Part 7
Plumbing

Part 7
Plumbing

Section 7.1. General

7.1.1. Scope

7.1.1.1. Scope

(1) The scope of this Part shall be as described in Section 2.1.

7.1.1.2. Industrial Systems

(1) 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.

7.1.2. Application

7.1.2.1. Application

(1) This Part applies to the design and *construction* of *plumbing*.

7.1.2.2. Alteration or Repair

(1) When an existing *building* is extended or subject to material alteration or repair, this Part is applicable,

(a) to the design and *construction* of *plumbing* in the extensions and those parts of the *building* subject to material alteration and repair, and

(b) to *plumbing* which is adversely affected by the extension, alteration or repair.

7.1.3. Definitions and Abbreviations

7.1.3.1. Reserved.

7.1.3.2. Definitions in Italics

(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.

7.1.3.3. Abbreviations of Names and Organizations

(1) Reserved.

7.1.3.4. Abbreviations of Words

(1) Reserved.

7.1.4. Equivalents

(1) Reserved.

7.1.5. Plumbing Facilities

7.1.5.1. Facilities Required

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

7.1.5.2. 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, serving more than one *dwelling unit*.

7.1.6. Service Connections

7.1.6.1. 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.

7.1.6.2. 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.

7.1.6.3. 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) Where a supply of *potable* water is unavailable or insufficient to supply water to a *plumbing system*, non-*potable* water may be used for the flushing of water closets, urinals or the priming of *traps*, and the piping conveying the non-*potable* water shall be installed in conformance with Section 7.7.

7.1.6.4. Separate Services

(1) Piping in any *building* shall be connected to the public services separately from piping of any other *building*, except that an ancillary *building* on the same property may be served by the same service. (See Appendix A.)

(2) No *plumbing* serving a *dwelling unit* shall be installed 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.

7.1.6.5. Private Sewers and Private Water Supply

(1) *Private sewers* and *private water supply* pipes shall be installed according to the Guidelines for the Design of Sanitary Sewage Work Systems, Guidelines for the Design of Storm Sewers and Guidelines for the Design of Water Distribution Systems issued by the Environmental Approvals and Projects Engineering Branch of the Ministry of the Environment.

7.1.7. Location of Fixtures

7.1.7.1. 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.

7.1.7.2. 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.

(2) 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.

Section 7.2. Materials and Equipment

7.2.1. General

7.2.1.1. Reserved.

7.2.1.2. 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.

7.2.1.3. 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*.

7.2.1.4. 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.

7.2.1.5. 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.

7.2.1.6. 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. Reserved.

7.2.2.3. Showers (See Appendix A.)

(1) Every shower receptor shall be constructed and arranged so that water cannot leak through the walls or floor.

(2) Not more than 6 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 (2 ft 6 in).

7.2.2.4. Concealed Overflows

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

7.2.2.5. Lavatories

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

7.2.2.6. 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 (1½ in),

(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 (2 in).

(3) Every *trap* that serves a lavatory, a sink or a laundry tray shall

(a) be provided with a *cleanout* plug of a minimum ¾ 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, or

(b) be designed so that part of the *trap* can be completely removed by screwed connections for cleaning purposes.

(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.

7.2.3.3. Tubular Traps

(1) Tubular metal or plastic *traps* that conform to CAN/CSA-B125, "Plumbing 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) Reserved.

(2) 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.

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

7.2.4.3. One-Quarter Bends

(1) A ¼ bend of 4 in. *size* or less that has 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) A ¼ bend of 4 inch *size* or less shall not be used on a horizontal *building drain*, a *branch* of the *building drain*, or *building sewer* except to change direction from horizontal to vertical.

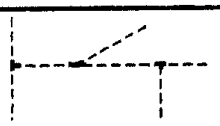
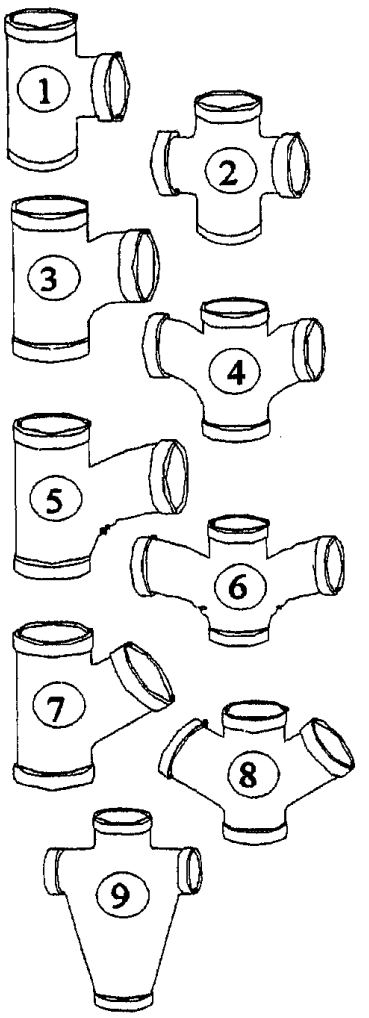
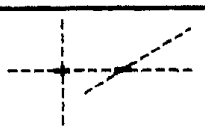
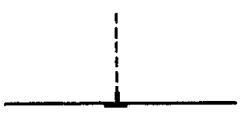
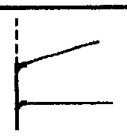
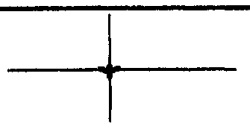
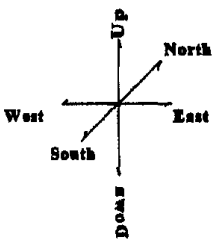
7.2.4.4. Fittings Restricted in Use

(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	
	LEGEND (DWV BRANCH FITTINGS) Vent pipe ---------- Drainage pipe —————— * Acceptable only if vertical run is of 3 inches size or larger and horizontal branches are of 1¼, 1½ or 2 inches size	

1. Straight T
2. Double T or Cross
3. Sanitary T or Short Turn TY
4. Double Sanitary T or Short Turn Double TY
5. Combination Y & ⅛ Bend or Long Turn TY
6. Double Combination Y & ⅛ Bend or Double Long Turn TY
7. Y
8. Double Y
9. Double Waste Fitting

7.2.5. Non-Metallic Pipe and Fittings

7.2.5.1. Asbestos-Cement Drainage Pipe and Fittings

(1) Except as provided in Sentence (2), asbestos-cement pipe and its fittings for use in a drain, waste or vent system shall conform to

(a) CAN/CGSB-34.22, "Pipe, Asbestos-Cement, Drain", or

(b) CSA B127.1, "Components for Use in Asbestos Cement Drain, Waste and Vent Systems".

(2) Asbestos-cement pipe and fittings used underground either outside a *building* or under a *building* shall conform to Sentence (1) or to

(a) CAN/CGSB-34.9, "Pipe, Asbestos-Cement, Sewer",

(b) CAN/CGSB-34.23, "Pipe, Asbestos-Cement, Sewer, House Connection", or

(c) CSA B127.2, "Components for Use in Asbestos-Cement Building Sewer Systems".

7.2.5.2. Reserved.

7.2.5.3. Concrete Pipe and Fittings

(1) Concrete pipe shall conform to CSA A257 Series,"Standards for Circular Concrete Pipe and Manholes". (See Appendix A.)

(2) Reserved.

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

(4) Concrete fittings field fabricated from lengths of pipe shall not be used.

(5) Concrete pipe shall not be used above ground inside a *building*.

(6) Precast reinforced circular concrete manhole sections, catch basins and fittings shall conform to CAN/CSA-A257.4-M, "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, "Vitrified Clay Pipe".

(2) Couplings and joints for vitrified clay pipe shall be certified to CSA A60.3, "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 Water Pipe and Fittings

(1) Polyethylene water pipe and fittings shall be certified to CAN/CSA-B137.1, "Polyethylene Pipe, Tubing and Fittings for Cold Water Pressure Services", Series 160, and shall have a rated working pressure of 1034 kPa (150 psi) or more.

(2) Except as permitted in Sentence (4), polyethylene water pipe or tube shall only be used in underground installations of cold water *distributing 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".

(4) Cross-linked polyethylene pressure pipe or tube and fittings used in above-ground or underground installations of water *distributing pipe* shall be certified to CAN/CSA-B137.5, "Cross-linked Polyethylene (PEX) Tubing Systems for Pressure Applications". (See Appendix A.)

7.2.5.6. PVC Pipe and Fittings

(1) PVC water pipe, fittings and solvent cement shall be certified to CAN/CSA-B137.3, "Rigid Poly (Vinyl Chloride) (PVC) Pipe for Pressure Applications" or CAN/CSA-B137.2, "PVC Injection-Moulded Gasketed Fittings for Pressure Applications", and have a minimum pressure rating of 1034 kPa (150 psi).

(2) PVC water pipe and fittings in Sentence (1) shall not be used in a hot *water system*.

7.2.5.7. CPVC Pipe, Fittings and Solvent Cements

(1) CPVC hot and cold water pipe, fittings and solvent cements shall be certified to CSA B137.6, "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 the Standard referenced in Sentence (1).

7.2.5.8. Polybutylene Pipe and Fittings

(1) Polybutylene pipe and its associated fittings shall be certified to CAN3-B137.8, "Polybutylene (PB) Piping for Pressure Applications".

(2) Polybutylene pipe and fittings shall not be used for a continuously circulating hot water line or the first metre of any branch off of the continuously circulating hot water line.

