2015 National Plumbing Code of Canada (NPC)

2018 Revisions and Errata Package

Selected replacement pages have been produced for the NPC.

Please print and insert in your copy of the Code.

Revisions and Errata

Issued by the Canadian Commission on Building and Fire Codes

The Change Summary table that follows describes revisions, errata and editorial updates that apply to the National Plumbing Code of Canada 2015:

- Revisions are changes deemed urgent that were posted for public review from November 6, 2017 to January 2, 2018 and have been approved by the Canadian Commission on Building and Fire Codes.
- Errata are corrections to existing text.
- Editorial updates are provided for information purposes only.

Code pages containing revisions and/or errata are identified with the words "Amended Page" in the footer; pages with editorial updates and index pages with changes are not flagged.

Code users should contact their local authority having jurisdiction to find out if these revisions and errata apply in their province or territory.

Change Summary — National Plumbing Code of Canada 2015

Division	Code Reference	Change	Date (Y-M-D)	Description of Change
A	Figure A-1.4.1.2.(1)-F	erratum	2018-09-28	Figure was corrected to show the storm and sanitary building drains sloping down to street level
	Figure A-1.4.1.2.(1)-G	erratum	2018-09-28	Figure was corrected to show the storm and sanitary building drains sloping down to street level
B	1.3.1.1.(1)	revision	2018-09-28	Date stated in Sentence was revised to read "30 June 2017"
	Table 1.3.1.2.	revision	2018-09-28	Document references were updated as applicable to reflect more recent editions published as of June 30, 2017
	2.2.5.	revision	2018-09-28	Article 2.2.5.1. was deleted
	2.2.6.	revision	2018-09-28	Article 2.2.6.3. was deleted
	Table 2.3.4.5.	revision	2018-09-28	Entries for "Asbestos-cement pipe" and "Asbestos-cement pipe that is ≤ 300 mm long between adjacent fittings" were deleted, and Table Note (1) was deleted
	2.3.5.	revision	2018-09-28	Article 2.3.5.1. was revised, and Article 2.3.5.2. was deleted
	2.5.6.5.(4)	erratum	2018-09-28	Clauses (a) and (b) were corrected to read "… and not less than 3.5 m in any other direction ..."
	2.5.7.2.(2)	erratum	2018-09-28	The term "*Building drains*" was corrected to read "*Sanitary building drains*"
	2.5.8.4.	erratum	2018-09-28	Sentence (5) was deleted to correct the duplication of Sentence 2.5.7.2.(2)
	2.6.1.11.(1)	erratum	2018-09-28	Sentence was restructured, revised to clarify the intent, and corrected to read "*backflow preventers* required by Sentence 2.6.2.1.(3), ..."
	Table 2.8.1.1.	errata (unless otherwise indicated)	2018-09-28	Table was corrected as follows:
				Article 2.2.2.4.: entry was corrected to read "2.2.2.3."
				Article 2.2.2.5.: entry was corrected to read "2.2.2.4."
				Article 2.2.2.6.: entry was corrected to read "2.2.2.5."

Change Summary — National Plumbing Code of Canada 2015 (Continued)

Division	Code Reference	Change	Date (Y-M-D)	Description of Change
B (continued)	Table 2.8.1.1. (continued)		2018-09-28	Sentence 2.2.3.2.(3): "[F81-OP5]" was added
		revision		Article 2.2.5.1.: entry was deleted
				Sentence 2.2.5.9.(1): "[F20,F80,F81-OH2.1,OH2.3]" was corrected to read "[F20,F80,F81-OH2.1]", and "[F20,F80-OP5]" was corrected to read "[F20,F80,F81-OP5]"
				Sentence 2.2.6.2.(1): "[F40,F81-OH1.1]" was corrected to read "[F81-OH1.1]", "[F20,F30-OS2.1]" was deleted, and "[F20,F30-OS3.1]" was corrected to read "[F20-OS3.1]"
		revision		Article 2.2.6.3.: entry was deleted
				Articles 2.2.6.11. to 2.2.6.13., Sentences (1) and (2): "[F71,F80-OH2.1,OH2.3]" was corrected to read "[F80-OH2.1]", "[F46-OH2.2]" was corrected to read "[F46,F80-OH2.2]", and the term "water systems" was italicized
				Sentences 2.2.6.14.(1) and (2): "[F80-OH2.1] Applies to *drainage systems* and *venting systems*. [F46,F80-OH2.2] Applies to *water systems*." was added
				Sentences 2.2.6.15.(1) and (2): "[F80-OP5]" was added
				Sentence 2.2.10.17.(1): "[F46,F70-OH2.2]" was corrected to read "[F46-OH2.2]"
		revision		Article 2.3.5.1.: entry was revised to read "Protection of Piping"
		revision		Sentence 2.3.5.1.(1): "[F81-OP5]" was revised to read "(a) [F81-OP5]"
		revision		Article 2.3.5.2.: entry was deleted
				Article 2.3.5.4.: entry was corrected to read "Protection Against Freezing"
				Sentence 2.3.6.2.(1): "[F81-OP5]" was added
				Sentence 2.3.6.2.(2): "[F81-OH2.1,OH2.3]" was corrected to read "[F81-OH2.1]"
				Sentence 2.4.3.6.(1): "[F62-OP5]" was corrected to read "(a) [F62-OP5]", and "(b) [F81-OH2.1]" was added
				Sentence 2.4.5.3.(1): "[F81-OH1.1]" was added
				Sentence 2.5.2.1.(1): "[F40,F81-OH1.1]" was corrected to read "[F81-OH1.1]"
				Sentence 2.5.6.2.(1): "[F81-OS1.1]" was corrected to read "[F81-OH1.1]"
				Sentence 2.5.7.5.(1): "[F81-OH2.1]" was corrected to read "[F81-OH1.1]"
				Sentence 2.5.8.1.(2): entry was deleted
				Sentence 2.5.8.4.(5): entry was deleted
	Table A-2.2.5, 2.2.6. and 2.2.7.	revision	2018-09-28	Entries for "Asbestos-cement DWV pipe" were deleted
	Figure A-2.3.3.9.	revision	2018-09-28	Legend was revised to read "12. mild steel and cast iron"
	Note A-2.3.5.1.(1)	revision	2018-09-28	Note was renumbered "A-2.3.5.1.(1)(a)" and label for arrow indicating backfill in Figure was revised to read "Backfill complying with Clause 2.3.5.1.(1)(a)"
	A-2.3.5.2.(1)	revision	2018-09-28	Note was deleted
	Figure A-2.4.9.3.(3)	erratum	2018-09-28	Depiction of the measurement of the standpipes was corrected
	Table A-2.6.2.4.(2)	erratum	2018-09-28	Subtitle was corrected to read "Forming Part of Note A-2.6.2.4.(2)"
	A-2.6.3.1.(2)	errata	2018-09-28	Text in the second paragraph was corrected to read "... (Small Building Method) ...", and division title was corrected to read "Small Building Method"
	Table A-2.6.3.1.(2)-A	erratum	2018-09-28	Title was corrected to read "… Using the Small Building Method(1)"
	Figure A-2.6.3.1.(2)-A	erratum	2018-09-28	Label "HWT" under the service water heater was corrected to read "SWH", and text at the bottom of the Figure was corrected to read "For use with Small Building and …"

Change Summary — National Plumbing Code of Canada 2015 (Continued)

Division	Code Reference	Change	Date (Y-M-D)	Description of Change
B (continued)	Figure A-2.6.3.4.(5)-B	erratum	2018-09-28	Label "SWH" was corrected to read "SHWR", load on Pipe A was corrected to read "2.8 FU", and label "HWT" under the service water heater was corrected to read "SWH"
Index	Letter A	revision	2018-09-28	Asbestos-cement pipe and fittings: entry was deleted
	Letter D	revision	2018-09-28	Drainage piping: "asbestos-cement, 2.2.5.1." was deleted
	Letter F	revision	2018-09-28	Fittings: "asbestos-cement, 2.2.5.1." was deleted
	Letter P	revision	2018-09-28	Pipe: "asbestos-cement, 2.2.5.1., 2.2.6.3., 2.3.4.5., 2.3.5.2." was deleted
n/a	Symbols and Abbreviations	editorial update	2018-09-28	Entry for "HWT" was deleted, and entry for "SHWR" was added

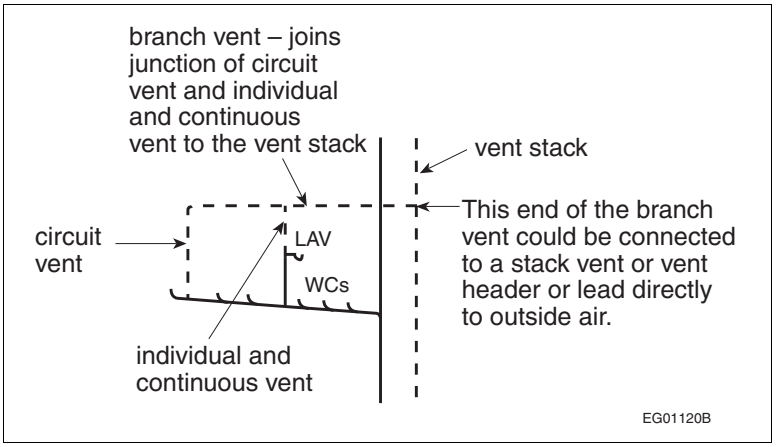


Figure A-1.4.1.2.(1)-D
Branch Vent

Note to Figure A-1.4.1.2.(1)-D:

(1) See also the definitions of header and drainage system in Article 1.4.1.2.

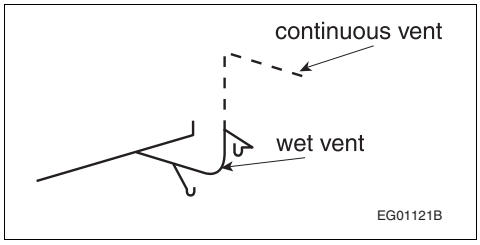


Figure A-1.4.1.2.(1)-E
Continuous Vent

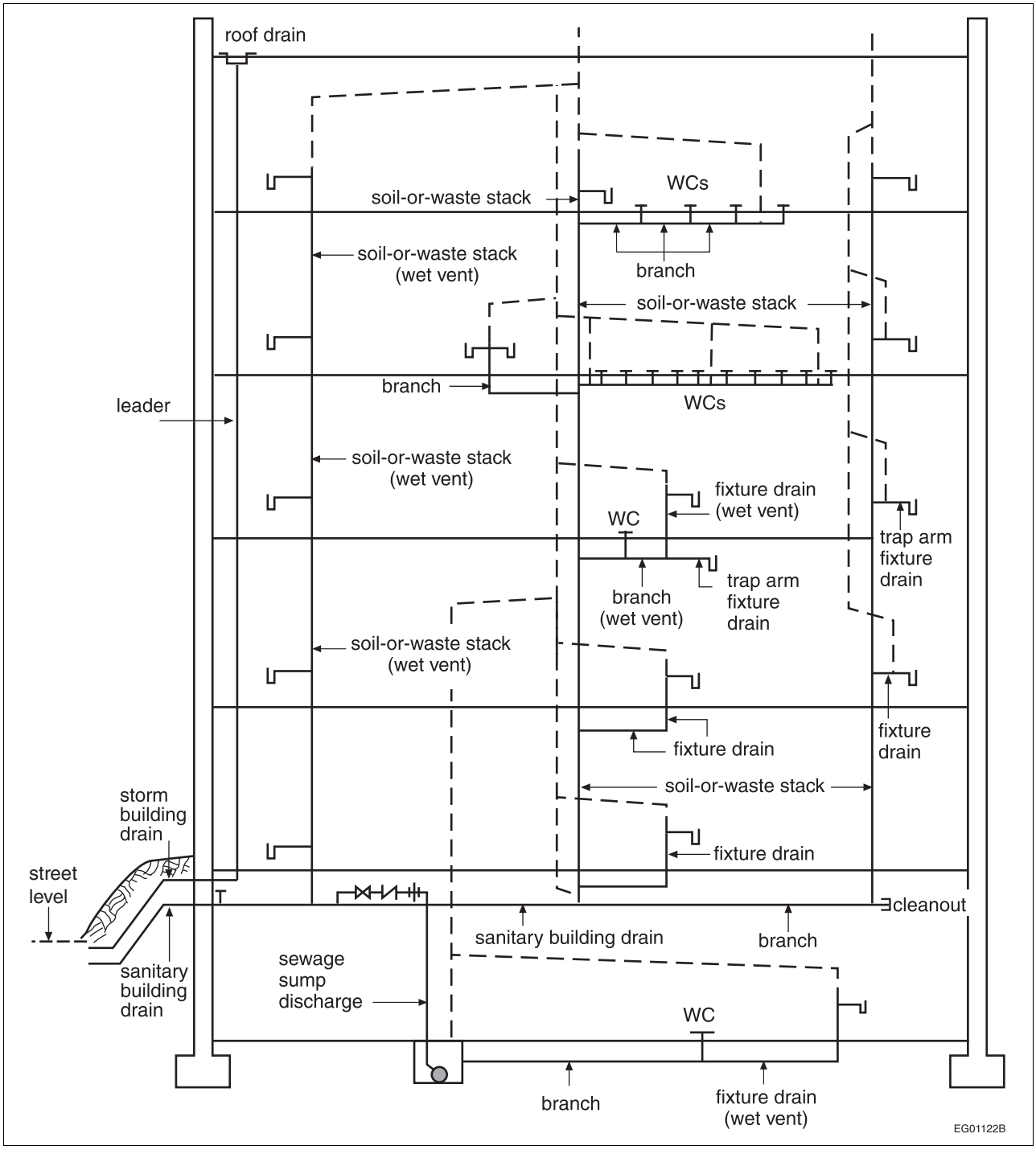


Figure A-1.4.1.2.(1)-F
Drainage System

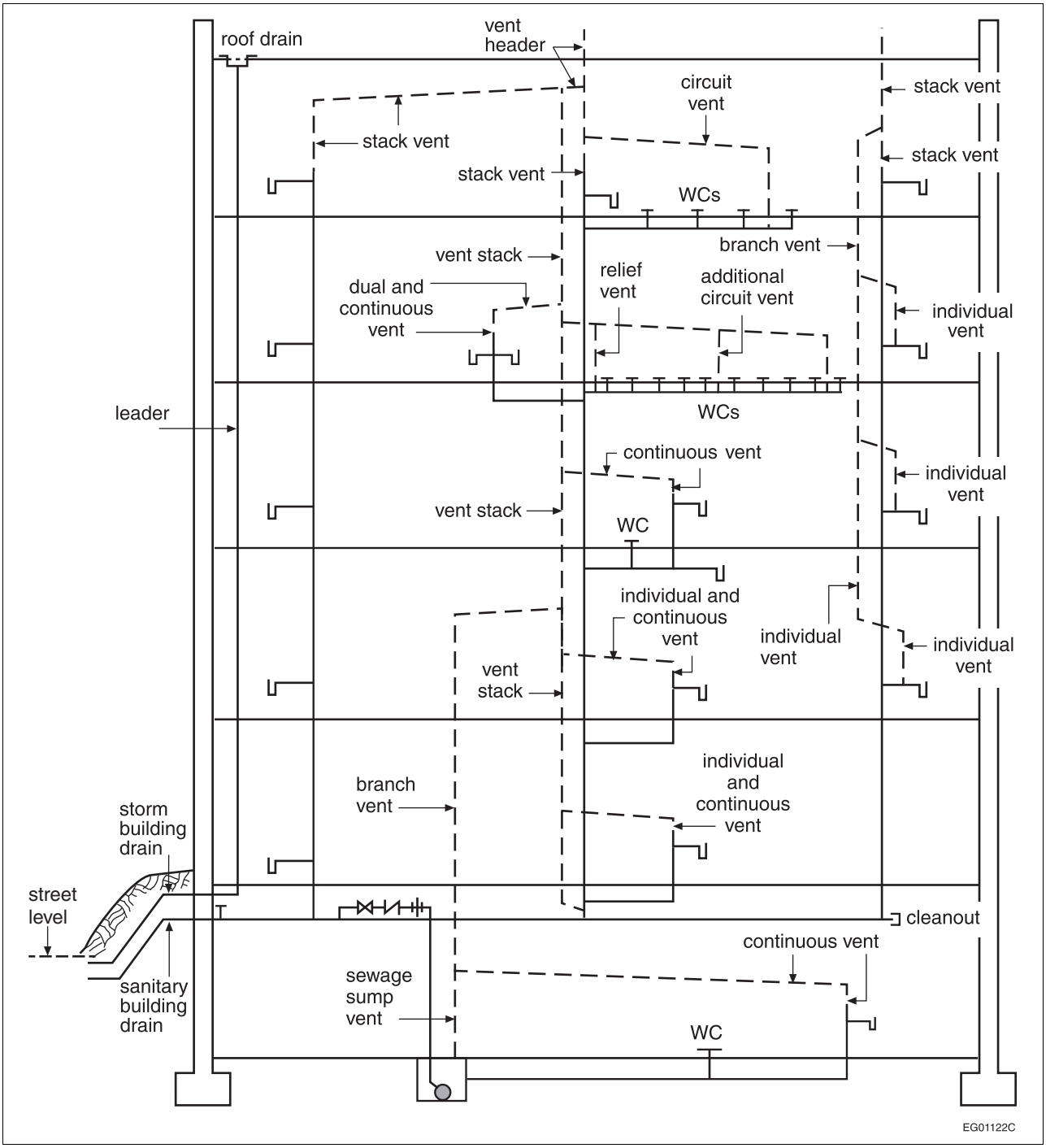


Figure A-1.4.1.2.(1)-G
Venting System

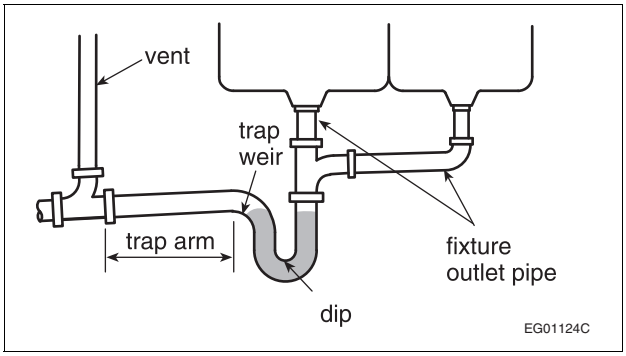


Figure A-1.4.1.2.(1)-H
Fixture Outlet Pipe and Trap Arm

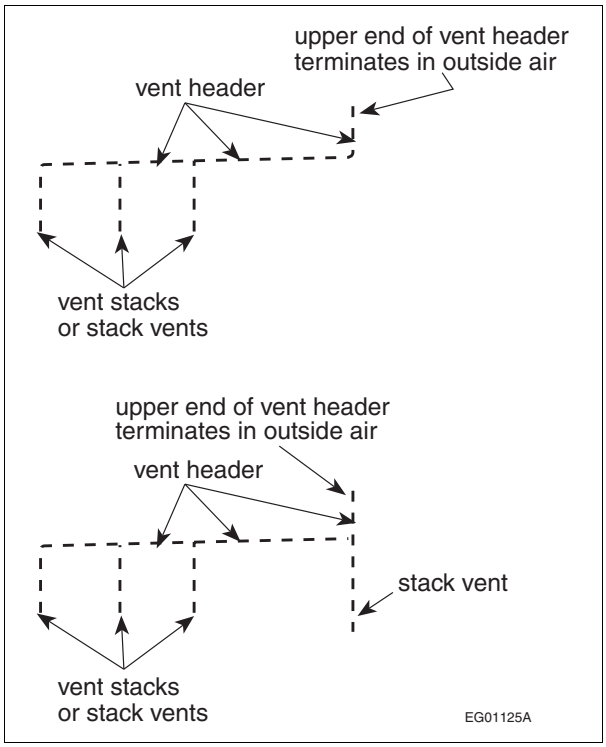


Figure A-1.4.1.2.(1)-I
Vent Header

Note to Figure A-1.4.1.2.(1)-I:

(1) Although a vent header is similar to a branch vent, it serves the special purpose of connecting the tops of stack vents or vent stacks. To make certain that it is adequate for that purpose, it is made larger than a branch vent. The developed length used to determine its size is the total length from the most distant soil-or-waste pipe to outside air, rather than the shorter length used to size a branch vent.

