately from piping of any other *building*.

(2) An ancillary *building* on the same property as the main *building* may be served by the same service.

(3) *Water service pipes* or *building sewers* serving *buildings* located on the same property may connect into a *private water supply* or a *private sewer* conforming to Article 7.1.5.5.

(4) No *plumbing* serving a *dwelling unit* shall be installed in or under another unit of the *building* unless the piping is located in a tunnel, pipe corridor, common *basement* or parking garage, so that the piping is *accessible* for servicing and maintenance throughout its length without encroachment on any private living space, but this Sentence does not prevent *plumbing* serving a unit located above another unit from being installed in or under the lower unit.

##### **7.1.5.5. Private Sewers and Private Water Supply**

(1) *Private water supply pipes* shall be designed and installed according to MOE PIBS 6881e, "Design Guidelines for Drinking-Water Systems".

(2) *Private sewers* shall be designed and installed according to MOE PIBS 6879, "Design Guidelines for Sewage Works".

## **7.1.6. Location of Fixtures**

### **7.1.6.1. Lighting and Ventilation Requirements**

(1) *Plumbing fixtures* shall not be installed in a room that is not lighted and ventilated in accordance with the appropriate requirements in Parts 3 and 9.

### **7.1.6.2. Accessibility**

(1) Every *fixture, plumbing appliance, interceptor, cleanout*, valve, device or piece of equipment shall be so located that it is readily *accessible* for use, cleaning and maintenance.

## **7.1.7. Accommodating Movement**

### **7.1.7.1. Structural Movement**

(1) *Plumbing* shall be designed and installed to accommodate the maximum relative structural movement provided for in the *construction* of the *building*.

## **Section 7.2. Materials and Equipment**

### **7.2.1. General**

#### **7.2.1.1. Exposure of Materials**

(1) Where unusual conditions exist such as excessively corrosive *soil* or water, only materials suited for use in such locations shall be used.

(2) Materials and equipment used in a *drainage system* where excessively corrosive wastes are present shall be suitable for the purpose.

#### **7.2.1.2. Restrictions on Re-Use**

(1) Used materials and equipment, including *fixtures*, shall not be reused unless they meet the requirements of this Part for new materials and equipment and are otherwise satisfactory for their intended use.

(2) Materials and equipment that have been used for a purpose other than the distribution of *potable* water shall not be subsequently used in a *potable water system*.

#### **7.2.1.3. Identification and Certification**

(1) Every length of pipe and every fitting shall have cast, stamped or indelibly marked on it the maker's name or mark and the weight or class or quality of the product, or it shall be marked in accordance with the relevant standard, and such markings shall be visible after installation.

(2) Where a component of a *plumbing system* is required by this Code to comply with a standard and the compliance is not certified by a testing agency accredited by the Standards Council of Canada for the testing of the component in question and, when an inspector requests proof of the compliance, proof of compliance shall be produced by the person proposing to install or have installed the component, and without such proof the component shall not be installed as a permanent part of any *plumbing system*.

(3) The lack of certification markings on a product or *plumbing* component shall be regarded as proof, in the absence of evidence to the contrary, that no certification exists.

(4) If a component of a *plumbing system* is required to be certified to a standard, the certification shall be made by a testing agency accredited for that purpose by the Standards Council of Canada.

#### **7.2.1.4. Pipe or Piping**

(1) Where the term pipe or piping and fittings is used, it shall also apply to tube or tubing and fittings unless otherwise stated.

#### **7.2.1.5. Withstanding Pressure**

(1) Piping, fittings and joints used in pressure sewer, forcemain or sump pump discharge applications shall be capable of withstanding at least one and one-half times the maximum potential pressure.

### **7.2.2. Fixtures**

#### **7.2.2.1. Surface Requirements**

(1) Except for the area designed to be slip proof in such *fixtures*, every exposed area of a *fixture* shall have a smooth, hard corrosion-resistant surface that is free from flaws and blemishes that may interfere with cleaning.

#### **7.2.2.2. Conformance to Standards**

(1) Water closets and urinals shall conform to the requirements in Article 7.6.4.2.

- (2) Vitreous china fixtures shall conform to ASME A112.19.2 / CSA B45.1, “Ceramic Plumbing Fixtures”.
- (3) Enamelled cast iron fixtures shall conform to ASME A112.19.1 / CSA B45.2, “Enamelled Cast Iron and Enamelled Steel Plumbing Fixtures”.
- (4) Porcelain enamelled steel fixtures shall conform to ASME A112.19.1 / CSA B45.2, “Enamelled Cast Iron and Enamelled Steel Plumbing Fixtures”.
- (5) Stainless steel fixtures shall conform to ASME A112.19.3 / CSA B45.4, “Stainless Steel Plumbing Fixtures”.
- (6) Plastic fixtures shall conform to CSA B45.5 / IAPMO Z124, “Plastic Plumbing Fixtures”.
- (7) Hydromassage bathtubs shall conform to ASME A112.19.7 / CSA B45.10, “Hydromassage Bathtub Systems”.
- (8) Macerating toilet systems shall conform to ASME A112.3.4 / CSA B45.9, “Plumbing Fixtures with Pumped Waste and Macerating Toilet Systems”.

#### **7.2.2.3. Showers**

- (1) Shower receptors shall be constructed and arranged so that water cannot leak through the walls or floor.
- (2) Not more than six shower heads shall be served by a single shower drain.
- (3) Where two or more shower heads are served by a shower drain, the floor shall be sloped and the drain located so that water from one head cannot flow over the area that serves another head.
- (4) Except for column showers, when a battery of shower heads is installed, the horizontal distance between two adjacent shower heads shall be at least 750 mm.

#### **7.2.2.4. Concealed Overflows**

- (1) A dishwashing sink and a food preparation sink shall not have concealed overflows.

#### **7.2.2.5. Water Closets in Public Washrooms**

- (1) Except for Eastern-Style toilets, where a water closet is installed in a washroom for *public use* it shall be of the elongated type and provided with a seat of the open front type.

#### **7.2.2.6. Lavatories**

- (1) A lavatory that does not have an overflow shall be equipped with a centre outlet waste fitting.

#### **7.2.2.7. Trough Urinals**

- (1) No trough urinal shall be used as part of a *plumbing system*.

### **7.2.3. Traps and Interceptors**

#### **7.2.3.1. Traps**

- (1) Except as provided for in Sentence (2), every *trap* shall,
  - (a) have a *trap seal depth* of at least 38 mm,
  - (b) be so designed that failure of the seal walls will cause exterior leakage, and
  - (c) have a water seal that does not depend on the action of moving parts.
- (2) The *trap seal depth* on *fixtures* draining to an acid waste system shall be a minimum of 50 mm.
- (3) Except for a floor-mounted service sink, every *trap* that serves a lavatory, a sink or a laundry tray shall,
  - (a) be provided with a *cleanout* plug of a minimum  $\frac{3}{4}$  in. *size* located at the lowest point of the *trap* and of the same material as the *trap*, except that a cast iron *trap* shall be provided with a brass *cleanout* plug,
  - (b) be designed so that the *trap dip* can be completely removed for cleaning purposes, or
  - (c) be provided with a *cleanout* installed above the floor as close as practical downstream of the *trap* when the *trap* is,
    - (i) installed below the floor, and
    - (ii) not readily *accessible* for cleaning as required by Clause (a).
- (4) A bell *trap* or an S-*trap* shall not be installed in a *drainage system*.
- (5) A drum *trap* shall not be installed in a *drainage system*.
- (6) Except as permitted in Sentence (7), no bottle *trap* shall be used in a *plumbing system*.
- (7) A bottle *trap* may be used on a laboratory sink or other *fixture* equipped with corrosion resistant fittings.

(8) No running *trap* shall be installed in a *plumbing system* unless an *accessible* handhole is provided for cleaning of the *trap*, and where the *trap* is too small to accommodate a handhole, a *cleanout* shall be provided.

#### **7.2.3.2. Interceptors**

- (1) Every *interceptor* shall be designed so that it can be readily cleaned.
- (2) Every grease *interceptor* shall be designed so that it does not become air bound.
- (3) Where a grease *interceptor* is required by Sentence 7.4.4.3.(1), the *interceptor* shall conform to,
  - (a) CSA B481.1, “Testing and Rating of Grease Interceptors Using Lard”, or
  - (b) CSA B481.2, “Testing and Rating of Grease Interceptors Using Oil”.
- (4) Grease *interceptors* shall be selected and installed in conformance with,
  - (a) CSA B481.0, “Material, Design, and Construction Requirements for Grease Interceptors”, and
  - (b) CSA B481.3, “Sizing, Selection, Location, and Installation of Grease Interceptors”.

#### **7.2.3.3. Tubular Traps**

(1) Tubular metal or plastic *traps* that conform to ASME A112.18.2 / CSA B125.2, “Plumbing Waste Fittings” shall be used in *accessible* locations.

#### **7.2.4. Pipe Fittings**

##### **7.2.4.1. T and Cross Fittings**

- (1) A T fitting shall not be used in a *drainage system* except to connect a *vent pipe*.
- (2) A cross fitting shall not be used in a *drainage system*.

##### **7.2.4.2. Sanitary T Fittings**

(1) A double sanitary T fitting shall not be used to connect the *fixture drains* of two urinals where no *cleanout* fitting is provided above the connection.

(2) No pipe fitting, joint or connection that would tend to intercept solids or reduce the flow through a pipe by more than 10 per cent shall be used in a *plumbing system*.

##### **7.2.4.3. 90° Elbows**

(1) Except as permitted in Sentences (2) and (3), 90° elbows of 4 in. *size* or less that have a centre-line radius that is less than the *size* of the pipe shall not be used to join two *soil* or *waste pipes*.

- (2) 90° elbows of 4 in. *size* or less in *sanitary drainage systems* may be used,
  - (a) to change the direction of piping from horizontal to vertical, in the direction of flow,
  - (b) where a *trap arm* enters a wall, or
  - (c) to connect *trap arms* as permitted by Sentence 7.5.6.3.(2).
- (3) A 90° elbow that is part of the pre-engineered wastewater heat recovery system is permitted to have a centre-line radius that is less than the *size* of the pipe.

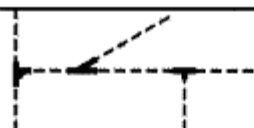
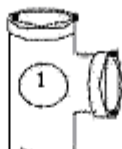
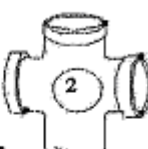

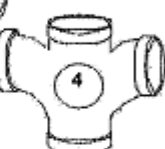

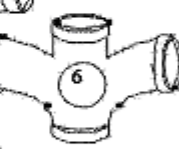


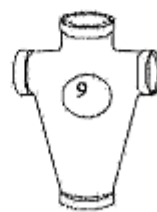
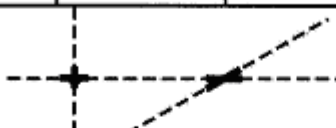
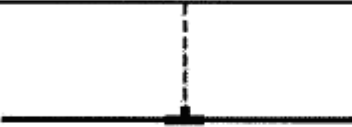

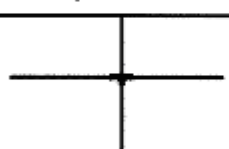
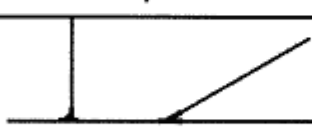
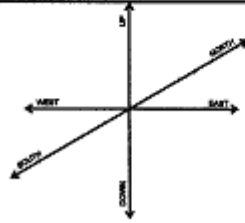
##### **7.2.4.4. Fittings Restricted in Use**

(1) No double Y, double TY, double T or double waste fitting shall be installed in a *nominally horizontal soil* or *waste pipe*.

##### **7.2.4.5. Assembled Pipe or Tubing**

(1) Pipe or tubing assembled to comprise a standard drain waste and venting system shall be connected with drain, waste and vent fittings in conformance with Table 7.2.4.5.

**Table 7.2.4.5.**  
**Pipe Arrangement for DWV Fittings**  
 Forming Part of Sentence 7.2.4.5.(1)

Pipe Arrangement	Fittings											
	Acceptable	Type										
	①③⑤⑦	        										
	②④⑥⑧⑨											
	①③⑤⑦											
	③⑤⑦											
	④*⑥⑧⑨*											
	⑤⑦											
	<b>LEGEND (DWV BRANCH FITTINGS)</b> Vent pipe ----- Drainage pipe ----- * Acceptable only if vertical run is of 3 inches size or larger and horizontal branches are of 1 ¼, 1 ½, or 2 inches size											
<table><tr><td>1. Straight T</td><td>6. Double Combination Y &amp; 1/8 Bend or Double Long Turn TY</td></tr><tr><td>2. Double T or Cross</td><td>7. Y</td></tr><tr><td>3. Sanitary T or Short Turn TY</td><td>8. Double Y</td></tr><tr><td>4. Double Sanitary T or Short Turn Double TY</td><td>9. Double Waste Fitting</td></tr><tr><td>5. Combination Y &amp; 1/8 Bend or Long Turn TY</td><td></td></tr></table>			1. Straight T	6. Double Combination Y & 1/8 Bend or Double Long Turn TY	2. Double T or Cross	7. Y	3. Sanitary T or Short Turn TY	8. Double Y	4. Double Sanitary T or Short Turn Double TY	9. Double Waste Fitting	5. Combination Y & 1/8 Bend or Long Turn TY	
1. Straight T	6. Double Combination Y & 1/8 Bend or Double Long Turn TY											
2. Double T or Cross	7. Y											
3. Sanitary T or Short Turn TY	8. Double Y											
4. Double Sanitary T or Short Turn Double TY	9. Double Waste Fitting											
5. Combination Y & 1/8 Bend or Long Turn TY												

## 7.2.5. Non-Metallic Pipe and Fittings

### 7.2.5.1. Reserved

### 7.2.5.2. Reserved

### 7.2.5.3. Concrete Pipe and Fittings

(1) Concrete pipe shall conform to CSA-A257 Series, “Standards for Concrete Pipe and Manhole Sections”.

(2) Joints with external elastomeric gaskets shall be made with corrosion resistant external band type flexible mechanical couplings that conform to CSA B602, “Mechanical Couplings for Drain, Waste, and Vent Pipe and Sewer Pipe”.

- (3) Concrete fittings field fabricated from lengths of pipe shall not be used.
- (4) Concrete pipe shall not be used above ground inside a *building*.
- (5) Precast reinforced circular concrete manhole sections, catch basins and fittings shall conform to CSA A257.4, “Precast Reinforced Circular Concrete Manhole Sections, Catch Basins, and Fittings”.

#### 7.2.5.4. Vitrified Clay Pipe and Fittings

- (1) Vitrified clay pipe and fittings shall be certified to CSA A60.1-M, “Vitrified Clay Pipe”.
- (2) Couplings and joints for vitrified clay pipe shall be certified to CSA A60.3-M, “Vitrified Clay Pipe Joints”.
- (3) Vitrified clay pipe and fittings shall not be used except for an underground part of a *drainage system*.

#### 7.2.5.5. Polyethylene Pipe and Fittings

- (1) Polyethylene water pipe, tubing and fittings shall be certified to, and have a pressure rating meeting the requirements of, Series 160 or a higher series of CSA B137.1, “Polyethylene (PE) Pipe, Tubing and Fittings for Cold Water Pressure Services”.
- (2) Except as permitted in Sentence 7.2.5.7.(1), polyethylene water pipe shall not be used except for a *water service pipe*.
- (3) Butt fusion fittings for polyethylene pipe shall conform to ASTM D3261, “Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing”.

#### 7.2.5.6. Polyethylene Pipe Used Underground

- (1) Polyethylene pipe used underground in a *drainage system* for rehabilitation of existing systems using trenchless technology shall conform to ASTM F714, “Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter” and shall be HDPE 3408, SDR 17 or heavier.

#### 7.2.5.7. Crosslinked Polyethylene Pipe and Fittings

- (1) Cross-linked polyethylene pipe and its associated fittings used in hot and cold *potable water systems* shall be certified to CSA B137.5, “Crosslinked Polyethylene (PEX) Tubing Systems for Pressure Applications”.

#### 7.2.5.8. PVC Pipe and Fittings

- (1) PVC water pipe, fittings and solvent cement shall be certified to CSA B137.3, “Rigid Polyvinylchloride (PVC) Pipe and Fittings for Pressure Applications” or CSA B137.2, “Polyvinylchloride (PVC) Injection-Moulded Gasketed Fittings for Pressure Applications”, and have a minimum pressure rating of 1 100 kPa.
- (2) PVC water pipe and fittings in Sentence (1) shall not be used in a hot *water system*.

#### 7.2.5.9. CPVC Pipe, Fittings and Solvent Cements

- (1) CPVC hot and cold water pipe, fittings and solvent cements shall be certified to CSA B137.6, “Chlorinated Polyvinylchloride (CPVC) Pipe, Tubing and Fittings for Hot and Cold Water Distribution Systems”.
- (2) The design temperature and design pressure of a CPVC piping system shall conform to Table 7.2.5.9.

**Table 7.2.5.9.**  
**Maximum Permitted Pressure for CPVC Piping at Various Temperatures**

Forming part of Sentence 7.2.5.9.(2)

Item	Column 1 Maximum Temperature of Water, °C	Column 2 Maximum Permitted Pressures, kPa
1.	10	3150
2.	20	2900
3.	30	2500
4.	40	2100
5.	50	1700
6.	60	1300
7.	70	1000
8.	82	690

#### 7.2.5.10. Plastic Pipe, Fittings and Solvent Cement Used Underground

- (1) Plastic pipe, fittings and solvent cement used underground outside a *building* or under a *building* in a *drainage system* shall be certified to,
  - (a) ASTM F628, “Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste and Vent Pipe With a Cellular Core”,
  - (b) CAN/CSA-B181.1, “Acrylonitrile-Butadiene-Styrene (ABS) Drain, Waste, and Vent Pipe and Pipe Fittings”,



- (c) CAN/CSA-B181.2, “Polyvinylchloride (PVC) and Chlorinated Polyvinylchloride (CPVC) Drain, Waste, and Vent Pipe and Pipe Fittings”,
  - (d) CAN/CSA-B182.1, “Plastic Drain and Sewer Pipe and Pipe Fittings”,
  - (e) CAN/CSA-B182.2, “PSM Type Polyvinylchloride (PVC) Sewer Pipe and Fittings”,
  - (f) CAN/CSA-B182.4, “Profile Polyvinylchloride (PVC) Sewer Pipe and Fittings”,
  - (g) CAN/CSA-B182.6, “Profile Polyethylene (PE) Sewer Pipe and Fittings for Leak-Proof Sewer Applications”,
  - (g.1) CAN/CSA-B182.8, “Profile Polyethylene (PE) Storm Sewer and Drainage Pipe and Fittings”, for Type 1 joints and non-perforated pipes,
  - (h) CSA B137.2, “Polyvinylchloride (PVC) Injection-Moulded Gasketed Fittings for Pressure Applications”, or
  - (i) CSA B137.3, “Rigid Polyvinylchloride (PVC) Pipe and Fittings for Pressure Applications”.
- (2) Except as permitted in Clauses (h) and (i), plastic pipe used as described in Sentence (1) shall have a stiffness equal or greater than 320 kPa.

#### **7.2.5.11. Transition Solvent Cement**

- (1) Solvent cement for transition joints shall conform to,
  - (a) CAN/CSA-B181.1, “Acrylonitrile-Butadiene-Styrene (ABS) Drain, Waste, and Vent Pipe and Pipe Fittings”, or
  - (b) CAN/CSA-B181.2, “Polyvinylchloride (PVC) and Chlorinated Polyvinylchloride (CPVC) Drain, Waste, and Vent Pipe and Pipe Fittings”.
- (2) Transition solvent cement shall only be used for joining an ABS *plumbing system* to a PVC *plumbing system*.

#### **7.2.5.12. Plastic Pipe, Fittings and Solvent Cement Used in Buildings**

- (1) Plastic pipe, fittings and solvent cement used inside or under a *building* in a *sanitary drainage system* or *venting system* shall be certified to,
  - (a) ASTM F628, “Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe With a Cellular Core”,
  - (b) CAN/CSA-B181.1, “Acrylonitrile-Butadiene-Styrene (ABS) Drain, Waste, and Vent Pipe and Pipe Fittings”, or
  - (c) CAN/CSA-B181.2, “Polyvinylchloride (PVC) and Chlorinated Polyvinylchloride (CPVC) Drain, Waste, and Vent Pipe and Pipe Fittings”.
- (2) Plastic pipe, fittings and solvent cement used inside a *building* in a *storm drainage system* shall be certified to,
  - (a) ASTM F628, “Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe With a Cellular Core”,
  - (b) CAN/CSA-B181.1, “Acrylonitrile-Butadiene-Styrene (ABS) Drain, Waste, and Vent Pipe and Pipe Fittings”,
  - (c) CAN/CSA-B181.2, “Polyvinylchloride (PVC) and Chlorinated Polyvinylchloride (CPVC) Drain, Waste, and Vent Pipe and Pipe Fittings”,
  - (d) CAN/CSA-B182.1, “Plastic Drain and Sewer Pipe and Pipe Fittings”, or
  - (e) CAN/CSA-B182.2, “PSM Type Polyvinylchloride (PVC) Sewer Pipe and Fittings”.
- (3) Plastic pipe used as described in Sentence (2) shall have a pipe stiffness equal or greater than 320 kPa.
- (4) Requirements for *combustible* piping in relation to fire safety shall conform to Sentences 3.1.5.16.(1) and 9.10.9.6.(2) to (8) and Articles 3.1.9.4. and 9.10.9.7.
- (5) Where *noncombustible* piping pierces a *fire separation* or a *fire block*, the requirements for fire stopping of Subsection 3.1.9., Sentence 9.10.9.6.(1) and Article 9.10.16.4. shall apply.