7.2.5.9. 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) CAN/CSA-B181.1, "ABS Drain, Waste, and Vent Pipe and Pipe Fittings",
(b) CAN/CSA-B181.2, "PVC Drain, Waste, and Vent Pipe and Pipe Fittings",
(c) CAN/CSA-B182.1, "Plastic Drain and Sewer Pipe and Pipe Fittings",
(d) CAN/CSA-B182.2, "PVC Sewer Pipe and Fittings, (PSM Type)",
(e) CAN/CSA-B182.4, "Profile (Ribbed) PVC Sewer Pipe and Fittings",
(f) CAN/CSA-B182.6, "Profile Polyethylene Sewer Pipe and Fittings",
(g) CAN/CSA-B137.2, "PVC Injection-Moulded Gasketed Fittings for Pressure Applications", or
(h) CAN/CSA-B137.3, "Rigid Poly (Vinyl Chloride) (PVC) Pipe for Pressure Applications".

(2) Except as permitted in Clauses (g) and (h), plastic pipe used as described in Sentence (1) shall have a stiffness equal or greater than 320 kPa (46.4 psi).

7.2.5.10. 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) CAN/CSA-B181.1, "ABS Drain, Waste, and Vent Pipe and Pipe Fittings", or
(b) CAN/CSA-B181.2, "PVC 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) CAN/CSA-B181.1, "ABS Drain, Waste, and Vent Pipe and Pipe Fittings",
(b) CAN/CSA-B181.2, "PVC Drain, Waste, and Vent Pipe and Pipe Fittings",
(c) CAN/CSA-B182.1, "Plastic Drain and Sewer Pipe and Pipe Fittings", or
(d) CAN/CSA-B182.2, "PVC Sewer Pipe and Fittings, (PSM Type)".

(3) Plastic pipe used as described in Sentence (2) shall have a pipe stiffness equal or greater than 320 kPa (46.4 psi).

(4) Requirements for *combustible* piping in relation to fire safety shall conform to Articles 3.1.5.15., 3.1.9.4., 9.10.9.6. and 9.10.9.7. of this Code.

(5) Where *noncombustible* piping pierces a *fire separation* or a fire stop, the requirements for fire stopping of Subsection 3.1.9., Articles 9.10.9.6. and 9.10.15.4. shall apply.

7.2.5.11. Transition Solvent Cement

(See Appendix A.)

(1) Solvent cement for transition joints shall conform to

(a) CAN/CSA-B181.1, "ABS Drain, Waste and Vent Pipe and Pipe Fittings", or
(b) CAN/CSA-B181.2, "PVC 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. Polyethylene/Aluminum/Polyethylene Composite Pipe and Fittings

(1) PE/AL/PE composite pipe and fittings used for *potable water systems* shall conform to CAN/CSA-B137.9, "Polyethylene/Aluminum/Polyethylene Composite Pressure Pipe Systems". (See Appendix A.)

(2) PE/AL/PE pipe and fittings shall not be used in a hot *water system*.

7.2.5.13. Crosslinked Polyethylene/ Aluminum/ Polyethylene Composite Pipe and Fittings

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

7.2.5.14. 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". (See Appendix A.)

7.2.6. Ferrous Pipe and Fittings

7.2.6.1. Cast Iron Drainage and Vent Pipe and Fittings

(1) Drainage piping, vent piping and fittings made of cast iron shall be certified to 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*.

7.2.6.2. Cast Iron Fittings for Asbestos-Cement Drainage Pipe

(1) Cast iron fittings designed for use with asbestos-cement pipe for drainage purposes shall conform to the applicable requirements of CSA B127.1, "Components for Use in Asbestos Cement Drain, Waste and Vent Systems" or CSA B127.2, "Components for Use in Asbestos Cement Building Sewer Systems".

7.2.6.3. Threaded Cast Iron Drainage Fittings

(1) Threaded cast iron drainage fittings shall conform to ANSI 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 in Metal Molds or Sand-Lined Molds, for Water or Other Liquids".

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

(3) Iron fittings for cast iron or ductile-iron water pipes shall conform to ANSI/AWWA C110/A21.10, "Ductile-Iron and Gray-Iron Fittings, 3-in. Through 48-in., for Water and Other Liquids".

(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 and Gray-Iron Pressure Pipe and Fittings".

7.2.6.5. Screwed Cast Iron Water Fittings

(1) Screwed cast iron water fittings shall conform to ANSI B16.4, "Cast 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 ANSI 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. (See Appendix A.)

(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, "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 CAN3-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*.

7.2.7. 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 ANSI B16.24, "Bronze Pipe Flanges and Flanged Fittings (Class 150 and 300)".

7.2.7.3. Brass or Bronze Threaded Water Fittings

(1) Brass or bronze threaded water fittings shall conform to ANSI B16.15, "Cast Bronze 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.

(3) Copper tube used in a *plumbing appliance* shall conform to
(a) ASTM B88 "Seamless Copper Water Tube", or
(b) ASTM B68 "Seamless Copper Tube".

7.2.7.5. Solder-Joint Drainage Fittings

(1) Solder-joint fittings for *drainage systems* shall conform to
(a) CSA B158.1, "Cast Brass Solder Joint Drainage, Waste and Vent Fittings", or
(b) ANSI 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*.

Table 7.2.7.4.
Permitted Use of Copper Tube and Pipe
Forming Part of Sentence 7.2.7.4.(2)

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

Notes to Table 7.2.7.4.:
P-Permitted N-Not Permitted

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) ANSI B16.18, "Cast Copper Alloy Solder Joint Pressure Fittings", or

(b) ANSI 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 ANSI B16.18, "Cast Copper Alloy Solder Joint Pressure Fittings".

7.2.7.7. Flared-Joint Fittings for Copper Water Systems

(1) Flared-joint fittings for copper tube *water systems* shall conform to ANSI 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 ANSI 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 conform to CSA B67, "Lead Service Pipe, Waste Pipe, Traps, Bends and Accessories".

(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.

(3) Lead *waste pipe* and fittings shall not be used in a *water system* or for a *building sewer*.

7.2.7.9. Aluminum DWV Pipe and Components

(1) Drainage piping and vent piping made of aluminum and its components shall be certified to CAN/CSA-B281, "Aluminum Drain, Waste, and Vent Pipe and Components".

(2) Aluminum DWV pipe shall not be used in *water systems*.

(3) Aluminum drain *waste* and *vent pipe* to be buried underground shall be protected by a factory applied coating in accordance with CAN/CSA-B281, "Aluminum Drain, Waste, and Vent Pipe and Components".

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 A518M, "Specification for Corrosion-Resistant High-Silicon Iron Castings",

(b) ASTM C1053, "Specification for Boronsilicate Glass Pipe and Fittings for Drain, Waste, and Vent (DWV) Applications", or
(c) CAN/CSA-B181.3, "Polyolefin 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. Wiping Solder and Caulking Lead

(1) Wiping solder and caulking lead shall conform to CSA B67, "Lead Service Pipe, Waste Pipe, Traps, Bends and Accessories".

(2) Solders for solder joint fittings shall conform to ASTM B32, "Solder Metal" in accordance with the recommended use.

(3) Solders and fluxes having a lead content in excess of 0.2 per cent shall not be used in a *potable water system*.

7.2.10. Miscellaneous Materials

7.2.10.1. Brass 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, "ABS Drain, Waste, and Vent Pipe and Pipe Fittings".

(3) PVC floor flanges shall be certified to CAN/CSA-B181.2, "PVC 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. Brass Screws, Bolts, Nuts and Washers

(1) Every screw, bolt, nut and washer shall be of brass or equally corrosion resistant material when used
(a) to connect a water closet to a water closet flange,
(b) to anchor the water closet 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. Groove and Shoulder Type Mechanical Pipe 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 CAN/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 eight inches 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 and waste fittings shall be certified to CAN/CSA-B125, "Plumbing Fittings".

7.2.10.7. Reserved. *

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) CAN/CSA-B64.0, "Definitions, General Requirements and Test Methods for Vacuum Breakers and Backflow Preventers",
(b) CAN/CSA-B64.1.1, "Vacuum Breakers, Atmospheric Type (AVB)",
(c) CAN/CSA-B64.1.2, "Vacuum Breakers, Pressure Type (PVB)",
(d) CAN/CSA-B64.2, "Vacuum Breakers, Hose Connection Type (HCVB)",
(e) CAN/CSA-B64.2.1, "Vacuum Breakers, Hose Connection Type (HCVB) with Manual Draining Feature,"
(f) CAN/CSA-B64.2.2, "Vacuum Breakers, Hose Connection type (HCVB) with Automatic Draining Feature,"
(g) CAN/CSA-B64.3, "Backflow Preventers, Dual Check Valve with Atmospheric Port Type (DCAP)",
(h) CAN/CSA-B64.4, "Backflow Preventers, Reduced Pressure Principle Type (RP)",
(i) CAN/CSA-B64.5, "Backflow Preventers, Double Check Valve Type (DCVA)",
(j) CAN/CSA-B64.6, "Backflow Preventers, Dual Check Valve Type (DuC)",
(k) CAN/CSA-B64.7, "Vacuum Breakers, Laboratory Faucet Type (LFVP)",
(l) CAN/CSA-B64.8, "Backflow Preventers, Dual Check with Intermediate Vent Type (DuCV)", or
(m) CAN/CSA-B64.10, "Backflow Prevention Devices - Selection, Installation, Maintenance and Field Testing".