Part 1
General

Section 1.1. General

1.1.1. Application

1.1.1.1. Application

1) This Part applies to all *plumbing systems* covered in this Code. (See Article 1.1.1.1. of Division A.)

1.1.2. Objectives and Functional Statements

1.1.2.1. Attribution to Acceptable Solutions

1) For the purposes of compliance with this Code as required in Clause 1.2.1.1.(1)(b) of Division A, the objectives and functional statements attributed to the acceptable solutions in Division B shall be the objectives and functional statements identified in Section 2.8. (See Note A-1.1.2.1.(1).)

Section 1.2. Terms and Abbreviations

1.2.1. Definitions of Words and Phrases

1.2.1.1. Non-defined Terms

1) Words and phrases used in Division B that are not included in the list of definitions in Article 1.4.1.2. of Division A shall have the meanings that are commonly assigned to them in the context in which they are used, taking into account the specialized use of terms by the various trades and professions to which the terminology applies.

2) Where objectives and functional statements are referred to in Division B, they shall be the objectives and functional statements described in Parts 2 and 3 of Division A.

3) Where acceptable solutions are referred to in Division B, they shall be the provisions stated in Part 2.

1.2.1.2. Defined Terms

1) The words and terms in italics in Division B shall have the meanings assigned to them in Article 1.4.1.2. of Division A.

1.2.2. Symbols and Other Abbreviations

1.2.2.1. Symbols and Other Abbreviations

1) The symbols and other abbreviations in Division B shall have the meanings assigned to them in Article 1.4.2.1. of Division A and Article 1.3.2.1.

Section 1.3. Referenced Documents and Organizations

1.3.1. Referenced Documents

1.3.1.1. Effective Date

1) Unless otherwise specified herein, the documents referenced in this Code shall include all amendments, revisions, reaffirmations, reapprovals, addenda and supplements effective to 30 June 2017.

1.3.1.2. Applicable Editions

1) Where documents are referenced in this Code, they shall be the editions designated in Table 1.3.1.2.

Table 1.3.1.2.
Documents Referenced in the National Plumbing Code of Canada 2015
Forming Part of Sentence 1.3.1.2.(1)

Issuing Agency	Document Number(1)	Title of Document(2)	Code Reference
ANSI/CSA	ANSI Z21.22-2015/CSA 4.4-2015	Relief Valves for Hot Water Supply Systems	2.2.10.11.(1)
ASHRAE	2013	ASHRAE Handbook – Fundamentals	A-2.6.3.1.(2)
ASHRAE	2011	ASHRAE Handbook – HVAC Applications	A-2.6.3.1.(2)
ASME/CSA	ASME A112.3.4-2013/CSA B45.9-13	Plumbing Fixtures with Pumped Waste and Macerating Toilet Systems	2.2.2.2.(1)
ASME/CSA	ASME A112.18.1-2012/CSA B125.1-12	Plumbing Supply Fittings	2.2.10.6.(1) 2.2.10.7.(1)
ASME/CSA	ASME A112.18.2-2015/CSA B125.2-15	Plumbing Waste Fittings	2.2.3.3.(1) 2.2.10.6.(6)
ASME/CSA	ASME A112.19.1-2013/CSA B45.2-13	Enamelled Cast Iron and Enamelled Steel Plumbing Fixtures	2.2.2.2.(1)
ASME/CSA	ASME A112.19.2-2013/CSA B45.1-13	Ceramic Plumbing Fixtures	2.2.2.2.(1)
ASME/CSA	ASME A112.19.3-2017/CSA B45.4-17	Stainless Steel Plumbing Fixtures	2.2.2.2.(1)
ASME/CSA	ASME A112.19.7-2012/CSA B45.10-12	Hydromassage Bathtub Systems	2.2.2.2.(1)
ASME	B16.3-2016	Malleable Iron Threaded Fittings: Classes 150 and 300	2.2.6.6.(1) A-2.2.5., 2.2.6. and 2.2.7.
ASME	B16.4-2011	Gray Iron Threaded Fittings: Classes 125 and 250	2.2.6.5.(1) A-2.2.5., 2.2.6. and 2.2.7.
ASME	B16.5-2017	Pipe Flanges and Flanged Fittings: NPS ½ Through NPS 24 Metric/Inch Standard	2.2.6.12.(1)
ASME	B16.9-2012	Factory Made Wrought Buttwelding Fittings	2.2.6.11.(1) 2.2.6.14.(1)
ASME	B16.12-2009	Cast Iron Threaded Drainage Fittings	2.2.6.3.(1)
ASME	B16.15-2013	Cast Copper Alloy Threaded Fittings: Classes 125 and 250	2.2.7.3.(1) A-2.2.5., 2.2.6. and 2.2.7.

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[1]	Title of Document[2]	Code Reference
ASME	B16.18-2012	Cast Copper Alloy Solder-Joint Pressure Fittings	2.2.7.6.(1) 2.2.7.6.(2) A-2.2.5., 2.2.6. and 2.2.7.
ASME	B16.22-2013	Wrought Copper and Copper Alloy Solder Joint Pressure Fittings	2.2.7.6.(1) A-2.2.5., 2.2.6. and 2.2.7.
ASME	B16.23-2016	Cast Copper Alloy Solder Joint Drainage Fittings: DWV	2.2.7.5.(1) A-2.2.5., 2.2.6. and 2.2.7.
ASME	B16.24-2016	Cast Copper Alloy Pipe Flanges and Flanged Fittings: Classes 150, 300, 600, 900, 1500, and 2500	2.2.7.2.(1)
ASME	B16.26-2013	Cast Copper Alloy Fittings for Flared Copper Tubes	2.2.7.7.(1) 2.2.7.7.(2)
ASME	B16.29-2012	Wrought Copper and Wrought Copper Alloy Solder-Joint Drainage Fittings – DWV	2.2.7.5.(1) A-2.2.5., 2.2.6. and 2.2.7.
ASME	B31.9-2014	Building Services Piping	2.3.2.8.(1)
ASME	B36.19M-2004	Stainless Steel Pipe	2.2.6.10.(1)
ASPE	2010	Plumbing Engineering Design Handbook, Volume 2	A-2.6.3.1.(2)
ASPE	2012	Plumbing Engineering Design Handbook, Volume 4, Chapter 8, Grease Interceptors	A-2.4.4.3.(1)
ASSE	ANSI/ASSE 1010-2004	Water Hammer Arresters	2.2.10.15.(1)
ASSE	ASSE 1016-2011/ASME 112.1016-2011/CSA B125.16-11	Performance Requirements for Automatic Compensating Valves for Individual Showers and Tub/Shower Combinations	A-2.2.10.6.(3)
ASSE	1051-2009G	Individual and Branch Type Air Admittance Valves (AAVs) for Sanitary Drainage Systems	2.2.10.16.(1)
ASTM	A 53/A 53M-12	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless	2.2.6.7.(4) A-2.2.5., 2.2.6. and 2.2.7.
ASTM	A 182/A 182M-16a	Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service	2.2.6.12.(1) 2.2.6.13.(1)
ASTM	A 269-15a	Seamless and Welded Austenitic Stainless Steel Tubing for General Service	2.2.6.14.(1) A-2.2.5., 2.2.6. and 2.2.7.
ASTM	A 312/A 312M-17	Seamless, Welded, and Heavily Cold Worked Stainless Steel Pipes	2.2.6.10.(1) A-2.2.5., 2.2.6. and 2.2.7.
ASTM	A 351/A 351M-16	Castings, Austenitic, for Pressure-Containing Parts	2.2.6.13.(1)
ASTM	A 403/A 403M-16	Wrought Austenitic Stainless Steel Piping Fittings	2.2.6.11.(1)
ASTM	A 518/A 518M-99	Corrosion-Resistant High-Silicon Iron Castings	2.2.8.1.(1)
ASTM	B 32-08	Solder Metal	2.2.9.2.(1)
ASTM	B 42-15a	Seamless Copper Pipe, Standard Sizes	2.2.7.1.(1) A-2.2.5., 2.2.6. and 2.2.7.
ASTM	B 43-15	Seamless Red Brass Pipe, Standard Sizes	2.2.7.1.(2) A-2.2.5., 2.2.6. and 2.2.7.
ASTM	B 88-16	Seamless Copper Water Tube	2.2.7.4.(1) A-2.2.5., 2.2.6. and 2.2.7.

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[1]	Title of Document[2]	Code Reference
ASTM	B 306-13	Copper Drainage Tube (DWV)	2.2.7.4.(1) A-2.2.5., 2.2.6. and 2.2.7.
ASTM	B 813-16	Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube	2.2.9.2.(3)
ASTM	B 828-16	Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings	2.3.2.4.(1)
ASTM	C 1053-00	Borosilicate Glass Pipe and Fittings for Drain, Waste, and Vent (DWV) Applications	2.2.8.1.(1)
ASTM	D 2466-15	Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40	2.2.5.6.(2) A-2.2.5., 2.2.6. and 2.2.7.
ASTM	D 2467-15	Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80	2.2.5.6.(2) A-2.2.5., 2.2.6. and 2.2.7.
ASTM	D 3138-04	Solvent Cements for Transition Joints Between Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Non-Pressure Piping Components	A-2.2.5.8. to 2.2.5.10.
ASTM	D 3261-16	Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing	2.2.5.3.(3)
ASTM	F 628-12e2	Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe With a Cellular Core	2.2.5.8.(1) 2.2.5.10.(1) A-2.2.5., 2.2.6. and 2.2.7.
ASTM	F 714-13	Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter	2.2.5.4.(1) A-2.2.5., 2.2.6. and 2.2.7.
AWS	ANSI/AWS A5.8M/A5.8:2011	Filler Metals for Brazing and Braze Welding	2.2.9.2.(4)
AWWA	M14-2004	Recommended Practice for Backflow Prevention and Cross-Connection Control	A-2.6.2.4.(2)
AWWA	ANSI/AWWA C104/A21.4-13	Cement-Mortar Lining for Ductile-Iron Pipe and Fittings	2.2.6.4.(2)
AWWA	ANSI/AWWA C110/A21.10-12	Ductile-Iron and Gray-Iron Fittings	2.2.6.4.(3)
AWWA	ANSI/AWWA C111/A21.11-12	Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings	2.2.6.4.(4)
AWWA	ANSI/AWWA C151/A21.51-09	Ductile-Iron Pipe, Centrifugally Cast	2.2.6.4.(1) A-2.2.5., 2.2.6. and 2.2.7.
AWWA	ANSI/AWWA C228-08	Stainless-Steel Pipe Flanges for Water Service – Sizes 2 in. through 72 in. (50 mm through 1,800 mm)	2.2.6.12.(1)
CCBFC	NRCC 56190	National Building Code of Canada 2015	1.1.1.1.(3)[3] 1.4.1.2.(1)[3] 2.1.3.1.(1) 2.2.5.10.(2) 2.2.5.10.(3) 2.2.6.7.(3) 2.4.3.1.(1) 2.4.10.4.(1) A-2.2.1.1.(1)[3] A-2.2.5., 2.2.6. and 2.2.7. A-2.4.10. A-2.4.10.4.(1) A-3.2.1.1.(1)[3]
CCBFC	NRC-CONST-56215	National Energy Code of Canada for Buildings 2017	A-2.2.1.1.(1)[3] A-3.2.1.1.(1)[3]

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[1]	Title of Document[2]	Code Reference
CCBFC	NRCC 56192	National Fire Code of Canada 2015	2.5.5.2. A-2.2.1.1.(1)[3] A-3.2.1.1.(1)[3]
CSA	A60.1-M1976	Vitrified Clay Pipe	2.2.5.2.(1) A-2.2.5., 2.2.6. and 2.2.7.
CSA	A60.3-M1976	Vitrified Clay Pipe Joints	2.2.5.2.(2)
CSA	A257.1-14	Non-Reinforced Circular Concrete Culvert, Storm Drain, Sewer Pipe, and Fittings	2.2.5.1.(1) A-2.2.5., 2.2.6. and 2.2.7.
CSA	A257.2-14	Reinforced Circular Concrete Culvert, Storm Drain, Sewer Pipe, and Fittings	2.2.5.1.(1) A-2.2.5., 2.2.6. and 2.2.7.
CSA	A257.3-14	Joints for Circular Concrete Sewer and Culvert Pipe, Manhole Sections, and Fittings Using Rubber Gaskets	2.2.5.1.(2)
CSA	A257.4-14	Precast Reinforced Circular Concrete Manhole Sections, Catch Basins, and Fittings	2.2.5.1.(5)
CSA	CAN/CSA-B45 Series-02	Plumbing Fixtures	2.2.2.2.(1)
CSA	B45.5-11/IAPMO Z124-2011	Plastic Plumbing Fixtures	2.2.2.2.(1)
CSA	B64.0-11	Definitions, General Requirements, and Test Methods for Vacuum Breakers and Backflow Preventers	2.2.10.10.(1)
CSA	B64.1.1-11	Atmospheric Vacuum Breakers (AVB)	2.2.10.10.(1)
CSA	B64.1.2-11	Pressure Vacuum Breakers (PVB)	2.2.10.10.(1)
CSA	B64.1.3-11	Spill-Resistant Pressure Vacuum Breakers (SRPVB))	2.2.10.10.(1)
CSA	B64.2-11	Hose Connection Vacuum Breakers (HCVB)	2.2.10.10.(1)
CSA	B64.2.1-11	Hose Connection Vacuum Breakers (HCVB) with Manual Draining Feature	2.2.10.10.(1)
CSA	B64.2.2-11	Hose Connection Vacuum Breakers (HCVB) with Automatic Draining Feature	2.2.10.10.(1)
CSA	B64.3-11	Dual Check Valve Backflow Preventers with Atmospheric Port (DCAP)	2.2.10.10.(1)
CSA	B64.4-11	Reduced Pressure Principle (RP) Backflow Preventers	2.2.10.10.(1)
CSA	B64.4.1-11	Reduced Pressure Principle Backflow Preventers for Fire Protection Systems (RPF)	2.6.2.4.(2) 2.6.2.4.(4) A-2.6.2.4.(2)
CSA	B64.5-11	Double Check Valve (DCVA) Backflow Preventers	2.2.10.10.(1)
CSA	B64.5.1-11	Double Check Valve Backflow Preventers for Fire Protection Systems (DCVAF)	2.6.2.4.(2) A-2.6.2.4.(2)
CSA	B64.6-11	Dual Check Valve (DuC) Backflow Preventers	2.2.10.10.(1)
CSA	B64.6.1-11	Dual Check Valve Backflow Preventers for Fire Protection Systems (DuCF)	2.6.2.4.(2) A-2.6.2.4.(2)
CSA	B64.7-11	Laboratory Faucet Vacuum Breakers (LFVB)	2.2.10.10.(1)
CSA	B64.8-11	Dual Check Valve Backflow Preventers with Intermediate Vent (DuCV)	2.2.10.10.(1)
CSA	B64.9-11	Single Check Valve Backflow Preventers for Fire Protection Systems (SCVAF)	2.6.2.4.(2) A-2.6.2.4.(2)
CSA	B64.10-17	Selection and Installation of Backflow Preventers	2.6.2.1.(3)
CSA	B64.10.1-17	Maintenance and Field Testing of Backflow Preventers	A-2.6.2.1.(3)

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[1]	Title of Document[2]	Code Reference
CSA	B70-12	Cast Iron Soil Pipe, Fittings, and Means of Joining	2.2.6.1.(1) 2.4.6.4.(2) A-2.2.5., 2.2.6. and 2.2.7.
CSA	B70.1-03	Frames and Covers for Maintenance Holes and Catchbasins	2.2.6.2.(1)
CSA	B125.3-12	Plumbing Fittings	2.2.10.6.(1) 2.2.10.7.(2) 2.2.10.10.(2) A-2.6.1.11.(1)
CSA	CAN/CSA-B128.1-06	Design and Installation of Non-Potable Water Systems	2.7.4.1.(1)
CSA	B137.1-17	Polyethylene (PE) Pipe, Tubing, and Fittings for Cold-Water Pressure Services	2.2.5.3.(1) A-2.2.5., 2.2.6. and 2.2.7.
CSA	B137.2-17	Polyvinylchloride (PVC) Injection-Moulded Gasketed Fittings for Pressure Applications	2.2.5.6.(3) A-2.2.5., 2.2.6. and 2.2.7.
CSA	B137.3-17	Rigid Polyvinylchloride (PVC) Pipe and Fittings for Pressure Applications	2.2.5.6.(1) A-2.2.5., 2.2.6. and 2.2.7.
CSA	B137.5-17	Crosslinked Polyethylene (PEX) Tubing Systems for Pressure Applications	2.2.5.5.(1) A-2.2.5., 2.2.6. and 2.2.7. A-2.2.5.5.(1)
CSA	B137.6-17	Chlorinated Polyvinylchloride (CPVC) Pipe, Tubing, and Fittings for Hot- and Cold-Water Distribution Systems	2.2.5.7.(1) A-2.2.5., 2.2.6. and 2.2.7. A-2.2.5.8. to 2.2.5.10.
CSA	B137.9-17	Polyethylene/Aluminum/Polyethylene (PE-AL-PE) Composite Pressure-Pipe Systems	2.2.5.11.(1) A-2.2.5., 2.2.6. and 2.2.7. A-2.2.5.11.(1)
CSA	B137.10-17	Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene (PEX-AL-PEX) Composite Pressure-Pipe Systems	2.2.5.11.(4) 2.2.5.12.(1) A-2.2.5., 2.2.6. and 2.2.7. A-2.2.5.12.(1)
CSA	B137.11-17	Polypropylene (PP-R) Pipe and Fittings for Pressure Applications	2.2.5.13.(1) A-2.2.5., 2.2.6. and 2.2.7. A-2.2.5.13.(1)
CSA	B158.1-1976	Cast Brass Solder Joint Drainage, Waste and Vent Fittings	2.2.10.1.(1)
CSA	CAN/CSA-B181.1-15	Acrylonitrile-Butadiene-Styrene (ABS) Drain, Waste, and Vent Pipe and Pipe Fittings	2.2.5.8.(1) 2.2.5.9.(1) 2.2.5.10.(1) 2.4.6.4.(2) A-2.2.5., 2.2.6. and 2.2.7. A-2.2.5.8. to 2.2.5.10.
CSA	CAN/CSA-B181.2-15	Polyvinylchloride (PVC) and Chlorinated Polyvinylchloride (CPVC) Drain, Waste, and Vent Pipe and Pipe Fittings	2.2.5.8.(1) 2.2.5.9.(1) 2.2.5.10.(1) 2.4.6.4.(2) A-2.2.5., 2.2.6. and 2.2.7. A-2.2.5.8. to 2.2.5.10.

