Division B
Acceptable Solutions

Part 7 — Plumbing Systems

Section 7.2. Materials and Equipment

(See Part 10)

[Rev. 2, B.C. Reg. 73/2008.]

7.2.1. GENERAL

7.2.1.1. Exposure of Materials

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

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

7.2.1.2. Restrictions on Re-Use

1) 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*. I

7.2.1.3. Identification

1) Every length of pipe and every fitting shall I

a) 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

b) be marked in accordance with the relevant standard.

2) Markings required in Sentence (1) shall be visible after installation. I

7.2.1.4. Pipe or Piping

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

7.2.1.5. Withstanding Pressure

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

7.2.1.6. Working Pressure of a Water Service Pipe

1) The working pressure rating of a *water service pipe* shall not be less than the maximum water main pressure at their point of connection as established by the water supply authority. I

7.2.2. FIXTURES

7.2.2.1. Surface Requirements

1) Every *fixture* shall have a smooth, hard, corrosion-resistant surface free from flaws and blemishes that may interfere with cleaning.

7.2.2.2. Conformance to Standards

1) Every *fixture* shall conform to CAN/CSA-B45 Series, "Plumbing Fixtures," as applicable.

2) Every vitreous china *fixture* shall conform to CAN/CSA-B45.1, "Ceramic Plumbing Fixtures."

3) Every enamelled cast-iron *fixture* shall conform to CAN/CSA-B45.2, "Enamelled Cast Iron Plumbing Fixtures."

4) Every porcelain-enamelled steel *fixture* shall conform to CAN/CSA-B45.3, "Porcelain-Enamelled Steel Plumbing Fixtures."

5) Every stainless steel *fixture* shall conform to CAN/CSA-B45.4, "Stainless Steel Plumbing Fixtures."

6) Every plastic *fixture* shall conform to CAN/CSA-B45.5, "Plastic Plumbing Fixtures."

7) Every hydromassage bathtub shall conform to CAN/CSA-B45.10, "Hydromassage Bathtubs."

8) Macerating toilet systems for single bathrooms shall conform to CAN/CSA-B45.9, "Macerating Systems and Related Components."

7.2.2.3. Showers

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 2 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. (See Appendix A.)

4) Except for column showers, when a battery of shower heads is installed, the horizontal distance between 2 adjacent shower heads shall be not less than 750 mm.

7.2.2.4. Concealed Overflows

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

7.2.2.5. Water Closets in Public Washrooms

1) When a water closet is installed in a washroom for *public use*, it shall be of the elongated type and provided with a seat of the open front type.

7.2.3. 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 not less than 38 mm,

b) be so designed that failure of the seal walls will cause exterior leakage, and

c) have a water seal that does not depend on the action of moving parts.

(See Appendix A.)

2) The *trap seal depth* on *fixtures* draining to an acid waste system shall be a minimum of 50 mm.

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

a) be provided with a *cleanout* plug 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 removed for cleaning purposes.

(See Appendix A.)

4) A bell *trap* shall not be installed in a *drainage system*. (See Appendix A.)

5) A drum *trap* shall not be used as a *fixture trap* unless required to serve as an *interceptor* and access for servicing is provided.

7.2.3.2. Interceptors

1) Every *interceptor* shall be designed so that it can be readily cleaned.

2) Every grease *interceptor* shall

a) be designed so that it does not become air bound, and

b) not have a water jacket.

7.2.3.3. Tubular Traps

1) Tubular metal or plastic *traps* conforming to CAN/CSA-B125, "Plumbing Fittings," shall be used only in accessible locations.

7.2.4. PIPE FITTINGS

7.2.4.1. T and Cross Fittings

(See Appendix A.)

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

(See Appendix A.)

1) A single or double sanitary T fitting shall not be used in a *nominally horizontal soil-or-waste pipe*, except that a single sanitary T fitting may be used to connect a *vent pipe*.

2) A double sanitary T fitting shall not be used to connect the *trap arms* of

a) back outlet water closets installed back-to-back, or

b) 2 urinals where no *cleanout* fitting is provided above the connection.

7.2.4.3. 90° Elbows

1) Except as permitted in Sentence (2), 90° elbows of 4 inch *size* or less whose centre-line radius is less than the *size* of the pipe shall not be used to join 2 *soil-or-waste pipes*.