(2) *Back-siphonage preventers* for tank type water closets shall be certified to CAN/CSA-B125, "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 CAN1-4.4, "Temperature, Pressure, Temperature and Pressure Relief Valves and Vacuum Relief Valves", or ANSI Z21.22, "Relief Valves and Automatic Gas Shut-off Devices 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 CSA-B356, "Water Pressure Reducing Valves for Domestic Water Supply Systems".

7.2.10.13. Solar Domestic Hot Water

(1) Equipment for solar heating of *potable* water shall conform to CAN/CSA-F379.1, "Solar Domestic Hot Water Systems (Liquid to Liquid Heat Transfer)".

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 (0.013 in) thick,
(b) aluminum sheet at least 0.61 mm (0.024 in) thick,
(c) alloyed zinc sheet at least 0.35 mm (0.014) thick,
(d) lead sheet at least 2.16 mm (3/32 in) thick,

(e) galvanized steel sheet at least 0.41 mm (0.016 in) thick, or

(f) polychloroprene (neoprene) at least 2.89 mm (⅛ in) thick.

(2) Prefabricated flashing for *vent pipes* shall be certified to CSA B272, "Prefabricated Self-Sealing Vent Flashings". (See Article 7.5.5.5. for location of vent pipe terminals)

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., 7.2.11.3., 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, "Standard for the 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.

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.

Table 7.2.11.2.
Water Service Pipe and Fire Service Main Materials
Forming Part of Sentence 7.2.11.2.(1)

Material	Standard	Limitations
Polyethylene pipe and fittings	certified to CAN/CSA-B137.1, "Polyethylene Pipe, Tubing and Fittings for Cold Water Pressure Services"	Pipe and fittings must have a rated working pressure of 1034 kPa (150 psi) or more. Can only be used in underground installations.
Cross-linked polyethylene pressure pipe or tube and fittings	certified to CAN/CSA-B137.5, "Cross-linked Polyethylene (PEX) Tubing Systems for Pressure Applications"	
PVC pipe and fittings	certified to CAN/CSA-B137. 3, "Rigid Poly (Vinyl Chloride) (PVC) Pipe for Pressure Applications", or certified to CAN/CSA-B137.2, "PVC Injection-Moulded Gasketed Fittings for Pressure Applications"	Pipe and fittings must have a rated working pressure of 1034 kPa (150 psi) or more
CPVC pipe and fittings	certified to CAN/CSA-B137.6, "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, "CPVC Pipe, Tubing and Fittings for Hot and Cold Water Distribution Systems"
Polybutylene pipe and fittings	certified to CAN/CSA-B137.7, "Polybutylene (PB) Piping for Cold Water Distribution Systems"	Pipe must have an SDR of 11 or less
Cast iron water pipe	conform to ANSI/AWWA C151/A21.51, "Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids"	Pipe shall have a cement mortar lining conforming to ANSI/AWWA C104/A21.4, "Cement-Mortar Lining for Ductile-Iron and Gray-Iron Pipe and Fittings for Water"
Column 1	2	3

Table 7.2.11.2. (Cont'd)
Water Service Pipe and Fire Service Main Materials
Forming Part of Sentence 7.2.11.2.(1)

Material	Standard	Limitations
Iron fittings for cast iron or ductile-iron water pipes	conform to ANSI/AWWA C110/A21.10, "Ductile-Iron and Gray-Iron Fittings, 3-in. Through 48 in., for Water and Other Liquids"	Pipe shall have a cement mortar lining conforming to ANSI/AWWA C104/A21.4, "Cement-Mortar Lining for Ductile-Iron and Gray-Iron Pipe and Fittings for Water"
Rubber gasket joints for cast iron and ductile-iron water pipes	conform to ANSI/AWWA C111/A21.11, "Rubber Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings"	
Screwed cast iron water fittings	conform to ANSI B16.4, "Cast Iron Threaded Fittings (Classes 125 and 250)"	Screwed cast iron water fittings shall be cement-mortar lined or galvanized
Type K soft copper tube	certified to ASTM B88, "Seamless Copper Water Tube"	
Solder-joint fittings for copper water systems	conform to ANSI B16.18, "Cast Copper Alloy Solder Joint Pressure Fittings", or conform to ANSI 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 ANSI B16.18, "Cast Copper Alloy solder Joint Pressure Fittings"
Flared-joint fittings for copper water systems	conform to ANSI B16.26, "Cast Copper Alloy Fittings for Flared Copper Tubes"	Flared-joint fittings not made by casting shall conform to ANSI B16.26, "Cast Copper Alloy Fittings for Flared Copper Tubes"
PE/AL/PE pipe and fittings	certified to CAN/CSA B137.9, "Polyethylene/ Aluminum/ Polyethylene Composite Pressure Pipe Systems"	
PEX/AL/PEX pipe and fittings	certified to CAN/CSA B137.10, "Crosslinked Polyethylene/ Aluminum/Crosslinked Polyethylene Composite Pressure Pipe Systems"	
Column 1	2	3

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 (1 in).

(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 (¾ in) wide, and
(c) be at least 10 mm (⅜ in) thick at the thickest part.

(3) Every wiped flanged joint shall be reinforced with a lead flange that is at least 19 mm (¾ in) 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.

(3) Aluminum DWV pipe shall not be used with a screwed joint.

7.3.2.4. Solder Joints

(1) In making a soldered joint the surface to be soldered shall be cleaned bright and the joint shall be properly fluxed, made with solder and thoroughly cleaned of all residue.

(2) Aluminum DWV pipe shall not be used with soldered joints.

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. Burned Lead Joints

(1) In making a burned lead joint the lead shall be lapped and fused to form a weld that is at least 1½ times as thick as the wall of the pipe.

(2) In lead pipe the width of the weld shall be at least
(a) 13 mm (½ in) where the *size* of the pipe is less than 3 in.,
(b) 16 mm (⅝ in) where the *size* of the pipe is 3 in., or
(c) 19 mm (¾ in) where the *size* of the pipe is 4 in.

(3) In sheet lead the width of the weld shall be as specified in Table 7.3.2.6.

Table 7.3.2.6.
Minimum Permitted Width of Weld for Sheet Lead
Forming Part of Sentence 7.3.2.6.(3)

Weight of Sheet Lead, kg/m² (lb/ft²)	Minimum Width of Weld, mm (in)
12.2 to 14.6 (2.5 to 3)	6 (¼)
19.5 to 24.4 (4 to 5)	10 (⅜)
29.3 to 39.1 (6 to 8)	20 (¾)
48.8 to 58.6 (10 to 12)	25 (1)
58.6 to 146.5 (12 to 30)	32 (1¼)
Column 1	2

7.3.2.7. 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.

7.3.2.8. Cold-Caulked Joints

(1) Cold-caulked joints shall not be used except for bel 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 (1 in).

(4) Every cold-caulked joint in a *water system* shall be made by tightly caulking the entire depth of the socket with caulking compound.

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.

(3) Aluminum DWV pipe 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. Burned Lead Joints

(1) Every joint in hard lead shall be made with a burned lead joint.

7.3.3.7. Dissimilar Connections

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

7.3.3.8. Connection of Roof Drain to Leader

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

7.3.3.9. 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, 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 shall be securely set on a firm base and bolted to the *trap* flange of the *fixture*, and every joint shall be sealed with a natural rubber, synthetic rubber or asbestos graphite gasket, or with a closet setting compound.

(5) Where a lead water closet stub is used, the length of the stub below the floor flange shall be at least 75 mm (3 in).

7.3.3.10. 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 movement of the *soil*.

7.3.3.11. Copper Tube

(1) Types M and DWV copper tube shall not be bent.

(2) Aluminum DWV pipe shall not be bent.

(3) Bends in copper tubing of soft or bending temper shall be made with tools manufactured and sized for the purpose.

7.3.3.12. 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 (1 in).

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 to prevent galvanic action.

(2) Where a hanger or support for aluminum DWV pipe is of a metal other than aluminum, the hanger or support shall be suitably separated and electrically insulated from the pipe.

7.3.4.4. Support for Vertical Piping

(1) Except as provided in Sentences (2) and (3), vertical piping shall be supported at its base and at the floor level of alternate *storeys* by metal rests, each of which can bear the weight of pipe that is between it and the metal rest above it.

(2) The maximum spacing of supports shall be 7.5 m (24 ft 7 in).

(3) The maximum spacing of supports for PE/AL/PE and PEX/AL/PEX composite pipe shall be 2 500 mm (8 ft 2 in).

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 (12 ft 4 in) if the pipe *size* is 6 in. or more, and
  (ii) 2 500 mm (8 ft 2 in) 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 (9 ft 10 in), and
  (iii) at intervals not exceeding 1 000 mm (3 ft 3 in) if the pipe has mechanical joints and the length of pipe between adjacent fittings is 300 mm (11¾ in) or less,

(d) asbestos-cement pipe is supported
  (i) at intervals not exceeding 2 000 mm (6 ft 7 in) or have two supports for every 4 m (13 ft 1 in) length of pipe, and
  (ii) at intervals not exceeding 1 000 mm (3 ft 3 in) where the length of pipe between adjacent fittings is 300 mm (11¾ in) or less,

(e) ABS or PVC plastic DWV pipe is supported
  (i) at intervals not exceeding 1 200 mm (3 ft 11 in),
  (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 (3 ft 3 in) in length, as close as possible to the *trap*,

(f) plastic water pipe is supported at intervals not exceeding 1 000 mm (3 ft 3 in),

(g) copper tube and copper and brass pipe is supported at intervals not exceeding
  (i) 3 m (9 ft 10 in) if the tube or pipe is hard temper and larger than 1 in. in *size*,
  (ii) 2 500 mm (8 ft 2 in) if the tube or pipe is hard

temper and 1 in. in *size* or less, and
(iii) 2 500 mm (8 ft 2 in) if the tube is soft temper,

(h) aluminum DWV pipe is supported
(i) at intervals not greater than 3 m (9 ft 10 in),
(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 (3 ft 3 in), and

(l) PP-R plastic pipe is supported
(i) at intervals not exceeding 1 000 mm (3 ft 3 in),
(ii) at the end of *branches*, and
(iii) at changes of direction and elevation.