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[1]	Title of Document[2]	Code Reference
CSA	CAN/CSA-B181.3-15	Polyolefin and Polyvinylidene Fluoride (PVDF) Laboratory Drainage Systems	2.2.8.1.(1) A-2.2.5., 2.2.6. and 2.2.7.
CSA	CAN/CSA-B182.1-15	Plastic Drain and Sewer Pipe and Pipe Fittings	2.2.5.8.(1) 2.4.6.4.(2) A-2.2.5., 2.2.6. and 2.2.7.
CSA	CAN/CSA-B182.2-15	PSM Type Polyvinylchloride (PVC) Sewer Pipe and Fittings	2.2.5.8.(1) A-2.2.5., 2.2.6. and 2.2.7.
CSA	CAN/CSA-B182.4-15	Profile Polyvinylchloride (PVC) Sewer Pipe and Fittings	2.2.5.8.(1) A-2.2.5., 2.2.6. and 2.2.7.
CSA	CAN/CSA-B182.6-15	Profile Polyethylene (PE) Sewer Pipe and Fittings For Leak-Proof Sewer Applications	2.2.5.8.(1) A-2.2.5., 2.2.6. and 2.2.7.
CSA	CAN/CSA-B182.8-15	Profile Polyethylene (PE) Storm Sewer and Drainage Pipe and Fittings	2.2.5.8.(1)
CSA	B242-05	Groove- and Shoulder-Type Mechanical Pipe Couplings	2.2.10.4.(1)
CSA	B272-93	Prefabricated Self-Sealing Roof Vent Flashings	2.2.10.14.(2)
CSA	CAN/CSA-B356-10	Water Pressure Reducing Valves for Domestic Water Supply Systems	2.2.10.12.(1)
CSA	B481.0-12	Material, Design, and Construction Requirements for Grease Interceptors	2.2.3.2.(3)
CSA	B481.3-12	Sizing, Selection, Location, and Installation of Grease Interceptors	2.2.3.2.(3)
CSA	B481.4-12	Maintenance of Grease Interceptors	A-2.2.3.2.(3)
CSA	CAN/CSA-B483.1-07	Drinking Water Treatment Systems	2.2.10.17.(1)
CSA	B602-16	Mechanical Couplings for Drain, Waste, and Vent Pipe and Sewer Pipe	2.2.10.4.(2)
CSA	CAN/CSA-F379 SERIES-09 (excluding Supplement F379S1-11)	Packaged Solar Domestic Hot Water Systems (Liquid-to-Liquid Heat Transfer)	2.2.10.13.(1)
CSA	CAN/CSA-F383-08	Installation of Packaged Solar Domestic Hot Water Systems	2.6.1.8.(1)
CSA	G401-14	Corrugated Steel Pipe Products	2.2.6.8.(1) A-2.2.5., 2.2.6. and 2.2.7.
McGraw-Hill	2009	International Plumbing Codes Handbook	A-2.6.3.
NFPA	13D-2016	Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes	2.6.3.1.(3)
NIST	Building Materials and Structures Report BMS-79, 1941	Water-Distributing Systems for Buildings	A-2.6.3.
TIAC	2013	Mechanical Insulation Best Practices Guide	A-2.3.5.3.
ULC	CAN/ULC-S114-05	Test for Determination of Non-Combustibility in Building Materials	1.4.1.2.(1)[3]

Notes to Table 1.3.1.2.:

(1) Some documents may have been reaffirmed or reapproved. Check with the applicable issuing agency for up-to-date information.

(2) Some titles have been abridged to omit superfluous wording.

(3) Code reference is in Division A.

1.3.2. Organizations

1.3.2.1. Abbreviations of Proper Names

1) The abbreviations of proper names in this Code shall have the meanings assigned to them in this Article.

ANSI ..... American National Standards Institute (www.ansi.org)

ASHRAE ..... American Society of Heating, Refrigerating and Air-Conditioning Engineers (www.ashrae.org)

ASME ..... American Society of Mechanical Engineers (www.asme.org)

ASPE ..... American Society of Plumbing Engineers (www.aspe.org)

ASSE ..... American Society of Sanitary Engineering (www.asse-plumbing.org)

ASTM ..... American Society for Testing and Materials International (www.astm.org)

AWS ..... American Welding Society (www.aws.org)

AWWA ..... American Water Works Association (www.awwa.org)

CAN ..... National Standard of Canada designation

CCBFC ..... Canadian Commission on Building and Fire Codes (see NRC)

CGSB ..... Canadian General Standards Board (www.tpsgc-pwgsc.gc.ca/ongc-cgsb/index-eng.html)

CSA ..... CSA Group (www.csagroup.org)

NBC ..... National Building Code of Canada 2015

NFC ..... National Fire Code of Canada 2015

NFPA ..... National Fire Protection Association (www.nfpa.org)

NIST ..... National Institute of Standards and Technology (www.nist.gov)

NPC ..... National Plumbing Code of Canada 2015

NRC ..... National Research Council of Canada (Ottawa, Ontario K1A 0R6; www.nrc-cnrc.gc.ca)

NRC-IRC ..... National Research Council of Canada, Institute for Research in Construction (former name of the NRC Construction Research Centre)

ULC ..... ULC Standards (canada.ul.com/ulcstandards)

g) hydromassage bathtubs shall conform to ASME A112.19.7/CSA B45.10, "Hydromassage Bathtub Systems,"and
h) macerating toilet systems shall conform to ASME A112.3.4/CSA B45.9, "Plumbing Fixtures with Pumped Waste and Macerating Toilet Systems."

2.2.2.3. Showers

1) Shower receptors shall be constructed and arranged so that water cannot leak through the walls or floor.

2) Not more than 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 Note A-2.2.2.3.(3).)

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.

2.2.2.4. Concealed Overflows

1) A dishwashing sink and a food preparation sink shall not have concealed overflows. (See Note A-2.2.2.4.(1).)

2.2.2.5. 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.

2.2.3. Traps and Interceptors

2.2.3.1. Traps

1) Except as provided for in Sentence (2), *traps* 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 Note A-2.2.3.1.(1) and (3).)

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

3) Except for a floor-mounted service sink, every *trap* that serves a lavatory, a sink or a laundry tray shall
a) be provided with a *cleanout* plug 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 Note A-2.2.3.1.(1) and (3).)

4) A bell *trap* shall not be installed in a *drainage system*. (See Note A-2.2.3.1.(4).)

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.

2.2.3.2. Interceptors

1) *Interceptors* shall be designed so that they can be readily cleaned.

2) Grease *interceptors* shall
a) be designed so that they do not become air bound, and
b) not have a water jacket.

3) Grease *interceptors* shall be selected and installed in conformance with
a) CSA B481.0, "Material, Design, and Construction Requirements for Grease Interceptors," and
b) CSA B481.3, "Sizing, Selection, Location, and Installation of Grease Interceptors."
(See Note A-2.2.3.2.(3).)

2.2.3.3. Tubular Traps

1) Tubular metal or plastic *traps* conforming to ASME A112.18.2/CSA B125.2, "Plumbing Waste Fittings," shall be used only in accessible locations.

2.2.4. Pipe Fittings

2.2.4.1. T and Cross Fittings

(See Note A-2.2.4.1.)

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*.

2.2.4.2. Sanitary T Fittings

(See Note A-2.2.4.2.)

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.

2.2.4.3. 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 described in Sentence (1) 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 2.5.6.3.(2).

2.2.5. Non-Metallic Pipe and Fittings

(For a summary of pipe applications, see Note A-2.2.5., 2.2.6. and 2.2.7.)

2.2.5.1. 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 Note A-2.2.5.1.(3).)

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."

2.2.5.2. 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*.

2.2.5.3. Polyethylene Pipe and Fittings

1) Polyethylene water pipe, tubing and fittings shall conform to Series 160 of CSA B137.1, "Polyethylene (PE) 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."

2.2.5.4. 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 (DR-PR) Based on Outside Diameter," and shall be HDPE 3408 and SDR 11 or heavier. (See Note A-2.2.5.4.(1).)

2.2.5.5. Crosslinked Polyethylene Pipe and Fittings

1) Crosslinked polyethylene pipe and its associated fittings used in hot and cold *potable water systems* shall conform to CSA B137.5, "Crosslinked Polyethylene (PEX) Tubing Systems for Pressure Applications." (See Note A-2.2.5.5.(1).)

2.2.5.6. PVC Pipe and Fittings

1) PVC water pipe, fittings and solvent cement shall
a) conform to CSA B137.3, "Rigid Polyvinylchloride (PVC) Pipe and Fittings 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 CSA B137.2, "Polyvinylchloride (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*.

2.2.5.7. CPVC Pipe, Fittings and Solvent Cements

1) CPVC hot and cold water pipe, fittings and solvent cements shall conform to CSA B137.6, "Chlorinated Polyvinylchloride (CPVC) Pipe, Tubing, and Fittings for Hot- and Cold-Water Distribution Systems."

2) The design temperature and design pressure of a CPVC piping system shall conform to Table 2.2.5.7.

Table 2.2.5.7.
Maximum Permitted Pressure for CPVC Piping at Various Temperatures
Forming Part of Sentence 2.2.5.7.(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
82	690

2.2.5.8. Plastic Pipe, Fittings and Solvent Cement Used Underground

(See Note A-2.2.5.8. to 2.2.5.10.)

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, "Acrylonitrile-Butadiene-Styrene (ABS) Drain, Waste, and Vent Pipe and Pipe Fittings,"
c) CAN/CSA-B181.2, "Polyvinylchloride (PVC) and Chlorinated Polyvinylchloride (CPVC) Drain, Waste, and Vent Pipe and Pipe Fittings,"
d) CAN/CSA-B182.1, "Plastic Drain and Sewer Pipe and Pipe Fittings," with a pipe stiffness not less than 320 kPa,
e) CAN/CSA-B182.2, "PSM Type Polyvinylchloride (PVC) Sewer Pipe and Fittings," with a pipe stiffness not less than 320 kPa,
f) CAN/CSA-B182.4, "Profile Polyvinylchloride (PVC) Sewer Pipe and Fittings," with a pipe stiffness not less than 320 kPa,
g) CAN/CSA-B182.6, "Profile Polyethylene (PE) Sewer Pipe and Fittings For Leak-Proof Sewer Applications," with a pipe stiffness of not less than 320 kPa, or
h) CAN/CSA-B182.8, "Profile Polyethylene (PE) Storm Sewer and Drainage Pipe and Fittings," for Type 1 joints and non-perforated pipes.

2.2.5.9. Transition Solvent Cement

(See Note A-2.2.5.8. to 2.2.5.10.)

1) Solvent cement for transition joints shall conform to

a) CAN/CSA-B181.1, "Acrylonitrile-Butadiene-Styrene (ABS) Drain, Waste, and Vent Pipe and Pipe Fittings," or
b) CAN/CSA-B181.2, "Polyvinylchloride (PVC) and Chlorinated Polyvinylchloride (CPVC) Drain, Waste, and Vent Pipe and Pipe Fittings."

2) Transition solvent cement shall only be used for joining an ABS *drainage system* to a PVC *drainage system*.

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

(See Note A-2.2.5.8. to 2.2.5.10.)

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, "Acrylonitrile-Butadiene-Styrene (ABS) Drain, Waste, and Vent Pipe and Pipe Fittings," or
c) CAN/CSA-B181.2, "Polyvinylchloride (PVC) and Chlorinated Polyvinylchloride (CPVC) Drain, Waste, and Vent Pipe and Pipe Fittings."

2) Requirements for *combustible* piping in relation to fire safety shall conform to Sentences 3.1.5.19.(1) and 9.10.9.6.(3) to (11), and Articles 3.1.9.5. and 9.10.9.7. of Division B of the NBC.

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. of Division B of the NBC shall apply.

2.2.5.11. Polyethylene/Aluminum/Polyethylene Composite Pipe and Fittings

1) PE/AL/PE composite pipe and fittings shall conform to CSA B137.9, "Polyethylene/Aluminum/Polyethylene (PE-AL-PE) Composite Pressure-Pipe Systems." (See Note A-2.2.5.11.(1).)

2) Except as provided in Sentences (3) and (4), PE/AL/PE pipe and fittings shall not be used in hot *water systems*.

3) PE/AL/PE pipe with a pressure rating of 690 kPa or greater at 82°C shall be permitted for hot *water systems*.

4) PE/AL/PE pipe with a pressure rating of 690 kPa or greater at 82°C shall be used with fittings that conform to CSA B137.10, "Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene (PEX-AL-PEX) Composite Pressure-Pipe Systems," in hot *water systems*.

2.2.5.12. 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 CSA B137.10, "Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene (PEX-AL-PEX) Composite Pressure-Pipe Systems." (See Note A-2.2.5.12.(1).)

2.2.5.13. 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 Note A-2.2.5.13.(1).)

2.2.6. Ferrous Pipe and Fittings

(For a summary of pipe applications, see Note A-2.2.5., 2.2.6. and 2.2.7.)

2.2.6.1. Cast-Iron Drainage and Vent Pipe and Fittings

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

2.2.6.2. Maintenance Holes and Catch Basins

1) Cast-iron frames and covers for maintenance holes and catch basins shall conform to CSA B70.1, "Frames and Covers for Maintenance Holes and Catchbasins."

2.2.6.3. Threaded Cast-Iron Drainage Fittings

1) Threaded cast-iron drainage fittings shall conform to ASME B16.12, "Cast Iron Threaded Drainage Fittings."

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

2.2.6.4. Cast-Iron Water Pipes

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

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

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

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

2.2.6.5. Screwed Cast-Iron Water Fittings

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

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

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

2.2.6.6. Screwed Malleable Iron Water Fittings

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

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

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

2.2.6.7. Steel Pipe

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

2) Galvanized steel pipe is permitted to 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* as described in the NBC, or
b) for the repair of existing galvanized steel piping systems.

(See Note A-2.2.6.7.(3).)

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."

2.2.6.8. 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.

2.2.6.9. Sheet Metal Leaders

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

2.2.6.10. Stainless Steel Pipe

1) Stainless steel pipe shall conform to

a) ASME B36.19M, "Stainless Steel Pipe," and
b) ASTM A 312/A 312M, "Seamless, Welded, and Heavily Cold Worked Stainless Steel Pipes."

2) Only grade 304/304L or 316/316L stainless steel pipe shall be used.

2.2.6.11. Stainless Steel Butt Weld Pipe Fittings

1) Stainless steel butt weld pipe fittings shall conform to
a) ASME B16.9, "Factory Made Wrought Buttwelding Fittings," and
b) ASTM A 403/A 403M, "Wrought Austenitic Stainless Steel Piping Fittings."

2) Stainless steel butt weld pipe fittings shall be made of a material that matches the grade of the pipe material used.

2.2.6.12. Stainless Steel Pipe Flanges

1) Stainless steel pipe flanges shall conform to ASME B16.5, "Pipe Flanges and Flanged Fittings: NPS ½ Through NPS 24 Metric/Inch Standard," and
a) ASTM A 182/A 182M, "Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service," or
b) AWWA C228, "Stainless-Steel Pipe Flanges for Water Service – Sizes 2 in. through 72 in. (50 mm through 1,800 mm)."

2) Stainless steel pipe flanges shall be made of a material that matches the grade of the pipe material used.

2.2.6.13. Stainless Steel Threaded Fittings

1) Stainless steel threaded fittings shall be schedule 40s or greater conforming to
a) ASTM A 182/A 182M, "Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service," or
b) ASTM A 351/A 351M, "Castings, Austenitic, for Pressure-Containing Parts."

2) Stainless steel threaded fittings shall be made of a material that matches the grade of the pipe material used.

2.2.6.14. Stainless Steel Tube

1) Stainless steel tube shall conform to
a) ASME B16.9, "Factory Made Wrought Buttwelding Fittings," and
b) ASTM A 269, "Seamless and Welded Austenitic Stainless Steel Tubing for General Service."

2) Only grade 304/304L or 316/316L stainless steel tube shall be used.

2.2.6.15. Stainless Steel Pipe and Tube

1) The use of stainless steel pipe and tube shall conform to Table 2.2.6.15.

Table 2.2.6.15.
Permitted Uses of Stainless Steel Pipe and Tube
Forming Part of Sentence 2.2.6.15.(1)

Stainless Steel Pipe or Tube	Plumbing Purposes						
	Water Distribution System		*Building Sewer*	*Drainage System*		*Venting System*	
	Underground	Aboveground		Underground	Aboveground	Underground	Aboveground
Stainless steel pipe	P	P	P	P	P	P	P
Stainless steel tube	P	P	N	N	N	N	N
P = Permitted N = Not Permitted							

2.2.7. Non-Ferrous Pipe and Fittings

(For a summary of pipe applications, see Note A-2.2.5., 2.2.6. and 2.2.7.)

2.2.7.1. 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."

2.2.7.2. Brass or Bronze Pipe Flanges and Flanged Fittings

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

2.2.7.3. Brass or Bronze Threaded Water Fittings

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

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

2.2.7.4. 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 2.2.7.4.