2) For *sanitary drainage systems* of 4 inch *size* or less, 90° elbows shall only be permitted

a) to change the direction of piping from horizontal to vertical, in the direction of flow,

b) where a *trap arm* enters a wall, or

c) to connect *trap arms* as permitted by Sentence 7.5.6.3.(2).

7.2.5. NON-METALLIC PIPE AND FITTINGS

(For a summary of pipe applications, see A-7.2.5, A-7.2.6. and A-7.2.7. in Appendix A .)

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, "Asbestos-Cement Drain Pipe," or

b) CSA B127.1, "Asbestos Cement Drain, Waste and Vent Pipe and Pipe Fittings."

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, "Asbestos-Cement Sewer Pipe,"

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

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

7.2.5.2. Asbestos-Cement Water Pipe and Fittings

1) Asbestos-cement water pipe, couplings and bends shall conform to CAN/CGSB-34.1, "Asbestos-Cement Pressure Pipe."

2) Asbestos-cement water pipe shall not be used above ground.

7.2.5.3. Concrete Pipe and Fittings

1) Concrete pipe shall conform to

a) CSA A257.1, "Non-Reinforced Circular Concrete Culvert, Storm Drain, Sewer Pipe, and Fittings," or

b) CSA A257.2, "Reinforced Circular Concrete Culvert, Storm Drain, Sewer Pipe, and Fittings."

2) Joints with internal elastomeric gaskets shall conform to CSA A257.3, "Joints for Circular Concrete Sewer and Culvert Pipe, Manhole Sections, and Fittings Using Rubber Gaskets."

3) Concrete fittings fabricated on the site from lengths of pipe shall not be used. (See Appendix A.)

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

5) Precast reinforced circular concrete manhole sections, catch basins and fittings shall conform to CSA A257.4, "Precast Reinforced Circular Concrete Manhole Sections, Catch Basins, and Fittings."

7.2.5.4. Vitrified Clay Pipe and Fittings

1) Vitrified clay pipe and fittings shall conform to CSA A60.1-M, "Vitrified Clay Pipe."

2) Couplings and joints for vitrified clay pipe shall conform to CSA A60.3-M, "Vitrified Clay Pipe Joints."

3) Vitrified clay pipe and fittings shall not be used except for an underground part of a *drainage system*.

7.2.5.5. Polyethylene Pipe and Fittings

1) Polyethylene water pipe, tubing and fittings shall conform to Series 160 of CAN/CSA-B137.1, "Polyethylene Pipe, Tubing, and Fittings for Cold-Water Pressure Services."

2) Polyethylene water pipe shall not be used except for a *water service pipe*.

3) Butt fusion fittings for polyethylene pipe shall conform to ASTM D 3261, "Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing."

7.2.5.6. Polyethylene Pipe Used Underground

1) Polyethylene pipe used underground outside a *building* for the rehabilitation of existing *drainage systems* using trenchless technology shall conform to ASTM F 714, "Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter," and shall be HDPE 3408 and SDR 11 or heavier. (See Appendix A.)

7.2.5.7. Crosslinked Polyethylene Pipe and Fittings

1) Crosslinked polyethylene pipe and its associated fittings used in hot and cold *potable water systems* shall conform to CAN/CSA-B137.5, "Crosslinked Polyethylene (PEX) Tubing Systems for Pressure Applications." (See Appendix A.)

7.2.5.8. PVC Pipe and Fittings

1) PVC water pipe, fittings and solvent cement shall

a) conform to CAN/CSA-B137.3, "Rigid Polyvinyl Chloride (PVC) Pipe for Pressure Applications," and

b) have a pressure rating of not less than 1 100 kPa.

2) PVC water pipe fittings shall conform to

a) ASTM D 2466, "Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40," or

b) ASTM D 2467, "Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80."

3) PVC injection-moulded gasketed fittings shall conform to CAN/CSA-B137.2, "PVC Injection-Moulded Gasketed Fittings for Pressure Applications."

4) PVC water pipe and fittings referred to in Sentences (1), (2) and (3) shall not be used in a hot *water system*.

7.2.5.9. CPVC Pipe, Fittings and Solvent Cements

1) CPVC hot and cold water pipe, fittings and solvent cements shall conform to CAN/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 Table 7.2.5.9.