#### **7.2.5.13. Polyethylene/Aluminum/Polyethylene Composite Pipe and Fittings**

- (1) PE/AL/PE composite pipe and fittings used for *potable water systems* shall conform to CSA B137.9, “Polyethylene/Aluminum/Polyethylene (PE-AL-PE) Composite Pressure-Pipe Systems”.
- (2) Except as provided in Sentences (3) and (4), PE/AL/PE pipe and fittings shall not be used in a hot *water system*.
- (3) PE/AL/PE pipe with a pressure rating of 690 kPa or greater at 82°C shall be permitted in a hot *water system*.
- (4) PE/AL/PE pipe with a pressure rating of 690 kPa or greater at 82°C shall be used with fittings that conform to CSA B137.10, “Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene (PEX-AL-PEX) Composite Pressure-Pipe Systems”, in a hot *water system*.

#### **7.2.5.14. Crosslinked Polyethylene/Aluminum/Polyethylene Composite Pipe and Fittings**

(1) PEX/AL/PEX composite pipe and fittings used for *potable water systems* shall conform to CSA B137.10, “Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene (PEX-AL-PEX) Composite Pressure-Pipe Systems”.

#### **7.2.5.15. Polypropylene Pipe and Fittings**

(1) Polypropylene pipe and fittings used for hot and cold *potable water systems* shall conform to CSA B137.11, “Polypropylene (PP-R) Pipe and Fittings for Pressure Applications”.

### **7.2.6. Ferrous Pipe and Fittings**

#### **7.2.6.1. Cast Iron Frames, Covers, Drainage and Vent Pipe and Fittings**

(1) Drainage piping, vent piping and fittings made of cast iron shall be certified to CAN/CSA-B70, “Cast Iron Soil Pipe, Fittings and Means of Joining”.

(2) Cast iron *soil pipe* and fittings shall not be used in a *water system*.

(3) Cast iron frames and covers for maintenance holes and catch basins shall conform to CAN/CSA-B70.1, “Frames and Covers for Maintenance Holes and Catchbasins”.

#### **7.2.6.2. Reserved**

#### **7.2.6.3. Threaded Cast Iron Drainage Fittings**

(1) Threaded cast iron drainage fittings shall conform to ASME B16.12, “Cast Iron Threaded Drainage Fittings”.

(2) Threaded cast iron drainage fittings shall not be used in a *water system*.

#### **7.2.6.4. Cast Iron Water Pipe**

(1) Cast iron water pipes shall conform to ANSI/AWWA C151/A21.51, “Ductile-Iron Pipe, Centrifugally Cast”.

(2) Cement-mortar lining for cast iron water pipes shall conform to ANSI/AWWA C104/A21.4, “Cement-Mortar Lining for Ductile-Iron Pipe and Fittings”.

(3) Cast iron fittings for cast iron or ductile-iron water pipes shall conform to ANSI/AWWA C110/A21.10, “Ductile-Iron and Gray-Iron Fittings”.

(4) Rubber gasket joints for cast iron and ductile-iron pressure pipe for water piping shall conform to ANSI/AWWA C111/A21.11, “Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings”.

#### **7.2.6.5. Screwed Cast Iron Water Fittings**

(1) Screwed cast iron water fittings shall conform to ASME B16.4, “Gray Iron Threaded Fittings: Classes 125 and 250”.

(2) Screwed cast iron water fittings used in a *water system* shall be cement-mortar lined or galvanized.

(3) Screwed cast iron water fittings shall not be used in a *drainage system*.

#### **7.2.6.6. Screwed Malleable Iron Water Fittings**

(1) Screwed malleable iron water fittings shall conform to ASME B16.3, “Malleable Iron Threaded Fittings: Classes 150 and 300”.

(2) Screwed malleable iron water fittings used in a *water system* shall be cement-mortar lined or galvanized.

(3) Screwed malleable iron water fittings shall not be used in a *drainage system*.

#### **7.2.6.7. Steel Pipe**

(1) Except as provided in Sentences (2) and (3), welded and seamless steel pipe shall not be used in a *plumbing system*.

(2) Galvanized steel pipe may be used in a *drainage system* or a *venting system* above ground inside a *building*.

(3) Galvanized steel pipe and fittings shall not be used in a *water distribution system* except,

(a) in *buildings* of *industrial occupancy*, or

(b) for the repair of existing galvanized steel piping systems.

(4) Galvanized steel pipe and fittings shall conform to ASTM A53/A53M, “Pipe, Steel, Black and Hot Dipped, Zinc-Coated Welded and Seamless”.

(5) Where galvanized steel pipe is used in a *drainage system*, it shall be used with drainage fittings.

(6) All steel pipe of 4 in. *size* and smaller shall be schedule 40 or heavier and fittings of less than 2 in. *size* shall be galvanized screw fittings.

#### **7.2.6.8. Corrugated Steel Pipe and Couplings**

- (1) Corrugated steel pipe and couplings shall be certified to CAN/CSA-G401, “Corrugated Steel Pipe Products”.
- (2) Corrugated steel pipe shall only be used underground outside a *building* in a *storm drainage system*.
- (3) Couplings for corrugated steel pipe shall be constructed so that when installed they shall,
  - (a) maintain the pipe alignment,
  - (b) resist the separation of adjoining lengths of pipe,
  - (c) prevent root penetration, and
  - (d) prevent the infiltration of surrounding material.

#### 7.2.6.9. Sheet Metal Leaders

- (1) A sheet metal *leader* shall not be used except above ground outside a *building*.

#### 7.2.6.10. Stainless Steel Pipe

- (1) Stainless steel pipe shall conform to,
  - (a) ASME B36.19M, “Stainless Steel Pipe”, and
  - (b) ASTM A312 / A312M, “Seamless, Welded, and Heavily Cold Worked Stainless Steel Pipes”.
- (2) Only grade 304/304L or 316/316L stainless steel pipe shall be used.

#### 7.2.6.11. Stainless Steel Butt Weld Pipe Fittings

- (1) Stainless steel butt weld pipe fittings shall conform to,
  - (a) ASME B16.9, “Factory-Made Wrought Buttwelding Fittings”, and
  - (b) ASTM A403 / A403M, “Wrought Austenitic Stainless Steel Piping Fittings”.
- (2) Stainless steel butt weld pipe fittings shall be made of a material that matches the grade of the pipe material used.

#### 7.2.6.12. Stainless Steel Pipe Flanges

- (1) Stainless steel pipe flanges shall,
  - (a) conform to ASME B16.5, “Pipe Flanges and Flanged Fittings: NPS ½ through NPS 24 Metric/Inch Standard”, and
  - (b) conform to ASTM A182 / A182M, “Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service”, or AWWA C228, “Stainless-Steel Pipe Flanges For Water Service – Sizes 2 in. through 72 in. (50 mm through 1 800 mm)”.
- (2) Stainless steel pipe flanges shall be made of a material that matches the grade of the pipe material used.

#### 7.2.6.13. Stainless Steel Threaded Fittings

- (1) Stainless steel threaded fittings shall be Schedule 40 or greater and shall conform to,
  - (a) ASTM A182 / A182M, “Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service”, or
  - (b) ASTM A351 / A351M, “Castings, Austenitic, for Pressure-Containing Parts”.
- (2) Stainless steel threaded fittings shall be made of a material that matches the grade of the pipe material used.

#### 7.2.6.14. Stainless Steel Tube

- (1) Stainless steel tube shall conform to,
  - (a) ASME B16.9, “Factory-Made Wrought Buttwelding Fittings”, and
  - (b) ASTM A269, “Seamless and Welded Austenitic Stainless Steel Tubing for General Service”.
- (2) Only grade 304/304L or 316/316L stainless steel tubes shall be used.

#### 7.2.6.15. Stainless Steel Pipe and Tube

- (1) The use of stainless steel pipe and tube shall conform to Table 7.2.6.15.

**Table 7.2.6.15.**  
**Permitted Use of Stainless Steel Tube and Pipe**

Forming Part of Sentence 7.2.6.15.(1)

Item	Column 1 Stainless	Column 2 Underground	Column 3 Above-ground	Column 4 <i>Building</i>	Column 5 Underground	Column 6 Above-	Column 7 Underground	Column 8 Above-
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	Steel Tube or Pipe	Water Distribution System	Water Distribution System	Sewer	Drainage System	ground Drainage System	Venting System	ground Venting System
1.	Stainless steel pipe	P	P	P	P	P	P	P
2.	Stainless steel tube	P	P	N	N	N	N	N

Notes to Table 7.2.6.15.:

P — Permitted

N — Not Permitted

## 7.2.7. Non-Ferrous Pipe and Fittings

### 7.2.7.1. Copper and Brass Pipe

(1) Copper pipe shall conform to ASTM B42, “Seamless Copper Pipe, Standard Sizes”.

(2) Brass pipe shall conform to ASTM B43, “Seamless Red Brass Pipe, Standard Sizes”.

### 7.2.7.2. Brass or Bronze Pipe Flanges and Flanged Fittings

(1) Brass or bronze pipe flanges and flanged fittings shall conform to ASME B16.24, “Cast Copper Alloy Pipe Flanges and Flanged Fittings: Classes 150, 300, 600, 900, 1500 and 2500”.

### 7.2.7.3. Brass or Bronze Threaded Water Fittings

(1) Brass or bronze threaded water fittings shall conform to ASME B16.15, “Cast Copper Alloy Threaded Fittings: Classes 125 and 250”.

(2) Brass or bronze threaded water fittings shall not be used in a *drainage system*.

### 7.2.7.4. Copper Tube

(1) Copper tube in a *plumbing system* shall,

(a) be certified to ASTM B88, “Seamless Copper Water Tube”, or

(b) comply with ASTM B306, “Copper Drainage Tube (DWV)”.

(2) The use of copper tube shall conform to Table 7.2.7.4.

**Table 7.2.7.4.**  
**Permitted Use of Copper Tube and Pipe**

Forming Part of Sentence 7.2.7.4.(2)

Item	Column 1 Type of Copper Tube or Pipe	Column 2 Underground Water Distribution System	Column 3 Above-ground Water Distribution System	Column 4 Building Sewer	Column 5 Underground Drainage System	Column 6 Above-ground Drainage System	Column 7 Underground Venting System	Column 8 Above- ground Venting System
1.	K & L hard	N	P	P	P	P	P	P
2.	K & L soft	P	P	N	N	N	N	N
3.	M hard	N	P	N	N	P	N	P
4.	M soft	N	N	N	N	N	N	N
5.	DWV	N	N	N	N	P	N	P

Notes to Table 7.2.7.4.:

P — Permitted

N — Not Permitted

(3) Copper tube used in a *plumbing appliance* shall conform to,

(a) ASTM B88, “Seamless Copper Water Tube”, or

(b) ASTM B68 / B68M, “Seamless Copper Tube, Bright Annealed”.

(4) Type K or L copper tube shall be used for the *potable* water side of a heat exchanger in a pre-engineered wastewater heat recovery system.

(5) Copper tube shall not be used for the *fixture drain* or the portion of the *vent pipe* below the *flood level rim* of manually flushing or waterless urinals.

#### **7.2.7.5. Solder-Joint Drainage Fittings**

- (1) Solder-joint fittings for *drainage systems* shall conform to,
  - (a) ASME B16.23, “Cast Copper Alloy Solder Joint Drainage Fittings: DWV”, or
  - (b) ASME B16.29, “Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings – DWV”.
- (2) Solder-joint fittings for *drainage systems* shall not be used in a *water system*.

#### **7.2.7.6. Solder-Joint Water Fittings**

- (1) Except as provided in Sentence (2), solder-joint fittings for *water systems* shall conform to,
  - (a) ASME B16.18, “Cast Copper Alloy Solder Joint Pressure Fittings”, or
  - (b) ASME B16.22, “Wrought Copper and Copper Alloy Solder Joint Pressure Fittings”.
- (2) Solder-joint fittings for *water systems* not made by casting or the wrought process shall conform to the applicable requirements of ASME B16.18, “Cast Copper Alloy Solder Joint Pressure Fittings”.

#### **7.2.7.7. Flared-Joint Fittings for Copper Tube Water Systems**

- (1) Flared-joint fittings for copper tube *water systems* shall conform to ASME B16.26, “Cast Copper Alloy Fittings for Flared Copper Tubes”.
- (2) Flared-joint fittings for copper tube *water systems* not made by casting shall conform to the applicable requirements of ASME B16.26, “Cast Copper Alloy Fittings for Flared Copper Tubes”.

#### **7.2.7.8. Lead Waste Pipe and Fittings**

- (1) Lead *waste pipe* and fittings shall not be used in a *water system* or for a *building sewer*.
- (2) When there is a change in *size* of a lead closet bend, the change shall be in the vertical section of the bend or made in such a manner that there shall be no retention of liquid in the bend.

### **7.2.8. Corrosion Resistant Materials**

#### **7.2.8.1. Pipe and Fittings**

- (1) Pipes and fittings to be used for drainage and venting of acid and corrosive wastes shall conform to,
  - (a) ASTM A518/A518M, “Corrosion-Resistant High-Silicon Iron Castings”,
  - (b) ASTM C1053, “Borosilicate Glass Pipe and Fittings for Drain, Waste, and Vent (DWV) Applications”, or
  - (c) CAN/CSA-B181.3, “Polyolefin and Polyvinylidene Fluoride (PVDF) Laboratory Drainage Systems”.

### **7.2.9. Jointing Materials**

#### **7.2.9.1. Cement-Mortar**

- (1) Cement-mortar shall not be used for jointing.

#### **7.2.9.2. Solder and Fluxes**

- (1) Solders for solder joint fittings shall conform to ASTM B32, “Solder Metal” in accordance with the recommended use.
- (2) Solders and fluxes having a lead content in excess of 0.2 per cent shall not be used in a *potable water system*.
- (3) Fluxes for soldered joints shall conform to ASTM B813, “Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube”.
- (4) Brazing alloys shall conform to ANSI/AWS A5.8M/A5.8, “Filler Metals for Brazing and Braze Welding”, BCuP range.

### **7.2.10. Miscellaneous Materials**

#### **7.2.10.1. Floor Flanges**

- (1) Brass floor flanges shall be certified to CSA B158.1, “Cast Brass Solder Joint Drainage, Waste and Vent Fittings”.
- (2) ABS floor flanges shall be certified to CAN/CSA-B181.1, “Acrylonitrile-Butadiene-Styrene (ABS) Drain, Waste, and Vent Pipe and Pipe Fittings”.
- (3) PVC floor flanges shall be certified to CAN/CSA-B181.2, “Polyvinylchloride (PVC) and Chlorinated Polyvinylchloride (CPVC) Drain, Waste, and Vent Pipe and Pipe Fittings”.
- (4) Cast iron, copper and aluminum floor flanges shall be suitable for the purpose.

#### **7.2.10.2. Screws, Bolts, Nuts and Washers**

- (1) Every screw, bolt, nut and washer shall be of materials that are resistant to corrosion, when used,
  - (a) to connect a water closet to a floor flange,
  - (b) to anchor the floor flange to the floor,
  - (c) to anchor the water closet to the floor, or
  - (d) to hold *cleanout* covers or floor drain grates.

#### **7.2.10.3. Cleanout Fittings**

- (1) Every plug, cap, nut or bolt that is intended to be removable from a ferrous fitting shall be of a non-ferrous material.
- (2) A *cleanout* fitting that as a result of normal maintenance operations cannot withstand the physical stresses of removal and reinstallation or cannot ensure a gas-tight seal shall not be installed.
- (3) A screw cap or test cap shall not be used as a *cleanout* plug or cover.

#### **7.2.10.4. Mechanical Couplings**

- (1) Groove and shoulder type mechanical pipe couplings shall conform to CSA B242, "Groove and Shoulder Type Mechanical Pipe Couplings".
- (2) Mechanical Couplings for DWV and Sewer Pipe shall be certified to CSA B602, "Mechanical Couplings for Drain, Waste, and Vent Pipe and Sewer Pipe".

#### **7.2.10.5. Saddle Hubs**

- (1) Except as provided in Sentence (2), a saddle hub or fitting shall not be installed in *drainage systems, venting systems* or *water systems*.
- (2) A saddle hub or saddle clamp may be installed in a *building drain* or *building sewer* of nominal diameter not less than 8 in. and that is in service provided that the connecting *branch* is at least two pipe *sizes* smaller than the run of the *building drain* or *building sewer* to which it is connected.

#### **7.2.10.6. Supply and Waste Fittings**

- (1) Supply fittings shall conform to ASME A112.18.1 / CSA B125.1, "Plumbing Supply Fittings" or CSA B125.3, "Plumbing Fittings".
- (2) Waste fittings shall conform to ASME A112.18.2 / CSA B125.2, "Plumbing Waste Fittings".

#### **7.2.10.7. Linings and Coatings of Domestic Water Tanks**

- (1) Linings and coatings of domestic water tanks that come into contact with *potable* water shall be certified to NSF/ANSI 61, "Drinking Water System Components - Health Effects".

#### **7.2.10.8. Direct Flush Valves**

- (1) Every direct flush valve shall,
  - (a) open fully and close positively under service pressure,
  - (b) complete its cycle of operation automatically,
  - (c) be provided with a means of regulating the volume of water that it discharges, and
  - (d) be provided with a *vacuum breaker* unless the *fixture* is designed so that *back-siphonage* cannot occur.

#### **7.2.10.9. Drinking Fountain Bubblers**

- (1) The orifice of every drinking fountain bubbler shall,
  - (a) be of the shielded type, and
  - (b) direct the water upward to an angle of approximately 45°.
- (2) Every drinking fountain bubbler shall include a means of regulating the flow to the orifice.

#### **7.2.10.10. Back-Siphonage Preventers and Backflow Preventers**

- (1) Except as provided in Sentence (2), *back-siphonage preventers* and *backflow preventers* shall be certified to,
  - (a) CSA B64.0, "Definitions, General Requirements and Test Methods for Vacuum Breakers and Backflow Preventers",
  - (b) CSA B64.1.1, "Atmospheric Vacuum Breakers (AVB)",
  - (c) CSA B64.1.2, "Pressure Vacuum Breakers (PVB)",
  - (d) CSA B64.1.3, "Spill-resistant Pressure Vacuum Breakers (SRPVB)",

- (e) CSA B64.1.4, “Vacuum Breaker, Air Space Type (ASVB)”,
- (f) CSA B64.2, “Hose Connection Vacuum Breakers (HCVB)”,
- (g) CSA B64.2.1, “Hose Connection Vacuum Breakers (HCVB) with Manual Draining Feature”,
- (h) CSA B64.2.1.1, “Hose Connection Dual Check Vacuum Breakers (HCDVB)”,
- (i) CSA B64.2.2, “Hose Connection Vacuum Breakers (HCVB) with Automatic Draining Feature”,
- (j) CSA B64.3, “Dual Check Valve Backflow Preventers with Atmospheric Port (DCAP)”,
- (k) CSA B64.3.1, “Dual Check Valve Backflow Preventers with Atmospheric Port for Carbonators (DCAPC)”,
- (l) CSA B64.4, “Reduced Pressure Principle (RP) Backflow Preventers”,
- (m) CSA B64.5, “Double Check Valve (DCVA) Backflow Preventers”,
- (n) CSA B64.6, “Dual Check Valve (DuC) Backflow Preventers”,
- (o) CSA B64.7, “Laboratory Faucet Vacuum Breakers (LFVB)”,
- (p) CSA B64.8, “Dual Check Valve Backflow Preventers with Intermediate Vent (DuCV)”,
- (q) CSA B64.10, “Selection and Installation of Backflow Preventers”.

(2) *Back-siphonage preventers* (anti-siphon fill valves) for tank type water closets shall be certified to CSA B125.3, “Plumbing Fittings”.

#### **7.2.10.11. Relief Valves**

(1) Temperature relief, pressure relief, combined temperature and pressure relief and vacuum relief valves shall conform to ANSI Z21.22 / CSA 4.4, “Relief Valves for Hot Water Supply Systems”.

#### **7.2.10.12. Reducing Valves**

(1) Direct acting water pressure reducing valves for domestic water supply systems shall conform to CAN/CSA-B356, “Water Pressure Reducing Valves for Domestic Water Supply Systems”.

#### **7.2.10.13. Solar Domestic Hot Water**

(1) Equipment forming part of a packaged system for solar heating of *potable* water, shall conform to CAN/CSA-F379.1, “Packaged Solar Domestic Hot Water Systems (Liquid-to-Liquid Heat Transfer) for All-Season Use”.

#### **7.2.10.14. Vent Pipe Flashing**

(1) Flashing fabricated on site for *vent pipes* shall be fabricated from,

- (a) copper sheet at least 0.33 mm thick,
- (b) aluminum sheet at least 0.48 mm thick,
- (c) alloyed zinc sheet at least 0.35 mm thick,
- (d) lead sheet at least 1.73 mm thick,
- (e) galvanized steel sheet at least 0.33 mm thick, or
- (f) polychloroprene (neoprene) at least 2.89 mm thick.

(2) Prefabricated flashing for *vent pipes* shall be certified to CSA B272, “Prefabricated Self-Sealing Roof Vent Flashings”.

#### **7.2.10.15. Water Hammer Arresters**

(1) Factory built water hammer arresters shall conform to ANSI/ASSE 1010, “Water Hammer Arresters”.