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

Table 2.3.4.5.
Support for Nominally Horizontal Piping
Forming Part of Sentence 2.3.4.5.(2)

Piping Material	Maximum Horizontal Spacing of Supports, m	Additional Support Conditions
Galvanized iron or steel pipe		
• diameter ≥ 6 inches	3.75	None
• diameter < 6 inches	2.5	
Stainless steel pipe		
• diameter ≥ 1 inch	3.0	None
• diameter < 1 inch	2.5	
Stainless steel tube		
• diameter ≥ 1 inch	3.0	None
• diameter < 1 inch	2.5	
Lead pipe	Throughout length of pipe	None
Cast-iron pipe	3	At or adjacent to each hub or joint
Cast-iron pipe with mechanical joints that is ≤ 300 mm long between adjacent fittings	1	None
ABS or PVC plastic pipe	1.2	At the end of *branches* or *fixture drains* and at changes in direction and elevation
ABS or PVC plastic *trap arm* or *fixture drain* pipe > 1 m long	n/a	As close as possible to the *trap*
CPVC pipe	1	None
Copper tube or copper and brass pipe, hard temper, diameter > 1 inch	3	None
Copper tube or copper and brass pipe, hard temper, diameter ≤ 1 inch	2.5	None
Copper tube, soft temper	2.5	None
PE/AL/PE composite pipe	1	None
PEX/AL/PEX composite pipe	1	None
PEX plastic pipe	0.8	None
PP-R plastic pipe	1	At the end of *branches* and at changes in direction and elevation

5) Where hangers are used to support *nominally horizontal* piping, the hangers shall be

a) supported by metal rods of not less than
   i) 6 mm diam to support piping 2 inches or less in *size*,
   ii) 8 mm diam to support piping 4 inches or less in *size*, and
   iii) 13 mm diam to support piping over 4 inches in *size*, or
b) solid or perforated metal straps of not less than
   i) 0.6 mm nominal thickness and 12 mm wide to support piping 2 inches or less in *size*, and
   ii) 0.8 mm nominal thickness and 18 mm wide to support piping 4 inches or less in *size*.

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

2.3.4.6. 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 Note A-2.3.4.6.(1).)

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

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

2.3.4.7. Support for Vent Pipe above a Roof

1) Where a *vent pipe* that may be subject to misalignment terminates above the surface of a roof, it shall be supported or braced. (See Article 2.5.6.5. for location of *vent pipe* terminals.)

2.3.5. Protection of Piping

2.3.5.1. Protection of Piping

1) Underground piping shall be protected

a) in the absence of the pipe manufacturer's instructions for backfill, by backfill that is (see Note A-2.3.5.1.(1)(a))
   i) placed and compacted to a height of 300 mm over the top of the pipe, and
   ii) free of stones, boulders, cinders and frozen earth or other material capable of damaging the piping, or
b) by concrete that is at least 75 mm thick and at least 200 mm wider than the pipe.

2.3.5.2. 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.

2.3.5.3. Protection Against Freezing

(See Note A-2.3.5.3.)

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

2.3.5.4. Protection from Mechanical Damage

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

2.3.5.5. Protection from Condensation

(See Note A-2.3.5.3.)

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

Table 2.5.6.3.
Length of Trap Arm
Forming Part of Sentence 2.5.6.3.(4)

Size of *Trap* Served, inches	Maximum Length of *Trap Arm*, m	Minimum Slope
1¼	1.5	1/50
1½	1.8	1/50
2	2.4	1/50
3	3.6	1/50
4	9.8	1/100

2.5.6.4. Connection of Vents above Fixtures Served

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

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

2.5.6.5. Terminals

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

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

3) A *vent pipe* is permitted to be erected outside a *building*, provided that
a) no single change in direction of the *vent pipe* exceeds 45°,
b) all parts of the *vent pipe* are *nominally vertical*,
c) in areas where the *vent pipe* may be subject to frost closure, it is increased to not less than 3 inches in *size* before penetrating a wall or roof, and
d) where the *building* is 4 *storeys* or less in height, the *vent pipe* terminates above the roof of the *building*.

4) Except for a *fresh air inlet*, where a *vent pipe* is terminated in outside air, the terminal shall be located
a) not less than 1 m above and not less than 3.5 m in any other direction from every air inlet, openable window or door,
b) not less than 2 m above and not less than 3.5 m in any other direction from a roof that supports an *occupancy*,
c) not less than 2 m above ground, and
d) not less than 1.8 m from every property line.
(See Note A-2.5.6.5.(4).)

5) Where a *vent pipe* passes through a roof, it shall
a) be terminated high enough to prevent the entry of roof drainage but not less than 150 mm above the roof or above the surface of *storm water*, which could pond on the roof (see Note A-2.5.6.5.(4)), and
b) be provided with flashing to prevent the entry of water between the *vent pipe* and the roof (see Article 2.2.10.14.).

6) Where a *vent pipe* passes through a roof and may be subject to frost closure, it shall be protected from frost closure by
a) increasing its diameter at least one *size*, but not less than 3 inches in *size*, immediately before it penetrates the roof,
b) insulating the pipe, or
c) protecting it in some other manner.
(See Article 2.3.4.7.)

2.5.7. Minimum Size of Vent Pipes

2.5.7.1. General

1) The *size* of every *vent pipe* shall conform to Table 2.5.7.1.

Table 2.5.7.1.
Minimum Permitted Size of Vent Pipe Based on Size of Trap Served
Forming Part of Sentences 2.5.7.1.(1) and 2.5.8.2.(1)

Size of *Trap* Served, inches	Minimum *Size* of *Vent Pipe*, inches
1¼	1¼
1½	1¼
2	1½
3	1½
4	1½
5	2
6	2

2.5.7.2. Size Restriction

1) The *size* of a *branch vent*, *stack vent*, *vent stack* or *vent header* shall be not less than the *size* of the *vent pipe* to which it is connected.

2) *Sanitary building drains* shall be provided with at least one vent that is not less than 3 inches in *size*.

2.5.7.3. Additional Circuit Vents and Relief Vents

1) Except as provided in Article 2.5.7.1. and Sentence 2.5.3.1.(7), the minimum *size* of an *additional circuit vent* or *relief vent* installed in conjunction with a *circuit vent* is permitted to be one *size* smaller than the required *size* of the *circuit vent*, but need not be larger than 2 inches.

2) The *size* of the *soil-or-waste pipe* acting as a *relief vent* in accordance with Sentence 2.5.3.1.(4) shall be in conformance with Tables 2.4.10.6.-A, 2.4.10.6.-B or 2.5.8.1., and Article 2.5.7.1., whichever *size* is the largest considering the hydraulic load drained into the *soil-or-waste pipe*.

2.5.7.4. Offset Relief Vents

1) Except as provided in Article 2.5.7.1., the minimum *size* of an *offset relief vent* is permitted to be one *size* smaller than the *size* of the *stack vent*.

2.5.7.5. Yoke Vents

1) *Yoke vents* required by Sentence 2.5.4.3.(1) are permitted to be one *size* smaller than the *size* of the smallest pipe to which they are connected.

2.5.7.6. Vent Pipes for Manholes

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

2.5.7.7. Vents for Sewage Sumps, Dilution Tanks and Macerating Toilet Systems

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

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

3) The *size* of a *vent pipe* for a macerating toilet system with a sump shall be not less than 1½ inches.

2.5.8. Sizing of Vent Pipes

(See Note A-2.5.8. for an explanation on the sizing of *vent pipes*.)

2.5.8.1. Hydraulic Loads Draining to Wet Vents

1) The hydraulic load that drains to a *wet vent* shall conform to Table 2.5.8.1.

2) When determining the *size* of a *wet vent*, the hydraulic load from the most downstream *fixture* or symmetrically connected *fixtures* shall not be included. (See Note A-2.5.8.1.(2).)

Table 2.5.8.1.
Maximum Permitted Hydraulic Loads Drained to a Wet Vent
Forming Part of Sentence 2.5.8.1.(1)

Size of *Wet Vent*, inches	Maximum Hydraulic Load, *fixture units*	
	Not Serving Water Closets	*Fixtures*, Other Than Water Closets, That Serve Not More Than 2 Water Closets
1½	2	—
2	4	3
3	12	8
4	36	14
5	—	18
6	—	23

2.5.8.2. Individual Vents and Dual Vents

1) The *size* of *individual vents* and *dual vents* shall be determined using Table 2.5.7.1. based on the largest *trap* served.

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

2.5.8.3. Branch Vents, Vent Headers, Continuous Vents and Circuit Vents

(See Note A-2.5.8.3. and 2.5.8.4.)

1) *Branch vents*, *vent headers*, *circuit vents* and *continuous vents* shall be sized in accordance with Table 2.5.8.3., unless they are *individual vents* or *dual vents*.

2) For the purposes of Table 2.5.8.3., the length of a *branch vent* shall be its *developed length* from the most distant *soil-or-waste pipe* connection to a *vent stack*, *stack vent*, *vent header* or outside air.

3) For the purposes of Table 2.5.8.3., the length of a *vent header* shall be its *developed length* from the most distant *soil-or-waste pipe* connection to outside air.

4) For the purposes of Table 2.5.8.3., the length of a *circuit vent* shall be its *developed length* from the horizontal *soil-or-waste pipe* connection to a *vent stack*, *stack vent*, *vent header* or outside air.

5) For the purposes of Table 2.5.8.3., the length of a *continuous vent* shall be its *developed length* from the vertical *soil-or-waste pipe* connection to a *vent stack*, *stack vent*, *vent header* or outside air.

Table 2.5.8.3.
Sizing of Branch Vents, Vent Headers, Circuit Vents and Continuous Vents
Forming Part of Article 2.5.8.3.

Total Hydraulic Load Served by *Vent Pipe*, *fixture units*	*Size* of *Vent Pipe*, inches							
	1¼	1½	2	3	4	5	6	8
	Maximum Length of *Vent Pipe*, m							
2	9							
8	9	30	61					
20	7.5	15	46			Not Limited		
24	4.5	9	30					
42		9	30					
60		4.5	15	120				
100			11	79	305			
200			9	76	275			
500			6	55	215			
1 100				15	61	215		
1 900				6	21	61	215	
2 200		Not Permitted			9	27	105	335
3 600					7.5	18	76	245
5 600						7.5	18	76

2.5.8.4. Vent Stacks or Stack Vents

(See Note A-2.5.8.3. and 2.5.8.4.)

1) A *vent stack* or *stack vent* shall be sized in accordance with Table 2.5.8.4. based on
a) the length of the *vent stack* or *stack vent*, and
b) the total hydraulic load that is drained to the lowest section of *soil-or-waste stack* or stacks served by the *vent pipe*, plus any additional vent loads connected to the *vent stack* or *stack vent*.

2) For the purposes of Table 2.5.8.4., the length of a *stack vent* or *vent stack* shall be its *developed length* from its lower end to outside air.

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

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

2.6.1.9. Water Hammer

1) Provision shall be made to protect the *water distribution system* from the adverse effects of water hammer. (See Note A-2.6.1.9.(1).)

2.6.1.10. Mobile Home Water Service

1) A *water service pipe* intended to serve a mobile home shall
a) be not less than ¾ inch in *size*,
b) terminate 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.

2.6.1.11. Thermal Expansion

1) Where thermal expansion can occur, protection shall be provided for
a) *check valves* required by Article 2.6.1.5.,
b) *backflow preventers* required by Sentence 2.6.2.1.(3), and
c) pressure-reducing valves required by Article 2.6.3.3.
(See Note A-2.6.1.11.(1).)

2.6.1.12. Service Water Heaters

1) Thermostat controls for electric *storage-type service water heaters* shall be set at a temperature of 60°C. (See Note A-2.6.1.12.(1).)

2.6.2. Protection from Contamination

2.6.2.1. Connection of Systems

1) Except as provided in Sentence (2), 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) A water treatment device or apparatus shall not be installed unless it can be demonstrated that the device or apparatus will not introduce substances into the system that may endanger health.

3) *Backflow preventers* shall be selected and installed in conformance with CSA B64.10, "Selection and Installation of Backflow Preventers." (See Note A-2.6.2.1.(3).)

2.6.2.2. Back-Siphonage

1) *Potable* water connections to *fixtures*, tanks, vats or other devices not subject to pressure above atmospheric and containing other than *potable* water shall be installed so as to prevent *back-siphonage* in conformance with Sentence (2).

2) Except as provided in Sentence 2.6.2.10.(2), *back-siphonage* shall be prevented by the installation of
a) an *air gap*,
b) an atmospheric *vacuum breaker*,
c) a pressure *vacuum breaker*,
d) a spill-resistant pressure *vacuum breaker*,
e) a hose connection *vacuum breaker*,
f) a dual *check valve backflow preventer* with atmospheric port,
g) a double *check valve* assembly,
h) a reduced pressure principle *backflow preventer*,
i) a dual *check valve backflow preventer*,
j) a laboratory faucet type *vacuum breaker*, or
k) a dual *check valve backflow preventer* with vent.

2.6.2.3. Backflow Caused by Back Pressure

1) *Potable* water connections to *fixtures*, tanks, vats, boilers or other devices containing other than *potable* water and subject to pressure above atmospheric shall be arranged to prevent *backflow* caused by *back pressure* in conformance with Sentences (2) and (3).

2) Except as provided in Article 2.6.2.4., *backflow* caused by *back pressure* of non-toxic substances into a *potable water system* shall be prevented by the installation of

a) an *air gap*,
b) a dual *check valve backflow preventer* with atmospheric port,
c) a dual *check valve backflow preventer*,
d) a dual *check valve backflow preventer* with vent,
e) a double *check valve* assembly, or
f) a reduced pressure principle *backflow preventer*.

3) *Backflow* caused by *back pressure* of toxic substances into a *potable water system* shall be prevented by the installation of

a) an *air gap*, or
b) a reduced pressure principle *backflow preventer*.

2.6.2.4. Backflow from Fire Protection Systems

1) A *backflow preventer* shall not be required in *residential full flow-through fire sprinkler/standpipe systems* in which the pipes and fittings are constructed of *potable water system* materials.

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

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

Table 2.8.1.1.
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 2
Forming Part of Sentence 2.8.1.1.(1)

Functional Statements and Objectives[1]	
2.1.2.1. Sanitary Drainage Systems	
(1)	[F72-OH2.1]
(2)	[F72-OH2.1]
	[F72-OP5]
2.1.2.2. Storm Drainage Systems	
(1)	[F72-OP5]
2.1.2.3. Water Distribution Systems	
(1)	[F46-OH2.2]
2.1.2.4. Separate Services	
(1)	[F71-OH2.1,OH2.3] [F70-OH2.1]
2.1.3.1. Lighting and Ventilation Requirements	
(1)	[F40-OH1.1] Applies to the requirement for ventilation.
	[F30-OS3.1] Applies to the requirement for lighting.
2.1.3.2. Accessibility	
(1)	[F40-OH2.1] [F41-OH2.4] [F71-OH2.3]
	[F82-OH2.1,OH2.2,OH2.3,OH2.4]
	[F71-OH2.3] [F81-OH2.4]
	[F81-OP5]
2.2.1.1. Exposure of Materials	
(1)	[F80-OH2.1,OH2.2,OH2.3,OH2.4]
	[F80-OP5]
(2)	[F80-OH2.1]
	[F80-OP5]
2.2.1.2. Restrictions on Re-Use	
(1)	[F70-OH2.2]
2.2.1.5. Withstanding Pressure	
(1)	[F20,F81-OH2.1,OH2.3] [F46-OH2.2]
	[F20-OP5]
2.2.1.6. Working Pressure of a Water Service Pipe	
(1)	[F20,F81-OH2.3]
	[F20-OP5]
2.2.2.1. Surface Requirements	
(1)	[F41-OH2.4]
2.2.2.2. Conformance to Standards	
(1)	[F80-OH2.1,OH2.4]
	[F80-OS3.1]
2.2.2.3. Showers	
(1)	[F80-OH2.1]
	[F80-OP5]
(2)	[F80-OH2.1]
	[F40-OP5]

Table 2.8.1.1. (Continued)

Functional Statements and Objectives[1]	
(3)	[F45-OH2.1]
(4)	[F45-OH2.1]
2.2.2.4. Concealed Overflows	
(1)	[F41,F81-OH2.1,OH2.4]
2.2.2.5. Water Closets in Public Washrooms	
(1)	[F30-OH2.1,OH2.4]
2.2.3.1. Traps	
(1)	[F81,F40-OH1.1]
(2)	[F81-OH1.1]
	[F81-OP5]
(3)	[F81-OH2.1,OH2.3,OH2.4]
	[F81-OP5]
(4)	[F81-OH1.1]
(5)	[F81-OH1.1]
2.2.3.2. Interceptors	
(1)	[F81-OH2.1,OH2.3,OH2.4]
(2)	[F81-OH2.1,OH2.3,OH2.4] [F46-OH2.2]
(3)	[F81-OH2.1]
	[F81-OP5]
2.2.3.3. Tubular Traps	
(1)	[F82-OH2.1,OH2.4]
	[F82-OP5]
2.2.4.1. T and Cross Fittings	
(1)	[F81-OH2.1,OH2.4]
(2)	[F81-OH2.1,OH2.4]
2.2.4.2. Sanitary T Fittings	
(1)	[F81-OH2.1,OH2.4]
(2)	[F81-OH2.1,OH2.4]
	[F81-OP5]
2.2.4.3. 90° Elbows	
(1)	[F81-OH2.1,OH2.4]
(2)	[F81-OH2.1,OH2.4]
2.2.5.1. Concrete Pipe and Fittings	
(1)	[F20-OH2.1]
(2)	[F20-OH2.1]
(3)	[F20-OH2.1]
(4)	[F20-OH2.1]
(5)	[F20-OH2.1]
2.2.5.2. Vitrified Clay Pipe and Fittings	
(1)	[F20-OH2.1]
(2)	[F20-OH2.1]
(3)	[F20-OH2.1]

Table 2.8.1.1. (Continued)

Functional Statements and Objectives[1]	
2.2.5.3. Polyethylene Pipe and Fittings	
(1)	[F20-OH2.1,OH2.2,OH2.3]
	[F20-OP5]
(2)	[F20-OP5]
(3)	[F20-OP5]
2.2.5.4. Polyethylene Pipe Used Underground	
(1)	[F72-OH2.1,OH2.3]
2.2.5.5. Crosslinked Polyethylene Pipe and Fittings	
(1)	[F20-OH2.2]
	[F20-OP5]
2.2.5.6. PVC Pipe and Fittings	
(1)	[F20-OH2.1,OH2.2,OH2.3]
	[F20-OP5]
(2)	[F20-OH2.1,OH2.2,OH2.3]
	[F20-OP5]
(3)	[F20-OH2.1,OH2.2,OH2.3]
	[F20-OP5]
(4)	[F20-OP5]
2.2.5.7. CPVC Pipe, Fittings and Solvent Cements	
(1)	[F20-OH2.2,OH2.3,OH2.4]
	[F20-OP5]
(2)	[F20-OP5]
2.2.5.8. Plastic Pipe, Fittings and Solvent Cement Used Underground	
(1)	[F20,F80,F81-OH2.1]
	[F20,F80,F81-OP5]
2.2.5.9. Transition Solvent Cement	
(1)	[F20,F80,F81-OH2.1,OH2.3]
(2)	[F20,F80,F81-OH2.1,OH2.3]
2.2.5.10. Plastic Pipe, Fittings and Solvent Cement Used in Buildings	
(1)	[F20,F80,F81-OH2.1,OH2.3]
2.2.5.11. Polyethylene/Aluminum/Polyethylene Composite Pipe and Fittings	
(1)	[F20,F80,F81-OH2.1,OH2.2,OH2.3]
	[F20-OP5]
(2)	[F20-OP5]
	[F20-OH2.1,OH2.2,OH2.3]
(3)	[F20-OP5]
	[F20-OH2.1,OH2.2,OH2.3]
(4)	[F20-OP5]
	[F20-OH2.1,OH2.2,OH2.3]