Table 7.2.5.9.
Maximum Permitted Pressure for CPVC Piping at Various Temperatures
Forming Part of Sentence 7.2.5.9.(2)

Maximum Temperature of Water, °C	Maximum Permitted Pressures, kPa
10	3 150
20	2 900
30	2 500
40	2 100
50	1 700
60	1 300
70	1 000
80	700
90	500
100	400

7.2.5.10. Plastic Pipe, Fittings and Solvent Cement Used Underground

(See A-7.2.5.10. to A-7.2.5.12. in Appendix A.)

1) Plastic pipe, fittings and solvent cement used underground outside a *building* or under a *building* in a *drainage system* shall conform to

a) ASTM F 628, "Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe With a Cellular Core,"

b) CAN/CSA-B181.1, "ABS Drain, Waste, and Vent Pipe and Pipe Fittings,"

c) CAN/CSA-B181.2, "PVC Drain, Waste, and Vent Pipe and Pipe Fittings,"

d) CAN/CSA-B182.1, "Plastic Drain and Sewer Pipe and Pipe Fittings," with a pipe stiffness not less than 320 kPa,

e) CAN/CSA-B182.2, "PVC Sewer Pipe and Fittings (PSM Type)," with a pipe stiffness not less than 320 kPa,

f) CAN/CSA-B182.4, "Profile PVC Sewer Pipe and Fittings," with a pipe stiffness not less than 320 kPa,

g) CAN/CSA-B182.6, "Profile Polyethylene Sewer Pipe and Fittings For Leak-Proof Sewer Applications," with a pipe stiffness of not less than 320 kPa, or

h) CAN/CSA-B182.7, "Multilayer PVC Sewer Pipe (PSM Type) Having Reprocessed-Recycled Content," with a pipe stiffness of not less than 320 kPa.

7.2.5.11. Transition Solvent Cement

(See A-7.2.5.10. to A-7.2.5.12. in 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 *drainage system* to a PVC *drainage system*.

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

(See A-7.2.5.10. to A-7.2.5.12. in Appendix A.)

1) Plastic pipe, fittings and solvent cement used inside or under a *building* in a*drainage* or *venting system* shall conform to

a) ASTM F 628, "Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe With a Cellular Core,"

b) CAN/CSA-B181.1, "ABS Drain, Waste, and Vent Pipe and Pipe Fittings," or

c) CAN/CSA-B181.2, "PVC Drain, Waste, and Vent Pipe and Pipe Fittings."

2) Requirements for *combustible* piping in relation to fire safety shall conform to Sentences 3.1.5.16.(1) and 9.10.9.6.(2) to (8), and Articles 3.1.9.4. and 9.10.9.7.

3) Where *noncombustible* piping pierces a *fire separation* or a fire stop, the requirements of fire stopping of Subsection 3.1.9., Sentence 9.10.9.6.(1) and Article 9.10.16.4. shall apply.

NBC

7.2.5.13. Polyethylene/Aluminum/Polyethylene Composite Pipe and Fittings

1) PE/AL/PE composite pipe and fittings shall conform to 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 hot *water systems*.

7.2.5.14. Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene Composite Pressure Pipe and Fittings

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

7.2.5.15. Polypropylene Pipe and Fittings

1) Polypropylene pipe and fittings used for hot and cold *potable water systems* shall conform to CAN/CSA-B137.11, "Polypropylene (PP-R) Pipe and Fittings for Pressure Applications." (See Appendix A.)

7.2.6. FERROUS PIPE AND FITTINGS

(For a summary of pipe applications, see A-7.2.5, A-7.2.6. and A-7.2.7. in Appendix A.)

7.2.6.1. Cast-Iron Drainage and Vent Pipe and Fittings

1) Drainage piping, vent piping and fittings made of cast iron shall conform to CAN/CSA-B70, "Cast Iron Soil Pipe, Fittings, and Means of Joining." I

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

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 I

a) CSA B127.1, "Asbestos Cement Drain, Waste and Vent Pipe and Pipe Fittings," or

b) CSA B127.2-M, "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/ASME B16.12, "Cast-Iron Threaded Drainage Fittings." I

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

7.2.6.4. Cast-Iron Water Pipes

1) Cast-iron water pipes shall conform to ANSI/AWWA C151/A21.51, "Ductile-Iron Pipe, Centrifugally Cast, for Water." I

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

3) Cast-iron fittings for cast-iron or ductile-iron water pipes shall conform to ANSI/AWWA C110/A21.10, "Ductile-Iron and Gray-Iron Fittings, 3 in. Through 48 in. (75 mm Through 1200 mm), for Water and Other Liquids." I