#### **7.2.10.16. Air Admittance Valves**

(1) Air admittance valves shall conform to ASSE 1051, “Individual and Branch Type Air Admittance Valves for Sanitary Drainage Systems”.

#### **7.2.10.17. Drinking Water Treatment Systems**

(1) A drinking water treatment system or device shall be certified to CAN/CSA-B483.1, “Drinking Water Treatment Systems”.

### **7.2.11. Water Service Pipes and Fire Service Mains**

#### **7.2.11.1. Design, Construction, Installation and Testing**

(1) Except as provided in Articles 7.2.11.2. to 7.2.11.4., and 7.3.7.2, the design, construction, installation and testing of *fire service mains* and *water service pipe* combined with *fire service mains* shall be in conformance with NFPA 24, “Installation of Private Fire Service Mains and Their Appurtenances”.

#### 7.2.11.2. Certification or Conformance

(1) *Water service pipes* and *fire service mains* shall be certified or conform to the standards for the materials listed in Table 7.2.11.2.

**Table 7.2.11.2.**  
**Water Service Pipe and Fire Service Main Materials**

Forming Part of Sentence 7.2.11.2.(1)			
Item	Column 1 Material	Column 2 Standard	Column 3 Limitations
1.	Polyethylene pipe and fittings	Certified to Series 160 or a higher series of CSA B137.1, “Polyethylene (PE) Pipe, Tubing and Fittings for Cold Water Pressure Services”	
2.	Crosslinked polyethylene pressure pipe or tube and fittings	Certified to CSA B137.5, “Crosslinked Polyethylene (PEX) Tubing Systems for Pressure Applications”	
3.	PVC pipe and fittings	Certified to CSA B137.3, “Rigid Polyvinylchloride (PVC) Pipe and Fittings for Pressure Applications”, or certified to CSA B137.2, “Polyvinylchloride (PVC) Injection-Moulded Gasketed Fittings for Pressure Applications”	Pipe and fittings must have a rated working pressure of 1 100 kPa or more
4.	CPVC pipe and fittings	Certified to CSA B137.6, “Chlorinated Polyvinylchloride (CPVC) Pipe, Tubing and Fittings for Hot and Cold Water Distribution Systems”	The design temperature and pressure shall conform to the requirements of the CSA B137.6, “Chlorinated Polyvinylchloride (CPVC) Pipe, Tubing and Fittings for Hot and Cold Water Distribution Systems”
5.	Cast iron water pipe	Conform to ANSI/AWWA C151/A21.51, “Ductile-Iron Pipe, Centrifugally Cast”	Pipe shall have a cement-mortar lining conforming to ANSI/AWWA C104/A21.4, “Cement-Mortar Lining for Ductile-Iron Pipe and Fittings”
6.	Iron fittings for cast iron or ductile-iron water pipes	Conform to ANSI/AWWA C110/A21.10, “Ductile-Iron and Gray-Iron Fittings”	Pipe shall have a cement-mortar lining conforming to ANSI/AWWA C104/A21.4, “Cement-Mortar Lining for Ductile-Iron Pipe and Fittings”
7.	Rubber gasket joints for cast iron and ductile-iron water pipes	Conform to ANSI/AWWA C111/A21.11, “Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings”	
8.	Screwed cast iron water fittings	Conform to ASME B16.4, “Gray Iron Threaded Fittings: Classes 125 and 250”	Screwed cast iron water fittings shall be cement-mortar lined or galvanized
9.	Type K soft copper tube	Certified to ASTM B88, “Seamless Copper Water Tube”	
10.	Solder-joint fittings for copper water systems	Conform to ASME B16.18, “Cast Copper Alloy Solder Joint Pressure Fittings”, or conform to ASME B16.22, “Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings”	Solder-joint fittings not made by casting or the wrought process shall conform to the applicable requirements of ASME B16.18, “Cast Copper Alloy Solder-Joint Pressure Fittings”
11.	Flared-joint fittings for copper water systems	Conform to ASME B16.26, “Cast Copper Alloy Fittings for Flared Copper Tubes”	Flared-joint fittings not made by casting shall conform to ASME B16.26, “Cast Copper Alloy Fittings for Flared Copper Tubes”
12.	PE/AL/PE pipe and fittings	Certified to CSA B137.9, “Polyethylene/Aluminum/Polyethylene (PE-AL-PE) Composite Pressure-Pipe Systems”	
13.	PEX/AL/PEX pipe and fittings	Certified to CSA B137.10, “Crosslinked Polyethylene/ Aluminum/Crosslinked Polyethylene (PEX-AL-PEX) Composite Pressure-Pipe Systems”	

#### 7.2.11.3. Tracer Wire

(1) Except as provided in Sentence (2), a 14 gauge TW solid copper light coloured plastic coated tracer wire shall be attached to every non-metallic *water service pipe* or *fire service main*.

(2) Where a *water service pipe* or *fire service main* is detectable without the tracer wire referenced in Sentence (1), the tracer wire may be omitted.

#### 7.2.11.4. Required Check Valve



(1) Where a *water service pipe* is supplied with water by more than one *drinking water system*, a *check valve* shall be installed at each connection with a *drinking water system*.

(2) Where a *fire service main* is supplied with water by more than one source, a *check valve* shall be installed at each connection with a source of water.

### **Section 7.3. Piping**

#### **7.3.1. Application**

##### **7.3.1.1. Application**

(1) This Section applies to the *construction* and use of joints and connections, and the arrangement, protection, support and testing of piping.

#### **7.3.2. Construction and Use of Joints**

##### **7.3.2.1. Caulked Lead Drainage Joints**

(1) Every caulked lead drainage joint shall be firmly packed with oakum and tightly caulked with lead to a depth of at least 25 mm.

(2) No paint, varnish or other coating shall be applied on the lead until after the joint has been tested.

(3) Caulked lead drainage joints shall not be used except for cast iron pipe in a *drainage system* or *venting system*, or between such pipe and,

- (a) other ferrous pipe,
- (b) brass and copper pipe,
- (c) a caulking ferrule, or
- (d) a *trap standard*.

(4) A length of hub and spigot pipe and pipe fittings in a *drainage system* shall be installed with the hub at the upstream end.

##### **7.3.2.2. Wiped Joints**

(1) Wiped joints shall not be used except for sheet lead or lead pipe, or between such pipe and copper pipe or a ferrule.

(2) Every wiped joint in straight pipe shall,

- (a) be made of solder,
- (b) have an exposed surface on each side of the joint at least 19 mm wide, and
- (c) be at least 10 mm thick at the thickest part.

(3) Every wiped flanged joint shall be reinforced with a lead flange that is at least 19 mm wide.

##### **7.3.2.3. Screwed Joints**

(1) In making a screwed joint, the ends of the pipe shall be reamed or filed out to the *size* of the bore and all chips and cuttings shall be removed.

(2) No pipe-joint cement or paint shall be applied to the internal threads.

##### **7.3.2.4. Solder Joints**

(1) Soldered joints shall be made in accordance with ASTM B828, "Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings".

##### **7.3.2.5. Flared Joints**

(1) In making a flared joint, the pipe shall be expanded with a proper flaring tool.

(2) Flared joints shall not be used for hard (drawn) copper tube.

##### **7.3.2.6. Mechanical Joints**

(1) Mechanical joints shall be made with compounded elastomeric couplings or rings held by stainless steel or cast iron clamps or contained within a compression connection or groove and shoulder type mechanical coupling.

##### **7.3.2.7. Cold-Caulked Joints**

(1) Cold-caulked joints shall not be used except for bell and spigot pipe in a *water system*, a *drainage system* or a *venting system*.

(2) The caulking compound used in cold-caulked joints shall be applied according to the manufacturer's directions.

(3) Every cold-caulked joint in a *drainage system* shall be firmly packed with oakum and tightly caulked with cold caulking compound to a depth of at least 25 mm.

#### **7.3.2.8. Stainless Steel Welded Joints**

- (1) Stainless steel welded joints shall conform to ASME B31.9, "Building Services Piping".
- (2) Butt weld pipe fittings shall be at least as thick as the wall of the pipe used.

### **7.3.3. Joints and Connections**

#### **7.3.3.1. Drilled and Tapped Joints**

(1) Except as provided in Sentences (2) to (4), no water *distributing pipe*, drainage pipe or fittings shall be drilled, tapped or swaged.

(2) A water *distributing pipe* may be drilled or tapped to provide for a mechanically extracted T in copper tubing of Type L or K provided that all branch connections shall be notched and dimpled to limit depth of insertion and conform to the inner contour of the main.

(3) A copper water *distributing pipe* of 1 in. *size* or larger may be mechanically swaged to permit the joining of other copper pipe of equal *size*.

(4) A drainage pipe or fitting may be drilled or tapped,

(a) to provide for the connection of a *trap* seal primer line,

(b) to connect a device designed to dispense germicidal or odour control chemicals or *trap* seal water to a floor drain downstream of a *vacuum breaker* or flush valve in a flush tube connected to a *sanitary unit*,

(c) to provide a hole for a *branch* connection to a drainage pipe, where the *branch* connection is made with a saddle hub as permitted by Article 7.2.10.5. and where the hole is drilled to provide a smooth clean hole of the required *size* and orientation, or

(d) to provide for the connection of pipe or fittings to metal or rigid plastic pipe and fittings where the pipe or fittings are thick enough to be threaded or are bossed for tapping.

(5) No pipe adaption shall be made by the use of a bushing that leaves a square edge or shoulder on the inside of the pipe or fitting.

#### **7.3.3.2. Reserved**

#### **7.3.3.3. Prohibition of Welding of Pipes and Fittings**

- (1) Cast iron *soil pipe* and fittings shall not be welded.
- (2) Galvanized steel pipe and fittings shall not be welded.

#### **7.3.3.4. Unions and Slip Joints**

(1) Running thread and packing nut connections and unions with a gasket seal shall not be used downstream of a *trap weir* in a *drainage system* or in a *venting system*.

(2) A slip joint shall not be used,

(a) in a *venting system*, or

(b) in a *drainage system*, except to connect a *fixture trap* to a *fixture drain* in an *accessible* location.

#### **7.3.3.5. Increaser or Reducer**

(1) Every connection between two pipes of different *size* shall be made with an increaser or a reducer fitting installed so that it will permit the system to be completely drained.

#### **7.3.3.6. Connection of Dissimilar Materials**

(1) Adapters, connectors or mechanical joints used to join dissimilar materials shall be designed to accommodate the required transition.

#### **7.3.3.7. Connection of Roof Drain to Leader**

(1) Every *roof drain* shall be securely connected to a *leader* and provision shall be made for expansion.

#### **7.3.3.8. Connection of Floor Outlet Fixtures**

(1) Every pedestal urinal, floor-mounted water closet or *S-trap standard* shall be connected to a *fixture drain* by a floor flange or other means of connection, except that a cast iron *trap standard* may be caulked to a cast iron pipe.

(2) Except as provided in Sentence (3), every floor flange shall be of brass.

- (3) Where cast iron or plastic pipe is used, a floor flange of the same material may be used.
- (4) Every floor flange and *fixture* shall be securely set on a firm base and fastened to the floor or *trap* flange of the *fixture*.
- (4.1) Every joint in a floor flange or between a *fixture* and the *drainage system* shall be sealed with a resilient, watertight and gas-tight seal.
- (5) Where a lead water closet stub is used, the length of the stub below the floor flange shall be at least 75 mm.

#### **7.3.3.9. Expansion and Contraction**

(1) The design and installation of every piping system shall, where necessary, include means to accommodate expansion and contraction of the piping system caused by temperature change or *building* shrinkage.

#### **7.3.3.10. Copper Tube**

- (1) Types M and DWV copper tube shall not be bent.
- (2) Bends in copper tubing of soft or bending temper shall be made with tools manufactured and sized for the purpose.

#### **7.3.3.11. Indirect Connections**

- (1) Where a *fixture* or device is *indirectly connected*, the connections shall be made by terminating the *fixture drain* above the *flood level rim* of a *directly connected fixture* to form an *air break*.
- (2) The size of the *air break* shall be at least 25 mm.

#### **7.3.3.12. Copper Joints Used Underground**

- (1) Except as provided in Sentence (2), joints in copper tubes installed underground shall be,
  - (a) made with either flared or compression fittings, or
  - (b) brazed using a brazing alloy within the American Welding Society's AWS-BCuP range.
- (2) Compression fittings shall not be used underground under a *building*.

### **7.3.4. Support of Piping**

#### **7.3.4.1. Capability of Support**

- (1) Piping shall be provided with support that is capable of keeping the pipe in alignment and bearing the weight of the pipe and its contents.
- (2) Every floor or wall mounted water closet bowl shall be securely attached to the floor or wall by means of a flange and shall be stable.
- (3) Every wall mounted *fixture* shall be supported so that no strain is transmitted to the piping.

#### **7.3.4.2. Independence of Support**

- (1) Piping, *fixtures*, tanks or devices shall be supported independently of each other.

#### **7.3.4.3. Insulation of Support**

- (1) Where a hanger or support for copper tube or brass or copper pipe is of a material other than brass or copper, it shall be suitably separated and electrically insulated from the pipe or tube to prevent galvanic action.
- (2) Where a hanger or support for stainless steel pipe or tube is of a material other than stainless steel, it shall be suitably separated and electrically insulated from the pipe or tube.

#### **7.3.4.4. Support for Vertical Piping**

- (1) Except as provided in Sentence (2), vertical piping shall be supported at its base and at the floor level of alternate *storeys* by rests, each of which can bear the weight of pipe that is between it and the rest above it.
- (2) The maximum spacing of supports shall be 7.5 m.

#### **7.3.4.5. Support for Horizontal Piping**

- (1) *Nominally horizontal* piping that is inside a *building* shall be braced to prevent swaying and buckling and to control the effects of thrust.
- (2) *Nominally horizontal* piping shall be supported so that,
  - (a) galvanized iron or steel pipe is supported at intervals not exceeding,
    - (i) 3.75 m if the pipe *size* is 6 in. or more, and
    - (ii) 2 500 mm if the pipe *size* is less than 6 in.,

- (b) lead pipe is supported throughout its length,
- (c) cast iron pipe is supported,
  - (i) at or adjacent to each hub or joint,
  - (ii) at intervals not exceeding 3 m, and
  - (iii) at intervals not exceeding 1 000 mm if the pipe has mechanical joints and the length of pipe between adjacent fittings is 300 mm or less,
- (d) Reserved
- (e) ABS or PVC plastic DWV pipe is supported,
  - (i) at intervals not exceeding 1 200 mm,
  - (ii) at the ends of *branches*,
  - (iii) at changes of direction or elevation, and
  - (iv) if the pipe is a *fixture drain* that is more than 1 000 mm in length, as close as possible to the *trap*,
- (f) plastic water pipe is supported at intervals not exceeding 1 000 mm,
- (g) copper tube and copper and brass pipe is supported at intervals not exceeding,
  - (i) 3 m if the tube or pipe is hard temper and larger than 1 in. in *size*,
  - (ii) 2 500 mm if the tube or pipe is hard temper and 1 in. in *size* or less, and
  - (iii) 2 500 mm if the tube is soft temper,
- (h) aluminum DWV pipe is supported,
  - (i) at intervals not greater than 3 m,
  - (ii) at both sides of all joints,
  - (iii) at all *branch* ends,
  - (iv) at all points where there is a change in direction, and
  - (v) as close to all *traps* as possible,
- (i) supports and hangers for aluminum DWV pipe shall have a broad support base and shall be free of burrs and rough edges to prevent abrasion of the pipe,
- (j) where joints in the piping are less rigid than the pipe, the support points shall be selected so as to minimize the shear and bending forces imposed on the joints,
- (k) PE/AL/PE or PEX/AL/PEX composite pipe is supported at intervals not exceeding 1 000 mm,
- (l) PP-R plastic pipe is supported,
  - (i) at intervals not exceeding 1 000 mm,
  - (ii) at the end of *branches*, and
  - (iii) at changes of direction and elevation, and
- (m) stainless steel pipe or tube is supported at intervals not exceeding,
  - (i) 3 000 mm if the pipe or tube *size* is 1 in. or more, and
  - (ii) 2 500 mm if the pipe or tube *size* is less than 1 in.
- (3)** Where plastic pipe or a composite pipe incorporating a plastic component is installed,
  - (a) the pipe shall be aligned without added strain on the piping,
  - (b) the pipe shall not be bent or pulled into position after being welded or joined, and
  - (c) hangers shall not compress, cut or abrade the pipe.
- (4)** Reserved
- (5)** Where hangers are used to support *nominally horizontal* piping, the hangers shall be,
  - (a) supported by metal rods of not less than,
    - (i) 6 mm diam for supporting pipe 2 in. or less in size,

- (ii) 8 mm diam for supporting pipe 4 in. or less in size, and
- (iii) 13 mm diam for supporting pipe over 4 in. in size, or
- (b) solid or perforated metal straps not less than,
  - (i) 0.6 mm nominal thickness, 12 mm wide for pipe 2 in. or less in size, and
  - (ii) 0.8 mm nominal thickness, 18 mm wide for pipe 4 in. or less in size.

(6) Where a hanger is attached to concrete or masonry, it shall be fastened by metal or expansion-type plugs that are inserted or built into the concrete or masonry.

#### **7.3.4.6. Support for Underground Horizontal Piping**

(1) Except as provided in Sentence (2), *nominally horizontal* piping that is underground shall be supported on a base that is firm and continuous under the whole of the pipe.

(2) *Nominally horizontal* piping installed underground that is not supported as described in Sentence (1) may be installed using hangers fixed to a foundation or structural slab provided that the hangers are capable of,

- (a) keeping the pipe in alignment, and
- (b) supporting the weight,
  - (i) of the pipe,
  - (ii) its contents, and
  - (iii) the fill over the pipe.

#### **7.3.4.7. Support for Vent Pipe Above a Roof**

(1) Where a *vent pipe* terminates above the surface of a roof, it shall be supported or braced to prevent misalignment.

#### **7.3.4.8. Compression Fittings**

(1) No compression fitting connecting to plain end pipe or tube shall be used in a *plumbing system* unless the pipe or tube and fittings are sufficiently stayed, clamped, anchored or buttressed so as to prevent separation during normal service of the system allowing for surge pressures.

#### **7.3.4.9. Thrust Restraint of Water Service Pipes**

(1) Pipe clamps and tie-rods, thrust blocks, locked mechanical or push-on joints, mechanical joints utilizing set screw retainer glands, or other suitable means of thrust restraint shall be provided at each change of direction of a *water service pipe* 4 in. or more in *size* and at all tees, plugs, caps and bends.

- (2) Backing for underground *water service pipes* shall be placed,
  - (a) between undisturbed earth and the fitting to be restrained and shall be of sufficient bearing area to provide adequate resistance to the thrust to be encountered, and
  - (b) so that the joints will be *accessible* for inspection and repair.
- (3) Concrete thrust blocks shall have a minimum compressive strength of not less than 10 MPa after 28 days.
- (4) Thrust blocks shall not be used to restrain vertical pipe.

### **7.3.5. Protection of Piping**

#### **7.3.5.1. Backfill of Pipe Trench**

(1) Where piping is installed underground, the backfill shall be carefully placed and tamped to a height of 300 mm over the top of the pipe and shall be free of stones, boulders, cinders and frozen earth.

#### **7.3.5.2. Protection of Non-Metallic Pipe**

(1) Where vitrified clay is located less than 600 mm below a basement floor and the floor is constructed of other than 75 mm or more of concrete, the pipe shall be protected by a 75 mm layer of concrete installed above the pipe.

#### **7.3.5.3. Isolation from Loads**

(1) Where piping passes through or under a wall, it shall be installed so that the wall does not bear on the pipe.

#### **7.3.5.4. Protection from Frost**

(1) Where piping may be exposed to freezing conditions, it shall be protected from the effects of freezing.

#### **7.3.5.5. Protection from Mechanical Damage**

(1) *Plumbing*, piping and equipment exposed to mechanical damage shall be protected.

### 7.3.5.6. Protection from Condensation

(1) Piping used for internal *leaders*, which may be subject to condensation, shall be installed in a manner that limits the risk of damage to the *building* due to condensation.

### 7.3.5.7. Spatial Separation

(1) Except as permitted in Sentences (2) and (3), a buried *water service pipe* shall be separated from the *building drain*, *building sewer* and a *private sewage disposal system*, by not less than 2 440 mm measured horizontally, of undisturbed or compacted earth.

(2) The *water service pipe* may be closer than 2 440 mm or be placed in the same trench with the *building drain* or *building sewer* if,

(a) the following conditions are met:

- (i) the bottom of the *water service pipe* at all points is at least 500 mm above the top of the *building drain* or *building sewer*, and
- (ii) when in a common trench with the *building drain* or *building sewer*, the *water service pipe* is placed on a shelf at one side of the common trench,

(b) the *water service pipe* is constructed of a single run of pipe with no joints or fittings between the street line or source of supply on the property and the inside face of the *building*, or

(c) the *building drain* or *building sewer* is constructed of piping which is pressure tested in accordance with Subsection 7.3.7. at 345 kPa.

(3) A buried *water service pipe* may pass under a *building drain* or *building sewer* if,

(a) a vertical separation of not less than 500 mm is provided between the invert of the *building drain* or *building sewer* and the crown of the *water service pipe*,

(b) adequate structural support is provided for the *building drain* or *building sewer* to prevent excessive deflection of joints and settling, and

(c) the length of the *water service pipe* is located so that there are no joints within 2 440 mm measured horizontally from the intersection with the *building drain* or *building sewer*.