Table 2.8.1.1. (Continued)

Functional Statements and Objectives[1]	
2.2.5.12. Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene Composite Pressure Pipe and Fittings	
(1)	[F20-OH2.1,OH2.2,OH2.3]
	[F20-OP5]
2.2.5.13. Polypropylene Pipe and Fittings	
(1)	[F20-OH2.1,OH2.2,OH2.3]
	[F20-OP5]
2.2.6.1. Cast-Iron Drainage and Vent Pipe and Fittings	
(1)	[F20-OH2.1,OH2.3]
(2)	[F20-OH2.2]
2.2.6.2. Maintenance Holes and Catch Basins	
(1)	[F81-OH1.1]
	[F20-OS3.1]
2.2.6.3. Threaded Cast-Iron Drainage Fittings	
(1)	[F20-OH2.1,OH2.3]
(2)	[F20-OP5]
2.2.6.4. Cast-Iron Water Pipes	
(1)	[F20-OP5]
	[F20-OH2.1,OH2.2,OH2.3]
(2)	[F80-OH2.2]
(3)	[F20-OP5]
(4)	[F20-OP5]
2.2.6.5. Screwed Cast-Iron Water Fittings	
(1)	[F20-OP5]
(2)	[F80-OH2.2]
(3)	[F81-OH2.1,OH2.3]
2.2.6.6. Screwed Malleable Iron Water Fittings	
(1)	[F81-OP5]
(2)	[F80-OH2.2]
(3)	[F81-OH2.1,OH2.3]
2.2.6.7. Steel Pipe	
(1)	[F80-OH2.1,OH2.3] [F46-OH2.2]
(3)	[F46-OH2.2]
(4)	[F80-OH2.1,OH2.3]
	[F80-OP5]
2.2.6.8. Corrugated Steel Pipe and Couplings	
(1)	[F80-OP5]
(2)	[F81-OP5]
(3)	[F81-OP5]
2.2.6.9. Sheet Metal Leaders	
(1)	[F80-OP5]

Table 2.8.1.1. (Continued)

Functional Statements and Objectives[1]	
2.2.6.10. Stainless Steel Pipe	
(1)	[F80-OH2.1] Applies to *drainage systems* and *venting systems*. [F46,F80-OH2.2] Applies to *water systems*.
	[F80-OP5]
(2)	[F80-OH2.1] Applies to *drainage systems* and *venting systems*. [F46,F80-OH2.2] Applies to *water systems*.
	[F80-OP5]
2.2.6.11. Stainless Steel Butt Weld Pipe Fittings	
(1)	[F80-OH2.1] Applies to *drainage systems* and *venting systems*. [F46,F80-OH2.2] Applies to *water systems*.
	[F80-OP5]
(2)	[F80-OH2.1] Applies to *drainage systems* and *venting systems*. [F46,F80-OH2.2] Applies to *water systems*.
	[F80-OP5]
2.2.6.12. Stainless Steel Pipe Flanges	
(1)	[F80-OH2.1] Applies to *drainage systems* and *venting systems*. [F46,F80-OH2.2] Applies to *water systems*.
	[F80-OP5]
(2)	[F80-OH2.1] Applies to *drainage systems* and *venting systems*. [F46,F80-OH2.2] Applies to *water systems*.
	[F80-OP5]
2.2.6.13. Stainless Steel Threaded Fittings	
(1)	[F80-OH2.1] Applies to *drainage systems* and *venting systems*. [F46,F80-OH2.2] Applies to *water systems*.
	[F20-OP5]
(2)	[F80-OH2.1] Applies to *drainage systems* and *venting systems*. [F46,F80-OH2.2] Applies to *water systems*.
	[F20-OP5]
2.2.6.14. Stainless Steel Tube	
(1)	[F46-OH2.2]
	[F80-OP5]
(2)	[F46-OH2.2]
	[F80-OP5]
2.2.6.15. Stainless Steel Pipe and Tube	
(1)	[F80-OH2.1,OH2.2,OH2.3]
2.2.7.1. Copper and Brass Pipe	
(1)	[F80-OH2.1,OH2.3] Applies to *drainage systems* and *venting systems*. [F46-OH2.2] Applies to *water systems*.
	[F80-OP5]

Table 2.8.1.1. (Continued)

Functional Statements and Objectives[1]	
(2)	[F80-OH2.1,OH2.3] Applies to *drainage systems* and *venting systems*. [F46-OH2.2] Applies to *water systems*.
	[F80-OP5]
2.2.7.2. Brass or Bronze Pipe Flanges and Flanged Fittings	
(1)	[F80-OH2.1,OH2.3] Applies to *drainage systems* and *venting systems*. [F46-OH2.2] Applies to *water systems*.
	[F80-OP5]
2.2.7.3. Brass or Bronze Threaded Water Fittings	
(1)	[F80-OP5]
(2)	[F80-OH2.1,OH2.3]
2.2.7.4. Copper Tube	
(1)	[F80-OH2.1,OH2.3] Applies to *drainage systems* and *venting systems*. [F46-OH2.2] Applies to *water systems*.
	[F80-OP5]
(2)	[F80-OH2.1,OH2.2,OH2.3]
(3)	[F80-OH2.1,OH2.4]
2.2.7.5. Solder-Joint Drainage Fittings	
(1)	[F80-OH2.1,OH2.4]
(2)	[F20-OP5]
2.2.7.6. Solder-Joint Water Fittings	
(1)	[F20-OP5]
(2)	[F20-OP5]
2.2.7.7. Flared-Joint Fittings for Copper Water Systems	
(1)	[F20-OP5]
(2)	[F20-OP5]
2.2.7.8. Lead Waste Pipe and Fittings	
(1)	[F46,F20-OH2.2,OH2.3]
(2)	[F81-OH2.1,OH2.3,OH2.4]
2.2.8.1. Pipes and Fittings	
(1)	[F80,F81-OH2.1]
	[F80,F81-OS3.2,OS3.4]
2.2.9.1. Cement Mortar	
(1)	[F80-OP5]
	[F80-OH2.1,OH2.3]
2.2.9.2. Solders and Fluxes	
(1)	[F80-OP5]
	[F80-OH2.1,OH2.3]
(2)	[F46-OH2.2]
(3)	[F80-OH2.1,OH2.3]
(4)	[F20,F80,F81-OH2.1,OH2.3]
2.2.10.1. Brass Floor Flanges	
(1)	[F80-OH2.1]

Table 2.8.1.1. (Continued)

Functional Statements and Objectives[1]	
2.2.10.2. Screws, Bolts, Nuts and Washers	
(1)	[F80-OH2.1,OH2.3]
2.2.10.3. Cleanout Fittings	
(1)	[F80-OH2.1,OH2.3] Applies to *drainage systems*. [F46-OH2.2] Applies to *water systems*.
(2)	[F80-OH2.1]
2.2.10.4. Mechanical Couplings	
(1)	[F80-OP5]
(2)	[F80-OH2.1,OH2.3]
2.2.10.5. Saddle Hubs	
(1)	[F81-OH2.1,OH2.3]
	[F81-OP5]
2.2.10.6. Supply and Waste Fittings	
(1)	[F80-OP5]
(2)	[F131-OE1.2]
(3)	[F30-OS3.1]
	[F31-OS3.2]
(4)	[F131-OE1.2]
(5)	[F131-OE1.2]
(6)	[F80-OH2.1,OH2.3]
2.2.10.7. Water Temperature Control	
(1)	[F80-OS3.2]
(3)	(a) [F31-OS3.2] (b) [F30-OS3.1]
(4)	[F31-OS3.2]
2.2.10.8. Direct Flush Valves	
(1)	(c) and (d) [F80-OH2.1] [F81-OH2.4]
	(a) and (b) [F80,F81-OP5]
2.2.10.9. Drinking Fountain Bubblers	
(1)	[F40,F46-OH2.4]
(2)	[F41,F46-OH2.2]
(3)	[F41,F46-OH2.2]
2.2.10.10. Back-Siphonage Preventers and Backflow Preventers	
(1)	[F46-OH2.2]
(2)	[F46-OH2.2]
2.2.10.11. Relief Valves	
(1)	[F31-OS3.2]
	[F31-OP5]
2.2.10.12. Reducing Valves	
(1)	[F81-OP5]
2.2.10.13. Solar Domestic Hot Water	
(1)	[F81-OS3.2]
	[F46-OH2.2]
	[F80,F81-OP5]

Table 2.8.1.1. (Continued)

Functional Statements and Objectives[1]	
2.2.10.14. Vent Pipe Flashing	
(1)	[F80,F81-OP5]
(2)	[F80,F81-OP5]
2.2.10.15. Water Hammer Arresters	
(1)	[F20,F80-OP5]
2.2.10.16. Air Admittance Valves	
(1)	[F81-OH1.1]
2.2.10.17. Water Treatment Systems	
(1)	[F46-OH2.2]
	[F30-OS3.1] [F46,F70-OS3.4]
	[F20,F30-OS2.1]
2.3.2.1. Caulked Lead Drainage Joints	
(1)	[F80-OH2.1,OH2.3]
(2)	[F80-OH2.1]
(3)	[F81-OH2.1]
(4)	[F81-OH2.1]
2.3.2.2. Wiped Joints	
(1)	[F80,F81-OH2.1]
	[F80,F81-OP5]
(2)	[F80,F81-OH2.1,OH2.2,OH2.3]
(3)	[F80,F81-OH2.1,OH2.2,OH2.3]
2.3.2.3. Screwed Joints	
(1)	[F80,F81-OH2.1,OH2.2,OH2.3]
(2)	[F70-OH2.2]
2.3.2.4. Soldered Joints	
(1)	[F20,F81-OH2.1,OH2.2,OH2.3]
2.3.2.5. Flared Joints	
(1)	[F20,F81-OH2.1,OH2.2,OH2.3]
	[F20,F81-OP5]
(2)	[F20,F81-OH2.1,OH2.2,OH2.3]
	[F20,F81-OP5]
2.3.2.6. Mechanical Joints	
(1)	[F20-OH2.1,OH2.2,OH2.3]
	[F20-OP5]
2.3.2.7. Cold-Caulked Joints	
(1)	[F20,F81-OH1.1] Applies to bell and spigot joints in *venting systems*.
	[F20,F81-OH2.1,OH2.3] Applies to bell and spigot joints in *drainage systems* or *venting systems*.
	[F20,F81-OP5]
(2)	[F20,F81-OH1.1]
	[F20,F81-OP5]
	[F20,F81-OH2.1,OH2.2,OH2.3]

Table 2.8.1.1. (Continued)

Functional Statements and Objectives[1]	
(3)	[F20-OH2.1,OH2.3]
2.3.2.8. Stainless Steel Welded Joints	
(1)	[F20,F81-OH2.1,OH2.2,OH2.3]
(2)	[F20,F81-OH2.1,OH2.2,OH2.3]
2.3.3.1. Drilled and Tapped Joints	
(1)	[F81-OH1.1]
	[F20,F81-OH2.2,OH2.3]
2.3.3.2. Extracted Tees	
(1)	[F81-OH2.1,OH2.3]
	[F20-OP5]
2.3.3.3. Prohibition of Welding of Pipes and Fittings	
(1)	[F20-OH1.1]
	[F20-OH2.1,OH2.2,OH2.3]
(2)	[F80-OH2.2]
	[F80-OP5]
2.3.3.4. Unions and Slip Joints	
(1)	[F81-OH1.1]
	[F81-OH2.1,OH2.3]
(2)	[F81-OH1.1]
	[F81-OH2.1,OH2.3]
2.3.3.5. Increaser or Reducer	
(1)	[F81-OH1.1]
	[F70,F80-OH2.2]
2.3.3.6. Dissimilar Materials	
(1)	[F80-OH1.1]
	[F80-OP5]
	[F80-OH2.1]
2.3.3.7. Connection of Roof Drain to Leader	
(1)	[F21,F81-OP5]
2.3.3.8. Connection of Floor Outlet Fixtures	
(1)	[F80-OH2.1,OH2.3]
(2)	[F80-OH2.1]
(4)	[F20-OH2.1]
	[F20-OS3.1]
(5)	[F81-OH2.1]
(6)	[F21-OH2.1]
2.3.3.9. Expansion and Contraction	
(1)	[F21-OH1.1]
	[F21-OH2.1]
	[F21-OP5]
2.3.3.10. Copper Tube	
(1)	[F20-OH1.1]
	[F20-OP5]

Table 2.8.1.1. (Continued)

Functional Statements and Objectives[1]	
2.3.3.11. Indirect Connections	
(1)	[F81-OH2.2,OH2.4]
(2)	[F81-OH2.2,OH2.4]
2.3.3.12. Copper Joints Used Underground	
(1)	[F20,F80-OP5]
(2)	[F20,F80-OP5]
2.3.4.1. Capability of Support	
(1)	[F20-OH2.1,OH2.4]
	[F20-OS3.1]
	[F20-OP5]
(2)	[F20-OH2.1,OH2.3]
	[F20-OS3.1]
(3)	[F20-OS3.1]
	[F20-OH2.1,OH2.3]
2.3.4.2. Independence of Support	
(1)	[F20-OS3.1]
	[F20-OH2.1,OH2.3]
	[F20-OP5]
2.3.4.3. Insulation of Support	
(1)	[F80-OH2.1,OH2.3]
	[F80-OS3.1]
	[F80-OP5]
(2)	[F80-OH2.1,OH2.3]
	[F80-OS3.1]
	[F80-OP5]
2.3.4.4. Support for Vertical Piping	
(1)	[F20-OH2.1]
	[F20-OS3.1]
(2)	[F20-OH2.1]
	[F20-OS3.1]
	[F20-OP5]
2.3.4.5. Support for Horizontal Piping	
(1)	[F20-OS3.1]
	[F20-OH2.1,OH2.3]
	[F20-OP5]
(2)	[F20-OS3.1]
	[F20-OH2.1]
	[F20-OP5]
(3)	[F20-OP5]
	[F20,F81-OS3.1]
	[F20-OH2.1]
(4)	[F81-OP5]
	[F81-OS3.1]

Table 2.8.1.1. (Continued)

Functional Statements and Objectives[1]	
(5)	[F20,F21-OP5]
	[F20-OS3.1]
	[F20-OH2.1]
(6)	[F20-OP5]
	[F20-OS3.1]
	[F20-OH2.1]
2.3.4.6. Support for Underground Horizontal Piping	
(1)	[F20-OP5]
	[F81-OH2.1]
2.3.4.7. Support for Vent Pipe above a Roof	
(1)	[F81-OS3.1]
	[F81-OP5]
2.3.5.1. Protection of Piping	
(1)	(a) [F81-OP5]
	[F81-OH2.1,OH2.3]
2.3.5.2. Isolation from Loads	
(1)	[F81-OH2.1,OH2.3]
	[F81-OP5]
2.3.5.3. Protection Against Freezing	
(1)	[F81-OP5]
	[F81-OH2.1,OH2.3]
2.3.5.4. Protection from Mechanical Damage	
(1)	[F81-OH2.1,OH2.3]
	[F81-OP5]
2.3.5.5. Protection from Condensation	
(1)	[F81-OP5]
2.3.6.1. Tests and Inspection of Drainage or Venting Systems	
(1)	[F81-OH2.1,OH2.3] Applies to *drainage systems*.
	[F81-OH1.1] Applies to *venting systems*.
(2)	[F81-OH1.1] Applies to *venting systems*.
	[F81-OH2.1,OH2.3] Applies to *drainage systems*.
(3)	[F81-OH1.1]
	[F81-OH2.1,OH2.3]
(4)	[F81-OH1.1] Applies to *venting systems*.
	[F81-OH2.1,OH2.3] Applies to *drainage systems*.
(5)	[F81-OH2.1,OH2.3]
2.3.6.2. Tests of Pipes in Drainage Systems	
(1)	[F81-OH2.1,OH2.3]
	[F81-OP5]
(2)	[F81-OH2.1]
2.3.6.3. Tests of Venting Systems	
(1)	[F81-OH1.1]

Table 2.8.1.1. (Continued)

Functional Statements and Objectives[1]	
2.3.6.4. Water Pressure Tests	
(1)	[F81-OH1.1]
	[F81-OH2.1,OH2.3]
(2)	[F81-OH1.1]
	[F81-OH2.1,OH2.3]
2.3.6.5. Air Pressure Tests	
(1)	[F81-OH1.1]
	[F81-OH2.1,OH2.3]
2.3.6.6. Final Tests	
(1)	[F81-OH1.1]
	[F81-OH2.1,OH2.3]
(2)	[F81-OH1.1]
	[F81-OH2.1,OH2.3]
2.3.6.7. Ball Tests	
(1)	[F81-OH2.1,OH2.3]
(2)	[F81-OH2.1,OH2.3]
2.3.7.1. Application of Tests	
(1)	[F81-OP5]
(3)	[F81-OP5]
(4)	[F81-OP5]
2.3.7.2. Pressure Tests of Potable Water Systems	
(1)	[F20-OP5]
(2)	[F20,F81-OS3.1]
2.3.7.3. Water Pressure Tests	
(1)	[F81-OP5]
(2)	[F70-OH2.2]
2.4.2.1. Connections to Sanitary Drainage Systems	
(1)	[F72-OH2.1] Applies to *fixtures* that are *directly connected* to *sanitary drainage systems*.
	(a) [F81-OH2.2]
	(b) [F81-OH2.2]
	(c) [F81-OH2.1]
	(d) [F81-OH2.1]
	(e) [F81-OH2.1]
(2)	[F81-OH1.1]
(3)	[F81-OH1.1]
(4)	[F81-OH1.1]
(5)	[F81-OH1.1]
2.4.2.2. Connection of Overflows from Rainwater Tanks	
(1)	[F81-OH2.2]
2.4.2.3. Direct Connections	
(1)	[F81-OH2.2]
(2)	[F81-OH2.1,OH2.4]

Table 2.8.1.1. (Continued)