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

7.2.6.5. Screwed Cast-Iron Water Fittings

1) Screwed cast-iron water fittings shall conform to ANSI/ASME B16.4, "Gray Iron Threaded Fittings." I

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

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

7.2.6.6. Screwed Malleable Iron Water Fittings

1) Screwed malleable iron water fittings shall conform to ANSI/ASME B16.3, "Malleable-Iron Threaded Fittings." I

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

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

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*. I

2) Galvanized steel pipe is permitted to be used in a *drainage system* or a *venting system* above ground inside a *building*. I

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

a) in *buildings* of industrial *occupancy* as described in the NBC, or

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

(See Appendix A.) NBC

4) Galvanized steel pipe and fittings shall conform to ASTM A 53/A 53M, "Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless." I

7.2.6.8. Corrugated Steel Pipe and Couplings

1) Corrugated steel pipe and couplings shall conform to CSA G401, "Corrugated Steel Pipe Products."

2) Corrugated steel pipe shall only be used underground outside a *building* in a *storm drainage system*.

3) Couplings for corrugated steel pipe shall be constructed so that when installed they shall

a) maintain the pipe alignment,

b) resist the separation of adjoining lengths of pipe,

c) prevent root penetration, and

d) prevent the infiltration of surrounding material.

7.2.6.9. Sheet Metal Leaders

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

7.2.7. NON-FERROUS PIPE AND FITTINGS

(For a summary of pipe applications, see A-7.2.5, A-7.2.6. and A-7.2.7. in Appendix A.)

7.2.7.1. Copper and Brass Pipe

1) Copper pipe shall conform to ASTM B 42, "Seamless Copper Pipe, Standard Sizes."

2) Brass pipe shall conform to ASTM B 43, "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/ASME B16.24, "Cast Copper Alloy Pipe Flanges and Flanged Fittings."

7.2.7.3. Brass or Bronze Threaded Water Fittings

1) Brass or bronze threaded water fittings shall conform to ANSI/ASME 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 shall conform to

a) ASTM B 88, "Seamless Copper Water Tube," or

b) ASTM B 306, "Copper Drainage Tube (DWV)."

2) Except as provided in Sentence (3), the use of copper tube shall conform to Table 7.2.7.4.

3) Copper tube shall not be used for the *fixture drain* or the portion of the *vent pipe* below the *flood level rim* of a flush-valve-operated urinal.

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	Plumbing Purposes							
	Water Service 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 temper	N	N	P	P	P	P	P	P
K & L soft temper	P	P	P	N	N	N	N	N
M hard temper	N	N	N	N	N	P	N	P
M soft temper	N	N	N	N	N	N	N	N
DWV	N	N	N	N	N	P	N	P
P = Permitted N = Not Permitted								

7.2.7.5. Solder-Joint Drainage Fittings

1) Solder-joint fittings for *drainage systems* shall conform to

a) ASME B16.23, "Cast Copper Alloy Solder Joint Drainage Fittings: DWV," or

b) ANSI/ASME B16.29, "Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings – DWV."

2) Solder-joint fittings for *drainage systems* shall not be used in a *water system*.

7.2.7.6. Solder-Joint Water Fittings

1) Except as provided in Sentence (2), solder-joint fittings for *water systems* shall conform to

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

b) ANSI/ASME B16.22, "Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings."

2) Solder-joint fittings for *water systems* not made by casting or the wrought process shall conform to the applicable requirements of 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/ASME B16.26, "Cast Copper Alloy Fittings for Flared Copper Tubes."

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

7.2.7.8. Lead Waste Pipe and Fittings

1) Lead *waste pipe* and fittings shall not be used in a *water system* or as a *building sewer*.

2) When there is a change in *size* of a lead closet bend, the change shall be in the vertical section of the bend or made in a manner that prevents the retention of liquid in the bend.

7.2.8. CORROSION-RESISTANT MATERIALS

7.2.8.1. Pipes and Fittings

1) Pipes and fittings to be used for drainage and venting of acid and corrosive wastes shall conform to

a) ASTM A 518/A 518M, "Corrosion-Resistant High-Silicon Iron Castings,"

b) ASTM C 1053, "Borosilicate 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. Solders and Fluxes

1) Solders for solder joint fittings shall conform to ASTM B 32, "Solder Metal."