(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) Where hangers are used to support *nominally horizontal* piping they shall be
(a) metal rods of at least 9.5 mm (3/8 in) diam. for pipe over 4 in. in *size*, and
(b) solid or perforated metal strap hangers for pipe 4 in. or less in *size*.

(5) 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. (See Appendix A.)

(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 keeping the pipe in alignment and supporting the weight of the pipe, its contents and 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. (See Article 7.5.5.5. for location of vent pipe terminals)

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 (See Appendix A.)

(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 (1450 psi) 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 (11¾ in) over the top of the pipe and shall be free of stones, boulders, cinders and frozen earth. (See Appendix A.)

7.3.5.2. Protection of Non-Metallic Pipe

(1) Where asbestos-cement drainage pipe or vitrified clay is located less than 600 mm (23⅝ in) below a basement floor and the floor is constructed of other than 75 mm (3 in) or more of concrete, the pipe shall be protected by a 75 mm (3 in) 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 frost. (See Appendix A.)

7.3.5.5. Protection from Mechanical Damage

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

7.3.5.6. Spatial Separation

◆ (1) Except as permitted in Sentence (2), 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 (8 ft) measured horizontally, of undisturbed or compacted earth.

(2) The *water service pipe* may be closer than 2 440 mm (8 ft) or be placed in the same trench with the *building drain* or *building sewer* if,

(a) (i) the bottom of the *water service pipe* at all points is at least 500 mm (19¾ in) 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 (50 psi).

(3) 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 (49 ft 3 in) 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.

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

(1) Where a water test is made it shall be applied to
(a) the system as a whole, or
(b) sections of the system, each of which is at least 3 m (9 ft 10 in) high and includes at least 1 500 mm (4 ft 11 in) of the section below.

(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
(a) every opening in the system shall be closed,
(b) air shall be forced into the system until a pressure of 35 kPa (5.1 psi) is created, and
(c) this pressure shall be maintained for 15 min without the addition of more air.

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 (1 in) water column shall be maintained for 15 min without the addition of more smoke.

(2) The smoke referred to in Clauses 7.3.6.6.(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 (1 in) 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 (2 in) 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*, all other *plumbing* work shall be tested and inspected, and 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 1000 kPa (145 psi) 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 (102 psi).

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 7.1.5.2.(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 a HVAC system or equipment.

(e) *fixtures* that have a hydraulic load totaling not more than 1½ *fixture units* may be connected to a vertical section of a *circuit vent* provided
  (i) the *fixtures* are located in the same *storey* as the *fixtures* served by the *vent pipes*,
  (ii) not more than 2 *fixtures* are connected to the *vent pipe*, and
  (iii) where 2 *fixtures* are connected to the *vent pipe*, the connection is done with a double fitting in conformance with Table 7.2.4.5.,

(f) *fixtures* that have a hydraulic load totaling not more than 1½ *fixture units* may be connected to the vertical section of a *yoke vent* provided
  (i) not more than 2 *fixtures* are connected to the *vent pipe*, and
  (ii) where 2 *fixtures* are connected to the *vent pipe*, the connection is done with a double fitting in conformance with Table 7.2.4.5., and

(g) *fixtures* may be connected to a *vent stack* provided
  (i) the total hydraulic load of the connected *fixtures* does not exceed 8 *fixture units*,
  (ii) at least 1 *fixture* is connected to a vertical portion of the *vent stack* and upstream of any other *fixtures*,
  (iii) no other *fixture* is connected downstream of a water closet, and
  (iv) all *fixtures* are located in the lowest *storey* served by the *vent stack*.

(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 (4 ft 11 in) 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.

7.4.2.2. Connection of Overflows from Rainwater Tanks

(1) An overflow from a rainwater tank shall not be *directly connected* to a *storm drainage system*.

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 1¼ in., and

(b) is terminated above the *flood level rim* of a *directly connected fixture* with a minimum diameter waste of 1½ in. to form an *air break*.

(2) *Fixture drains* from *fixtures* that are listed in Subclauses (i) and (ii) of Clause 7.4.2.1.(1)(d) 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 (iii) to (vi) of Clause 7.4.2.1.(1)(d) 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), garbage grinders, potato peelers and other similar types of equipment shall not be located upstream of an *interceptor*.

(2) If a food scrap *interceptor* has been installed upstream of the grease *interceptor*, garbage grinders, potato peelers and other similar equipment may discharge through a grease *interceptor*.

7.4.3.4. Fixtures Located in Chemical Storage Locations and Elevator Pits

(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*.

(2) If a floor drain is provided in an elevator pit, it shall be installed in accordance with Section 2.7. of the CAN/CSA-B44, "Safety Code for Elevators, Escalators, Dumbwaiters, Moving Walks and Freight Platform Lifts".

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. (See Appendix A.)

7.4.4.3. Interceptors (See Appendix A.)

(1) Except for *suites* of *residential occupancy*, a grease *interceptor* shall be required anywhere that food is cooked, processed or prepared.

(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:

$$Q=(\sum_{1}^{N}(0.75\frac{V}{DDT}))+PD$$

Where Q is the flow rate to a grease *interceptor* in *L*/s.
Where V is the volume of the *fixture* in *l*.
Where DDT is the drain down time, 60 or 120 seconds (1 or 2 minutes)
Where PD is any pump discharge in *L*/s.
Where 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 which shall be 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.

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, and
(b) at least 900 mm (2 ft 11 in) above or at least 3.5 m (11 ft 6 in) in any other direction from any air inlet, openable window or door, and at least 2 000 mm (6 ft 7 in) 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 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 (See Appendix A.)

(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 *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.

7.4.6.4. Protection from Backflow

(1) A *backwater valve* or a gate valve shall not be installed in a *building drain* or in a *building sewer*.

(2) Except as provided in Sentences (3), (4) and (5), where a *building drain* or a *branch* may be subject to *backflow*, a gate valve or a *backwater valve* shall be installed on every *fixture drain* connected to them when the *fixture* is located below the level of the adjoining street. (See Appendix A.)

(3) Where the *fixture* is a floor drain, a removable screw cap or other device may be installed on the upstream side of the *trap*.

(4) Where more than one *fixture* is located on a *storey* and all are connected to the same *branch*, the gate valve or *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 (3 ft 3 in) 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 (3 ft 3 in) 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 *fixture drain* serving a kitchen sink.

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 (19 ft 8 in),
(b) in the case of a horizontal *sanitary drainage pipe*, or *storm drainage pipe*, other than a *waste pipe* from a sink, 15 m (49 ft 3 in), and
(c) in the case of a horizontal *sanitary drainage pipe* or *storm drainage pipe* larger than 4 in. *size*, 30 m (98 ft 5 in).

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

(a) 24 in. or less in *size* shall not exceed 90 m (295 ft 3 in), and
(b) over 24 in. in *size* shall not exceed 150 m (492 ft 2 in).

(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 (98 ft 5 in).

(4) *Cleanouts* capable of rodding in one direction only shall be installed to rod in the direction of flow.

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

(6) Manholes shall be located at changes of grade, *size*

or alignment (except for curvilinear alignment) on a *storm building sewer*.

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 (3 ft 3 in), 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 (3 ft 11 in), except that the top 1 500 mm (4 ft 11 in) may be tapered from 1 200 mm (3 ft 11 in) down to a minimum of 600 mm (23⅝ in) 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 rodding and cleaning purposes. (See Appendix A.)

(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 is 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*.

7.4.8. Minimum Slope and Length of Drainage Pipes

7.4.8.1. Minimum Slope

(1) Every drainage pipe that has a *size* of 3 in. or less, and every *fixture drain* shall have a downward slope in the direction of flow of at least 1 in 50. (See Appendix A.)

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

7.4.8.2. Length of Fixture Outlet Pipe

(1) Except as provided in Sentence 7.4.5.1.(3) the *developed length* of every *fixture outlet pipe* shall not exceed 900 mm (2 ft 11 in).

7.4.9. Size of Drainage Pipes

7.4.9.1. No Reduction in Size

(1) No *soil* or *waste pipe* that is of minimum *size* required by this Code 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.

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 branch* 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 6 water closets shall be at least 4 in.

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. (See Appendix A.)

(2) The part of the *fixture outlet pipe* that is common to 3 compartments of a sink shall be one *size* larger than the largest *fixture outlet pipe* of the compartments that 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. *size*.