Functional Statements and Objectives[1]	
(3)	[F81-OH2.4]
2.4.3.1. Urinals	
(1)	[F81-OH2.4]
2.4.3.2. Restricted Locations of Indirect Connections and Traps	
(1)	[F81-OH2.1,OH2.4]
2.4.3.3. Equipment Restrictions Upstream of Grease Interceptors	
(1)	[F81-OH2.1]
2.4.3.4. Fixtures Located in Chemical Storage Locations	
(1)	[F81-OS1.1]
	[F43-OH5]
2.4.3.5. Macerating Toilet Systems	
(1)	[F72-OH2.1]
2.4.3.6. Drains Serving Elevator Pits	
(1)	(a) [F62-OP5]
	(b) [F81-OH2.1]
2.4.4.1. Sewage Treatment	
(1)	[F81-OH2.1]
2.4.4.2. Cooling of Hot Water or Sewage	
(1)	[F81-OH2.1]
2.4.4.3. Interceptors	
(1)	[F81-OH2.1]
(2)	[F81-OS1.1]
	[F43-OH5]
(3)	[F81-OH2.1]
(4)	[F81-OH2.1]
2.4.4.4. Neutralizing and Dilution Tanks	
(1)	[F80-OS3.4]
(2)	[F43-OH5]
	[F80-OH2.1]
2.4.5.1. Traps for Sanitary Drainage Systems	
(1)	[F81-OH1.1]
(6)	[F81-OH1.1]
	[F81-OP5]
2.4.5.2. Traps for Storm Drainage Systems	
(1)	[F81-OH1.1]
(2)	[F81-OH1.1]
(3)	[F81-OP5]
2.4.5.3. Connection of Subsoil Drainage Pipe to a Sanitary Drainage System	
(1)	[F81-OH2.1]
	[F81-OH1.1]
2.4.5.4. Location and Cleanout for Building Traps	
(1)	[F81-OH2.1]

Table 2.8.1.1. (Continued)

Functional Statements and Objectives[1]	
2.4.5.5. Trap Seals	
(1)	[F81-OH1.1]
2.4.6.1. Separate Systems	
(1)	[F81-OH2.1]
(2)	[F81-OH2.1]
(3)	[F81-OH1.1]
2.4.6.2. Location of Soil-or-Waste Pipes	
(1)	[F81-OH2.2]
2.4.6.3. Sumps or Tanks	
(1)	[F81-OH2.1]
(2)	[F81-OH2.1] Applies to the watertightness of sumps or tanks.
	[F81-OH1.1]
(3)	[F81-OH2.1]
(4)	[F81-OH2.1]
(5)	[F81-OH2.1]
(6)	[F81-OH2.1]
(7)	[F81-OH2.1]
2.4.6.4. Protection from Backflow	
(1)	[F81-OH2.1]
	[F81-OH1.1]
(2)	[F81-OH1.1]
	[F81-OH2.1]
(3)	[F81-OH2.1]
(6)	[F81-OH2.1]
2.4.6.5. Mobile Home Sewer Service	
(1)	[F81-OH2.1]
2.4.7.1. Cleanouts for Drainage Systems	
(1)	[F81-OH2.1]
(2)	[F81-OH2.1]
(3)	[F81-OH2.1]
(4)	[F81-OH2.1]
(5)	[F81-OH2.1]
(6)	[F81-OH2.1]
(7)	[F81-OH2.1]
(8)	[F81-OH2.1]
(9)	[F81-OH2.1]
(10)	[F82-OH2.1]
	[F82-OP5]
(11)	[F81-OH2.1]
	[F81-OP5]
2.4.7.2. Size and Spacing of Cleanouts	
(1)	[F81-OH2.1]
(2)	[F81-OH2.1]

Table 2.8.1.1. (Continued)

Functional Statements and Objectives[1]	
(3)	[F81-OH2.1]
(4)	[F81-OH2.1]
(5)	[F81-OH2.1]
(6)	[F81-OH2.1]
2.4.7.3. Manholes	
(1)	[F20-OS3.1]
(2)	(a) and (c) [F81-OH1.1]
	(a) and (c) [F81-OS1.1]
	(b) [F20-OS3.1]
(3)	[F30-OS3.1]
(4)	[F81-OH2.1]
2.4.7.4. Location of Cleanouts	
(1)	[F81-OH2.1]
(2)	(a) [F81-OS3.1]
	(b) [F81-OH2.1]
(3)	[F81-OH2.1]
(4)	[F81-OH2.1] Applies to drainage piping.
	[F81-OH1.1] Applies to vent piping.
(5)	[F43-OH2.1]
2.4.8.1. Minimum Slope	
(1)	[F81-OH2.1]
2.4.8.2. Length of Fixture Outlet Pipes	
(1)	[F81-OH1.1]
2.4.9.1. No Reduction in Size	
(1)	[F81-OH2.1]
	[F81-OH1.1]
2.4.9.2. Serving Water Closets	
(1)	[F81-OH2.1]
(2)	[F81-OH2.1]
(3)	[F81-OH2.1]
(4)	[F81-OH2.1]
2.4.9.3. Size of Fixture Outlet Pipes	
(1)	[F81-OH2.1]
(2)	[F81-OH2.1]
(3)	[F81-OP5]
	[F81-OH1.1]
2.4.9.4. Size of Building Drain and Building Sewer	
(1)	[F81-OH2.1]
2.4.9.5. Offset in Leaders	
(1)	[F81-OH2.1,OH2.3]
(2)	[F81-OH2.1]
2.4.10.1. Total Load on a Pipe	
(1)	[F81-OH2.1]

Table 2.8.1.1. (Continued)

Functional Statements and Objectives[1]	
2.4.10.2. Hydraulic Loads for Fixtures	
(2)	[F81-OH2.1]
2.4.10.3. Hydraulic Loads from Fixtures with a Continuous Flow	
(1)	[F81-OH2.1]
(2)	[F81-OH2.1]
2.4.10.4. Hydraulic Loads from Roofs or Paved Surfaces	
(1)	[F81-OP5]
	[F20,F81-OS2.1]
(2)	[F20,F81-OP5]
	(a), (d) and (e) [F41,F81-OH2.4]
	(b) and (c) [F20,F81-OS2.1]
(3)	[F20,F81-OP5]
	[F20,F81-OS2.1]
(4)	[F21,F81-OP5]
	[F20,F81-OS2.1]
2.4.10.5. Conversion of Fixture Units to Litres	
(1)	[F81-OH2.1]
2.4.10.6. Hydraulic Loads to Soil-or-Waste Pipes	
(1)	[F72-OH2.1,OH2.3]
(2)	[F72-OH2.1,OH2.3]
2.4.10.7. Hydraulic Loads on Branches	
(1)	[F72-OH2.1,OH2.3]
2.4.10.8. Hydraulic Loads on Sanitary Building Drains or Sewers	
(1)	[F81-OH2.1,OH2.3]
2.4.10.9. Hydraulic Loads on Storm or Combined Building Drains or Sewers	
(1)	[F81-OH2.1,OH2.3]
2.4.10.10. Hydraulic Loads to Roof Gutters	
(1)	[F81-OP5]
2.4.10.11. Hydraulic Loads on Leaders	
(1)	[F81-OP5]
2.4.10.12. Hydraulic Loads from Fixtures with a Semi-continuous Flow	
(1)	[F81-OP5]
2.4.10.13. Design of Storm Sewers	
(1)	[F81-OH2.1]
2.5.1.1. Venting for Traps	
(1)	[F81-OH1.1]
(2)	[F81-OH1.1]
2.5.2.1. Wet Venting	
(1)	[F81-OH1.1]
2.5.3.1. Circuit Venting	
(1)	[F40,F81-OH1.1]
(2)	[F40,F81-OH1.1]

Table 2.8.1.1. (Continued)

Functional Statements and Objectives[1]	
(3)	[F40,F81-OH1.1]
(4)	[F40,F81-OH1.1]
(5)	[F40,F81-OH1.1]
(6)	[F40,F81-OH1.1]
(7)	[F40,F81-OH1.1]
(8)	[F40,F81-OH1.1]
(9)	[F40,F81-OH1.1]
(10)	[F40,F81-OH1.1]
(11)	[F40,F81-OH1.1]
2.5.4.1. Stack Vents	
(1)	[F40,F81-OH1.1]
2.5.4.2. Vent Stacks	
(1)	[F40,F81-OH1.1]
(3)	[F40,F81-OH1.1]
(4)	[F40,F81-OH1.1]
2.5.4.3. Yoke Vents	
(1)	[F40,F81-OH1.1]
(2)	[F40,F81-OH1.1]
(3)	[F40,F81-OH1.1]
(4)	[F40,F81-OH1.1]
2.5.4.4. Offset Relief Vents	
(1)	[F40,F81-OH1.1]
2.5.4.5. Fixtures Draining into Vent Pipes	
(1)	[F40,F81-OH1.1]
2.5.5.1. Venting of Sewage Sumps	
(1)	[F40,F81-OH1.1]
2.5.5.2. Venting of Oil Interceptors	
(1)	[F40,F81-OS1.1]
	[F72,F81-OH2.1,OH2.3]
	[F40,F81-OH1.1]
(2)	[F40,F81-OS1.1]
	[F40,F81-OH1.1]
(3)	[F40,F81-OS1.1]
(4)	[F40,F81-OS1.1]
(5)	[F40,F81-OS1.1]
2.5.5.3. Venting of Drain Piping and Dilution Tanks for Corrosive Waste	
(1)	[F80,F81-OS3.4]
2.5.5.4. Fresh Air Inlets	
(1)	[F81-OH1.1]
2.5.5.5. Provision for Future Installations	
(1)	[F81-OH1.1] Applies to *venting systems*.
	[F81-OH2.1,OH2.3] Applies to *drainage systems*.

Table 2.8.1.1. (Continued)

Functional Statements and Objectives[1]	
(2)	[F40,F81-OH1.1]
2.5.6.1. Drainage of Vent Pipes	
(1)	[F81-OH1.1]
	[F81-OS1.1]
2.5.6.2. Vent Pipe Connections	
(1)	[F81-OH1.1]
(2)	[F81-OH1.1]
(3)	[F40,F81-OH1.1]
2.5.6.3. Location of Vent Pipes	
(1)	[F81-OH1.1]
(2)	[F81-OH2.1,OH2.3]
(3)	[F81-OH1.1]
(4)	[F40,F81-OH1.1]
2.5.6.4. Connection of Vents above Fixtures Served	
(1)	[F81-OH1.1]
(2)	[F81-OH1.1]
2.5.6.5. Terminals	
(1)	[F81-OH1.1]
(2)	[F81-OH1.1]
(3)	[F81-OH1.1]
(4)	[F81-OH1.1]
(5)	[F81-OH1.1]
(6)	[F81-OH1.1]
2.5.7.1. General	
(1)	[F81-OH1.1]
2.5.7.2. Size Restriction	
(1)	[F81-OH1.1]
(2)	[F81-OH1.1]
2.5.7.3. Additional Circuit Vents and Relief Vents	
(1)	[F81-OH1.1]
(2)	[F81-OH1.1]
2.5.7.4. Offset Relief Vents	
(1)	[F81-OH1.1]
2.5.7.5. Yoke Vents	
(1)	[F81-OH1.1]
2.5.7.6. Vent Pipes for Manholes	
(1)	[F81-OH2.1]
2.5.7.7. Vents for Sewage Sumps, Dilution Tanks and Macerating Toilet Systems	
(1)	[F81-OH2.1]
(2)	[F81-OH2.1]
(3)	[F81-OH1.1]

Table 2.8.1.1. (Continued)

Functional Statements and Objectives[1]	
2.5.8.1. Hydraulic Loads Draining to Wet Vents	
(1)	[F81-OH1.1]
2.5.8.2. Individual Vents and Dual Vents	
(1)	[F81-OH1.1]
2.5.8.3. Branch Vents, Vent Headers, Continuous Vents and Circuit Vents	
(1)	[F81-OH1.1]
2.5.8.4. Vent Stacks or Stack Vents	
(3)	[F81-OH1.1]
(4)	[F81-OH1.1]
2.5.9.2. Air Admittance Valves	
(1)	[F40,F81-OH1.1]
(2)	[F40,F81-OH1.1]
2.5.9.3. Installation Conditions	
(1)	[F40,F81-OH1.1]
(2)	[F40,F81-OH1.1]
(3)	[F40,F81-OH1.1]
(4)	[F40,F81-OH1.1]
(5)	[F40,F81-OH1.1]
2.6.1.1. Design	
(1)	[F31-OS3.2]
(2)	[F71-OH2.3]
2.6.1.2. Drainage	
(1)	[F81-OP5]
2.6.1.3. Shut-off Valves	
(1)	[F81-OP5]
(2)	[F81-OP5]
(3)	[F81-OP5]
(4)	[F81-OP5]
(5)	[F70,F72-OH2.1,OH2.3]
(6)	[F70,F72-OH2.1,OH2.3]
(7)	[F70,F81-OH2.1,OH2.3]
2.6.1.4. Protection for Exterior Water Supply	
(1)	[F81-OP5]
2.6.1.5. Check Valves	
(1)	[F20,F81-OP5]
2.6.1.6. Flushing Devices	
(1)	[F72-OH2.1]
(2)	[F72-OH2.1]
(3)	[F130-OE1.2]
(4)	[F81-OH2.1]
(5)	[F130-OE1.2]

Table 2.8.1.1. (Continued)

Functional Statements and Objectives[1]	
2.6.1.7. Relief Valves	
(1)	[F31,F81-OS3.2]
(2)	[F81-OS3.1,OS3.2]
(4)	(a) [F31-OS3.2] [F81-OS1.1] (b) [F81-OS3.1,OS3.2]
(5)	[F31-OS3.2]
	(b) [F81-OH2.2] Applies to the size of *air breaks*.
(6)	[F31-OS3.2]
(7)	[F31-OS3.2]
(8)	[F81-OS3.2]
(9)	[F81-OP5]
(10)	[F81-OP5]
2.6.1.8. Solar Domestic Hot Water Systems	
(1)	[F31-OS3.2] [F81-OS3.4]
	[F70-OH2.2]
2.6.1.9. Water Hammer	
(1)	[F20,F81-OS3.2]
	[F20,F81-OP5]
2.6.1.10. Mobile Home Water Service	
(1)	[F71,F70,F46-OH2.2,OH2.3]
2.6.1.11. Thermal Expansion	
(1)	[F20,F81,F46-OP5]
2.6.1.12. Service Water Heaters	
(1)	[F40-OS3.4]
2.6.2.1. Connection of Systems	
(1)	[F70,F81,F46-OH2.1,OH2.2,OH2.3]
(2)	[F70,F81,F46-OH2.1,OH2.2,OH2.3]
(3)	[F70,F81,F82-OH2.2,OH2.3]
2.6.2.2. Back-Siphonage	
(1)	[F70,F81,F46-OH2.1,OH2.2,OH2.3]
(2)	[F70,F81,F46-OH2.1,OH2.2,OH2.3]
2.6.2.3. Backflow Caused by Back Pressure	
(1)	[F70,F81,F46-OH2.1,OH2.2,OH2.3]
(2)	[F70,F81,F46-OH2.1,OH2.2,OH2.3]
(3)	[F70,F81,F46-OH2.1,OH2.2,OH2.3]
2.6.2.4. Backflow from Fire Protection Systems	
(2)	[F46,F70,F81-OH2.1,OH2.2,OH2.3]
(3)	[F46,F70,F81-OH2.1,OH2.2,OH2.3]
(4)	[F46,F70,F81-OH2.1,OH2.2,OH2.3]
2.6.2.5. Separation of Water Supply Systems	
(1)	[F70,F81,F46-OH2.1,OH2.2,OH2.3]
2.6.2.6. Premise Isolation	
(1)	[F70,F81,F82-OH2.1,OH2.2,OH2.3]

Table 2.8.1.1. (Continued)

Functional Statements and Objectives[1]	
2.6.2.7. Hose Bibb	
(1)	[F70,F81,F46-OH2.1,OH2.2,OH2.3]
2.6.2.8. Cleaning of Systems	
(1)	[F70,F81,F46-OH2.1,OH2.2,OH2.3]
2.6.2.9. Air Gap	
(1)	[F70,F81,F46-OH2.1,OH2.2,OH2.3]
(2)	[F70,F81,F46-OH2.1,OH2.2,OH2.3]
2.6.2.10. Vacuum Breakers	
(2)	[F70,F81,F46-OH2.1,OH2.2,OH2.3]
(3)	[F70,F81,F46-OH2.1,OH2.2,OH2.3]
(4)	[F70,F81,F46-OH2.1,OH2.2,OH2.3]
2.6.2.11. Tank-Type Water Closets	
(1)	[F70,F81,F46-OH2.1,OH2.2,OH2.3]
2.6.2.12. Backflow Preventers	
(1)	[F70,F81,F46-OH2.1,OH2.2,OH2.3]
2.6.3.1. Design, Fabrication and Installation	
(1)	[F71,F72-OH2.1,OH2.3]
(2)	[F72-OH2.1] [F70-OH2.2] [F71-OH2.3]
(3)	[F81-OS1.4]
	[F70,F71-OH2.1,OH2.3]
	[F81-OP5]
2.6.3.2. Hydraulic Load	
(1)	[F71,F72-OH2.1,OH2.3]
(2)	[F71,F72-OH2.1,OH2.3]
(3)	[F71,F72-OH2.1,OH2.3]
(4)	[F81-OH2.1,OH2.2]
2.6.3.3. Static Pressure	
(1)	[F81-OS3.2]
2.6.3.4. Size	
(1)	[F71,F72-OH2.1,OH2.3]
(2)	[F71,F72-OH2.1,OH2.3]
(3)	[F71,F72-OH2.1,OH2.3]
(4)	[F81-OH2.3]
(5)	[F71,F72-OH2.1,OH2.3]
2.6.3.5. Velocity	
(1)	[F81-OH2.1,OH2.3]
	[F81-OP5]
	[F81-OS3.1]
2.7.1.1. Not Permitted	
(1)	[F46-OH2.2]
2.7.2.1. Markings Required	
(1)	[F46-OH2.2]

Table 2.8.1.1. (Continued)

Functional Statements and Objectives[1]	
2.7.3.1. Pipes	
(1)	[F46-OH2.2]
2.7.3.2. Outlets	
(1)	[F46-OH2.2]
2.7.4.1. Non-potable Water System Design	
(1)	[F81-OH2.1]
(2)	[F82-OH2.2]

Notes to Table 2.8.1.1.:

(1) See Parts 2 and 3 of Division A.

A-2.2.4.2. Sanitary T Fittings in Drainage Systems. A sanitary T fitting may be used to change the direction of flow in a drainage system from horizontal to vertical, but may not be used to change the direction of flow in a nominally horizontal drainage system. A combination Y and 1/8th bend fitting may also be used as shown in Figure A-2.2.4.2.(b).