(4) A buried *water service pipe* shall be constructed of a single run of pipe with no joints or fittings between the street line or source of supply on the property and the inside face of the *building* if the *water service pipe* is less than 15 m from,

(a) a *private sewage disposal system*, or

(b) a source of pollution other than a *private sewage disposal system*.

### 7.3.6. Testing of Drainage and Venting Systems

#### 7.3.6.1. Tests and Inspection of Drainage or Venting Systems

(1) Except in the case of an external *leader*, after a section of *drainage system* or a *venting system* has been roughed in, and before any *fixture* is installed or piping is covered, a water or an air test shall be conducted.

(2) Where a *chief building official* requires a final test, it shall be carried out after every *fixture* is installed and before any part of the *drainage system* or *venting system* is placed in operation.

(3) Where a prefabricated system is assembled off the *building* site in such a manner that it cannot be inspected and tested on site, off-site inspections and tests shall be conducted.

(4) Where a prefabricated system is installed as part of a *drainage system* and *venting system*, all other *plumbing work* shall be tested and inspected and a final test shall be carried out on the complete system.

(5) A ball test shall be carried out on a *sanitary building drain*, *sanitary building sewer*, *storm building drain* and a *storm building sewer* buried underground.

(6) A *sewer lateral extension* need not be tested and inspected if the *sewer lateral extension* was constructed, tested and inspected at the time of the installation of the public sewer.

#### 7.3.6.2. Tests of Pipes in Drainage Systems

(1) Every pipe in a *drainage system*, except an external *leader* or *fixture outlet pipe*, shall be capable of withstanding without leakage a water test, air test and final test.

#### 7.3.6.3. Tests of Venting Systems

(1) Every *venting system* shall be capable of withstanding without leakage a water test, air test and final test.

#### 7.3.6.4. Water Tests in Drain, Waste and Vent Systems

- (1) Where a water test is made, all joints shall be tested with a water column of not less than 3 m.
- (2) In making a water test,
  - (a) every opening except the highest shall be tightly closed with a testing plug or a test cap, and
  - (b) the system or the section shall be kept filled with water for 15 min.

#### **7.3.6.5. Air Tests**

- (1) Where an air test is made, it shall be conducted in accordance with the manufacturer's instructions for the piping materials, and,
  - (a) air shall be forced into the system until a gauge pressure of 35 kPa is created, and
  - (b) this pressure shall be maintained for at least 15 min without a drop in pressure.

#### **7.3.6.6. Final Tests**

- (1) Where a final test is made,
  - (a) every *trap* shall be filled with water,
  - (b) the bottom of the system being tested shall terminate at the *building trap*, test plug or cap,
  - (c) except as provided in Sentence (2), smoke from smoke-generating machines shall be forced into the system,
  - (d) when the smoke appears from all roof terminals they shall be closed, and
  - (e) a pressure equivalent to a 25 mm water column shall be maintained for 15 min without the addition of more smoke.
- (2) The smoke referred to in Clauses (1)(c) and (d) may be omitted provided the roof terminals are closed and the system is subjected to an air pressure equivalent to a 25 mm water column maintained for 15 min without the addition of more air.

#### **7.3.6.7. Ball Tests**

- (1) Where a ball test is made, a hard ball dense enough not to float shall be rolled through the pipe.
- (2) The diameter of the ball shall be not less than 50 mm where the *size* of the pipe is 4 in. or more.

### **7.3.7. Testing of Potable Water Systems**

#### **7.3.7.1. Application of Tests**

- (1) After a section of a *potable water system* has been completed, and before it is placed in operation, a water test or an air test shall be conducted.
- (2) A test may be applied to each section of the system or to the system as a whole.
- (3) Where a prefabricated system is assembled off the *building* site in such a manner that it cannot be inspected and tested on site, off-site inspections and tests shall be conducted.
- (4) Where a prefabricated system is installed as part of a *water system*,
  - (a) all other *plumbing* work shall be tested and inspected, and
  - (b) the complete system shall be pressure tested.

#### **7.3.7.2. Tests of Potable Water Systems**

- (1) Every *potable water system* shall be capable of,
  - (a) withstanding without leakage a water pressure that is at least 1 000 kPa for at least 1 h, or
  - (b) withstanding for at least 2 h without a drop in pressure an air pressure that is at least 700 kPa.

#### **7.3.7.3. Water Tests**

- (1) Where a water test is made, all air shall be expelled from the system before *fixture* control valves or faucets are closed.
- (2) *Potable* water shall be used to test a *potable water system*.

## **Section 7.4. Drainage Systems**

### **7.4.1. Application**

#### **7.4.1.1. Application of Drainage Systems**

- (1) This Section applies to *sanitary drainage systems* and *storm drainage systems*.

### **7.4.2. Connections to Drainage Systems**

#### 7.4.2.1. Connections to Sanitary Drainage Systems

- (1) Every *fixture* shall be directly connected to a *sanitary drainage system*, except that,
  - (a) drinking fountains may be,
    - (i) *indirectly connected* to a *sanitary drainage system*, or
    - (ii) connected to a *storm drainage system* provided that where the system is subject to *backflow*, a *check valve* is installed in the *fountain waste pipe*,
  - (b) *laundry plumbing appliances* may be *indirectly connected* to a *sanitary drainage system*,
  - (c) *fixtures* or *plumbing appliances*, other than floor drains, except as provided in Sentence 7.1.4.2.(2), that discharge only *clear water waste* may be connected to a *storm drainage system*,
  - (d) the following devices shall be *indirectly connected* to a *drainage system*:
    - (i) a device for the display, storage, preparation or processing of food or drink,
    - (ii) a sterilizer,
    - (iii) a device that uses water as a cooling or heating medium,
    - (iv) a water operated device,
    - (v) a water treatment device,
    - (vi) a drain or overflow from a *water system* or a heating system, or
    - (vii) a drain line from an HVAC system or equipment, and
  - (e) floor drains within walk-in coolers shall be connected to a *sanitary drainage system*,
    - (i) indirectly with an *air break*, or
    - (ii) directly with a *backwater valve* installed on the *drainage system* before connection to the *sanitary building drain*.
- (2) The connection of a *soil* or *waste pipe* to a *nominally horizontal soil* or *waste pipe* or to a *nominally horizontal offset* in a *soil* or *waste stack* shall be respectively at least 1 500 mm measured horizontally from the bottom of a *soil* or *waste stack* or from the bottom of the upper vertical section of the *soil* or *waste stack* that,
  - (a) receives a discharge of 30 or more *fixture units*, or
  - (b) receives a discharge from *fixtures* located on 2 or more *storeys*.
- (3) No other *fixture* shall be connected to a lead bend or stub that serves a water closet.
- (4) Where a change in direction of more than 45° occurs in a *soil* or *waste pipe* that serves more than one clothes washer, and in which pressure zones are created by detergent suds, no other *soil* or *waste pipe* shall be connected to it within a length less than,
  - (a) 40 times the *size* of the *soil* or *waste pipe* or 2.44 m maximum vertical, whichever is less, before the change in direction, and
  - (b) 10 times the *size* of the *nominally horizontal soil* or *waste pipe* after the change in direction.
- (5) Where a *vent pipe* is connected into a suds pressure zone referred to in Sentence (4), no other *vent pipe* shall be connected to that *vent pipe* within the height of the suds pressure zone.

#### 7.4.2.2. Connection of Overflows from Rainwater Tanks

- (1) Where an overflow from a *rainwater* tank is connected to a *storm drainage system*, it shall be connected by,
  - (a) an *air break*, or
  - (b) a *backwater valve* installed on the *storm drainage pipe* before the connection to the *storm building drain*.

#### 7.4.2.3. Direct Connections

- (1) Two or more *fixture outlet pipes* that serve outlets from a single *fixture* that is listed in Clause 7.4.2.1.(1)(d) may be *directly connected* to a *branch* that,
  - (a) has a *size* of at least 1 ¼ in., and
  - (b) is terminated above the *flood level rim* of a *directly connected fixture* with a minimum diameter waste of 1 ½ in. to form an *air break*.
- (2) *Fixture drains* from *fixtures* that are listed in Subclauses 7.4.2.1.(1)(d)(i) and (ii) may be *directly connected* to a pipe that,



- (a) is terminated to form an *air break* above the *flood level rim* of a *fixture* that is *directly connected* to a *sanitary drainage system*, and
- (b) is extended through the roof when *fixtures* that are on 3 or more *storeys* are connected to it.
- (3) *Fixture drains* from *fixtures* that are listed in Subclauses 7.4.2.1.(1)(d)(iii) to (vi) may be *directly connected* to a pipe that,
  - (a) is terminated to form an *air break* above the *flood level rim* of a *fixture* that is *directly connected* to a *storm drainage system*, and
  - (b) is extended through the roof when *fixtures* that are on 3 or more *storeys* are connected to it.
- (4) Every *waste pipe* carrying waste from a device for the display, storage, preparation or processing of food or drink shall be trapped and have a minimum diameter equal to the diameter of the drain outlet from the device.

### **7.4.3. Location of Fixtures**

#### **7.4.3.1. Plumbing Fixtures**

- (1) *Sanitary units*, bathtubs and shower baths shall not be installed adjacent to wall and floor surfaces that are pervious to water.

#### **7.4.3.2. Restricted Locations of Indirect Connections and Traps**

- (1) Indirect connections or any *trap* that may overflow shall not be located in a crawl space or any other unfrequented area.

#### **7.4.3.3. Equipment Restrictions Upstream of Interceptors**

- (1) Except as provided in Sentence (2), equipment discharging waste with organic solids shall not be located upstream of an *interceptor*.
- (2) If a food scrap *interceptor* has been installed upstream of the grease *interceptor*, equipment discharging waste with organic solids may discharge through a grease *interceptor*.

#### **7.4.3.4. Fixtures Located in Chemical Storage Locations**

- (1) A floor drain or other *fixture* located in an oil transformer vault, a high voltage room or any room where flammable, dangerous or toxic chemicals are stored or handled shall not be connected to a *drainage system*.

#### **7.4.3.5. Macerating Toilet System**

- (1) A maceration toilet system shall only be installed,
  - (a) where no connection to a gravity *sanitary drainage system* is available, and
  - (b) in accordance with the manufacturer's instructions.

#### **7.4.3.6. Drains Serving Elevator Pits**

- (1) If a floor drain is provided in an elevator pit, it shall be installed in accordance with Section 2.2. of ASME A17.1 / CSA B44, "Safety Code for Elevators and Escalators".

### **7.4.4. Treatment of Sewage and Wastes**

#### **7.4.4.1. Sewage Treatment**

- (1) Where a *fixture* or equipment discharges *sewage* or waste that may damage or impair the *sanitary drainage system* or the functioning of a *sanitary sewage works* or *sanitary sewage system*, provision shall be made for treatment of the *sewage* or waste before it is discharged to the *sanitary drainage system*.

#### **7.4.4.2. Protection for Drainage System**

- (1) Where a *fixture* discharges *sewage* or *clear water waste* that has been heated, the *drainage system* shall be suitable for the temperature of the *sewage* or *clear water waste* being discharged.

#### **7.4.4.3. Interceptors**

- (1) Except for *suites* of *residential occupancy*, where a *fixture* discharges *sewage* that includes fats, oils or grease and is located in an area where food is cooked, processed or prepared, it shall discharge through a grease *interceptor*.
- (2) Except as provided in Sentence (3), oil *interceptors* shall be provided as follows:
  - (a) service stations, repair shops and garages or any establishment where motor vehicles are repaired, lubricated or maintained shall be provided with an oil *interceptor*, and
  - (b) establishments which use oily or *flammable liquids* or have such wastes as a result of an industrial process shall be provided with an engineered oil *interceptor*.

(3) Oil *interceptors* are not required for a drain in a hydraulic elevator pit, parking lot, car wash or a garage used exclusively as a motor vehicle parking area.

(4) Where a *fixture* discharges sand, grit or similar materials, an *interceptor* designed for the purpose of intercepting such discharges shall be installed.

(5) Every *interceptor* shall have sufficient capacity to perform the service for which it is provided.

(6) An on site constructed *interceptor* shall be constructed to the requirements of a manufactured *interceptor*.

(7) A grease *interceptor* shall be located as close as possible to the *fixture* or *fixtures* it serves.

(8) The flow rate through a grease *interceptor* shall not exceed its rated capacity and the flow rate shall be determined using the following:

$$Q = \left( \sum_i^N \left( 0.75 \frac{V}{DDT} \right) \right) + PD$$

where:

Q is the flow rate to a grease *interceptor* in L/s.

V is the volume of the *fixture* in L.

DDT is the drain down time, 60 or 120 seconds.

PD is any pump discharge in L/s.

N is the number of *fixtures* to go through the *interceptor*.

(9) All grease and oil *interceptors* shall have an internal flow control and, where the head will exceed five feet, a secondary flow control shall be required.

(10) Floor drains that conform to Sentence 7.4.5.1.(3) are not required to be separately trapped and vented, and may be gang trapped when discharging through an oil *interceptor*.

#### 7.4.4.4. Neutralizing and Dilution Tanks

(1) Where a *fixture* or equipment discharges corrosive or acid waste, it shall discharge into a neutralizing or diluting tank that is connected to the *sanitary drainage system* through,

(a) a *trap*, or

(b) *indirect connection*.

(2) Each neutralizing or diluting tank shall have a method for neutralizing the liquid.

#### 7.4.5. Traps

##### 7.4.5.1. Traps for Sanitary Drainage Systems

(1) Except as provided in Sentences (2) and (3) and Article 7.4.5.2., every *fixture* shall be protected by a separate *trap*.

(2) One *trap* may protect,

(a) all the trays or compartments of a two or three compartment sink,

(b) a two or three compartment laundry tray, or

(c) two similar type single compartment *fixtures* located in the same room.

(3) One *trap* may serve a group of floor drains and *hub drains*, a group of shower drains, a group of washing machines or a group of laboratory sinks if the *fixtures*,

(a) are in the same room, and

(b) are not located where they can receive food or other organic matter.

(4) Reserved

(5) A grease *interceptor* shall not serve as a *fixture trap* and each *fixture* discharging through the *interceptor* shall be trapped and vented.

(6) Where a domestic dishwashing machine equipped with a drainage pump discharges through a direct connection into the *fixture outlet pipe* of an adjacent kitchen sink or disposal unit, the pump discharge line shall,

(a) rise as high as possible to just under the counter, and

(b) connect,

- (i) on the inlet side of the sink *trap* by means of a Y fitting, or
- (ii) to the disposal unit.

#### **7.4.5.2. Traps for Storm Drainage Systems**

(1) Where a *storm drainage system* is connected to a public combined sewer, a *trap* shall be installed between any opening in the system and the drain or sewer, except that no *trap* is required if the opening is the upper end of a *leader* that terminates,

- (a) at a roof that is used only for weather protection,
- (b) not less than 1 000 mm above or not less than 3.5 m in any other direction from any air inlet, openable window or door, and
- (c) not less than 1 800 mm from a property line.

#### **7.4.5.3. Connection of Subsoil Drainage Pipe to a Sanitary Drainage System**

(1) Except as permitted in Sentence (2), no foundation drain or *subsoil drainage pipe* shall connect to a *sanitary drainage system*.

(2) Where a *storm drainage system* is not available or *soil* conditions prevent drainage to a culvert or dry well, a foundation drain or *subsoil drainage pipe* may connect to a *sanitary drainage system*.

(3) Where a *subsoil drainage pipe* may be connected to a *sanitary drainage system*, the connection shall be made on the upstream side of a *trap* with a *cleanout* or a trapped sump.

#### **7.4.5.4. Location and Cleanout for Building Traps**

- (1) Where a *building trap* is installed, it shall,
  - (a) be provided with a *cleanout* fitting on the upstream side of and directly over the *trap*,
  - (b) be located upstream of the *building cleanout*, and
  - (c) be located,
    - (i) inside the *building* as close as practical to the place where the *building drain* leaves the *building*, or
    - (ii) outside the *building* in a manhole.

#### **7.4.5.5. Trap Seals**

(1) Provision shall be made for maintaining the *trap* seal of a floor drain or a *hub drain* by the use of a *trap* seal primer, by using the drain as a receptacle for an *indirectly connected* drinking fountain, or by equally effective means.

(2) Where a mechanical device is installed to furnish water to a *trap*, the pipe or tube conveying water from the device to the *trap* shall be at least  $\frac{3}{8}$  in. inside diameter.

### **7.4.6. Arrangement of Drainage Piping**

#### **7.4.6.1. Separate Systems**

- (1) No vertical *soil* or *waste pipe* shall conduct both *sanitary sewage* and *storm sewage*.
- (2) There shall be no unused open ends in a *drainage system* and *dead ends* shall be so graded that water will not collect in them.

#### **7.4.6.2. Location of Soil or Waste Pipes**

- (1) A *soil* or *waste pipe* shall not be located directly above,
  - (a) non-pressure *potable* water storage tanks,
  - (b) manholes in pressure *potable* water storage tanks, or
  - (c) food-handling or processing equipment.

#### **7.4.6.3. Sumps or Tanks**

- (1) Only piping that is too low to drain into a *building sewer* by gravity shall be drained to a sump or receiving tank.
- (2) Where the sump or tank receives *sanitary sewage* it shall be water and air-tight and shall be vented.
- (3) Equipment such as a pump or ejector that can lift the contents of the sump or tank and discharge it into the *sanitary building drain* or *sanitary building sewer* shall be installed.
- (4) Where the equipment does not operate automatically, the *capacity* of the sump shall be sufficient to hold at least a 24 hours accumulation of liquid.

(5) Where there is a *building trap*, the discharge pipe from the equipment shall be connected to the *sanitary building drain* downstream of the *trap*.

(6) The discharge pipe from every pumped *sanitary sewage* sump shall be equipped with a union, a *check valve* and a shut-off valve installed in that sequence in the direction of discharge.

(7) The discharge piping from a pump or ejector shall be sized for optimum flow velocities at pump design conditions.

(8) The discharge pipe from every pumped *storm sewage* sump shall be equipped with,

(a) a union and a *check valve* installed in that sequence in the direction of discharge and pumped to above grade level, or

(b) a union, a *check valve* and a shut-off valve installed in that sequence in the direction of discharge.

#### **7.4.6.4. Protection from Backflow**

(1) Except as permitted in Sentence (2), a *backwater valve* that would prevent free circulation of air shall not be installed in a *building drain* or in a *building sewer*.

(2) A *backwater valve* may be installed in a *building drain* provided that,

(a) it is a “normally open” design conforming to,

(i) CAN/CSA-B70, “Cast Iron Soil Pipe, Fittings, and Means of Joining”,

(ii) CAN/CSA-B181.1, “Acrylonitrile-Butadiene-Styrene (ABS) Drain, Waste, and Vent Pipe and Pipe Fittings”,

(iii) CAN/CSA-B181.2, “Polyvinylchloride (PVC) and Chlorinated Polyvinylchloride (CPVC) Drain, Waste, and Vent Pipe and Pipe Fittings”, or

(iv) CAN/CSA-B182.1, “Plastic Drain and Sewer Pipe and Pipe Fittings”, and

(b) it does not serve more than one *dwelling unit*.

(3) Except as provided in Sentences (4) and (5), where a *building drain* or a *branch* may be subject to *backflow*,

(a) a *backwater valve* shall be installed on every *fixture drain* connected to it when the *fixture* is located below the level of the adjoining street, or

(b) a *backwater valve* shall be installed to protect *fixtures* which are below the upstream sanitary manhole cover when a *residential building* is served by a public *sanitary sewer*.

(4) Where more than one *fixture* is located on a *storey* and all are connected to the same *branch*, the *backwater valve* may be installed on the *branch*.

(5) A *subsoil drainage pipe* that drains into a *sanitary drainage system* that is subject to surcharge shall be connected in such a manner that *sewage* cannot back up into the *subsoil drainage pipe*.

#### **7.4.6.5. Mobile Home Sewer Service**

(1) A *building sewer* intended to serve a mobile home shall,

(a) be not less than 4 in. in *size*,

(b) be terminated above ground,

(c) be provided with,

(i) a tamperproof terminal connection that is capable of being repeatedly connected, disconnected and sealed,

(ii) a protective concrete pad, and

(iii) a means to protect it from frost heave, and

(d) be designed and constructed in accordance with good engineering practice.

#### **7.4.6.6. Building Drain Ends**

(1) Where a *building drain* enters a *building* above the elevation of the bottom of the wall of a *building*, the *building drain* may be deemed to terminate at the first point that the drainage pipe changes direction from the horizontal to the vertical.

#### **7.4.7. Cleanouts**

##### **7.4.7.1. Cleanouts for Drainage Systems**

(1) Every *sanitary drainage system* and *storm drainage system* shall be provided with *cleanouts* that will permit cleaning of the entire system.

(2) A *cleanout* fitting shall be provided on the upstream side and directly over every running *trap*.

(3) Every interior *leader* shall be provided with a *cleanout* fitting at the bottom of the *leader* or not more than 1 000 mm upstream from the bottom of the *leader*.

(4) Where a *cleanout* is required on a *building sewer* 8 in. or larger in *size*, it shall be a manhole.

(5) Where there is a change of direction greater than 45° in a *sanitary building drain* or a *sanitary building sewer*, a *cleanout* shall be installed at each change in direction.

(6) Every *sanitary building drain* or *storm building drain* shall be provided with a *cleanout* fitting that is located as close as practical to the place where the drain leaves the *building*.

(7) Every *soil* or *waste stack* shall be provided with a *cleanout* fitting,

(a) at the bottom of the stack,

(b) not more than 1 000 mm upstream of the bottom of the stack, or

(c) on a Y fitting connecting the stack to the *building drain* or *branch*.