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

Table 7.4.9.3.
Minimum Permitted Size of Fixture Outlet Pipe and Hydraulic Loads for Fixtures
Forming Part of Sentence 7.4.9.3.(1) and 7.4.10.2.(1)

Fixture	Min. *Size* of *Fixture Outlet Pipe*, in.	Hydraulic Load, *fixture units*
Autopsy table	1½	2
Bathroom group		
(a) with flush tank		6
(b) with direct flush valve		8
Bathtub (with or without shower)	1½	1½
Bath: foot, sitz or slab	1½	1½
Bed pan washer	3	6
Beer cabinet	1½	1½
Bidet	1¼	1
Chinese range	1½	3
Clothes washer		
(a) domestic	N/A	1½ with 1½ in. *trap*
(b) commercial	N/A	2 with 1½ in. *trap*
Dental unit or cuspidor	1¼	1
Dishwasher		½
(a) domestic	1½	no load when connected to garbage grinder or domestic sink
(b) commercial type	2	3
Drinking fountain	1¼	½
Fish tank or tray	1½	1½
Floor drain	2	2 with 2 in. *trap* 3 with 3 in. *trap*
Garbage grinder, commercial type	2	3
Icebox	1¼	1
Laundry tray		
(a) single or double units or 2 single units with common *trap*	1½	1½
(b) 3 compartments	1½	2
Lavatory		
(a) barber or beauty parlor	1½	1½
(b) dental	1¼	1
(c) domestic type single, or 2 single with common *trap*	1¼	1 with 1¼ in. *trap* 1½ with 1½ in. *trap*
(d) multiple or industrial type	1½	3
Potato Peeler	2	3
Shower drain		
(a) from 1 head	1½	1½
(b) from 2 or 3 heads	2	3
(c) from 4 to 6 heads	3	6
Sink		
(a) domestic and other small type with or without garbage grinders, single, double or 2 single with a common *trap*	1½	1½
(b) other sinks	1½	1½ with 1½ in. *trap* 2 with 2 in. *trap* 3 with 3 in. *trap*
Column 1	2	3

Table 7.4.9.3. (Cont'd)
Minimum Permitted Size of Fixture Outlet Pipe and Hydraulic Loads for Fixtures
Forming Part of Sentence 7.4.9.3.(1) and 7.4.10.2.(1)

Fixture	Min. *Size* of *Fixture Outlet Pipe*, in.	Hydraulic Load, *fixture units*
Urinal		
(a) pedestal, siphon jet or blowout type	2	4
(b) stall, washout type	2	2
(c) wall		
(i) washout type	1½	1½
(ii) other types	2	3
Water closet		
(a) with flush tank	3	4
(b) with direct flush	3	6
Column 1	2	3

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, and
(b) every *fixture* for which provision is made for future connection 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 *size* of the *trap* that serves the *fixture*.

7.4.10.3. Fixture Loading for Horizontal Drain

(1) No horizontal *sanitary drainage pipe* of less than 3 in. *size* shall have a *fixture* loading in excess of that permitted by Table 7.4.10.3.A.

(2) Reserved.

(3) The horizontal *sanitary drainage pipe size* shall be that *size* determined from Table 7.4.10.3.C. after the total connected load in *fixture units* on a horizontal *sanitary drainage pipe* is converted to gallons per minute in accordance with Table 7.4.10.3.B.

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

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)

Size of *Trap*, In.	Hydraulic Load, *fixture units*
1¼	1
1½	2
2	3
2½	4
3	5
4	6
Column 1	2

Table 7.4.10.3.A.
Maximum Permitted Hydraulic Load Drained to a Branch
Forming Part of Sentence 7.4.10.3.(1)

Size of *Branch*, In.	Maximum Load, *fixture units*
1¼	2
1½	4
2	6
Column 1	2

Table 7.4.10.3.B.
Maximum Probable Drainage Rate, gal/min
Forming Part of Sentences 7.4.10.3.(3), 7.4.10.4.(1), 7.4.10.5.(3)

Fixture Units in Service	*Fixture Units* Col. 1	*Fixture Units* Col. 1 x 10	*Fixture Units* Col. 1 x 100
100	53	174	900
90	51	164	835
80	49	153	750
70	47	140	680
60	44	128	600
50	41	115	520
40	38	102	435
30	33	88	350
20	27	72	262
10	21	53	174
Column 1	2	3	4

Notes to Table 7.4.10.3.B.:
(See Appendix A.)

7.4.10.4. Hydraulic Loads from Continuous Flows

(1) For the purposes of determining the *size* of *sanitary drainage pipe* in accordance with Table 7.4.10.3.C. pumped discharge and other continuous or semi-continuous flows shall be calculated in gallons per minute and added to the drainage rate in gallons per minute from Table 7.4.10.3.B.

7.4.10.5. Hydraulic Loads for Vertical Drains

(1) No vertical *waste pipe*, *branch* or stack of less than 3 in. diameter shall have a hydraulic load in excess of that permitted by Table 7.4.10.5.A.

Table 7.4.10.3.C.
Capacity of Horizontal Drainage Pipe, gal/min
Forming Part of Sentences 7.4.10.3.(3) and 7.4.10.4.(1)

Drain *Size*, Nominal in.	Loading	Slope(1)					
		1:400	1:200	1:125	1:100	1:50	1:25
3	65% Full					46	67
4	65% Full				63	91	132
5	65% Full		81	96	116	165	240
6	65% Full	94	127	156	185	272	396
8	65% Full	182	269	341	390	578	835
10	65% Full	347	507	618	735	1050	1540
12	65% Full	585	825	975	1180	1750	2460
15	65% Full	720	1010	1180	1390	1990	2790
Col. 1	2	3	4	5	6	7	8

Notes to Table 7.4.10.3.C.:
(1) Slope is the ratio of rise to run, in whatever measurement units are chosen.

(2) Reserved.

(3) The vertical *sanitary drainage pipe size* shall be that *size* determined from Table 7.4.10.5.B. after the total connected load in *fixture units* on a vertical drainage pipe is converted to gallons per minute in accordance with Table 7.4.10.3.B.

(4) Vertical *sanitary drainage pipe* shall be designed to carry no more than 33% of its full capacity.

Table 7.4.10.5.A.
Maximum Load on Vertical Drainage Pipe, fixture units
Forming Part of Sentence 7.4.10.5.(1)

Pipe *Size*, in.	Stack Height 3 *Storeys* or less	Stack Height more than 3 *Storeys*	For Each *Storey* in Stack of more than 3 *Storeys*
1¼	3	3	3
1½	8	8	5
2	16	24	10
Column 1	2	3	4

Table 7.4.10.5.B.
Maximum Load on Vertical Drainage Pipe in GPM and Maximum Length of Vent Stacks
Forming Part of Sentences 7.4.10.5.(3), 7.5.3.2.(3) and 7.5.7.2.(1)

Stack *Size*, in. (Drain)	Water Occupied Area	Flow Rate, gal/min	*Vent Stack Size*, in. and Maximum Length, metres										
			1½	2	2½	3	4	5	6	8	10	12	14
3	0.15	18.4	12.8	44.2	108.0	317.0							
	.20	29.4	9.8	33.5	82.3	245.4							
	.25	43.0	8.2	28.7	70.1	207.3							
	.29	55.7	7.6	26.2	64.0	189.0							
	.30	58.4	7.3	25.9	62.5	185.9							
	.33	69.5	7.0	24.7	61.0	178.3							
4	0.15	39.6		10.7	25.9	76.2	297.2						
	.20	64.0		8.2	19.8	59.4	228.6						
	.25	92.5		7.0	16.8	50.3	193.5						
	.29	120.0		6.4	15.2	45.7	176.8						
	.30	126.0		6.1	14.9	44.8	173.7						
	.33	150.0		5.8	14.3	42.7	166.1						
5	0.15	72.0			8.5	25.0	97.5	300.2					
	.20	116.0			6.4	19.2	74.7	231.6					
	.25	168.0			5.5	16.2	63.1	195.1					
	.29	217.0			4.9	14.9	57.6	178.3					
	.30	228.0			4.9	14.6	56.7	175.3					
	.33	272.0			4.6	14.0	54.6	169.2					
6	0.15	117.0				10.1	39.6	121.9	304.8				
	.20	189.0				7.9	30.5	94.5	236.2				
	.25	274.0				6.7	25.6	79.2	199.6				
	.29	354.0				6.1	23.5	73.2	181.4				
	.30	370.0				5.8	23.2	71.6	179.8				
	.33	441.0				5.8	22.3	68.6	172.2				
8	0.15	251.0					9.4	29.0	73.2	286.5			
	.20	406.0					7.3	22.3	56.4	219.5			
	.25	589.0					6.1	18.9	47.2	185.9			
	.29	762.0					5.5	17.1	42.7	169.2			
	.30	798.0					5.5	17.1	42.7	167.6			
	.33	950.0					5.2	16.2	41.1	160.0			
10	0.15	455.0						9.4	23.8	93.0	292.6		
	.20	736.0						7.3	18.3	71.6	224.0		
	.25	1070.0						6.1	15.5	61.0	190.5		
	.29	1380.0						5.5	14.0	54.9	173.7		
	.30	1440.0						5.5	14.0	54.9	170.7		
	.33	1730.0						5.2	13.4	51.8	163.1		
12	0.15	740.0							9.4	36.6	115.8	286.5	
	.20	1200.0							7.3	28.7	89.9	219.5	
	.25	1730.0							6.1	24.1	76.2	185.9	
	.29	2240.0							5.5	21.9	68.6	169.2	
	.30	2350.0							5.5	21.6	68.6	167.6	
	.33	2800.0							5.2	20.7	65.5	160.0	
15	0.15	1340.0								12.2	38.1	93.0	146.3
	.20	2170.0								9.4	29.3	71.6	112.8
	.25	3140.0								7.9	24.7	61.0	94.5
	.29	4070.0								7.3	22.6	54.9	88.4
	.30	4260.0								7.0	22.3	54.9	85.3
	.33	5080.0								6.7	21.3	51.8	82.3
Column 1	2	3	4	5	6	7	8	9	10	11	12	13	14

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 (2) and (3) and Article 7.5.2.1., every *trap* shall be vented.