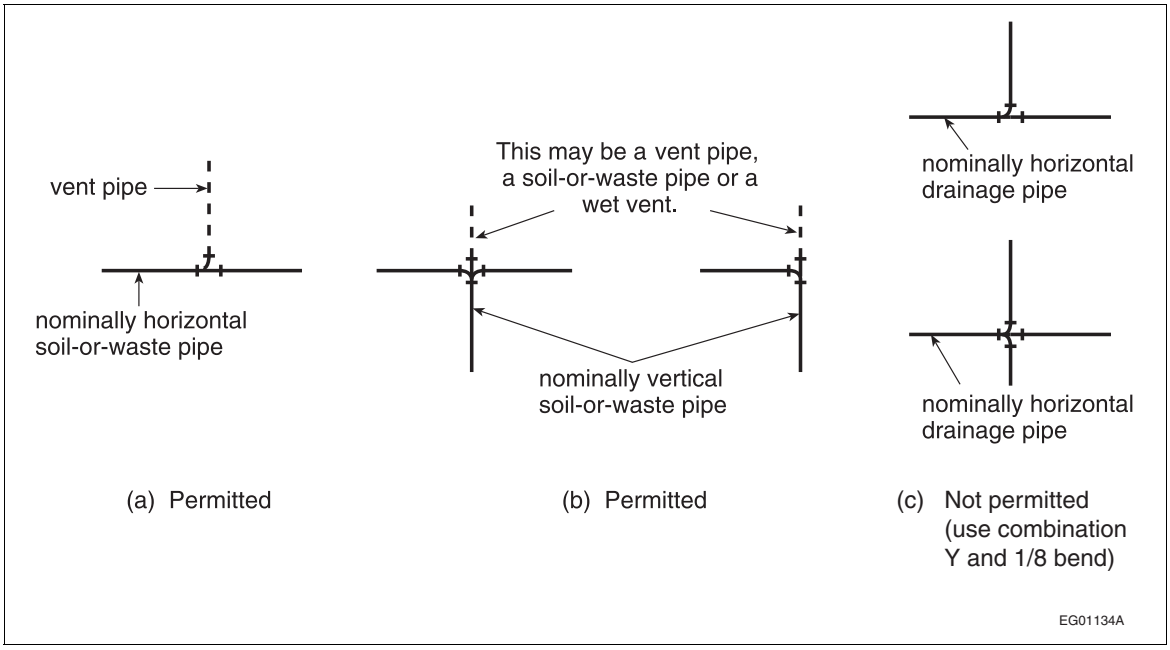


Figure A-2.2.4.2.
Sanitary T Fittings in Drainage Systems

A-2.2.5., 2.2.6. and 2.2.7. Pipe and Fitting Applications.

Table A-2.2.5., 2.2.6. and 2.2.7.
Summary of Pipe and Fitting Applications
Forming Part of Note A-2.2.5., 2.2.6. and 2.2.7.

Types of Piping and Fittings	Standard References	NPC References	Use of Piping and Fittings[1]								
			Drainage System			Venting System		Potable Water System			
								Above-ground		Underground	
			Above-ground inside building	Under-ground under building	Building sewer	Above-ground	Under-ground	Cold	Hot	Under building	Outside building
Concrete sewer pipe	CSA Series A257										
Sewer, storm drain and culvert	CSA A257.1	2.2.5.1.	N	P[2]	P	N	N	N	N	N	N
Reinforced culvert, storm drain and sewer	CSA A257.2	2.2.5.1.	N	P[2]	P	N	N	N	N	N	N
Vitrified clay pipe	CSA A60.1-M	2.2.5.2.	N	P	P	N	P	N	N	N	N
Polyethylene water pipe and tubing											
Series 160 sizes with compression fittings	CSA B137.1	2.2.5.3.	N	N	N	N	N	N	N	P[3]	P[3]
Series 50, 75, 100 and 125		2.2.5.3.	N	N	N	N	N	N	N	N	N
Polyethylene (PE) plastic pipe (SDR-PR) based on outside diameter	ASTM F 714	2.2.5.4.(1)	N	P	P	N	P	N	N	N	N
Polyvinyl chloride (PVC) pressure fittings	CSA B137.2	2.2.5.6.	N	N	N	N	N	P[4][5]	N	P	P
Polyvinyl chloride (PVC) water pipe											
Dimension ratios (DR) or standard dimension ratios (SDR) 14, 17, 18, 21, 25 and 26	CSA B137.3	2.2.5.6.	N	N	N	N	N	P	N	P[6]	P[6]
Schedule 40 in sizes from ½ inch to 2½ inches inclusively											
Schedule 80 in sizes from ½ inch to 6 inches inclusively											
PVC fittings, Schedule 40	ASTM D 2466	2.2.5.6.(2)	N	N	N	N	N	P[4][5]	N	N	N
PVC fittings, Schedule 80	ASTM D 2467	2.2.5.6.(2)	N	N	N	N	N	P[4][5]	N	P	P

Table A-2.2.5., 2.2.6. and 2.2.7. (Continued)

Types of Piping and Fittings	Standard References	NPC References	Use of Piping and Fittings[1]								
			Drainage System			Venting System		Potable Water System			
								Above-ground		Underground	
			Above-ground inside building	Underground under building	Building sewer	Above-ground	Underground	Cold	Hot	Under building	Outside building
Crosslinked polyethylene (PEX) pressure tubing	CSA B137.5	2.2.5.5.	N	N	N	N	N	P[4][5]	P[4][5]	P	P
Chlorinated polyvinyl chloride (CPVC) water pipe	CSA B137.6	2.2.5.7.	N	N	N	N	N	P[4][5][7]	P[4][5][7]	P[7]	P[7]
Polyethylene/aluminum/ polyethylene (PE/AL/PE) pressure pipe	CSA B137.9	2.2.5.11.	N	N	N	N	N	P[4][5]	N	P	P
Crosslinked polyethylene/aluminum/ crosslinked polyethylene (PEX/AL/PEX) pressure pipe	CSA B137.10	2.2.5.12.	N	N	N	N	N	P[4][5]	P[4][5]	P	P
Polypropylene (PP-R) pressure pipe	CSA B137.11	2.2.5.13.	N	N	N	N	N	P[4][5]	P[4][5]	P	P
Plastic sewer pipe PS ≥ 320 kPa	CAN/CSA-B182.1	2.2.5.8.	N	P	P	N	N	N	N	N	N
Acrylonitrile-butadiene-styrene (ABS) DWV pipe	CAN/CSA-B181.1	2.2.5.8. 2.2.5.9.	P[4][5]	P	P	P[4][5]	P	N	N	N	N
ABS Schedule 40 DWV pipe with a cellular core	ASTM F 628	2.2.5.8.	P[4][5]	P	P	P[4][5]	P	N	N	N	N
Polyvinyl chloride (PVC) DWV pipe	CAN/CSA-B181.2	2.2.5.8. 2.2.5.9.	P[4][5]	P	P	P[4][5]	P	N	N	N	N
PVC sewer pipe (PSM type) ≤ 35-SDR	CAN/CSA-B182.2	2.2.5.8.	N	P	P	N	P	N	N	N	N
Profile polyvinyl chloride (PVC) sewer pipe PS ≥ 320 kPa	CAN/CSA-B182.4	2.2.5.8.(1)(f)	N	P	P	N	P	N	N	N	N
Profile polyethylene sewer pipe PS ≥ 320 kPa	CAN/CSA-B182.6	2.2.5.8.(1)(g)	N	P	P	N	P	N	N	N	N
Polyolefin laboratory drainage systems	CAN/CSA-B181.3	2.2.8.1.	P[4][5]	P	P	P[4][5]	P	N	N	N	N
Cast-iron soil pipe	CSA B70	2.2.6.1.	P	P	P	P	P	N	N	N	N

Table A-2.2.5., 2.2.6. and 2.2.7. (Continued)

Types of Piping and Fittings	Standard References	NPC References	Use of Piping and Fittings[1]								
			Drainage System			Venting System		Potable Water System			
								Above-ground		Underground	
			Above-ground inside building	Underground under building	Building sewer	Above-ground	Underground	Cold	Hot	Under building	Outside building
Cast-iron water pipe	ANSI/AWWA C151/A21.51 (Ductile iron)	2.2.6.4.	P	P	P	P	P	P	P	P	P
Cast-iron screwed fittings	ASME B16.4 (Cast iron)	2.2.6.5.	N	N	N	N	N	P	P	P	P
	ASME B16.3 (Malleable iron)	2.2.6.6.	N	N	N	N	N	P	P	P	P
Stainless steel pipe	ASTM A 312/A 312M	2.2.6.10.	P	P	P	P	P	P	P	P	P
Stainless steel tube	ASTM A 269	2.2.6.14.	N	N	N	N	N	P	P	P	P
Welded and seamless steel galvanized pipe	ASTM A 53/A 53M	2.2.6.7.	P	N	N	P	N	P[8]	P[8]	P[8]	P[8]
Corrugated steel galvanized pipe	CSA G401	2.2.6.8.	N	N	P[9]	N	N	N	N	N	N
Sheet metal pipe[10]	—	2.2.6.9.	N	N	N	N	N	N	N	N	N
Copper and brass pipe	ASTM B 42 (Copper)	2.2.7.1.	P	P	P	P	P	P	P	P	P
	ASTM B 43 (Red brass)	2.2.7.1.	P	P	P	P	P	P	P	P	P
Brass or bronze threaded water fittings	ASME B16.15	2.2.7.3.	N	N	N	N	N	P	P	P	P
Copper tube											
Types K and L hard temper	ASTM B 88	2.2.7.4.	P	P	P	P	P	P	P	N	N
Types K and L soft temper	ASTM B 88	2.2.7.4.	N	N	N	N	N	P	P	P	P
Type M hard temper	ASTM B 88	2.2.7.4.	P	N	N	P	N	P	P	N	N
Type M soft temper	ASTM B 88	2.2.7.4.	N	N	N	N	N	N	N	N	N
Type DWV	ASTM B 306	2.2.7.4.	P[11]	N	N	P[11]	N	N	N	N	N
Solder-joint drainage fittings	ASME B16.23	2.2.7.5.	P	P	P	P	P	N	N	N	N
	ASME B16.29										
Solder-joint water fittings	ASME B16.18	2.2.7.6.	N	N	N	P	P	P	P	P	P
	ASME B16.22										
Lead waste pipe	—	2.2.7.8.	P[4][5]	P	N	P[4][5]	P	N	N	N	N

N = Not permitted P = Permitted

Table A-2.2.5., 2.2.6. and 2.2.7. (Continued)

Notes to Table A-2.2.5., 2.2.6. and 2.2.7.:

(1) Where fire stops are pierced by pipes, the integrity of the fire stop must be maintained.
(2) Gasketted joints required.
(3) Permitted only for water service pipe.
(4) Combustible piping in noncombustible construction is subject to the requirements of Sentence 3.1.5.19.(1) of Division B of the NBC.
(5) Combustible piping that penetrates a fire separation is subject to the requirements in Articles 3.1.9.1., 9.10.9.6. and 9.10.9.7. of Division B of the NBC.
(6) Not permitted in hot water systems.
(7) Not to exceed design temperature and design pressure stated in Sentence 2.2.5.7.(2).
(8) Permitted only in buildings of industrial occupancy as described in the NBC, or for the repair of existing galvanized steel piping systems.
(9) Permitted underground only in a storm drainage system.
(10) Permitted only for an external leader.
(11) Not permitted for the fixture drain or vent below the flood level rim of a flush-valve-operated urinal.

A-2.2.5.1.(3) Concrete Fittings. Concrete fittings fabricated on the site from lengths of pipe may have proven acceptable on the basis of past performance in some localities and their acceptance under this Code may be warranted.

A-2.2.5.4.(1) Polyethylene Pipe Used Underground. Joints within the high-density polyethylene pipe (HDPE) shall be heat-fused according to the manufacturer's instructions. Joints between HDPE pipes and other materials shall be made with a suitable hubless coupling.

A-2.2.5.5.(1) Crosslinked Polyethylene Pipe and Fittings. There are some special installation requirements for the use of crosslinked polyethylene pipe and its associated fittings. Reference should, therefore, be made to the installation information in CSA B137.5, "Crosslinked Polyethylene (PEX) Tubing Systems for Pressure Applications."

A-2.2.5.8. to 2.2.5.10. Solvent Cement. CSA B137.6, "Chlorinated Polyvinylchloride (CPVC) Pipe, Tubing, and Fittings for Hot- and Cold-Water Distribution Systems," CAN/CSA-B181.1, "Acrylonitrile-Butadiene-Styrene (ABS) Drain, Waste, and Vent Pipe and Pipe Fittings," and CAN/CSA-B181.2, "Polyvinylchloride (PVC) and Chlorinated Polyvinylchloride (CPVC) Drain, Waste, and Vent Pipe and Pipe Fittings," reference ASTM D 3138, "Solvent Cements for Transition Joints Between Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Non-Pressure Piping Components," which specifies the colour of the solvent cement. PVC cement shall be grey, ABS cement shall be yellow, CPVC cement shall be clear and transition cement shall be white. The standard colour allows Code users to readily determine if the correct solvent cement has been used. It should be noted that a transition cement is not an all-purpose cement.

A-2.2.5.11.(1) Polyethylene/Aluminum/Polyethylene Composite Pipe and Fittings. There are some special installation requirements for the use of polyethylene/aluminum/polyethylene composite pipe and fittings. Reference should, therefore, be made to the installation information in CSA B137.9, "Polyethylene/Aluminum/Polyethylene (PE-AL-PE) Composite Pressure-Pipe Systems."

A-2.2.5.12.(1) Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene Composite Pressure Pipe and Fittings. There are some special installation requirements for the use of crosslinked polyethylene/aluminum/crosslinked polyethylene composite pipe and fittings. Reference should, therefore, be made to the installation information in CSA B137.10, "Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene (PEX-AL-PEX) Composite Pressure-Pipe Systems."

A-2.2.5.13.(1) Polypropylene Pipe and Fittings. There are some special installation requirements for the use of polypropylene pipe and fittings. Reference should, therefore, be made to the installation information in CSA B137.11, "Polypropylene (PP-R) Pipe and Fittings for Pressure Applications."

A-2.2.6.7.(3) Galvanized Steel Pipe. The use of galvanized steel pipe and fittings in a water distribution system may have proven acceptable on the basis of past performance in some localities and its acceptance under this Code may be warranted.

A-2.2.10.5.(1) Saddle Hubs or Fittings. Saddle hubs or fittings may have proven acceptable on the basis of past performance in some localities and their acceptance under this Code may be warranted.

A-2.2.10.6.(2) Supply Fittings and Individual Shower Heads. Flow restriction devices within supply fittings should not be removed.

Due to the low flow rate of public lavatory faucets, design consideration should be given to the wait time for hot water to be delivered to each fixture.

A-2.2.10.6.(3) Automatic Compensating Valves. When replacing a shower head, the appropriate shower valve with a suitable compensating feature matching the flow rate should be chosen to decrease the possibility that users will suffer thermal shock. The water flow rate of automatic compensating mixing valves can be found in ASSE 1016/ASME 112.1016/CSA B125.16, "Performance Requirements for Automatic Compensating Valves for Individual Showers and Tub/Shower Combinations."

A-2.2.10.6.(4) and (5) Automatic Shut-off of Water Flow. Examples of water shut-off devices include occupant sensors and self-closing valves.

A-2.2.10.7. Hot Water Temperature. Hot water delivered at 60°C will severely burn human skin in 1 to 5 seconds. At 49°C, the time for a full thickness scald burn to occur is 10 minutes. Children, the elderly and persons with disabilities are particularly at risk of scald burns. Compliance with Article 2.2.10.7. will reduce the risk of scalding in showers and bathtubs, and reduce the risk of thermal shock from wall-mounted shower heads.

These requirements apply to all occupancies, not just residential occupancies.

The water outlet temperature at other fixtures, such as lavatories, sinks, laundry trays or bidets, is not addressed by Article 2.2.10.7., but a scald risk may exist at such fixtures nonetheless.

A-2.2.10.9.(3) Bubblers. Bubblers installed on other than drinking fountains may have proven acceptable on the basis of past performance in some localities and their acceptance under this Code may be warranted.

A-2.2.10.16.(1) Air Admittance Valve. An air admittance valve is a device that is closed by gravity and seals the vent terminal at zero differential pressure (no flow conditions) and under positive internal pressures. The valve allows air to enter the drainage system without the use of a vent extended to outside air and prevents trap siphonage.

The material of the diaphragm can be damaged by exposure to acidic or corrosive fumes in the ambient atmosphere; therefore, air admittance valves should not be installed in locations where there is a potential for exposure to such fumes.

A-2.3.2.6.(1) Mechanical Joints. Storm sewer blockage can cause mechanical joints at the base of leaders to fail, which results in flooding. The failure occurs because the cleanout joints at the base of the rainwater leaders are not able to withstand the water column pressure. To avoid such failures, it is necessary to ensure that storm water systems installed using mechanical joints be braced and/or restrained at the ends of branches, changes in direction and elevation, at dead ends and at other locations as required by the manufacturer to prevent the separation of joints due to internal pressure, mechanical stress or seismic events. Care should be taken to replace cleanouts properly after maintenance or testing.

A-2.3.3.9. Linear Expansion.

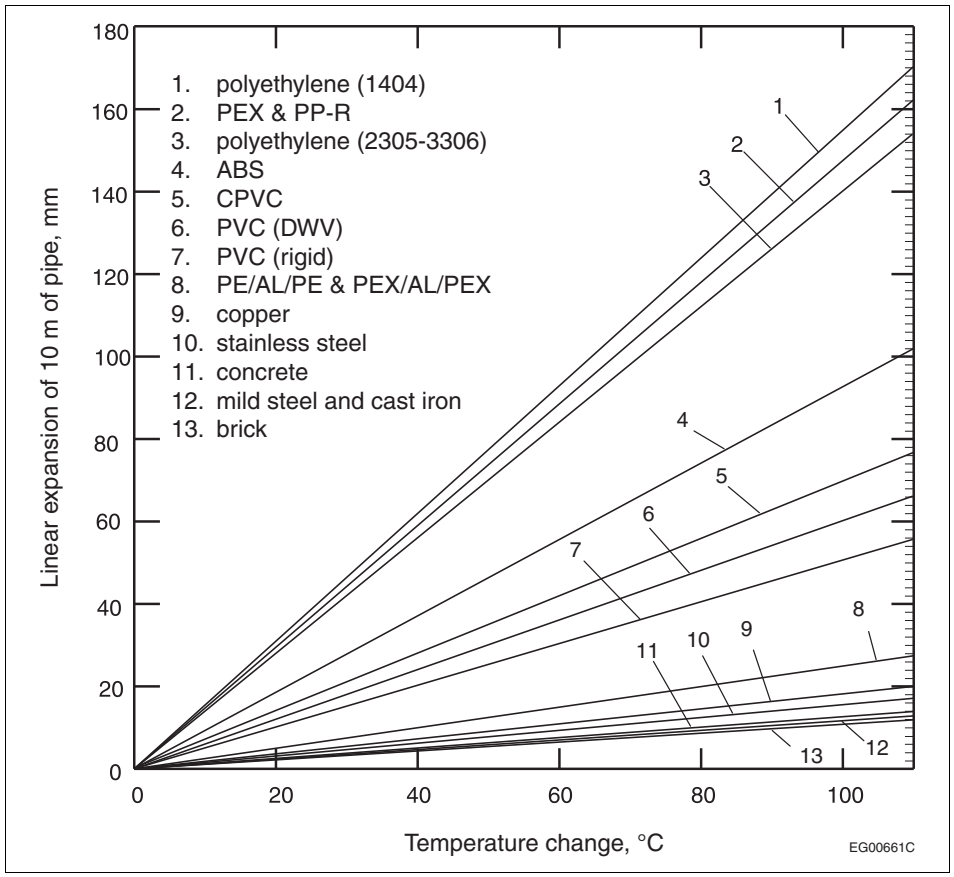


Figure A-2.3.3.9.
Linear Expansion

Example: To determine the expansion of 20 m of ABS pipe for a temperature change from 10°C to 60°C.
Temperature change = 60 – 10 = 50°C,
Enter the chart at 50°C, read up to ABS line, and then across to the mm scale = 47 mm/10 m of pipe,
∴ change in length of 20 m of pipe =

$$\frac{20}{10} \times 47 = 94 \text{ mm}$$

A-2.3.3.9.(1) Expansion and Contraction. Expansion and contraction in piping systems may be accommodated in a number of ways including, but not limited to, piping design and layout, material selection, and the inclusion of expansion joints.