(8) A *cleanout* shall be provided to permit the cleaning of the piping immediately downstream of an *interceptor*.

(9) Every indirect drainage pipe carrying waste from a food receptacle shall have a *cleanout* access at every change of direction of more than 45°.

(10) A *cleanout* shall be installed on a *trap arm* serving a kitchen sink as close as practical to the *trap* outlet and shall be readily *accessible*.

#### **7.4.7.2. Size and Spacing of Cleanouts**

(1) Except as provided in Sentences (2) and (3), on drainage piping of 4 in. *size* and smaller, the minimum *size cleanout* opening shall be the same *size* as the drainage pipe and on drainage piping larger than the 4 in. *size*, the *cleanout* opening shall be 4 in. or larger and the maximum spacing between *cleanouts* on horizontal pipe shall be,

(a) in the case of a sink *waste pipe*, 6 m,

(b) in the case of a horizontal *sanitary drainage pipe*, or *storm drainage pipe*, other than a *waste pipe* from a sink, 15 m, and

(c) in the case of a horizontal *sanitary drainage pipe* or *storm drainage pipe* larger than 4 in. *size*, 30 m.

(2) The spacing between manholes serving a *building sewer*,

(a) 24 in. or less in *size* shall not exceed 90 m, and

(b) over 24 in. in *size* shall not exceed 150 m.

(3) The *developed length* of a *building sewer* between the *building* and the first manhole to which the *building sewer* connects shall not exceed 30 m.

(4) *Cleanouts* that allow rodding in one direction only shall be installed to permit rodding in the direction of flow.

(5) Manholes shall be located at all junctions and all changes in grade, *size* or alignment (except for curvilinear alignment) on a *sanitary building sewer* that is 8 in. or larger in *size*.

(6) Manholes shall be located at changes of grade, *size* or alignment (except for curvilinear alignment) on a *storm building sewer* or exterior *storm drainage pipe* that is 8 in. or larger in *size*.

#### **7.4.7.3. Manholes**

(1) A manhole including the cover shall be designed to support all loads imposed upon it.

(2) A manhole shall be provided with,

(a) a cover which shall provide an airtight seal if located within a *building*,

(b) a rigid ladder of a corrosion-resistant material where the depth exceeds 1 000 mm, and

(c) a vent to the exterior if the manhole is located within a *building*.

(3) A manhole shall have a minimum horizontal dimension of 1 200 mm, except that the top 1 500 mm may be tapered from 1 200 mm down to a minimum of 600 mm at the top.

(4) A manhole in a *sanitary drainage system* shall be channelled to direct the flow of effluent.

#### **7.4.7.4. Location of Cleanouts**

(1) *Cleanouts* and access covers shall be located so that the openings are readily *accessible* for drain cleaning purposes.

(2) A *cleanout* shall not be located in a floor assembly in a manner that may constitute a hazard and shall not be used as a floor drain.

(3) Reserved

(4) Each change of direction of the piping between a *cleanout* fitting and the drainage piping or *vent piping* that it serves shall be accomplished by using 45° bends.

(5) A *cleanout* shall be provided to serve vertical drainage piping from a wall hung urinal and shall extend above the *flood level rim* of the *fixture*.

(6) A *cleanout* serving a *fixture* in health care facilities, mortuaries, laboratories and similar *occupancies*, where contamination by body fluids is likely, shall be located a minimum of 150 mm above the *flood level rim* of the *fixture*.

#### 7.4.8. Minimum Slope and Length of Drainage Pipes

##### 7.4.8.1. Minimum Slope

(1) Except as provided in Sentences (2) and (3), every drainage pipe that has a *size* of 3 in. or less shall have a downward slope in the direction of flow of at least 1 in 50.

(2) Sentence (1) does not apply to a *force main*.

(3) Where it is not possible to comply with Sentence (1), a lesser slope may be used if it will produce a gravity flow of not less than 0.6 m per second.

##### 7.4.8.2. Length of Fixture Outlet Pipes

(1) Except for *fixture outlet pipes* installed in conformance with Sentence 7.4.5.1.(3), the *developed length* of every *fixture outlet pipe* shall not exceed 1 200 mm.

#### 7.4.9. Size of Drainage Pipes

##### 7.4.9.1. No Reduction in Size

(1) Except as permitted in Sentence (3), no drainage pipe that is of minimum *size* required by this Part for the purpose for which it is installed shall be so connected as to drain to other drainage pipe of lesser *size*.

(2) Where a *building drain* connects to a stack through a wall or floor, the drain shall retain its full *size* through the wall or floor.

(3) A *sanitary drainage pipe* may be connected to a pre-engineered waste water heat recovery system that incorporates piping of a lesser *size* than required by Sentence (1) provided that it does not convey *sewage*,

(a) from a *sanitary unit*, or

(b) that contains solids.

##### 7.4.9.2. Serving Water Closets

(1) The *size* of every drainage pipe that serves a water closet shall be at least 3 in.

(2) The *size* of every horizontal drainage pipe downstream of the third water closet *fixture drain* connection shall be at least 4 in.

(3) The *size* of every *soil stack* that serves more than six water closets shall be at least 4 in.

(4) The *size* of the discharge pipe serving a macerating toilet system shall be at least ¾ in.

(5) No *vertical leg* of the drainage pipe from a water closet or other *fixture* that has an integral siphonic flushing action shall exceed 1 000 mm.

##### 7.4.9.3. Size of Fixture Outlet Pipes

(1) Except as provided in Sentence (2), the *size* of every *fixture outlet pipe* shall conform to Table 7.4.9.3.

**Table 7.4.9.3.**  
**Minimum Permitted Size of Fixture Outlet Pipe and Hydraulic Loads for Fixtures**

Forming Part of Sentences 7.4.9.3.(1) and 7.4.10.2.(1)

Item	Column 1 <i>Fixture</i>	Column 2 Minimum <i>Size</i> of <i>Fixture</i> <i>Outlet Pipe</i> , in.	Column 3 Hydraulic Load, <i>fixture units</i>
1.	Autopsy table	1 ½	2
2.	Bathroom group		
	(a) with flush tank		6
	(b) with direct flush valve		8
3.	Bathtub (with or without shower)	1 ½	1 ½
4.	Bath: foot, sitz or slab	1 ½	1 ½

5.	Bed pan washer	3	6
6.	Beer cabinet	1 ½	1 ½
7.	Bidet	1 ¼	1
8.	Chinese range	1 ½	3
9.	Clothes washer		
	(a) domestic	N/A	1 ½ with 2 in. <i>trap</i>
	(b) commercial	N/A	2 with 2 in. <i>trap</i>
10.	Cup Sinks	1 ¼	½
11.	Dental unit or cuspidor	1 ¼	1
12.	Dishwasher		
	(a) domestic	1 ½	1 (no load if connected to garbage grinder or domestic sink)
	(b) commercial type	2	3
13.	Drinking fountain	1 ¼	½
14.	Fish tank or tray	1 ½	1 ½
15.	Floor drain	2	2 with 2 in. <i>trap</i> 3 with 3 in. <i>trap</i>
16.	Garbage grinder, commercial type	2	3
17.	Icebox	1 ¼	1
18.	Laundry tray		
	(a) single or double units or 2 single units with common <i>trap</i>	1 ½	1 ½
	(b) 3 compartments	1 ½	2
19.	Lavatory		
	(a) barber or beauty parlor	1 ½	1 ½
	(b) dental	1 ¼	1
	(c) domestic type single, or 2 single with common <i>trap</i>	1 ¼	1 with 1 ¼ in. <i>trap</i> 1 ½ with 1 ½ in. <i>trap</i>
	(d) multiple or industrial type	1 ½	3
20.	Macerating Toilet System	¾	4
21.	Potato Peeler	2	3
22.	Shower drain		
	(a) from 1 head	1 ½	1 ½
	(b) from 2 or 3 heads	2	3
	(c) from 4 to 6 heads	3	6
23.	Sink		
	(a) domestic and other small type with or without garbage grinders, single, double or 2 single with a common trap	1 ½	1 ½
	(b) other sinks	1 ½	1 ½ with 1 ½ in. <i>trap</i> 2 with 2 in. <i>trap</i> 3 with 3 in. <i>trap</i>
24.	Urinal		
	(a) pedestal, siphon jet or blowout type	2	4
	(b) stall, washout type	2	2
	(c) wall		
	(i) washout type	1 ½	1 ½
	(ii) other types	2	3
25.	Water closet		
	(a) with flush tank	3	4
	(b) with direct flush	3	6

(2) The part of the *fixture outlet pipe* that is common to three compartments of a sink shall be one *size* larger than the largest *fixture outlet pipe* of the compartments that it serves.

(3) Where clothes washers do not drain to a laundry tray, the *trap* inlet shall be fitted with a vertical standpipe that is not less than 600 mm long measured from the *trap weir* and the top of the standpipe shall terminate above the *flood level rim* of the clothes washer it serves.

#### 7.4.9.4. Minimum Size of Building Drains and Sewers

(1) Every *sanitary building drain* and every *sanitary building sewer* shall be at least 4 in. in *size*.

(2) Every *storm building drain* and every *storm building sewer* shall be at least 4 in. in *size*.

#### 7.4.10. Hydraulic Loads

#### 7.4.10.1. Total Load on a Pipe

- (1) The hydraulic load on a pipe is the total load from,
  - (a) every *fixture* that is connected to the system upstream of the pipe,
  - (b) every *fixture* for which provision is made for future connection upstream of the pipe, and
  - (c) all roofs and paved surfaces that drain into the system upstream of the pipe.

#### 7.4.10.2. Hydraulic Loads for Fixtures

- (1) The hydraulic load from a *fixture* that is listed in Table 7.4.9.3. is the number of *fixture units* set forth in the Table.
- (2) Except as provided in Sentence (1), the hydraulic load from a *fixture* that is not listed in Table 7.4.9.3. is the number of *fixture units* set forth in Table 7.4.10.2. for the *trap* of the *size* that serves the *fixture*.

**Table 7.4.10.2.**  
**Permitted Hydraulic Load from a Fixture Based on Size of Trap**

Forming Part of Sentence 7.4.10.2.(2)

Item	Column 1 <i>Size of Trap, in.</i>	Column 2 Hydraulic Load, <i>fixture units</i>
1.	1 ¼	1
2.	1 ½	2
3.	2	3
4.	2 ½	4
5.	3	5
6.	4	6

#### 7.4.10.3. Hydraulic Loads from Fixtures with Continuous or Semi-continuous Flow

- (1) Except as provided in Sentence (2), the hydraulic load from a *fixture* that produces a continuous flow, such as a pump or an air-conditioning *fixture*, is 31.7 *fixture units* for each litre per second of flow.
- (2) Where a *fixture* or equipment that produces a continuous or semi-continuous flow drains to a *storm drainage system*, the hydraulic load from the *fixture* is 900 litres for each litre per second of flow.
- (3) The hydraulic load from a *fixture* or equipment that produces a semi-continuous flow shall conform to Table 7.4.10.3.

**Table 7.4.10.3.**  
**Maximum Permitted Hydraulic Load from Fixtures with Semi-continuous Flows**

Forming Part of Sentence 7.4.10.3.(3)

Item	Column 1	Column 2	Column 3
	Maximum Permitted Flows by <i>Trap Size</i>		
	<i>Trap Size, in.</i>	Flow, L/s	Hydraulic Load, <i>fixture units</i>
1.	1 ½	0.00 - 0.090	3
2.	2	0.091 - 0.190	6
3.	3	0.191 - 0.850	27
4.	4	0.851 - 5.700	180

#### 7.4.10.4. Hydraulic Loads from Roofs or Paved Surfaces

- (1) Except as provided in Sentence (2), the hydraulic load in litres from a roof or paved surface is the maximum 15 min rainfall determined in conformance with MMAH Supplementary Standard SB-1, “Climatic and Seismic Data”, multiplied by the sum of,
  - (a) the area in square metres of the horizontal projection of the surface drained, and
  - (b) one-half the area in square metres of the largest adjoining vertical surface.
- (2) *Flow control roof drains* may be installed provided,
  - (a) the maximum drain down time does not exceed 24 h,
  - (b) the roof structure is designed to carry the load of the stored water,
  - (c) one or more scuppers are installed not more than 30 m apart along the perimeter of the *building* so that,
    - (i) the scuppers are designed to handle at least 200% of the 15-minute rainfall intensity, and
    - (ii) the maximum depth of controlled water is limited to 150 mm,



- (d) they are located not more than 15 m from the edge of the roof and not more than 30 m from adjacent drains, and
- (e) there is at least one drain for each 900 m<sup>2</sup>.
- (3) Where the height of the parapet is more than 150 mm or exceeds the height of the adjacent wall flashing,
  - (a) emergency roof overflows or scuppers described in Clause (2) (c) shall be provided, and
  - (b) there shall be a minimum of two roof drains.

#### 7.4.10.5. Conversion of Fixture Units to Litres and Gal/min

(1) Except as provided in Sentence 7.4.10.3.(2), where the hydraulic load is to be expressed in litres, *fixture units* shall be converted as follows:

- (a) when the number of *fixture units* is 260 or fewer, the load is 2 360 L, and
- (b) when the number of *fixture units* exceeds 260, the load is 9.1 L for each *fixture unit*.

(2) Where the hydraulic load is to be expressed in gal/min, *fixture units* shall be converted in accordance with Table 7.4.10.5.

**Table 7.4.10.5.**  
**Maximum Probable Drainage Rate, gal/min**

Forming Part of Sentence 7.4.10.5.(2)

Item	Column 1	Column 2	Column 3	Column 4
	<i>Fixture Units</i> in Service	<i>Fixture Units</i>	<i>Fixture Units</i>	<i>Fixture Units</i>
		Col. 1	Col. 1 × 10	Col. 1 × 100
1.	100	53	174	900
2.	90	51	164	835
3.	80	49	153	750
4.	70	47	140	680
5.	60	44	128	600
6.	50	41	115	520
7.	40	38	102	435
8.	30	33	88	350
9.	20	27	72	262
10.	10	21	53	174

#### 7.4.10.6. Hydraulic Loads to Soil or Waste Pipes

(1) Except as provided in Sentence (2), the hydraulic load that is drained to every *soil* or *waste stack* shall conform to Table 7.4.10.6.

**Table 7.4.10.6.**  
**Maximum Permitted Hydraulic Load Drained to Soil or Waste Stack**

Forming Part of Sentence 7.4.10.6.(1)

Item	Column 1 Pipe Size, in.	Column 2 Maximum Hydraulic Load, <i>fixture units</i>	Column 3 Maximum <i>Fixture Units</i> Drained from any one Storey
1.	1 ¼	2	2
2.	1 ½	8	5
3.	2	24	10
4.	3	102	18
5.	4	540	100
6.	5	1 400	250
7.	6	2 900	500
8.	8	7 600	830
9.	10	15 000	2 700
10.	12	26 000	4 680
11.	15	50 000	9 000

(2) Where the *nominally horizontal offset* in a *soil* or *waste stack* is 1 500 mm or more, the hydraulic load that is served by it shall conform to Table 7.4.10.8.

(3) Vertical *sanitary drainage pipe* shall be designed to carry no more than 29% of its full capacity.

#### 7.4.10.7. Hydraulic Loads on Branches

(1) No horizontal *sanitary drainage pipe* of less than 3 in. *size* shall have a *fixture* loading in excess of that permitted by Table 7.4.10.7.

**Table 7.4.10.7.**  
**Maximum Permitted Hydraulic Load Drained to a Branch**

Forming Part of Sentence 7.4.10.7.(1)

Item	Column 1 <i>Size of Branch, in.</i>	Column 2 <i>Maximum Load, fixture units</i>
1.	1 ¼	2
2.	1 ½	4
3.	2	6

#### 7.4.10.8. Hydraulic Loads on Sanitary Horizontal Drain

(1) Except as permitted by Article 7.4.10.7., the hydraulic load that is drained to a horizontal *sanitary drainage pipe* shall conform to Table 7.4.10.8., based on the *size* and slope.

(2) Horizontal *sanitary drainage pipe* shall be designed to carry no more than 65% of its full capacity.

**Table 7.4.10.8.**  
**Maximum Permitted Hydraulic Load Drained to a Horizontal Sanitary Drainage Pipe**

Forming Part of Sentences 7.4.10.6.(2) and 7.4.10.8.(1)

Item	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
	Drain <i>Size</i> , Nominal in.	Maximum Hydraulic Load, <i>fixture units</i>					
		Slope <sup>(1)</sup>					
		1 in 400	1 in 200	1 in 133	1 in 100	1 in 50	1 in 25
1.	3	---	---	---	---	27	36
2.	4	---	---	---	180	240	300
3.	5	---	---	380	390	480	670
4.	6	---	---	600	700	840	1300
5.	8	---	1400	1500	1600	2250	3370
6.	10	---	2500	2700	3000	4500	6500
7.	12	2240	3900	4500	5400	8300	13000
8.	15	4800	7000	9300	10400	16300	22500

**Notes to Table 7.4.10.8.:**

<sup>(1)</sup> Slope is the ratio of rise to run, in whatever measurement units are chosen.

#### 7.4.10.9. Hydraulic Loads on Horizontal Storm Drains

(1) The hydraulic load that is drained to a horizontal *storm drainage pipe* shall conform to Table 7.4.10.9., based on the *size* and slope.

**Table 7.4.10.9.**  
**Maximum Permitted Hydraulic Load Drained to a Horizontal Storm Drainage Pipe**

Forming Part of Sentences 7.4.10.9.(1) and 7.4.10.10.(2)

Item	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8
	Size of Drain or Sewer, in.	Maximum Hydraulic Load, L						
		Slope <sup>(1)</sup>						
		1 in 400	1 in 200	1 in 133	1 in 100	1 in 68	1 in 50	1 in 25
1.	3	-----	-----	-----	-----	-----	2 770	3 910
2.	4	-----	-----	-----	4 220	5 160	5 970	8 430
3.	5	-----	-----	6 760	7 650	9 350	10 800	15 300
4.	6	-----	-----	10 700	12 400	15 200	17 600	24 900
5.	8	-----	18 900	23 200	26 700	32 800	37 800	53 600
6.	10	-----	34 300	41 900	48 500	59 400	68 600	97 000
7.	12	37 400	55 900	68 300	78 700	96 500	112 000	158 000
8.	15	71 400	101 000	124 000	143 000	175 000	202 000	287 000

**Notes to Table 7.4.10.9.:**

<sup>(1)</sup> Slope is the ratio of rise to run, in whatever measurement units are chosen.

#### 7.4.10.10. Rain Leaders

(1) No change in the *size* of a rain *leader* with a *nominally horizontal offset* is required if the *offset*,

- (a) is located immediately under the roof,
- (b) is not more than 6 m long, and
- (c) has a slope not less than 1 in 50.
- (2) If the horizontal *offset* is more than 6 m long, the rain *leader* shall conform to Table 7.4.10.9.
- (3) The hydraulic load that is drained to a rain *leader* shall conform to Table 7.4.10.10.

**Table 7.4.10.10.**  
**Maximum Permitted Hydraulic Load Drained to a Circular Rain Leader**

Forming Part of Sentence 7.4.10.10.(3)

Item	Column 1 <i>Size, in.</i>	Column 2 Maximum Hydraulic Load, L
1.	2	1 700
2.	2 ½	3 070
3.	3	5 000
4.	4	10 800
5.	5	19 500
6.	6	31 800
7.	8	68 300

## Section 7.5. Venting Systems

### 7.5.1. Vent Pipes for Traps

#### 7.5.1.1. Venting for Traps

- (1) Except as provided in Sentences (3) and (4), every *trap* shall be protected by a *vent pipe*.
- (2) *Drainage systems* shall be protected by the installation of a system as provided in Subsections 7.5.4. and 7.5.5. by the installation of,
  - (a) *additional circuit vents*,
  - (b) *branch vents*,
  - (c) *circuit vents*,
  - (d) *continuous vents*,
  - (e) *dual vents*,
  - (f) *fresh air inlets*,
  - (g) *headers*,
  - (h) *individual vents*,
  - (i) *offset relief vents*,
  - (j) *relief vents*,
  - (k) *stack vents*,
  - (l) *vent stacks*,
  - (m) *wet vents*, or
  - (n) *yoke vents*.
- (3) A *trap* that serves a floor drain or *hub drain* need not be protected by a *vent pipe* separately where,
  - (a) the *size* of the *trap* is not less than 3 in.,
  - (b) the length of the *fixture drain* is not less than 450 mm,
  - (c) the fall on the *fixture drain* does not exceed its *size*, and
  - (d) the *trap* is connected to a horizontal drainage pipe that terminates at its upstream end in a 3 in. *stack*.
- (4) A *trap* need not be protected by a *vent pipe*,
  - (a) where it serves,
    - (i) a *subsoil drainage pipe*, or

(ii) a *storm drainage system*, or

(b) where it forms part of an indirect *drainage system*.