(2) A *trap* that serves a floor drain or *hub drain*, *directly connected* to a *sanitary building drain* is not required to be vented where

(a) the *size* of the *trap* is at least 3 in.,
(b) the length of the *fixture drain* is at least 900 mm (2 ft 11 in),
(c) the total fall on the *fixture drain* does not exceed its inside diameter, and
(d) the minimum slope on a 3 in. *fixture drain* is 1 in 50 and on *sizes* larger than 3 in. is 1 in 100.

(3) A *trap* is not required to be vented where

(a) it serves a *subsoil drainage pipe*,
(b) it serves a *storm drainage system*, or
(c) it forms part of an indirect *drainage system*, less than three *storeys* high.

7.5.2. Stack Venting & Modified Stack Venting, Circuit Venting and Relief Venting

7.5.2.1. Vertical Stacks

(1) A vertical *soil stack* that is not less than 3 inches diameter that is extended as a *stack vent* shall be deemed to vent a *fixture trap* where the connection of the *fixture drain* meets the following requirements:

(a) the number of *stack vented fixtures* connected to one stack above the water closet is not greater than 4,
(b) all *fixtures* of the *stack vented* group numbering four or less above the water closet are on the same floor level or *storey* and the stack receives no waste at a higher level,
(c) the number of *stack vented* water closets is not greater than 2,
(d) where two water closets are installed they are connected at the same level to a vertical part of the stack,
(e) where there are two water closets in a *stack vented* group and they are installed as described in Clause (d), the remaining *fixtures* of the group are connected directly and independently to the stack above the centre-line of the connection of the two water closets and the uppermost *fixture* is connected to the vertical portion of the stack,
(f) where there is only one water closet in the *stack vented* group it is connected to the vertical stack or the horizontal continuation of the stack and the remaining *fixtures* upstream of the water closet are connected directly and independently to the stack and the uppermost *fixture* is connected to the vertical portion of the stack,
(g) the total number of *fixture units* connected above the water closet is not greater than 8, and
(h) no *fixture drain* connected above the water closet is of more than 2 in. trade *size* and is not serving a siphonic *trap*.

7.5.2.2. Horizontal Branches and Relief Vents

(1) A *horizontal branch* off a stack or off a *sanitary building drain* may be *circuit vented* where

(a) the *circuit vented branch* is of a *size* 3 in. or greater,
(b) the number of *circuit vented fixtures* is less than 7 per vent and in any group of 6 or less *circuit vented fixtures* all but the last of the group are downstream of the point where the *circuit vent* connects to the *branch*,
(c) the *circuit vented fixture* is a *sanitary unit*, floor drain, *hub drain*, shower drain or *trap standard* slop sink,
(d) all *fixtures* connected to the *circuit vented branch* are on the same floor level,
(e) no *soil* or *waste stack* connects to the *circuit vented branch*,
(f) no *circuit vented trap* has a horizontal run of *waste pipe* of more than 1 500 mm (4 ft 11 in), and
(g) in a water closet installation, no *circuit vented trap* has a horizontal run of *waste pipe* of more than 1 500 mm (4 ft 11 in) nor a vertical run of more than 900 mm (2 ft 11 in).

(2) Where a stack or a *sanitary building drain* has a *circuit vented branch* connected to it and the stack or *sanitary building drain* carries more than eight *fixture units* of drainage upstream of the connection or has connected to it a *sanitary drainage pipe* larger than 2 in. *size* or receives drainage from a higher floor level, the *circuit vented branch* shall be *relief vented*.

(3) A *relief vent* required by Sentence (2) may be a *wet vent* if it is of 2 in. *size* or greater and not more than one

fixture having a maximum of 1½ *fixture units* is drained into it.

(4) Where *circuit vented fixture traps* are connected to 2 or more *horizontal branches* that connect to the same *horizontal branch*, the *horizontal branches* may have a combined *relief vent*.

7.5.3. Vent Pipes for Soil or Waste Stacks

7.5.3.1. 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*.

7.5.3.2. Vent Stacks

(1) Except as provided in Sentence (2), where *back vents*, *relief vents* or *circuit vents* are installed in two or more *storeys* served by a *soil stack* or *waste stack*, a *vent stack* shall be installed in conjunction with the *soil* or *waste stack*.

(2) A *vent stack* is not required to be installed in conjunction with the *soil* or *waste stack* in a residential *building* of 3 *storeys* or less.

(3) A *vent stack* shall
(a) have its lower end connected to
  (i) the *waste stack* or *soil stack* at or below the lowest horizontal *sanitary drainage pipe* connected to the *waste stack* or *soil stack*, or
  (ii) the *sanitary building drain* immediately downstream of the stack connection;
(b) extend to the *open air* independently or through a *header*;
(c) except as provided for in Clause (d), where it is connected to the *soil stack*, *waste stack* or *sanitary building drain*, of a *size* and length as determined from Table 7.4.10.5.B.; and
(d) at each point of interconnection with a *branch vent* be not smaller than the minimum *size* permitted by Table 7.5.7.2.

(4) Where a *plumbing system* is installed in a *building*, every *storey* in which *plumbing* is or may be installed, including the basement of a single family dwelling, shall have extended into it or passing through it a *vent pipe* that is at least 1½ in. *size* for the provision of future connections.

(5) Where a single family dwelling, built prior to the 7th day of April, 1976, has a *vent pipe* installed in the basement that is at least 1¼ in. trade *size* and there is no larger *vent pipe* in the area, the 1¼ in. pipe may be used to vent one water closet and one wash basin, where both *fixtures* are located in the basement and where the vent connecting the water closet or the wash basin and the water closet to the *vent pipe*, is at least 1½ in. trade *size*.

(6) Where a *vent stack* is installed as a result of additions or alterations to a *plumbing system* in an existing *building*, the *vent stack* may be erected outside the *building*, provided that
(a) no single change of direction of the stack exceeds 45°,
(b) all parts of the stack are vertical,
(c) the stack terminates above the roof of the *building* where the *building* is 4 *storeys* in height or less, and
(d) the requirements set out in Sentence 7.5.5.5.(3) are met.

7.5.3.3. Yoke Vents

(1) Except as provided in Sentence (4), where a *soil stack* or a *waste stack* receives the discharge from *fixtures* located on more than eleven *storeys*, a *yoke vent* shall be installed
(a) for each section of five *storeys* or part thereof counted from the top down, and
(b) at or immediately above each *offset* or double *offset*.

(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 section described in Sentence (1).

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

(4) A *yoke vent* is not required to be installed where the *soil* or *waste stack* is interconnected to the *vent stack* in each *storey* by means of a *fixture* or a group of vented *fixtures* installed in accordance with Subsection 7.5.2.

7.5.4. Miscellaneous Vent Pipes

7.5.4.1. Venting of Sanitary Sewage Sumps

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

tank and that is sized in accordance with Article 7.5.6.5.

7.5.4.2. Venting of Interceptors

(1) Every oil *interceptor* shall be provided with two *vent pipes* that

(a) connect to the *interceptor* at opposite ends,
(b) extend independently to *open air*,
(c) terminate at least 2 000 mm (6 ft 7 in) above ground and at elevations differing by at least 300 mm (11¾ in), and
(d) do not connect to each other or any other *vent pipe*.

(2) Adjacent compartments within an oil *interceptor* shall be connected to each other by a vent opening.

(3) Every grease *interceptor* shall have a *vent pipe* that is at least 1½ in. *size* connected to the outlet pipe, that connects to the *plumbing venting system*.

(4) A *vent pipe* shall be provided within 1 500 mm (4 ft 11 in) of the inlet to a grease *interceptor* complete with a *cleanout* to provide cleaning of the *vent pipe*.

(5) Where a secondary receiver is installed in conjunction with an oil *interceptor*, it shall be vented as per manufacturer's recommendations, but in no case shall the vent be less than 1½ inch trade *size* and shall extend independently to *open air*.

(6) 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 7.5.6.5.

(7) Where a manufacturer of an oil *interceptor* makes no recommendations with respect to the *size* of the *vent pipe* venting an oil *interceptor*, the *interceptor* shall be vented at each end with a *vent pipe* that is not more than one *size* smaller than the largest connected drainage pipe and not less than 1¼ in. nominal pipe *size*.

(8) Every *vent pipe* serving an oil *interceptor* that is built in location shall be at least 3 in. *size* throughout its length.

(9) Every *vent pipe* serving an oil or grease *interceptor* that is located outside a *building* shall be a minimum 3 in. *size*.

7.5.4.3. Fresh Air Inlet

(1) Where a *building trap* is installed in a *plumbing system*, a *fresh air inlet* not less than 4 in. *size* shall be connected upstream of the *building trap* and within 1 200 mm (3 ft 11 in) of the *building trap* and downstream of any other connection.

7.5.4.4. Venting of Corrosive Drain Piping and Dilution Tanks

(1) Vents connecting to the corrosive drain piping or dilution tank shall extend independently to and terminate in *open air*.

7.5.5. Arrangement of Vent Pipes

7.5.5.1. Drainage of Vent Pipes

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

(2) Every *vent pipe* shall be installed without a sag or depression and shall have no unused open ends.

7.5.5.2. 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 as provided in Sentence (3), 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*. (See Appendix A.)

(3) A *wet vent* is not required to be connected above the horizontal centre line of the *soil* or *waste pipe*.