2) Solders and fluxes having a lead content in excess of 0.2% shall not be used in a *potable water system*.

3) Fluxes for soldered joints shall conform to ASTM B 813, "Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube."

4) Except as provided in Sentence (5), joints in copper tubes installed underground shall be made with either flared or compression fittings, or be brazed using a brazing alloy within the American Welding Society's AWS-BCuP range.

5) Compression fittings shall not be used underground under a *building*.

7.2.10. MISCELLANEOUS MATERIALS

7.2.10.1. Brass Floor Flanges

1) Brass floor flanges shall conform to CSA B158.1, "Cast Brass Solder Joint Drainage, Waste and Vent Fittings."

7.2.10.2. Screws, Bolts, Nuts and Washers

1) Every screw, bolt, nut and washer shall be of corrosion-resistant materials when used

a) to connect a water closet to a water closet flange,

b) to anchor the water closet flange to the floor, or

c) to anchor the water closet to the floor.

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.

7.2.10.4. Mechanical Couplings

1) Groove and shoulder type mechanical couplings for pressure applications shall conform to CSA B242-M, "Groove and Shoulder Type Mechanical Pipe Couplings."

2) Mechanical couplings for non-pressure applications shall conform to CAN/CSA-B602, "Mechanical Couplings for Drain, Waste, and Vent Pipe and Sewer Pipe."

7.2.10.5. Saddle Hubs

1) A saddle hub or fitting shall not be installed in *drainage*, *venting* or *water systems.* (See Appendix A.)

7.2.10.6. Supply and Waste Fittings

1) Supply and waste fittings shall conform to CAN/CSA-B125, "Plumbing Fittings."

7.2.10.7. Shower Valves

1) Except as provided in Sentences (2) and (3), all valves supplying fixed-location shower heads shall be individual pressure-balanced or thermostatic-mixing valves conforming to CAN/CSA-B125, "Plumbing Fittings."

2) Individual pressure-balanced or thermostatic-mixing valves shall not be required for showers having a single tempered water supply that is controlled by a master thermostatic-mixing valve conforming to CAN/CSA-B125, "Plumbing

Fittings.”

3) Deck-mounted, hand-held, flexible-hose spray attachments are exempt from the requirements of Sentence (1).

4) Pressure-balanced and thermostatic-mixing valves shall be

a) designed such that the outlet temperature does not exceed 49°C, or

b) equipped with high-limit stops that are adjusted to a maximum hot water setting of 49°C.

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 at an angle of approximately 45°.

2) Every drinking fountain bubbler shall include a means of regulating the flow to the orifice.

3) Bubblers shall be installed only on drinking fountains. (See Appendix A.)

7.2.10.10. Back-Siphonage Preventers and Backflow Preventers

1) Except as provided in Sentence (2), *back-siphonage preventers* and *backflow preventers* shall conform 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 Type with Atmospheric Port (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 (LFVB),” or

l) CAN/CSA-B64.8, “Backflow Preventers, Dual Check Valve Type with Intermediate Vent (DuCV).”

2) *Back-siphonage preventers* for tank-type water closets (anti-siphon ballcocks) shall conform 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 ANSI Z21.22/CSA 4.4-M, “Relief Valves for Hot Water Supply Systems.”

7.2.10.12. Reducing Valves

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

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)." I

7.2.10.14. Vent Pipe Flashing

1) Flashing fabricated on-site for *vent pipes* shall be fabricated from I

a) copper sheet not less than 0.33 mm thick,

b) aluminum sheet not less than 0.61 mm thick,

c) *alloyed zinc* sheet not less than 0.35 mm thick,

d) lead sheet not less than 2.16 mm thick,

e) galvanized steel sheet not less than 0.41 mm thick, or

f) polychloroprene (neoprene) not less than 2.89 mm thick.

2) Prefabricated flashing for *vent pipes* shall conform to CSA B272, "Prefabricated Self-Sealing Roof Vent Flashings." (See Article 2.5.6.5. for location of *vent pipe* terminals.) I

7.2.10.15. Water Hammer Arresters

1) Water hammer arresters shall conform to ASSE 1010, "Water Hammer Arresters." I

7.2.10.16. Air admittance valves

1) *Air admittance valves* shall conform to ASSE 1051, "Individual and Branch Type Air Admittance Valves for Sanitary Drainage Systems." (See Appendix A.) I