## **7.5.2. Wet Venting**

### **7.5.2.1. Wet Venting**

(1) A *soil* or *waste pipe* may serve as a *wet vent* provided that,

(a) the hydraulic load is in accordance with Table 7.5.8.1.,

(b) the number of wet vented water closets does not exceed two,

(c) when two water closets are installed, they are connected at the same level to a vertical part of the stack by means of a double fitting in accordance with Table 7.2.4.5.,

(d) the water closets are installed downstream of all other *fixtures*,

(e) *trap arms* and *fixture drains* connected to the *wet vent* do not exceed 2 in. in *size*, except for connections from floor drains in accordance with Clauses 7.5.1.1.(3)(a) to (c),

(f) the total hydraulic load on the *wet vent* does not exceed the limits stated in Table 7.5.8.1. when separately vented *branches* or *fixture drains* in the same *storey*, having a total hydraulic load not greater than two *fixture units*, are connected to a *wet vent* or a wet vented water closet *trap arm*,

(g) the hydraulic load of separately vented *fixtures* that drain into the *wet vent* is not included when sizing the *continuous vent* that serves the *wet vent*,

(h) where a *wet vent* extends through more than 1 *storey*, the total discharge from any 1 *storey* above the *first storey* does not exceed four *fixture units*,

(i) where a *wet vent* extends through more than 1 *storey*, there is not more than one *nominally horizontal offset* in the *wet vent*, and,

(i) the *offset* does not exceed 1 200 mm for pipes 2 in. or less in *size*, or

(ii) the *offset* does not exceed 2 500 mm for pipes larger than 2 in. in *size*,

(j) the wet vented portion is not reduced in *size* except for the portion that is upstream of floor drains in accordance with Clauses 7.5.1.1.(3)(a) to (c),

(k) the highest *fixture* is connected to a vertical portion of the *wet vent*, upstream of any other *fixtures*, in the form of a *continuous vent*, and

(l) the length of the *wet vent* is not limited.

## **7.5.3. Circuit Venting**

### **7.5.3.1. Circuit Venting**

(1) A section of a *horizontal branch* may be *circuit vented* provided,

(a) a *circuit vent* is connected to it,

(b) all *fixtures* served by the *circuit vent* are located in the same *storey* and located at the most distant upstream section of the *horizontal branch*, and

(c) no *soil* or *waste stack* is connected to it upstream of a circuit vented *fixture*.

(2) *Fixtures* with *fixture outlet pipes* less than 2 in. in *size* shall be separately vented or separately circuit vented.

(3) Except as provided in Sentences (4) and (5), a *relief vent* shall be connected to the *branch* that forms part of a circuit vented system, downstream of the connection of the most downstream circuit vented *fixture*.

(4) A *soil* or *waste pipe* having a hydraulic load not greater than six *fixture units* may act as a *relief vent* for a *branch* that is being circuit vented.

(5) A symmetrically connected *relief vent* may serve as a combined *relief vent* for a maximum of two *branches* that are circuit vented, provided there are not more than eight circuit vented *fixtures* connected between the combined *relief vent* and each *circuit vent*.

(6) *Additional circuit vents* shall be required,

(a) when each cumulative horizontal change in direction of a *branch* served by a *circuit vent* exceeds 45° between *vent pipe* connections, or

(b) where more than eight circuit vented *fixtures* are connected to a *branch* between *vent pipe* connections.

(7) A *soil or waste pipe* may serve as an *additional circuit vent* in accordance with Sentence (6) provided that the *soil or waste pipe* is sized as a *wet vent* in conformance with Article 7.5.8.1. and is not less than 2 in. in *size*.

(8) Connections to *circuit vents* and *additional circuit vents* in accordance with Sentence (6) shall conform to Sentence 7.5.4.5.(1).

(9) A circuit vented *branch*, including the *fixture drain* downstream of the *circuit vent* connection, shall be sized in accordance with Articles 7.4.10.7. and 7.4.10.8., except that it shall be not less than,

- (a) 2 in., where *traps* less than 2 in. in *size* are circuit vented, or
- (b) 3 in., where *traps* 2 in. in *size* or larger are circuit vented.

(10) *Additional circuit vents* shall be sized in accordance with Table 7.5.7.1. and Sentence 7.5.7.3.(1).

(11) The hydraulic load on a *circuit vent* shall include the hydraulic load from *fixtures* connected to the *branch* served by the *circuit vent*, but shall not include the hydraulic load from *fixtures* permitted by Sentences (3), (4) and (5).

#### **7.5.4. Vent Pipes for Soil or Waste Stacks**

##### **7.5.4.1. Stack Vents**

(1) The upper end of every *soil or waste stack* shall terminate in a *stack vent* and the *stack vent* shall terminate in *open air* outside the *building*, or connect directly or through a *header* to another *stack vent* or *vent stack* that does terminate in *open air* outside the *building*.

##### **7.5.4.2. Vent Stacks**

(1) Except as provided in Sentence (2), every *soil or waste stack* draining *fixtures* from more than 4 *storeys* shall have a *vent stack*.

(2) A *soil or waste stack* that serves as a *wet vent* does not require a *vent stack*.

(3) The *vent stack* required by Sentence (1) shall be connected to a vertical section of the *soil or waste stack* at or immediately below the lowest *soil or waste pipe* connected to the *soil or waste stack*.

(4) *Fixtures* may be connected to a *vent stack* provided,

- (a) the total hydraulic load of the connected *fixtures* does not exceed eight *fixture units*,
- (b) at least one *fixture* is connected to a vertical portion of the *vent stack* and upstream of any other *fixtures*,
- (c) no other *fixture* is connected downstream of a water closet,
- (d) all *fixtures* are located in the lowest *storey* served by the *vent stack*, and
- (e) the section of the *vent pipe* that acts as a *wet vent* conforms to the requirements regarding *wet vents*.

##### **7.5.4.3. Yoke Vents**

(1) Except as provided in Sentence (4), where a *soil or waste stack* receives the discharge from *fixtures* located on more than 11 *storeys*, a *yoke vent* shall be,

- (a) installed for each section of 5 *storeys* or part of them counted from the top down,
- (b) installed at or immediately above each *offset* or double *offset*, and
- (c) sized in accordance with Sentence 7.5.7.5.(1).

(2) The *yoke vent* shall be connected to the *soil or waste stack* by means of a drainage fitting at or immediately below the lowest *soil or waste pipe* from the lowest *storey* of the sections described in Sentence (1).

(3) The *yoke vent* shall connect to the *vent stack* at least 1 000 mm above the floor level of the lowest *storey* in the section described in Sentence (1).

(4) A *yoke vent* need not be installed provided the *soil or waste stack* is interconnected with the *vent stack* in each *storey* of the section in which *fixtures* are located by means of a *vent pipe* equal in *size* to the *branch* or *fixture drain* or 2 in. in *size*, whichever is smaller.

##### **7.5.4.4. Offset Relief Vents**

(1) A *soil or waste stack* that has a *nominally horizontal offset* more than 1 500 mm long and above which the upper vertical portion of the stack passes through more than 2 *storeys* and receives a hydraulic load of more than 100 *fixture units* shall be vented by an *offset relief vent* connected to the vertical section immediately above the *offset*, and by another *offset relief vent*,

- (a) connected to the lower vertical section at or above the highest *soil or waste pipe* connection, or
- (b) extended as a vertical continuation of the lower section.

#### 7.5.4.5. Fixtures Draining into Vent Pipes

(1) The *trap arm* of a *fixture* that has a hydraulic load of not more than 1 ½ *fixture units* may be connected to the vertical section of a *circuit vent*, *additional circuit vent*, *offset relief vent* or *yoke vent*, provided that,

- (a) not more than two *fixtures* are connected to the *vent pipe*,
- (b) where two *fixtures* are connected to the *vent pipe*, the connection is by means of a double fitting, in accordance with Table 7.2.4.5., and
- (c) the section of the *vent pipe* that acts as a *wet vent* conforms to the requirements regarding *wet vents*.

#### 7.5.5. Miscellaneous Vent Pipes

##### 7.5.5.1. Venting of Sanitary Sewage Sumps

(1) Every sump or tank that receives *sanitary sewage* shall be provided with a *vent pipe* that is connected to the top of the sump or tank.

##### 7.5.5.2. Venting of Interceptors

- (1) Every oil *interceptor* shall be provided with 2 *vent pipes* that,
  - (a) connect to the *interceptor* at opposite ends,
  - (b) extend independently to *open air*,
  - (c) terminate not less than 2 000 mm above ground and at elevations differing by at least 300 mm, and
  - (d) do not connect to each other or any other *vent pipe*.
- (2) Adjacent compartments within every oil *interceptor* shall be connected to each other by a *vent* opening.
- (3) Where a secondary receiver for oil is installed in conjunction with an oil *interceptor*, it shall be vented in accordance with the manufacturer's recommendations, and the *vent pipe* shall,
  - (a) in no case be less than 1 ½ in. in *size*,
  - (b) extend independently to *open air*, and
  - (c) terminate not less than 2 000 mm above ground.
- (4) The *vent pipes* referred to in Sentence (1) are permitted to be one *size* smaller than the largest connected drainage pipe but not less than 1 ¼ in. in *size*, or can be sized in accordance with the manufacturer's recommendations.
- (5) Every *vent pipe* that serves an oil or grease *interceptor* and is located outside a *building* shall be not less than 3 in. in *size* in areas where it may be subject to frost closure.
- (6) Every grease *interceptor* shall have a *vent pipe* that is not less than 1 ½ in. in *size* connected to the outlet pipe, that connects to the *plumbing venting system*.
- (7) A *vent pipe* shall be provided within 1 500 mm of the inlet to a grease *interceptor* complete with a *cleanout* to provide cleaning of the *vent pipe*.
- (8) Where an acid waste dilution tank is installed, it shall be provided with a *vent pipe* connected at the top of the tank and that is sized in accordance with Article 7.5.7.7.

##### 7.5.5.3. Venting of Corrosive Drain Piping and Dilution Tanks

(1) *Venting systems* for drain piping or dilution tanks conveying corrosive waste shall extend independently and terminate in *open air*.

##### 7.5.5.4. Fresh Air Inlets

(1) Where a *building trap* is installed, a *fresh air inlet* not less than 4 in. in *size* shall be connected upstream and within 1 200 mm of the *building trap* and downstream of any other connection.

##### 7.5.5.5. Provision for Future Installations

- (1) Where provision is made for a *fixture* to be installed in the future, the *drainage system* and *venting system* shall be sized accordingly and provision made for the necessary future connections.
- (2) Except as required in Sentence 7.5.7.7.(2), where a *plumbing system* is installed in a *building*, every *storey* in which *plumbing* is or may be installed, including the *basement* of the *building*, shall have extended into it or passing through it a *vent pipe* that is at least 1 ½ in. in *size* for the provision of future connections.

#### 7.5.6. Arrangement of Vent Pipes

##### 7.5.6.1. Drainage of Vent Pipes

(1) Every *vent pipe* shall be installed without depression in which moisture can collect.

(2) Every *waste pipe* shall be installed and *back vented* at the same time.

#### 7.5.6.2. Vent Pipe Connections

(1) Every *vent pipe* in a *plumbing system* shall be installed so as to be direct as possible to a *vent stack* or *open air*, as the case may be, and so that any horizontal run below the flood level of the *fixture* to which the *vent pipe* is installed is eliminated where structurally possible.

(2) Except for *wet vents*, where a *vent pipe* is connected to a *nominally horizontal soil* or *waste pipe*, the connection shall be above the horizontal centre line of the *soil* or *waste pipe*.

(3) Unused *vent pipes* installed for future connections shall be permanently capped with an end *cleanout* or an adapter and plug.

#### 7.5.6.3. Location of Vent Pipes

(1) Except as provided in Sentences (2) and (3), a *vent pipe* that protects a *fixture trap* shall be located so that,

(a) the *developed length* of the *trap arm* is not less than twice the *size* of the *fixture drain*,

(b) the total fall of the *trap arm* is not greater than its inside diameter, and

(c) the *trap arm* does not have a cumulative change in direction of more than 135°.

(2) The *trap arm* of water closets, *S-trap standards* or any other *fixture* that also discharges vertically and depends on siphonic action for its proper functioning shall not have a cumulative change in direction of more than 225°.

(3) A *vent pipe* that protects a water closet or any other *fixture* that also depends on siphonic action for its proper functioning shall be located so that the distance between the connections of the *fixture drain* to the *fixture* and the *vent pipe* shall not exceed,

(a) 1 000 mm in the vertical plane, and

(b) 3 m in the horizontal plane.

(4) The maximum length and minimum slope of every *trap arm* shall conform to Table 7.5.6.3.

**Table 7.5.6.3.  
Length of Trap Arm**

Forming Part of Sentence 7.5.6.3.(4)

Item	Column 1 Size of Trap Served, in.	Column 2 Maximum Trap Arm, m	Column 3 Minimum Slope
1.	1 ¼	1.5	1 in 50
2.	1 ½	1.8	1 in 50
3.	2	2.4	1 in 50
4.	3	3.6	1 in 50
5.	4	4.9	1 in 50
6.	4	9.8	1 in 100

(5) The *vent pipe* from a water closet or any other *fixture* that has an integral siphonic flushing action may be connected to the *vertical leg* of its drainage pipe.

#### 7.5.6.4. Connection of Vents above Fixtures Served

(1) Except for a *wet vent*, every *vent pipe* shall extend above the *flood level rim* of every *fixture* that it serves before being connected to another *vent pipe*.

(2) No *vent pipe* shall be connected in such a manner that a blockage in a *soil* or *waste pipe* would cause waste to drain through the *vent pipe* to the *drainage system*.

#### 7.5.6.5. Terminals

(1) Except as provided in Sentence (3), the upper end of every *vent pipe* that is not terminated in *open air* shall be connected to a *venting system* that terminates through a roof to *open air*.

(2) The upper end of every *vent pipe* that is terminated in *open air*, other than a *vent pipe* that serves an oil *interceptor* or a *fresh air inlet*, shall be extended above the roof.

(3) Where a *vent pipe* is installed as a result of additions or alterations to a *plumbing system* in an existing *building*, the *vent pipe* may be erected outside the *building*, provided that,

- (a) no single change of direction of the *vent pipe* exceeds 45°,
- (b) all parts of the *vent pipe* are *nominally vertical*,
- (c) the *vent pipe* is increased to not less than 3 in. in *size* before penetrating a wall or roof, and
- (d) where the *building* is 4 *storeys* or less in height, the *vent pipe* terminates above the roof of the *building*.
- (4) Except for a *fresh air inlet*, where a *vent pipe* is terminated in *open air*, the terminal shall be located,
  - (a) not less than 1 000 mm above or not less than 3.5 m in any other direction from every air inlet, openable window or door,
  - (b) not less than 2 000 mm above or not less than 3.5 m in any other direction from a roof that supports an *occupancy*, and
  - (c) not less than 2 000 mm above ground.
- (5) Where a *vent pipe* passes through a roof, it shall,
  - (a) be terminated high enough to prevent the entry of roof drainage but not less than 150 mm above the roof or above the surface of storm water, which could pond on the roof, and
  - (b) be equipped with flashing to prevent the entry of water between the *vent pipe* and the roof or the wall.
- (6) Where a *vent pipe* passes through a roof or an outside wall of a *building*, it shall be protected from frost closure by increasing its diameter at least one *size*, but not less than 3 in. in *size*, immediately before it penetrates the roof or the wall.
- (7) Where a *vent pipe* is located 2 000 mm or more above a roof, it shall be so constructed as to be stable and secure.
- (8) Flashing shall be of material specified in Article 7.2.10.14. and on a shingled roof shall have a minimum dimension of 500 mm by 500 mm.
- (9) Where a sleeve flashing is installed on a flat roof, it shall extend at least 150 mm above the flood level and on a sloped roof shall be at least 150 mm high on the short side.
- (10) No bore of a *vent stack* or *stack vent* shall be reduced or obstructed by the installation of a flashing.

### 7.5.7. Minimum Size of Vent Pipes

#### 7.5.7.1. General

- (1) The *size* of every *vent pipe* shall conform to Table 7.5.7.1.

**Table 7.5.7.1.**  
**Minimum Permitted Size of Vent Pipe Based on Size of Trap**

Forming Part of Sentence 7.5.7.1.(1)

Item	Column 1 <i>Size of Trap Served, in.</i>	Column 2 <i>Minimum Size of Vent Pipe, in.</i>
1.	1 ¼	1 ¼
2.	1 ½	1 ¼
3.	2	1 ½
4.	3	1 ½
5.	4	1 ½
6.	5	2
7.	6	2

#### 7.5.7.2. Size Restriction

- (1) The *size* of a *branch vent*, *stack vent*, *vent stack* or *header* shall be not less than the *size* of the *vent pipe* to which it is connected.
- (2) Every *sanitary building drain* shall terminate at its upstream end in a stack of at least 3 in. *size*.
- (3) A stack referred to in Sentence (2) shall be a *soil stack* if one is available and may be a *vent stack* or *waste stack* that provides at least 3 in. *stack vent* and that goes to *open air* above the roof, either directly or through a *header*.

#### 7.5.7.3. Additional Circuit Vents and Relief Vents

- (1) Except as provided in Article 7.5.7.1. and in Sentence 7.5.3.1.(7), the minimum *size* of an *additional circuit vent* or *relief vent* installed in conjunction with a *circuit vent* is permitted to be one *size* smaller than the required *size* of the *circuit vent*, but need not be larger than 2 in.



(2) The *size* of the *soil* or *waste pipe* acting as a *relief vent* in accordance with Sentence 7.5.3.1.(4) shall be in conformance with Table 7.4.10.6., 7.4.10.7. or 7.5.8.1. or Article 7.5.7.1., whichever *size* is the largest considering the hydraulic load drained into the *soil* or *waste pipe*.

#### 7.5.7.4. Offset Relief Vents

(1) Except as provided in Article 7.5.7.1., the minimum *size* of an *offset relief vent* is permitted to be one *size* smaller than the *size* of the *stack vent*.

#### 7.5.7.5. Yoke Vents

(1) *Yoke vents* required by Sentence 7.5.4.3.(1) are permitted to be one *size* smaller than the *size* of the smallest pipe to which they are connected.

#### 7.5.7.6. Vent Pipes for Manholes

(1) The minimum *size* of a *vent pipe* that serves a manhole within a *building* shall be 2 in.

#### 7.5.7.7. Vents for Sanitary Sewage Sumps or Tanks, Dilution Tanks and Macerating Toilet Systems

(1) Except as provided in Sentences (2) and (3), the minimum *size* of the *vent pipe* for a *sanitary sewage* sump or tank, or dilution tank shall be one *size* smaller than the *size* of the largest *branch* or *fixture drain* draining to the sump or tank.

(2) The *size* of every *vent pipe* for a *sanitary sewage* sump or tank, or dilution tank shall be not less than 2 in., but need not be greater than 4 in.

(3) The *size* of every *vent pipe* for a macerating toilet system with a sump or tank shall be not less than 1 ½ in.

#### 7.5.8. Sizing of Vent Pipes

##### 7.5.8.1. Hydraulic Loads Draining to Wet Vents

(1) The hydraulic load that drains to a *wet vent* shall conform to Table 7.5.8.1.

(2) When determining the *size* of a *wet vent*, the hydraulic load from the most downstream *fixture* or symmetrically connected *fixtures* shall not be included.

**Table 7.5.8.1.**  
**Maximum Permitted Hydraulic Loads Drained to a Wet Vent**

Forming Part of Articles 7.5.2.1. and 7.5.8.1.

Item	Column 1	Column 2	Column 3
	Size of <i>Wet Vent</i> , in.	Maximum Hydraulic Load, <i>Fixture Units</i>	
		Not Serving Water Closets	Serving Not More Than Two Water Closets <i>Fixtures</i> Other Than Water Closets
1.	1 ½	2	N/A
2.	2	4	3
3.	3	12	8
4.	4	36	14
5.	5	N/A	18
6.	6	N/A	23

##### 7.5.8.2. Individual Vents and Dual Vents

(1) The *size* of *individual vents* and *dual vents* shall be determined using Table 7.5.7.1. according to the largest *trap* served.

(2) When sizing an *individual vent* or a *dual vent*, the length is not taken into consideration.

##### 7.5.8.3. Branch Vents, Headers, Continuous Vents and Circuit Vents

(1) *Branch vents*, *headers*, *circuit vents* and *continuous vents* shall be sized in accordance with Table 7.5.8.3., unless they are *individual vents* or *dual vents*.

**Table 7.5.8.3.**  
**Sizing of Branch Vents, Headers, Continuous Vents and Circuit Vents**

Forming Part of Article 7.5.8.3.

Item	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9
	Total Hydraulic Load Served by Vent, <i>fixture units</i>	Size of <i>Vent Pipe</i> , in.							
		1 ¼	1 ½	2	3	4	5	6	8
		Maximum Length of <i>Vent Pipe</i> , m <sup>(1)(2)</sup>							

1.	2	9	NL	NL	NL	NL	NL	NL	NL
2.	8	9	30	61	NL	NL	NL	NL	NL
3.	20	7.5	15	46	NL	NL	NL	NL	NL
4.	24	4.5	9	30	NL	NL	NL	NL	NL
5.	42	NP	9	30	NL	NL	NL	NL	NL
6.	60	NP	4.5	15	120	NL	NL	NL	NL
7.	100	NP	NP	11	79	305	NL	NL	NL
8.	200	NP	NP	9	76	275	NL	NL	NL
9.	500	NP	NP	6	55	215	NL	NL	NL
10.	1 100	NP	NP	NP	15	61	215	NL	NL
11.	1 900	NP	NP	NP	6	21	61	215	NL
12.	2 200	NP	NP	NP	NP	9	27	105	335
13.	3 600	NP	NP	NP	NP	7.5	18	76	245
14.	5 600	NP	NP	NP	NP	NP	7.5	18	76

**Notes to Table 7.5.8.3.:**

(1) NL means not limited.

(2) NP means not permitted.

(2) For the purposes of Table 7.5.8.3., the length of a *branch vent* shall be its *developed length* from the most distant *soil* or *waste pipe* connection to a *vent stack*, *stack vent*, *header* or *open air*.