7.5.5.3. Location of Vent Pipes

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

(a) the *developed length* of a *fixture drain* measured from the *trap weir* is,
  (i) not less than twice the pipe *size* of the *fixture drain*, and
  (ii) not more than 1 500 mm (4 ft 11 in),
(b) the total fall of the *fixture drain* from a P-*trap* is not greater than the *size* of the *fixture drain*,
(c) no *fixture drain* has a cumulative change of direction of more than 135°, and
(d) except as permitted in Article 7.5.7.1., no *waste pipe* is connected to the *fixture drain* between the

trap and its protecting vent.

(2) No *fixture drain* of a water closet, S-*trap standard* or a *fixture* that depends on siphonic action for the proper functioning of the *fixture* and that discharges vertically shall have a cumulative change of direction of more than 225°.

(3) No *vertical leg* of the *waste pipe* from a water closet or other *fixture* that has an integral siphonic flushing action shall exceed 900 mm (2 ft 11 in).

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

7.5.5.4. Connection of Vents Above Fixtures Served

(1) The upper end of every *vent pipe* shall be above the flood level of the highest *fixture* it serves before connection to another *vent pipe*.

(2) No vent piping shall be so arranged that it will serve as a bypass in the event of an obstruction in the drainage pipe.

7.5.5.5. Terminals

(1) The upper end of every *vent pipe* that is not terminated in *open air* shall be connected to a *venting system* that is terminated in *open air*.

(2) A *vent pipe* that serves an oil *interceptor*, a *vent stack* that is permitted by Sentence 7.5.3.2.(6), a *vent stack* and a *stack vent* shall each terminate in *open air* as set out in Sentence (3).

(3) The terminal of a *vent pipe* shall be located
(a) at least 900 mm (2 ft 11 in) above or 3.5 m (11 ft 6 in) in any other direction from air inlet, openable window or door,
(b) at least 150 mm (5⅞ in) above the roof of the *building* where the vent is installed and, where storm water is intended to pond on the roof, at least 150 mm (5⅞ in) above the high water level, and
(c) at least 2 000 mm (6 ft 7 in) above the roof of the *building* that the vent is installed in, where the roof is intended for human occupancy.

(4) Clause (3)(a) does not apply to a *fresh air inlet* pipe.

(5) Where a *vent pipe* is located 2 000 mm (6 ft 7 in) or more above a roof, it shall be so constructed as to be stable and secure.

(6) Where a stack or *vent pipe* passes through a roof or a wall, the stack or *vent pipe* shall be equipped with a flashing so installed that no storm water can pass between the structure and the flashing or between the flashing and the pipe or stack.

(7) 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 (19¾ in) by 500 mm (19¾ in).

(8) Where a sleeve flashing is installed on a flat roof it shall extend at least 150 mm (5⅞ in) above the flood level and on a sloped roof shall be at least 150 mm (5⅞ in) high on the short side.

(9) No bore of a *vent stack* or *stack vent* shall be reduced or obstructed by the installation of a flashing.

(10) Where a *vent pipe* passes through a roof or an outside wall of a *building* it shall be increased to a minimum *size* of 3 in. before penetrating the roof or wall.

7.5.6. Minimum Size of Vent Pipes

7.5.6.1. General

(1) Except as provided in Article 7.5.3.1. and 7.5.7.1, where a *vent pipe* vents one or more *fixture traps*, the pipe *size* of the *vent pipe* shall be in accordance with Table 7.5.6.1.

Table 7.5.6.1.
Minimum Permitted Size of Vent Pipe Based on Size of Trap
Forming Part of Sentence 7.5.6.1.(1)

Size of *Trap* Served, in.	Minimum *Size* of *Vent Pipe*, in.
1¼	1¼
1½	1¼
2	1½
2½	1½
3	1½
4	1½
5	2
6	2
Column 1	2

(2) Every *relief vent* or *circuit vent* shall be at least 2 in.

size.

7.5.6.2. Size Restriction

(1) Except as provided in Sentence 7.5.3.2.(5), no *branch vent*, *stack vent*, *vent stack* or *header* shall be a *size* less than the *size* of the largest *vent pipe* connected to it.

(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*.

7.5.6.3. Reserved.

7.5.6.4. Minimum Size of Yoke Vents

(1) Where a *yoke vent* is required to be installed in accordance with Article 7.5.3.3., the *yoke vent* shall be at least 2 in. *size*.

7.5.6.5. Vents for Sanitary Sewage Sumps

(1) Where the diameter of an inlet pipe to a *sanitary sewage* tank is

(a) 5 in. or larger, the diameter of the *vent pipe* from the tank shall be at least 4 in., and

(b) less than 5 in., the diameter of the *vent pipe* from the tank shall be the greater of,

(i) 1¼ in., and

(ii) one trade *size* smaller than the inlet pipe.

7.5.7. Sizing of Vent Pipes

7.5.7.1. Sizes for Wet Vents

(1) Where 2 or 3 *fixtures* are installed in a *plumbing system*, any one of the *fixtures* may be *wet vented* by one or both of the other *fixtures* if

(a) all the *fixtures* are on the same floor level,

(b) only the *wet vented fixture* is a water closet or other *fixture* using a siphonic *trap*,

(c) where the *wet vented trap* is not a siphonic *trap*, it is a P-*trap* and the *wet vent* is connected to the horizontal *waste pipe* downstream from the weir of the P-*trap* at least 450 mm (17¾ in) and not more than 1 500 mm (4 ft 11 in), and

(d) at least one of the *wet venting fixtures* is drained through a vertical *continuous waste and vent* and the *waste pipe* serving as a *wet vent* is at least,

(i) 1¼ in. *size*, where the *wet vented trap* is of 1¼ or 1½ in. *size*,

(ii) 1½ in. *size*, where the *wet vented trap* is of 2 in. *size*, or

(iii) 2 in. *size*, where the *wet vented trap* is of 3, 4 or 6 in. *size*.

(2) Where there are two *wet venting fixtures* in a *plumbing system* referred to in Sentence (1) and both connect to the same vertical *continuous waste and vent*, both *wet venting fixtures* shall, where they are connected at the same level, be vented by a double fitting in confomance to Table 7.2.4.5. or, where they are not connected at the same level, be separately vented.

7.5.7.2. Branch Vent Sizing

(1) No *branch vent* and its connecting *branch* shall be smaller in diameter than the diameter calculated in accordance with Table 7.5.7.2.A. and where Table 7.4.10.5.B. is not applicable to the vent, the maximum length of the vent shall be calculated in accordance with Table 7.5.7.2.B.

(2) Where Table 7.4.10.5.B. is not applicable to a *branch vent*, *header* or *circuit vent*, no vent or *header* shall have *branch* connections in excess of the number that are permitted by the combinations in Table 7.5.7.2.A. and, where one *vent pipe* protects more than one *trap*, each *trap* shall be counted as one vent.

(3) Reserved.

(4) For the purpose of Table 7.5.7.2.B.,

(a) the length of a *circuit vent* shall be the *developed length* from the horizontal *soil* or *waste pipe* to the *vent stack*, *stack vent*, *header* or *open air*, and

(b) the length of a *branch vent* shall be the *developed length* of vent piping from the most distant *soil* or *waste pipe* connection to a *vent stack*, *stack vent*, *header* or *open air*.

(5) Reserved.

(6) Reserved.

(7) For the purpose of Table 7.4.10.5.B. and Table 7.5.7.2.B., the length of a *header* shall be the *developed length* of vent piping from the *vent stack* or *stack vent* where the *header* terminates to the most distant vent or stack connected to it.

Table 7.5.7.2.A.
Branch Venting
Forming Part of Sentences 7.5.3.2.(3), 7.5.7.2.(1) and (2)

Combination Number	*Size* of Receiving Vent, in.	Maximum Number *Size* and Nature of Connecting Vents		
		1¼ in. Other than Water Closet	1½ in. Other than Water Closet	1½ in. Water Closet
1	1¼	4	--	--
2	1½	12	--	--
3	1½	--	6	--
4	1½	--	--	2
5	1½	4	--	1
6	1½	2	1	1
7	1½	--	2	1
8	2	50	--	--
9	2	--	25	--
10	2	--	12	6
11	2½	--	12	10
12	2½	25	--	10
Column 1	2	3	4	5

Note to Table 7.5.7.2.A.:
(1) *Vent pipes* permitted in Columns 3 and 4 of combinations 2 to 12 may be exchanged on the basis of two 1¼ in. *vent pipes* equal to one 1½ in. *vent pipe*.

Table 7.5.7.2.B.
Maximum Length of Vents
Forming Part of Articles 7.5.7.2. and 7.5.7.3.

Pipe, Trade *Size*, in.	Maximum Length, metres (ft)
1¼	15.2 (50)
1½	15.2 (50)
2	18.3 (60)
2½	24.4 (80)
3	30.5 (100)
4	45.7 (150)
5	61.0 (200)
6	76.2 (250)
Column 1	2

7.5.7.3. Developed Length

(1) For the purpose of Table 7.4.10.5.B. and Table 7.5.7.2.B., the length of a *vent stack* or *stack vent* shall be its *developed length* from its lower end where it connects to drainage piping to its upper end where it connects to a *header* or goes directly to *open air*.

Section 7.6. Potable Water Systems

7.6.1. Arrangement of Piping

7.6.1.1. Design, Fabrication and Installation (See Appendix A.)

(1) *Potable water systems* shall be designed, fabricated and installed in accordance with good engineering practice.

(2) 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.

(3) 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.

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 one 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 (polybutylene, polyethylene or PVC) 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 (11¾ in) and not greater than 450 mm (17¾ in).

7.6.1.4. Shut-off Valves

(1) Except for a single-family dwelling, 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 frost-proof hydrant or a stop-and-waste valve located inside the *building* and close to the wall.

(2) Where a self draining frost proof hydrant is used, a stop valve may be used in lieu of a stop and waste valve.

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. (See Appendix A.)

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. (See Article 7.6.4.2.)

(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 1100 kPa (160 psi) or ½ 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) a temperature relief valve with a temperature sensing element located within the top 150 mm (5⅞ in) of the tank and designed to open and discharge sufficient water from the tank to keep the temperature of the water in the tank from exceeding 99°C (210°F) under all operating conditions, or

(b) a device that

(i) is designed to shut off the supply of electricity or fuel to the heater,

(ii) is not connected to and operates independently of the thermostatic control that determines the temperature of the water in the tank, and

(iii) is located and maintained on or within the top 150 mm (5⅞ in) of the tank so that the maximum temperature of the water in the tank shall not exceed 99°C (210°F) under all operating conditions.

(3) Every tank equipped as specified in Clause 7.6.1.12.(2)(b) shall bear the information in a clearly visible location that it is so equipped.

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

(5) 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.

(6) A temperature relief, pressure relief, or a combined temperature and pressure relief valve which is installed on a hot water tank shall have a pipe that

(a) has a *size* at least equal to the *size* of the outlet of the valve,
(b) is rigid, slopes downward from the valve, and
  (i) terminates with an indirect connection above a floor drain, sump or other safe location, with an *air break* of not more than 300 mm (11¾ in), or
  (ii) terminates at a distance not less than 150 mm (5⅞ in) and not more than 300 mm (11¾ in) from a floor and discharges vertically down,
(c) has no thread at its outlet, and
(d) is capable of operating at a temperature of not less than 99°C (210°F).

(See Appendix A.)

(7) The temperature relief valve required in Clause 7.6.1.12.(5)(b) shall have a temperature sensing element located within the top 150 mm (5⅞ in) of the tank and be designed to open and discharge sufficient water to keep the temperature of the water in the tank from exceeding 99°C (210°F) under all operating conditions.

(8) 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. Water Hammer

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

7.6.1.14. Mobile Home Water Service

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

(a) be not less than ¾ 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.

7.6.1.15. Solar Domestic Hot Water Systems

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

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. Cleaning of Systems

(1) Every newly installed part of a *potable water system* shall be clean and free of any matter that may affect the health of a person before being put into service. (See Appendix A.)

7.6.2.3. 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*.

(4) Where a *potable water system* serves a fire protection system, the fire protection system shall be isolated from the *potable water system* in the following manner:

(a) a wet sprinkler fire protection system containing water only shall be provided with a *listed* alarm *check valve* installed in conformance with NFPA 13, "Installation of Sprinkler Systems".

(b) a wet standpipe fire protection system containing water only shall be provided with a resilient seated *check valve*.

(c) a wet sprinkler or wet standpipe fire protection system containing anti-freeze or chemicals shall be provided with a reduced pressure principle *backflow preventer* certified to CAN/CSA-B64.4 Series, "Backflow Preventers, Reduced Pressure Principle Type (RP)".

(d) a dry sprinkler or dry standpipe fire protection system does not require isolation.

(e) a water storage tank fire protection system shall be provided with a *backflow preventer* certified to CAN/CSA-B64 Series, "Backflow Preventers and Vacuum Breakers".

(f) a fire hydrant fire protection system does not require isolation.

✔ (g) a *fire service main* shall be provided with a reduced pressure principle *backflow preventer* certified to CAN/CSA-B64.4, "Backflow Preventers, Reduced Pressure Principle Type (RP)" if it is connected to more than one of the following different sources of supply:

(i) a *drinking-water system*, or

(ii) a source of non-*potable* water.

(5) Except as permitted in Sentences (4) and (8), *backflow* prevention devices to protect a *potable water system* from contamination shall be selected, installed and field tested in accordance with CAN/CSA-B64.10, "Backflow Prevention Devices - Selection, Installation, Maintenance and Field Testing".

(6) *Backflow* prevention devices shall be provided in conformance with Sentence 7.2.10.10.(1).

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

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

7.6.2.4. 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 (1 in) high and at least twice the diameter of the opening of the water supply outlet in height.

7.6.2.5. Vacuum Breakers and Flood Levels

(1) Where the *critical level* is not marked on an atmospheric *vacuum breaker* or 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 (1 in) 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* shall be installed with its *critical level* at least 300 mm (11¾ in) 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

(1) Except as provided in Sentence (2), the *size* of every pipe in a *water distribution system* that supplies water to a *fixture* or device shall comply with Table 7.6.3.1.

(2) Where a pipe in a *water distribution system* is not directly connected to a *fixture* or a *fixture* faucet but is connected with a flexible tube of a diameter smaller than that specified by Table 7.6.3.1., the *developed length* of the connector shall not be more than 355 mm (14 in) and, where 3/8 in. pipe of iron pipe *size* is used, the maximum length shall not exceed 914 mm (3 ft).

Table 7.6.3.1.
Pipe Sizing for Water Supply to Fixture/Device
Forming Part of Sentences 7.6.3.1.(1) and (2)

Fixture or Device	Minimum *Size* of Supply Pipe, in.
Bath tub	½
Combination sink and tray	½
Dishwasher, domestic	½
Drinking fountain	⅜
Hose bib	½
Laundry tray: 1, 2 or 3 compartments	½
Lavatory	⅜
Shower, single head	½
Sink	
(a) kitchen, domestic	½
(b) kitchen, commercial	½
(c) service, slop	½
(d) service with direct flush valve	¾
Urinal	
(a) with flush tank	½
(b) with direct flush valve	¾
(c) with self closing metering	½
Wall hydrant	½
Water closet	
(a) with flush tank	⅜
(b) with direct flush valve	1
Column 1	2

7.6.3.2. Peak Demand Flow

(1) No *water system* shall have a capacity that is less than the peak demand flow.

(2) 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, shall be less than ¾ in. *size*.

(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.

7.6.3.3. Static Pressure

(1) Where the static pressure exceeds 550 kPa (79.8 psi), a pressure reducing valve shall be installed to limit the maximum static pressure to not more than 550 kPa (79.8 psi) in areas that may be occupied.

7.6.3.4. Size

(1) Every *water service pipe* shall be not less than ¾ in. trade *size*.

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.

(2) Sentence (1) does not apply to a *fixture* located in a *heritage building*.

Table 7.6.4.1.
Maximum Flow Rates for Water Supply Fittings
Forming Part of Sentence 7.6.4.1.(1)

Fitting	Maximum Flow, L/min (gal/min)	Test Pressure, kPa (psi)
Lavatory Faucet	8.35 (1.84)	413 (59.9)
Kitchen Faucet	8.35 (1.84)	413 (59.9)
Shower Heads	9.50 (2.09)	550 (79.8)
Column 1	2	3

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) The flush cycle for each *fixture* that is a water closet or urinal and that is installed as a replacement for a *fixture* in a *building* that existed before the 1st day of January 1996 shall not exceed the maximum flush cycle listed for that *fixture* in Table 7.6.4.2.A.

(3) Except as provided in Sentence (2) the flush cycle for each *fixture* that is a water closet or urinal shall not exceed the maximum flush cycle listed for that *fixture* in Table 7.6.4.2.B.

(4) Sentences (2) and (3) do not apply to a *fixture* located in a *heritage building*, *care or detention occupancy* or passenger station.

Table 7.6.4.2.A.
Maximum Flush Cycles for Sanitary Fixtures
Forming Part of Sentences 7.6.4.2.(2)

Fixture	litres (gal)
Water Closet (Tank Type)	13.25 (2.9)
Water Closet (Direct Flush)	13.25 (2.9)
Urinal (Tank Type)	5.68[1] (1.25)
Urinal (Direct Flush)	5.68[1] (1.25)
Column 1	2

Notes to Table 7.6.4.2.A.:
[1] Urinals equipped with automatic flushing devices shall be controlled to prevent unnecessary flush cycles during *building* down time.

Table 7.6.4.2.B.
Maximum Flush Cycles for Sanitary Fixtures
Forming Part of Sentence 7.6.4.2.(3)

Fixture	litres (gal)
Water Closet (Tank Type)	6.0 (1.32)
Water Closet (Direct Flush)	6.0 (1.32)
Urinal (Tank Type)	3.8[1] (0.84)
Urinal (Direct Flush)	3.8[1] (0.84)
Column 1	2

Notes to Table 7.6.4.2.B.:
[1] Urinals equipped with automatic flushing devices shall be controlled to prevent unnecessary flush cycles during *building* down time.

* 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 (120°F).

(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 in Sentence (2), all shower valves shall be pressure-balanced or thermostatic-mixing valves, conforming to CAN/CSA-B125, "Plumbing Fittings".

(2) No pressure-balanced or thermostatic-mixing valve is required for a shower if the hot water supply for the shower is controlled by a master thermostatic-mixing valve conforming to CAN/CSA-B125, "Plumbing Fittings".

(3) Pressure-balanced or thermostatic-mixing valves shall be

(a) designed so that the outlet temperature does not exceed 49°C (120°F), or
(b) equipped with high-limit stops and adjusted to a maximum hot water setting of 49°C (120°F).

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 developmentally-handicapped adults 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 (120°F).

Section 7.7. Non-Potable Water Systems

7.7.1. Connection

7.7.1.1. Non-Potable Connection

(1) A non-*potable water system* shall not be connected to a *potable water system*.

7.7.2. Identification

7.7.2.1. Markings

(1) Non-*potable* water piping shall be identified by markings that are permanent, distinct and easily recognized.

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) 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.