(3) For the purposes of Table 7.5.8.3., the length of a *header* shall be its *developed length* from the most distant *soil* or *waste pipe* connection to *open air*.

(4) For the purposes of Table 7.5.8.3., the length of a *circuit vent* shall be its *developed length* from the horizontal *soil* or *waste pipe* connection to a *vent stack*, *stack vent*, *header* or *open air*.

(5) For the purposes of Table 7.5.8.3., the length of a *continuous vent* shall be its *developed length* from the vertical *soil* or *waste pipe* connection to a *vent stack*, *stack vent*, *header* or *open air*.

#### 7.5.8.4. Vent Stacks, or Stack Vents

(1) A *vent stack*, or *stack vent* shall be sized in accordance with Table 7.5.8.4. based on,

(a) the length of the *vent stack* or *stack vent*, and

(b) the total hydraulic load that is drained to the lowest section of *soil* or *waste stack* or stacks served by the *vent pipe*, plus any additional vent loads connected to the *vent stack* or *stack vent*.

**Table 7.5.8.4.**  
**Size and Developed Length of Stack Vents and Vent Stacks**

Forming Part of Sentence 7.5.8.4.(1)

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9	Column 10	Column 11	Column 12	Column 13
Size of Soil or Waste Stack, in.	Total Hydraulic Load Being Vented, fixture units	Water Occupied Area	Size of Stack Vent or Vent Stack, in.									
			1¼	1½	2	3	4	5	6	8	10	12
			Maximum Length of Stack Vent or Vent Stack, m <sup>(1)(2)</sup>									
1¼	2	0.29	9	NL	NL	NL	NL	NL	NL	NL	NL	NL
1½	8	0.25	15	46	NL	NL	NL	NL	NL	NL	NL	NL
2	12	0.25	9	23	61	NL	NL	NL	NL	NL	NL	NL
	24	.29	8	15	46	NL	NL	NL	NL	NL	NL	NL
3	10	0.15	NP	13	46	317	NL	NL	NL	NL	NL	NL
	21	.20	NP	10	33.5	247	NL	NL	NL	NL	NL	NL
	53	.25	NP	8	28.5	207	NL	NL	NL	NL	NL	NL
	102	.29	NP	7.5	26	189	NL	NL	NL	NL	NL	NL
4	43	0.15	NP	NP	10.5	76	299	NL	NL	NL	NL	NL
	140	.20	NP	NP	8	61	229	NL	NL	NL	NL	NL
	320	.25	NP	NP	7	52	195	NL	NL	NL	NL	NL
	540	.29	NP	NP	6.5	46	177	NL	NL	NL	NL	NL

5	190	0.15	NP	NP	NP	25	97.5	302	NL	NL	NL	NL
	490	.20	NP	NP	NP	19	76	232	NL	NL	NL	NL
	940	.25	NP	NP	NP	16	64	204	NL	NL	NL	NL
	1 400	.29	NP	NP	NP	15	58	180	NL	NL	NL	NL
6	500	0.15	NP	NP	NP	10	39.5	122	305	NL	NL	NL
	1 100	.20	NP	NP	NP	8	30.5	94.5	238	NL	NL	NL
	2 000	.25	NP	NP	NP	6.5	25.5	79	201	NL	NL	NL
	2 900	.29	NP	NP	NP	6	23.5	73	183	NL	NL	NL
8	1 800	0.15	NP	NP	NP	NP	9.5	29	73	287	NL	NL
	3 400	.20	NP	NP	NP	NP	7	22	58	219.5	NL	NL
	5 600	.25	NP	NP	NP	NP	6	19	49	186	NL	NL
	7 600	.29	NP	NP	NP	NP	5.5	17	43	170.5	NL	NL
10	4 000	0.15	NP	NP	NP	NP	NP	9.5	24	94.5	292.5	NL
	7 200	.20	NP	NP	NP	NP	NP	7	18	73	225.5	NL
	11 000	.25	NP	NP	NP	NP	NP	6	15.5	61	192	NL
	15 000	.29	NP	NP	NP	NP	NP	5.5	14	55	174	NL
12	7 300	0.15	NP	NP	NP	NP	NP	NP	9.5	36.5	116	287
	13 000	.20	NP	NP	NP	NP	NP	NP	7	28.5	91	219.5
	20 000	.25	NP	NP	NP	NP	NP	NP	6	24	76	186
	26 000	.29	NP	NP	NP	NP	NP	NP	5.5	22	70	152
15	15 000	0.15	NP	NP	NP	NP	NP	NP	NP	12	39.5	94.5
	25 000	.20	NP	NP	NP	NP	NP	NP	NP	9.5	29	73
	38 000	.25	NP	NP	NP	NP	NP	NP	NP	8	24.5	62
	50 000	.29	NP	NP	NP	NP	NP	NP	NP	7	22.5	55

Notes to Table 7.5.8.4.:

(1) NL means not limited.

(2) NP means not permitted.

(2) For the purposes of Table 7.5.8.4., the length of a *stack vent* or *vent stack* shall be its *developed length* from its lower end to *open air*.

(3) The minimum size of *vent stack* or *stack vent* shall be one-half the size of the *soil* or *waste stack* at its base.

(4) A *stack vent* serving a *wet vent* stack that is over 4 storeys high shall extend the full size of the *wet vent* to *open air*.

(5) Every *sanitary building drain* shall be provided with at least one *vent* that is not less than 3 in. in size.

#### 7.5.8.5. Lengths for other Vent Pipes

(1) When sizing an *additional circuit vent*, *offset relief vent*, *relief vent*, *yoke vent* and the *vent pipe* for an *interceptor*, *dilution tank*, *sanitary sewage tank* or *sump*, or *manhole*, length is not taken into consideration.

#### 7.5.9. Air Admittance Valves

##### 7.5.9.1. Air Admittance Valve as a Vent Terminal

(1) *Individual vents* and *dual vents* are permitted to terminate with a connection to an *air admittance valve* as provided in Articles 7.5.9.2. and 7.5.9.3.

##### 7.5.9.2. Air Admittance Valves

(1) *Air admittance valves* shall only be used to vent,

- (a) *fixtures* in *buildings* undergoing renovation, and
- (b) installations where connection to a *vent* may not be practical.

(2) The *air admittance valves* shall be located,

- (a) above the *flood level rim* of the *fixture* it serves,
- (b) within the maximum *developed length* permitted for the *vent*,
- (c) not less than 150 mm above insulation materials, and
- (d) installed in a location not subject to back pressure.

(3) *Air admittance valves* shall,

- (a) only vent *fixtures* located on the same *storey*, and
- (b) be connected to the horizontal *fixture drain*.

### 7.5.9.3. Installation Conditions

- (1) *Air admittance valves* shall not be installed in supply or return air *plenums*, or in locations where they may be exposed to freezing temperatures.
- (2) *Air admittance valves* shall be installed in accordance with the manufacturer's installation instructions.
- (3) *Air admittance valves* shall be rated for the *size* of *vent pipe* to which they are connected.
- (4) Installed *air admittance valves* shall be,
  - (a) *accessible*, and
  - (b) located in a space that allows air to enter the valve.
- (5) Every *drainage system* shall have one *vent* that terminates to *open air* in conformance with Sentence 7.5.6.5.(1).

## Section 7.6. Potable Water Systems

### 7.6.1. Arrangement of Piping

#### 7.6.1.1. Design

- (1) Every *fixture* supplied with separate hot and cold water controls shall have the hot water control on the left and the cold on the right.
- (2) Where hot and cold water are mixed and the temperature is regulated by a single, unmarked, manual control, a movement to the left shall increase the temperature and a movement to the right shall decrease the temperature.
- (3) In a hot water *distribution system* of a *developed length* of more than 30 m or supplying more than 4 *storeys*, the water temperature shall be maintained by,
  - (a) recirculation, or
  - (b) a self-regulating heat tracing system.

#### 7.6.1.2. Drainage

- (1) A *water distribution system* shall be installed so that the system can be drained or blown out with air and outlets for this purpose shall be provided.

#### 7.6.1.3. Control and Shut-off Valves

- (1) A *building control valve* shall be provided,
  - (a) on every *water service pipe* at the location where the *water service pipe* enters the *building*, or
  - (b) on the *water distribution system* at a location immediately downstream of the *point of entry treatment unit*, where the *building* is served by a *point of entry treatment unit* located in the *building*.
- (2) Except as provided in Sentence (3), a drain port shall be provided on the *water distribution system* immediately downstream of the *building control valve* required by Sentence (1) and if there is a meter, the drain port shall be installed immediately downstream of the meter on the *water distribution system*.
- (3) Where the *building control valve* required by Sentence (1) is of 1 in. trade *size* or smaller, the drain port may be an integral part of the *building control valve* in the form of a stop and waste valve and the drain port shall be located on the *water distribution system* side of the stop and waste valve.
- (4) Every pipe that is supplied with water from a tank on the property that is a gravity water tank or a tank of a *drinking water system* shall be provided with a shut-off valve located close to the tank.
- (5) Where the water supply is to be metered, the installation of the meter, including the piping that is part of the meter installation and the valving arrangement for the meter installation, shall be according to the *water purveyor's* requirements.
- (6) For the purpose of identifying the pipe material where plastic water pipe is used underground for a service pipe, the end of the pipe inside the *building* shall be brought above ground for a distance not less than 300 mm and not greater than 450 mm.

#### 7.6.1.4. Shut-off Valves

- (1) Except for a *house* containing not more than one *dwelling unit*, every *riser* shall be provided with a shut-off valve at the source of supply.

#### 7.6.1.5. Water Closets

- (1) Every water closet shall be provided with a shut-off valve on its water supply pipe.

#### 7.6.1.6. Suites

(1) Shut-off valves shall be installed in every *suite* in a *building* of *residential occupancy* as may be necessary to ensure that when the supply to one *suite* is shut off the supply to the remainder of the *building* is not interrupted.

#### **7.6.1.7. Public Washrooms**

(1) The water supply to each *fixture* in a washroom for *public use* shall be individually valved and each valve shall be *accessible*.

#### **7.6.1.8. Tanks**

(1) Every water pipe that supplies a hot water tank, pressure vessel, *plumbing appliance* or water using device shall be provided with a shut-off valve located close to the tank, pressure vessel, *plumbing appliance* or water using device.

#### **7.6.1.9. Protection for Exterior Water Supply**

(1) Every pipe that passes through an exterior wall to supply water to the exterior of the *building* shall be provided with,

- (a) a frost-proof hydrant with a separate shut-off valve located inside the *building*, or
- (b) a stop-and-waste cock located inside the *building* and close to the wall.

#### **7.6.1.10. Check Valves**

(1) A *check valve* shall be installed at the *building* end of the *water service pipe* where the pipe is made of plastic that is suitable for cold water use only.

#### **7.6.1.11. Flushing Devices**

(1) Every flushing device that serves a water closet or one or more urinals shall have sufficient capacity and be adjusted to deliver at each operation a volume of water that will thoroughly flush the *fixture* or *fixtures* that it serves.

(2) Where a manually operated flushing device is installed, it shall serve only one *fixture*.

#### **7.6.1.12. Relief Valves**

(1) Every pressure vessel that is part of a *plumbing system* or connected to a *plumbing system* shall be equipped with a pressure relief valve designed to open when the water pressure in the tank reaches the rated working pressure of the tank, and so located that the pressure in the tank shall not exceed 1 100 kPa or one-half the maximum test pressure sustained by the tank, whichever is the lesser.

(2) Every hot water tank of a *storage-type service water heater* shall be equipped with a temperature relief valve with a temperature sensing element,

- (a) located within the top 150 mm of the tank, and
- (b) designed to open and discharge sufficient water from the tank to keep the temperature of the water in the tank from exceeding 99°C under all operating conditions.

(3) A pressure relief valve and temperature relief valve may be combined where Sentences (1) and (2) are complied with.

(4) Every *indirect service water heater* shall be equipped with,

- (a) a pressure relief valve, and
- (b) a temperature relief valve on every storage tank that forms part of the system.

(5) Every pipe that conveys water from a temperature relief, pressure relief, or a combined temperature and pressure relief valve shall,

- (a) be of a *size* at least equal to the *size* of the outlet of the valve,
  - (b) be rigid, slope downward from the valve, and,
    - (i) terminate with an indirect connection above a floor drain, sump or other safe location, with an *air break* of not more than 300 mm, or
    - (ii) terminate at a distance not less than 150 mm and not more than 300 mm from a floor and discharge vertically down,
  - (c) have no thread at its outlet, and
  - (d) be capable of operating at a temperature of not less than 99°C.
- (6) The temperature relief valve required in Clause (4)(b) shall,
- (a) have a temperature sensing element located within the top 150 mm of the tank, and
  - (b) be designed to open and discharge sufficient water to keep the temperature of the water in the tank from exceeding 99°C under all operating conditions.

(7) No shut-off valve shall be installed on the pipe between any tank and the relief valves or on the discharge lines from such relief valves.

#### **7.6.1.13. Solar Domestic Hot Water Systems**

(1) Except as provided in Sentence (2), a system for solar heating of *potable* water shall be installed in accordance with good engineering practice.

(2) Packaged systems for solar heating of *potable* water in *residential occupancies* shall be installed in conformance with CAN/CSA-F383, "Installation of Packaged Solar Domestic Hot Water Systems".

#### **7.6.1.14. Water Hammer**

(1) Provision shall be made to protect the *water distribution system* from the adverse effects of water hammer.

#### **7.6.1.15. Mobile Home Water Service**

(1) A *water service pipe* intended to serve a mobile home shall,

(a) be not less than  $\frac{3}{4}$  in. in *size*,

(b) be terminated above ground, and

(c) be provided with,

(i) a tamperproof terminal connection that is capable of being repeatedly connected, disconnected and sealed,

(ii) a protective concrete pad,

(iii) a means to protect it from frost heave, and

(iv) a curb stop and a means of draining that part of the pipe located above the frost line when not in use.

#### **7.6.1.16. Thermal Expansion**

(1) Protection against thermal expansion shall be required when a *check valve* is required by Article 7.6.1.10., a *backflow preventer* is required by Article 7.6.2.2., or a pressure reducing valve is required by Article 7.6.3.3.

### **7.6.2. Protection from Contamination**

#### **7.6.2.1. Connection of Systems**

(1) Connections to *potable water systems* shall be designed and installed so that non-*potable* water or substances that may render the water non-*potable* cannot enter the system.

(2) No connection shall be made between a *potable water system* supplied with water from a *drinking water system* and any other *potable water system* without the consent of the *water purveyor*.

#### **7.6.2.2. Back-Siphonage**

(1) Every *potable water system* that supplies a *fixture* or tank that is not subject to pressures above atmospheric shall be protected against *back-siphonage* by a *backflow preventer*.

(2) Where a *potable* water supply is connected to a boiler, tank, cooling jacket, lawn sprinkler system or other device where a non-*potable* fluid may be under pressure that is above atmospheric or the water outlet may be submerged in the non-*potable* fluid, the water supply shall be protected against *backflow* by a *backflow preventer*.

(3) Where a hose bibb is installed outside a *building*, inside a garage, or where there is an identifiable risk of contamination, the *potable water system* shall be protected against *backflow* by a *backflow preventer*.

#### **7.6.2.3. Protection from Backflow**

(1) Except as provided in Sentence (3) and Articles 7.6.2.4. to 7.6.2.6., where a *backflow preventer* is required by this Subsection, the *backflow preventer* shall be selected, installed and tested in conformance with CSA B64.10, "Selection and Installation of Backflow Preventers".

(2) *Backflow preventers* shall be provided in conformance with Sentence 7.2.10.10.(1).

(3) Tank type water closet valves shall be provided with a *back-siphonage preventer* in conformance with Sentence 7.2.10.10.(2).

#### **7.6.2.4. Backflow from Fire Protection Systems**

(1) A *backflow preventer* shall not be required in a *residential full flow through fire sprinkler system*, in which the pipe and fittings are constructed of *potable water system* materials.

(2) Except as required in Sentence (4), *potable water system* connections to fire sprinkler and standpipe systems shall be protected against *backflow* caused by *back-siphonage* or *back pressure* in conformance with the following Clauses:

- (a) *Residential partial flow through fire sprinkler systems* in which the pipes and fittings are constructed of *potable water system* materials shall be protected by a *dual check valve backflow preventer* conforming to CSA B64.6.1, “Dual Check Valve Backflow Preventers for Fire Protection Systems (DuCF)”,
- (b) *Class 1 fire sprinkler/standpipe systems* shall be protected by a *single check valve backflow preventer* conforming to CSA B64.9, “Single Check Valve Backflow Preventers for Fire Protection Systems (SCVAF)”, provided that the systems do not use antifreeze or other additives of any kind and all pipes and fittings are constructed of *potable water system* materials,
- (c) *Class 1 fire sprinkler/standpipe systems* not covered by Clause (b) as well as *Class 2* and *Class 3 fire sprinkler/standpipe systems* shall be protected by a *double check valve backflow preventer* conforming to CSA B64.5.1, “Double Check Valve Backflow Preventers for Fire Protection Systems (DCVAF)”, provided that the systems do not use antifreeze or other additives of any kind,
- (d) *Class 1, Class 2 or Class 3 fire sprinkler/standpipe systems*, in which antifreeze or other additives are used, shall be protected by a *reduced pressure principle backflow preventer* conforming to CSA B64.4.1, “Reduced Pressure Principle Backflow Preventers for Fire Protection Systems (RPF)”, installed on the portion of the system that uses the additives and the balance of the system shall be protected as required by Clause (b) or (c),
- (e) *Class 4 and Class 5 fire sprinkler/standpipe systems* shall be protected by a *reduced pressure principle backflow preventer* conforming to CSA B64.4.1, “Reduced Pressure Principle Backflow Preventers for Fire Protection Systems (RPF)”,
- (f) *Class 6 fire sprinkler/standpipe systems* shall be protected,
  - (i) by a *double check valve backflow preventer* conforming to CSA B64.5.1, “Double Check Valve Backflow Preventers for Fire Protection Systems (DCVAF)”, or
  - (ii) where a severe hazard may be caused by *backflow*, by a *reduced pressure principle backflow preventer* conforming to CSA B64.4.1, “Reduced Pressure Principle Backflow Preventers for Fire Protection Systems (RPF)”, and
- (g) *backflow preventers* on fire sprinkler and standpipe systems shall be selected and installed in conformance with Table 7.6.2.4.

**Table 7.6.2.4.**  
**Backflow Preventers on Fire Sprinkler and Standpipe Systems**

Forming Part of Sentence 7.6.2.4.(2)

Item	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
	CSA Standard Number	Type of Device <sup>(1)</sup>	System Made with Potable Water System Materials		System Not Made with Potable Water System Materials	
			Minor Hazard <sup>(2)</sup> Residential Partial Flow-Through System	Minor Hazard <sup>(2)</sup> Class 1 System	Moderate Hazard <sup>(2)</sup> Class 1, 2, 3 and 6 Systems	Severe Hazard <sup>(2)</sup> – Any Class of System in which Antifreeze or Other Additives Are Used
1.	B64.6.1	DuCF	P	NP	NP	NP
2.	B64.9	SCVAF	P	P	NP	NP
3.	B64.5.1	DCVAF	P	P	P	NP
4.	B64.4.1	RPF	P	P	P	P

**Notes to Table 7.6.2.4.:**

**P – Permitted**

**NP – Not Permitted**

<sup>(1)</sup> The product is only permitted for use on fire sprinkler and standpipe systems.

<sup>(2)</sup> Minor Hazard, Moderate Hazard and Severe Hazard have the same meaning as indicated in CSA B64.10 “Selection and Installation of Backflow Preventers”.

**(3)** The *backflow preventer* required by Sentence (2) shall be installed upstream of the fire department pumper connection.

**(4)** Where a reduced pressure principle *backflow preventer* is required on the *water service pipe* at a service connection located on the same premises as the *fire service main* in *Class 3, 4, 5 and 6 fire sprinkler/standpipe systems*, a reduced pressure principle *backflow preventer* conforming to CSA B64.4.1, “Reduced Pressure Principle Backflow Preventers for Fire Protection Systems (RPF)”, shall also be provided on the fire service connection.

#### **7.6.2.5. Backflow from Buildings with a Solar Domestic Hot Water System**

(1) Except as permitted by Sentence (2) and as provided in Sentences (3) and (4), a *potable water system* shall be protected against *backflow* where the heat transfer loop of a solar domestic hot water system is *directly connected* to the *potable water system*.

(2) Where the heat transfer loop of the solar domestic hot water system consists of direct flow-through of *potable* water only, protection against *backflow* is not required.

(3) A *potable water system* that is *directly connected* to the heat transfer loop of a solar domestic hot water system that serves a *residential occupancy* within the scope of Part 9 shall be provided with a *backflow preventer* selected in accordance with CAN/CSA-F379.1, “Packaged Solar Domestic Hot Water Systems (Liquid-to-Liquid Heat Transfer) for All-Season Use”.

(4) Where a solar domestic hot water system includes a single wall heat exchanger and contains only a relatively harmless heat transfer fluid as described in CAN/CSA-F379.1, “Packaged Solar Domestic Hot Water Systems (Liquid-to-Liquid Heat Transfer) for All-Season Use”, the *backflow* prevention required in Sentence (1) is permitted to be a dual *check valve backflow preventer* conforming to CSA B64.3, “Dual Check Valve Backflow Preventers with Atmospheric Port (DCAP)”.

#### **7.6.2.6. Premise Isolation**

(1) *Buildings* or facilities where a moderate hazard or severe hazard may be caused by *backflow* shall be provided with premise isolation of the *potable water system* by the installation of a *backflow preventer* selected in accordance with Clauses 5.3.4.2.(b) and (c) of CSA B64.10, “Selection and Installation of Backflow Preventers”.

(2) *Buildings* of *residential occupancy* within the scope of Part 9 are not required to be isolated unless they have access to an *auxiliary water supply*.

(3) Except as provided in Sentence (1), where no direct connection exists between the *auxiliary water supply* and the *potable water system*, premise isolation shall be provided by a dual *check valve backflow preventer* conforming to CSA B64.6, “Dual Check Valve (DuC) Backflow Preventers”.

#### **7.6.2.7. Reserved**

#### **7.6.2.8. Cleaning of Systems**

(1) A newly installed part of a *potable water system* shall be cleaned and then flushed with *potable* water before the system is put into operation.

#### **7.6.2.9. Air Gap**

(1) An *air gap* shall not be located in a noxious environment.

(2) Every *air gap* shall be not less than 25 mm high and at least twice the diameter of the opening of the water supply outlet in height.

#### **7.6.2.10. Vacuum Breakers and Flood Levels**

(1) Where the *critical level* is not marked on an atmospheric *vacuum breaker*, pressure *vacuum breaker* or spill-resistant pressure *vacuum breaker*, the *critical level* shall be taken as the lowest point on the device.

(2) Where an atmospheric *vacuum breaker* is installed, it shall be located on the downstream side of the *fixture* control valve or faucet so that it will be subject to water supply pressure,

- (a) only when the *fixture* control valve or faucet is open, and
- (b) for periods of use not to exceed 12 h continuous.

(3) An atmospheric *vacuum breaker* shall be installed so that the *critical level* is at least the distance specified by the manufacturer at which the device will operate safely but not less than 25 mm above,

- (a) the *flood level rim* of a *fixture* or tank, or
- (b) the highest point open to atmosphere in an irrigation system.

(4) A pressure *vacuum breaker* or spill-resistant pressure *vacuum breaker* shall be installed with its *critical level* at least 300 mm above,

- (a) the *flood level rim* of a *fixture* or tank, or
- (b) the highest point open to atmosphere in an irrigation system.

#### **7.6.3. Size and Capacity of Pipes**

##### **7.6.3.1. Design, Construction and Installation**

(1) Every *water distribution system* shall be designed to provide peak demand flow when the flow pressures at the supply openings conform to the plumbing supply fitting manufacturer’s specifications.



(2) A *potable water system* shall be designed, constructed and installed to conform to good engineering practice appropriate to the circumstances, such as that described in the ASHRAE Handbooks and ASPE Data Books.

(3) Every pipe that supplies a *fixture* shall have a capacity that will produce a flow in the *fixture* that will flush the *fixture* and keep it in a sanitary condition.

### 7.6.3.2. Hydraulic Load

(1) Except as provided in Sentence (3), the hydraulic load of a *fixture* or device that is listed in Table 7.6.3.2.A. shall be the number of *fixture units* given in the Table.

(2) Except as provided in Sentences (1) and (3), the hydraulic load of a *fixture* that is not listed in Table 7.6.3.2.A. is the number of *fixture units* listed in Table 7.6.3.2.D.

(3) Where *fixtures* are supplied with both hot and cold water, the hydraulic loads for maximum separate demands shall be 75% of the hydraulic load of the *fixture units* given in Tables 7.6.3.2.A. and 7.6.3.2.D. when using a detailed engineering design method.

(4) The hydraulic load of urinals and water closets with direct flush valves shall be the number of *fixture units* listed in Tables 7.6.3.2.B. and 7.6.3.2.C.

**Table 7.6.3.2.A.**  
**Sizing of Water Distribution Systems<sup>(1)(2)</sup>**

Forming Part of Sentences 7.6.3.2.(1) to (3) and 7.6.3.4.(2), (3) and (5)

Item	Column 1 <i>Fixture</i> or Device	Column 2 Minimum Size of Supply Pipe, in.	Column 3 Private Use Hydraulic Load, <i>fixture</i> <i>units</i>			Column 6 Public Use Hydraulic Load, <i>fixture</i> <i>units</i>		
			Cold	Hot	Total	Cold	Hot	Total
1.	Bathroom group with 6 LPF flush tank <sup>(3)</sup>	N/A	2.7	1.5	3.6	-	-	-
2.	Bathroom group with greater than 6 LPF flush tank <sup>(3)</sup>	N/A	4	3	6	-	-	-
3.	Bathroom group with more than 3 <i>fixtures</i>	-	-	-	<sup>(4)</sup>	-	-	-
4.	Bathtub with or without shower head	1/2	1	1	1.4	3	3	4
5.	Bathtub with ¾ in. spout	3/4	7.5	7.5	10	7.5	7.5	10
6.	Bedpan washer	1	-	-	-	7.5	7.5	10
7.	Bidet	3/8	1.5	1.5	2	-	-	-
8.	Clothes washer, 3.5 kg	1/2	1	1	1.4	2.25	2.25	3
9.	Clothes washer, 6.8 kg	1/2	-	-	-	3	3	4
10.	Clothes washer, commercial <sup>(5)</sup>	-	-	-	-	-	-	-
11.	Dental lavatory	3/8	-	-	-	1.5	1.5	2
12.	Dental unit, cuspidor	3/8	-	-	-	1	-	1
13.	Dishwasher, commercial <sup>(5)</sup>	-	-	-	-	-	-	-
14.	Dishwasher, domestic	3/8	-	1.4	1.4	-	-	-
15.	Drinking fountain or water cooler	3/8	-	-	-	0.25	-	0.25
16.	Hose bibb	1/2	2.5	-	2.5	2.5	-	2.5
17.	Hose bibb	3/4	3	-	3	6	-	6
18.	Hose bibb, combination hot and cold	1/2	1.9	1.9	2.5	1.9	1.9	2.5
19.	Lavatory, 8.3 L/min or less	3/8	0.5	0.5	0.7	1.5	1.5	2
20.	Lavatory, greater than 8.3 L/min	3/8	0.75	0.75	1	1.5	1.5	2
21.	Shower head, 9.5 L/min or less per head	1/2	1	1	1.4	3	3	4
22.	Shower head, greater than 9.5 L/min per head	1/2	1.5	1.5	2	3	3	4
23.	Shower, spray, multi-head, <i>fixture unit</i> per head	<sup>(5)</sup>	1	1	1.4	3	3	4
24.	Sink, bar	3/8	0.75	0.75	1	1.5	1.5	2
25.	Sink, clinic service faucet	1/2	-	-	-	2.25	2.25	3
26.	Sink, clinic service with direct flush valve	1	-	-	-	6	-	6
27.	Sink, kitchen, commercial, per faucet	1/2	-	-	-	3	3	4
28.	Sink, kitchen, domestic, 8.3 L/min or less	3/8	1	1	1.4	1	1	1.4
29.	Sink, kitchen, domestic, greater than	3/8	1.5	1.5	2	1.5	1.5	2

	8.3 L/min							
30.	Sink, laboratory	3/8	-	-	-	1.5	1.5	2
31.	Sink, laundry (1 or 2 compartments)	3/8	1	1	1.4	1	1	1.4
32.	Sink, service or mop basin	1/2	-	-	-	2.25	2.25	3
33.	Sink, washup, per faucet	1/2	-	-	-	1.5	1.5	2
34.	Urinal, with direct flush valve	3/4	(6)	-	(6)	(6)	-	(6)
35.	Urinal, with flush tank	3/8	3	-	3	3	-	3
36.	Urinal, with self-closing metering valve	1/2	2	-	2	4	-	4
37.	Water closet, 6 LPF or less with flush tank	3/8	2.2	-	2.2	2.2	-	2.2
38.	Water closet, greater than 6 LPF with flush tank	3/8	3	-	3	5	-	5
39.	Water closet, with direct flush valve	1	(6)	-	(6)	(6)	-	(6)

**Notes to Table 7.6.3.2.A.:**

- (1) The *fixture unit* values in this Table are not applicable in certain *assembly occupancies* because of surges in use by the occupants. For such *occupancies*, refer to specific design information.
- (2) For *fixtures* not indicated in this Table, refer to Table 7.6.3.2.D.
- (3) *Bathroom group* is based on a ½ in. size bathtub supply pipe.
- (4) Add additional *fixture* to the *fixture* load for *bathroom group*.
- (5) Refer to the manufacturer's recommendations.
- (6) For *fixture unit* values for *fixtures* with direct flush valves, see Sentence 7.6.3.2.(4) and Tables 7.6.3.2.B. and 7.6.3.2.C.

**Table 7.6.3.2.B.**  
**Sizing of Water Distribution Systems for Urinals with Direct Flush Valves**

Forming Part of Sentences 7.6.3.2.(4) and 7.6.3.4.(5)

Item	Column 1 Number of Valves	Column 2 Individual <i>Fixture Units</i> Assigned in Decreasing Values	Column 3 <i>Fixture Units</i> in Accumulative Values <sup>(1)</sup>
1.	1	20	20
2.	2	15	35
3.	3	10	45
4.	4	8	53
5.	5 or more	5 each	58, plus 5 for each additional <i>fixture</i> in excess of 5

**Notes to Table 7.6.3.2.B.:**

- (1) The accumulative *fixture unit* values are the total values to be used in conjunction with Table 7.6.3.2.A.

**Table 7.6.3.2.C.**  
**Sizing of Water Distribution Systems for Water Closets with Direct Flush Valves**

Forming Part of Sentences 7.6.3.2.(4) and 7.6.3.4.(5)

Item	Column 1 Number of Valves	Column 2 Individual <i>Fixture Units</i> Assigned in Decreasing Values	Column 3 <i>Fixture Units</i> in Accumulative Values <sup>(1)</sup>
1.	1	40	40
2.	2	30	70
3.	3	20	90
4.	4	15	105
5.	5 or more	10 for each <i>public use</i> , and 6 for each <i>private use</i>	115, plus 10 for each <i>public use</i> additional <i>fixture</i> in excess of 5, and 111, plus 6 for each <i>private use</i> additional <i>fixture</i> in excess of 5

**Notes to Table 7.6.3.2.C.:**

- (1) The accumulative *fixture unit* values are the total values to be used in conjunction with Table 7.6.3.2.A.

**Table 7.6.3.2.D.**  
**Hydraulic Loads of Fixtures Not Listed in Table 7.6.3.2.A.**

Forming Part of Sentences 7.6.3.2.(2) and (3) and 7.6.3.4.(5)

Item	Column 1	Column 2	Column 3
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	Size of Supply Pipe, in.	Hydraulic Load, <i>fixture units</i>	
		<i>Private Use</i>	<i>Public Use</i>
1.	3/8	1	2
2.	1/2	2	4
3.	3/4	3	6
4.	1	6	10

### 7.6.3.3. Static Pressure

(1) Where the static pressure at any *fixture* may exceed 550 kPa, a pressure reducing valve conforming to Article 7.2.10.12. shall be installed to limit the maximum static pressure at the *fixture* to 550 kPa.

### 7.6.3.4. Size

(1) Every *water service pipe* shall be sized according to the peak demand flow but shall not be less than 3/4 in. in *size*.

(2) Except as permitted in Sentence (3), the *size* of a supply pipe that serves a *fixture* or device shall conform to Table 7.6.3.2.A.

(3) For *fixtures* listed in Table 7.6.3.2.A that have a permitted supply pipe *size* of 3/8 in., a connector not more than 750 mm long and not less than 6.3 mm inside diameter may be used to supply water to the *fixture* or device.

(4) No *water system* between the point of connection with the *water service pipe* or the water meter and the first branch that supplies a water heater that serves more than one *fixture* shall be less than 3/4 in. in *size*.

(5) Where both hot and cold water is supplied to *fixtures* in residential *buildings* containing more than one *dwelling unit*, the *water system* may be sized in accordance with Table 7.6.3.4. provided,

- (a) the hydraulic loads for maximum separate demands on *water distribution system* piping are not less than 100% of the total hydraulic load of the *fixture units* given in Tables 7.6.3.2.A., 7.6.3.2.B., 7.6.3.2.C. and 7.6.3.2.D. for *private use*,
- (b) the minimum water pressure at the entry to the *building* is 200 kPa, and
- (c) the total maximum length of the *water system* is 90 m.

**Table 7.6.3.4.**  
**Water Pipe Sizing for Buildings Containing More Than One Dwelling Unit**

Forming Part of Sentence 7.6.3.4.(5)

Item	Column 1	Column 2	Column 3
	Size of Water Pipe, in.	Water Velocity m/s <sup>(1)</sup>	
		2.4	1.5
		Hydraulic Load, <i>fixture units</i>	
1.	1/2	7	4
2.	3/4	16	9
3.	1	31	18
4.	1-1/4	57	30

**Notes to Table 7.6.3.4.:**

<sup>(1)</sup> Table 7.6.3.4. is not intended to limit water velocities that are permitted by Sentence 7.6.3.5.(1).

(6) Where both hot and cold water is supplied to *fixtures* in a *house* containing only one *dwelling unit*, the *water service pipe* is permitted to be a minimum of 3/4 in. in *size* provided,

- (a) a minimum 3/4 in. water supply piping located in the *basement* or lower level is extended to the base of every hot and cold *riser* that serves a maximum of one *bathroom group* and to the last water supply branch serving any *basement bathroom group*, *fixture* supply or hose bibb, and
- (b) the total hydraulic load is not more than 26 *fixture units*, using the values given in Table 7.6.3.2.A.

### 7.6.3.5. Velocity

(1) The maximum permitted water velocities shall be those recommended by the pipe and fitting manufacturer.

## 7.6.4. Water Efficiency

### 7.6.4.1. Water Supply Fittings

(1) The flow rates of fittings that supply water to a *fixture* shall not exceed the maximum flow rates at the test pressures listed for that fitting in Table 7.6.4.1.

**Table 7.6.4.1.  
Maximum Flow Rates for Water Supply Fittings**

Forming Part of Sentence 7.6.4.1.(1)

Item	Column 1 Fitting	Column 2 Maximum Flow, L/min	Column 3 Test Pressure, kPa
1.	Lavatory Faucets in <i>Residential Occupancy</i>	5.7	413
2.	Lavatory Faucets in Other <i>Occupancies</i>	1.9	413
3.	Kitchen Faucet	8.35	413
4.	Shower Heads in <i>Residential Occupancy</i>	7.6	550
5.	Shower Heads in Other <i>Occupancies</i>	9.5	550

(2) Sentence (1) does not apply to a *fixture* located in a *heritage building*.

(3) Each lavatory in a washroom with *fixtures* for *public use* shall be equipped with a device capable of automatically shutting off the flow of water when the lavatory is not in use.

(4) An automatic compensating valve serving an individual shower head shall have a manufacturer's minimum-rated water flow rate equal to or less than the shower head it serves.

(5) Where multiple shower heads installed in a public showering facility are served by one temperature control, each shower head shall be equipped with a device capable of automatically shutting off the flow of water when the shower head is not in use.

#### 7.6.4.2. Plumbing Fixtures

(1) Water closets and urinals shall be certified to CAN/CSA-B45.0, "General Requirements for Plumbing Fixtures".

(2) Except as provided in Sentence (3), the flush cycle for each *fixture* that is a water closet or urinal shall not exceed the maximum water consumption per flush cycle listed for that *fixture* in Table 7.6.4.2.A.

**Table 7.6.4.2.A.  
Maximum Water Consumption per Flush Cycle for Sanitary Fixtures**

Forming Part of Sentence 7.6.4.2.(2)

Item	Column 1 <i>Fixture</i>	Column 2 Maximum Water Consumption per Flush Cycle, LPF
1.	Water Closet (Tank Type)	6.0
2.	Water Closet (Direct Flush)	6.0
3.	Urinal (Tank Type)	1.9
4.	Urinal (Direct Flush)	1.9

<sup>(1)</sup> REVOKED: O. Reg. 88/19, s. 180 (1).

(3) In *buildings* classified as Group C *occupancy*, the flush cycle for each *fixture* that is a water closet or urinal shall not exceed the maximum water consumption per flush cycle listed for that *fixture* in Table 7.6.4.2.B.

**Table 7.6.4.2.B.  
Maximum Water Consumption per Flush Cycle for Sanitary Fixtures in a Group C Occupancy**

Forming Part of Sentence 7.6.4.2.(3)

Item	Column 1 <i>Fixture</i>	Column 2 Maximum Water Consumption per Flush Cycle, LPF
1.	Water Closet (Tank Type)	4.8 <sup>(1)</sup>
2.	Water Closet (Direct Flush)	4.8
3.	Urinal (Tank Type)	1.9
4.	Urinal (Direct Flush)	1.9

**Notes to Table 7.6.4.2.B.:**

<sup>(1)</sup> Water closets which provide a dual flush cycle option of both 4.1 LPF or less and 6.0 LPF are deemed to comply.

<sup>(2)</sup> REVOKED: O. Reg. 88/19, s. 180 (2).

(4) Sentences (2) and (3) do not apply to a *fixture* located in an existing *building* where the *chief building official* is satisfied that compliance with the requirement is impracticable because of maintenance or operational difficulties.

(5) Urinals shall be equipped with a device capable of preventing automatic flush cycles when not in use.

#### **7.6.5. Water Temperature Control**

##### **7.6.5.1. Maximum Temperature of Hot Water**

(1) Except as provided in Sentences (2) and 7.6.5.3.(1), the maximum temperature of hot water supplied by fittings to *fixtures* in a *residential occupancy* shall not exceed 49°C.

(2) Sentence (1) does not apply to hot water supplied to installed dishwashers or clothes washers.

##### **7.6.5.2. Showers**

(1) Except as provided for in Sentences (2) and (3), all valves supplying fixed location shower heads, shall be individually pressure-balanced or thermostatic-mixing valves, conforming to ASME A112.18.1 / CSA B125.1, "Plumbing Supply Fittings".

(2) An individually pressure-balanced or thermostatic-mixing valve is not required for shower heads having a single tempered water supply that is controlled by an automatic compensating valve conforming to CSA B125.3, "Plumbing Fittings".

(3) Deck-mounted, hand-held, flexible-hose spray attachments are exempt from the thermal shock requirements of Sentences (1) and (4).

(4) Pressure-balanced, thermostatic-mixing or combination pressure-balanced and thermostatic-mixing type valves shall be,

- (a) capable of limiting thermal shock, and
- (b) designed so that the outlet temperature does not exceed 49°C or equipped with high-limit stops which shall be adjusted to a maximum hot water setting of 49°C.

##### **7.6.5.3. Temperature Control Devices**

(1) A *water distribution system* supplying hot water to any bathtub, shower or hand basin that is accessible to a patient or resident in a Group B, Division 2 or 3 occupancy or a resident of a group home, *home for special care* or residence for adults with developmental disabilities shall have one or more temperature gauges and control devices that are,

- (a) accessible only to supervisory staff, and
- (b) capable of being adjusted to ensure that the temperature of the water supplied to the *fixtures* does not exceed 49°C.

#### **Section 7.7. Non-Potable Water Systems**

##### **7.7.1. Connection**

###### **7.7.1.1. Non-Potable Connection**

(1) Except as permitted by Sentences (2) and (3), a *non-potable water system* shall not be connected to a *potable water system*.

(2) Make-up water may be supplied to the *non-potable water system* by,

- (a) a reduced pressure *backflow preventer*, or
- (b) an *air gap*.

(3) Where a clothes washer is supplied by a *rainwater system* and a *potable water system*, the *potable water system* shall be protected by dual *check valve backflow preventers* conforming to CSA B64.6, "Dual Check Valve (DuC) Backflow Preventers" for,

- (a) area isolation, and
- (b) premise isolation.

##### **7.7.2. Identification**

###### **7.7.2.1. Markings Required**

(1) *Non-potable water* piping shall be identified by markings that are permanent, distinct and easily recognized.

(2) *Non-potable water system* for re-use purposes shall be marked in accordance with Section 12 of CAN/CSA-B128.1, "Design and Installation of Non-Potable Water Systems".

(3) A sign containing the words **NON-POTABLE WATER, DO NOT DRINK** shall be in letters at least 25 mm high with a 5 mm stroke and posted immediately above a *fixture* that is permitted to receive non-*potable* water.

### 7.7.3. Location

#### 7.7.3.1. Pipes

- (1) Non-*potable* water piping shall not be located,
  - (a) where food is prepared in a food processing plant,
  - (b) above food-handling equipment,
  - (c) above a non-pressurized *potable* water tank, or
  - (d) above a cover of a pressurized *potable* water tank.

#### 7.7.3.2. Outlets

- (1) Except as permitted in Sentence 7.1.5.3.(3), an outlet from a non-*potable water system* shall not be located where it can discharge into,
  - (a) a sink or lavatory,
  - (b) a *fixture* into which an outlet from a *potable water system* is discharged, or
  - (c) a *fixture* that is used for a purpose related to the preparation, handling or dispensing of food, drink or products that are intended for human consumption.

### 7.7.4. Non-Potable Water Systems for Re-use Purposes

#### 7.7.4.1. Conformance to Standards

- (1) Non-*potable water systems* for re-use purposes shall be designed, constructed and installed to conform to good engineering practice appropriate to the circumstances such as described in,
  - (a) the ASHRAE Handbooks,
  - (b) ASPE Data Books, or
  - (c) CAN/CSA-B128.1, “Design and Installation of Non-Potable Water Systems”.

O. Reg. 332/12, Division B, Part 7; O. Reg. 361/13, ss. 39-46; O. Reg. 191/14, ss. 64-89; O. Reg. 139/17, ss. 54-56; O. Reg. 88/19, s. 145-181.

## PART 8 SEWAGE SYSTEMS

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