A-2.3.3.11.(2) Air Break.

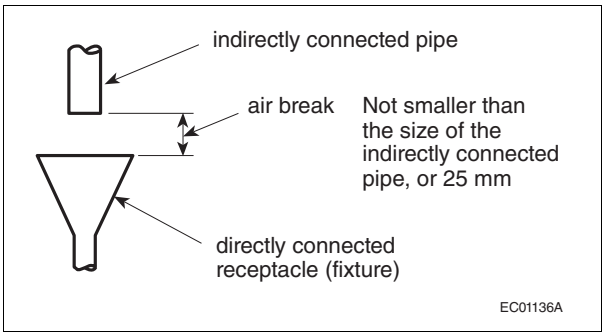


Figure A-2.3.3.11.(2)
Air Break

A-2.3.4.6.(1) Support for Underground Piping. See explanation for Subsection 2.3.5. for additional protection required for underground pipes. Permitted installations are shown in Figure A-2.3.4.6.(1)(a). The methods of support shown in Figure A-2.3.4.6.(1)(b) are not permitted because the base does not provide firm and continuous support for the pipe.

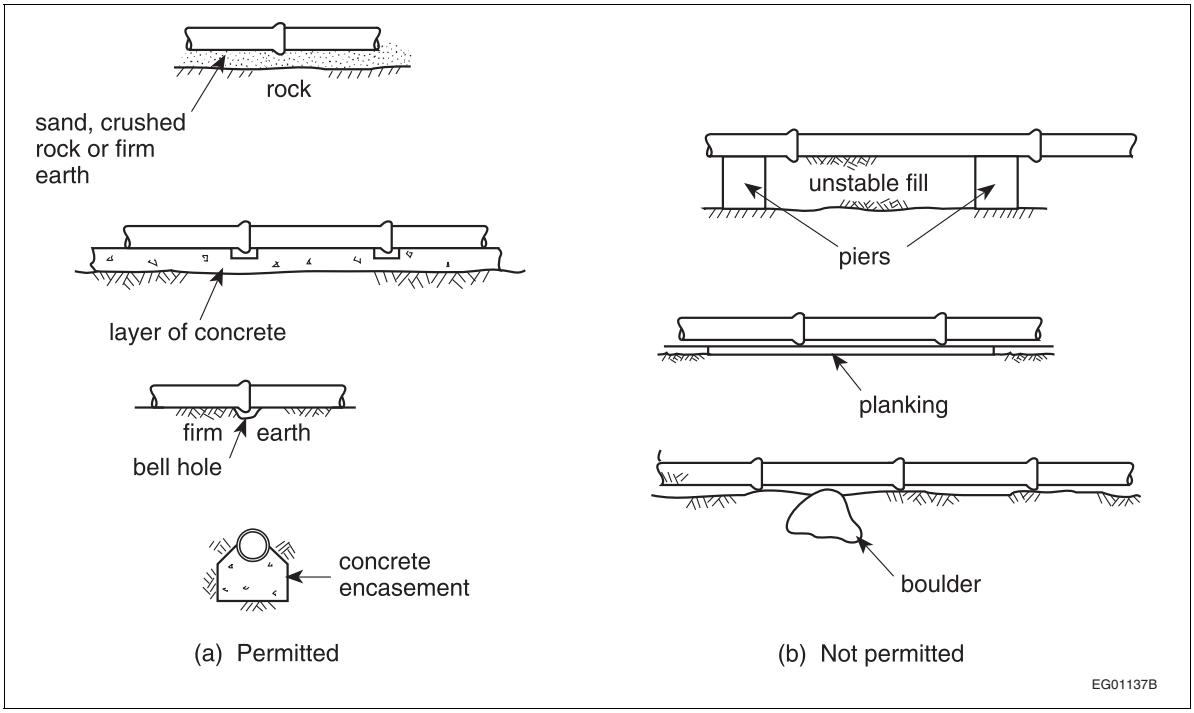


Figure A-2.3.4.6.(1)
Support for Underground Piping

A-2.3.5.1.(1)(a) Backfilling of Pipe Trench. Stronger pipes may be required in deep fill or under driveways, parking lots, etc., and compaction for the full depth of the trench may be necessary.

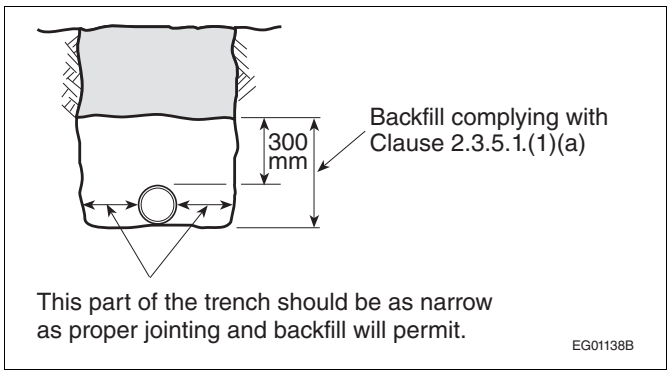


Figure A-2.3.5.1.(1)(a)
Backfilling of Pipe Trench

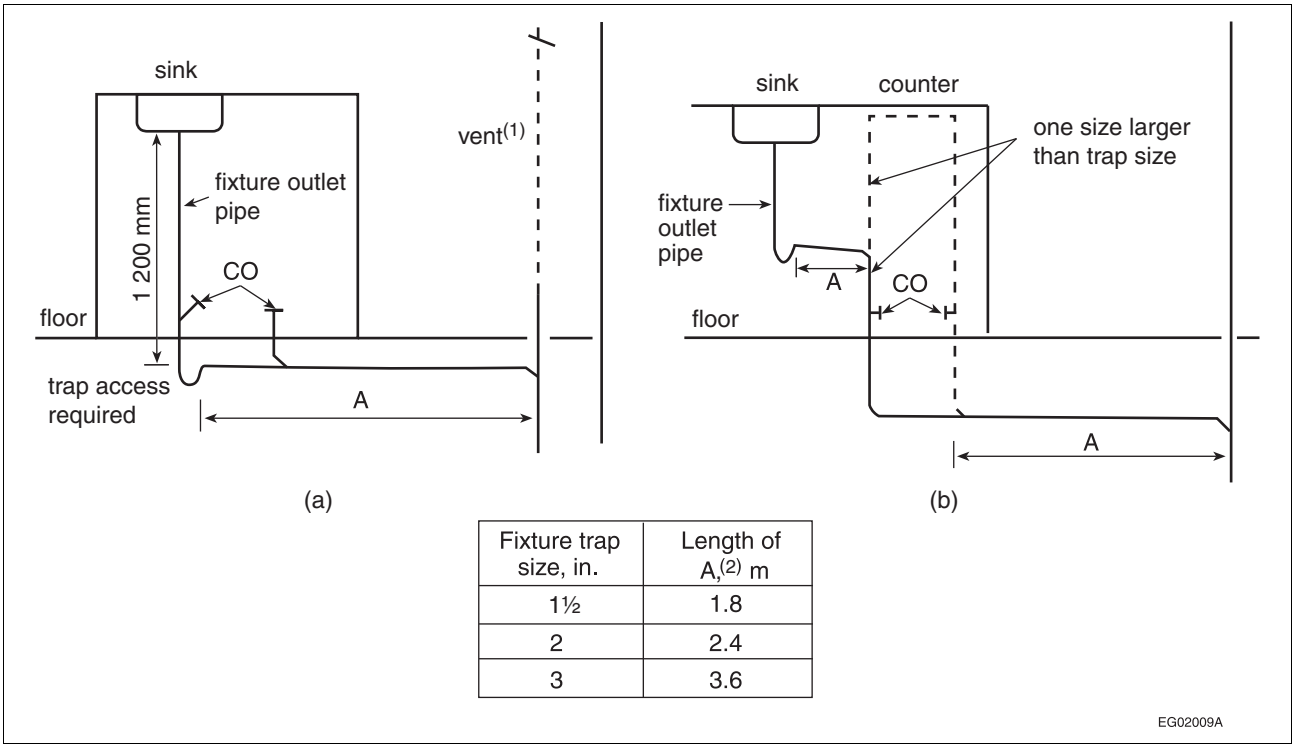
A-2.3.5.3. Protection of Piping Against Freezing. The TIAC "Mechanical Insulation Best Practices Guide" is a comprehensive source of information on the selection, installation and proper use of thermal insulation materials. (Note that Section 4 of this Guide is not included in the scope of this Note as it contains information on proprietary products, which are not within the mandate of the Code.)

A-2.3.7.2.(2) Pressure-Testing of Potable Water Systems. The plastic piping manufacturer should be consulted to determine the appropriateness of using air to pressure-test the piping system.

A-2.4.2.1.(1)(a)(ii) and (e)(vi) Indirect Connections. See Sentence 2.4.5.1.(4) for trapping requirements for indirectly connected fixtures.

See Sentence 2.4.7.1.(9) for cleanouts on drip pipes for food receptacles or display cases.

A-2.4.8.2.(1) Island Fixture Installation.



Fixture trap size, in.	Length of A,(2) m
1½	1.8
2	2.4
3	3.6

Figure A-2.4.8.2.(1)
Island Fixture Installation(3)

Notes to Figure A-2.4.8.2.(1):
(1) Vent size to be in accordance with Article 2.5.6.3.
(2) Length of A depends on trap size. Fall cannot exceed size.
(3) See also Article 2.5.1.1.

A-Table 2.4.9.3. Hydraulic Loads for Laundry Traps and Floor Drains. When determining the hydraulic load on a pipe, no allowance need be made for a load from a domestic clothes washer when discharged to a laundry tray since the hydraulic load from the laundry tray is sufficient. Also no hydraulic load is required from a floor drain in a washroom since it is for emergency use only.

A-2.4.9.3.(2) Continuous Wastes. Fixture outlet pipes that are common to 2 or 3 compartments or fixtures are sometimes referred to as continuous wastes and are not considered to be branches. (See also Note A-2.4.5.1.(2).)

A-2.4.9.3.(3) Standpipe Illustration.

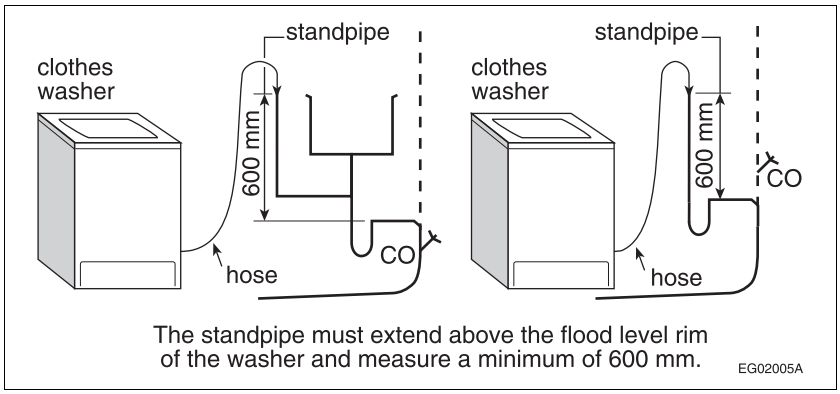


Figure A-2.4.9.3.(3)
Standpipe Installation for Clothes Washers

A-2.4.10. Determination of Hydraulic Loads and Drainage Pipe Sizes.

Hydraulic Loads

The hydraulic load that is imposed by a fixture is represented by a factor called a fixture unit. Fixture units are dimensionless and take into account the rate of discharge, time of discharge and frequency of discharge of the fixture.

Confusion often arises when attempts are made to convert fixture units to litres per second because there is no straightforward relationship between the two. The proportion of the total number of fixtures that can be expected to discharge simultaneously in a large system is smaller than in a small system. For example, doubling the number of fixtures in a system will not double the peak flow that the system must carry, although of course the flow will be increased somewhat. Figure A-2.4.10.-A shows the relationship that was used in constructing the tables of capacities of stacks, branches, sanitary building drains and sanitary building sewers (Tables 2.4.10.6.-A to 2.4.10.6.-C).

Although the curve in Figure A-2.4.10.-A was used to prepare the Code tables, it was not included in the National Plumbing Code. Instead, a single approximate conversion factor is given in the Code so that a continuous flow from a fixture may be converted from litres per second to fixture units in order to determine the total hydraulic load on the sanitary drainage system. The conversion factor, which is given in Sentence 2.4.10.3.(1), is 31.7 fixture units per litres per second. The discharge from a continuous flow fixture in litres per second when multiplied by 31.7 gives the hydraulic load in fixture units, and that load is added to the fixture unit load from other fixtures to give the total load that the sanitary drainage pipe must carry.

The hydraulic load that is produced by storm water runoff depends both on the size of the area that is drained and local rainfall intensity. The capacities of storm drainage pipes and combined sewers in Tables 2.4.10.9., 2.4.10.10. and 2.4.10.11. have been expressed in terms of the number of litres that they can carry when the local rainfall intensity is 1 mm in 15 min. The hydraulic load for a particular location is obtained by simply multiplying the rainfall intensity figure given in Appendix C of Division B of the NBC by the actual area drained as specified in Sentence 2.4.10.4.(1).

A-2.6.3.1.(2) Potable Water Systems. The design procedures contained in the following documents are considered good engineering practice in the field of potable water systems:

(a) ASHRAE 2011, "ASHRAE Handbook – HVAC Applications," chapter on Service Water Heating,
(b) ASHRAE 2013, "ASHRAE Handbook – Fundamentals," chapter on Pipe Sizing,
(c) ASPE 2010, "Plumbing Engineering Design Handbook, Volume 2,"chapter on Cold Water Systems, and
(d) ASPE 2010, "Plumbing Engineering Design Handbook, Volume 2," chapter on Domestic Water Heating Systems.

Alternatively, the following methods, which apply to both public and private water supplies, may be used in determining the size of each section of the water system using Table A-2.6.3.1.(2)-A (Small Building Method) and Table A-2.6.3.1.(2)-F (Average Pressure Loss Method). Where these methods are considered an alternative to a detailed engineering design method, the hydraulic loads shall be the sum of the total fixture units given in Tables 2.6.3.2.-A, 2.6.3.2.-B, 2.6.3.2.-C and 2.6.3.2.-D.

Small Building Method

Information required if using this method:

(a) The developed length:
  (i) from the property line or private water supply system when located outside the building to the water service entry point to the building, and
  (ii) from the water service entry point to the building to the most remote water outlet.
(b) Minimum static pressure:
  (i) the minimum static pressure available at the property line or other water source (private water supply system), or
  (ii) where there is a wide fluctuation of pressure in the main throughout the day, the minimum static pressure available.
(c) Pressure losses:
  (i) losses for meters, pressure-reducing valves, backflow preventers, water treatment systems, and any other devices, and
  (ii) losses or gains due to changes in elevation.
(d) The number of fixture units (FU) as determined by using the sum of the total values given in Tables 2.6.3.2.-A, 2.6.3.2.-B, 2.6.3.2.-C and 2.6.3.2.-D.
(e) The maximum velocities permitted in accordance with the manufacturer's recommendations for the pipe and fittings chosen for the installation.

Note that a private water supply system must be capable of meeting the demands of the water distribution system.

Pipe Sizing Procedures (see Figure A-2.6.3.1.(2)-A)

Step 1: Water Service Piping (see Table A-2.6.3.1.(2)-B)

(a) Obtain the total fixture units required for the installation using the sum of the total values given in Tables 2.6.3.2.-A, 2.6.3.2.-B, 2.6.3.2.-C and 2.6.3.2.-D and consider all other demands on the water supply.
(b) Determine the minimum static pressure available at the property line or private water supply system and consider all pressure losses for the water service.
(c) Select the pressure range group in Table A-2.6.3.1.(2)-A that is consistent with the minimum static pressure available including any other losses.
(d) Select the length column in Table A-2.6.3.1.(2)-A that is equal to or greater than the developed length from the property line or private water supply system to the water service entry point to the building.
(e) In that column, find the fixture unit value that is equal to or greater than the fixture unit demand for the installation and follow the row back to the first column to locate the water service pipe size.
(f) To establish the adjusted static pressure available where the water service enters the building for sizing the water distribution system, subtract the actual static pressure losses for the water service from the minimum static pressure available at the property line.
(g) The adjusted static pressure available where a private water supply system is installed should be the static pressure available from such a system at the entry to the building.

Step 2: Hot Water Piping (see Table A-2.6.3.1.(2)-C)

(a) Start with the most remote outlet in the most distant occupancy that requires hot water.

(b) Use the sum of the total fixture unit values given in Tables 2.6.3.2.-A, 2.6.3.2.-B, 2.6.3.2.-C and 2.6.3.2.-D and work back toward the service water heater, adding in the fixture unit values as they occur.
(c) Select the pressure range group in Table A-2.6.3.1.(2)-A that is consistent with the minimum static pressure available at the water service entry and any other losses (e.g. elevation or devices such as backflow preventers, etc.). Use this pressure range group for all portions (hot and cold) of the water distribution system.
(d) Select the length column that is equal to or greater than the developed length from the water service entry point to the building to the most remote outlet served with either hot or cold water.
(e) In that column, find the fixture unit value that is equal to or greater than the fixture unit demand at each pipe and follow the row back to the second column to locate the water distribution system pipe size.

Step 3: Cold Water Piping (see Table A-2.6.3.1.(2)-D)
(a) Start with the most remote outlet on the cold water piping using the established total developed length column and pressure range group in Table A-2.6.3.1.(2)-A and work through Steps 2(c), (d) and (e) for hot water piping.
(b) Use the sum of the total fixture unit values given in Tables 2.6.3.2.-A, 2.6.3.2.-B, 2.6.3.2.-C and 2.6.3.2.-D and work back toward the water service entry.
(c) Where the service water heater distribution pipe occurs, add in the fixture unit demand of the fixtures served only with hot water and those that have not yet been added in as served to the cold water side of the most remote fixtures requiring both a hot and cold water supply.
(d) Continue by sizing the cold water main between the service water heater distribution pipe and the water service entry.
(e) Add in the fixtures served with cold water only from the main within the most remote occupancy as they occur and all common distribution piping serving hot and cold water to other occupancies as they occur.
(f) Complete by sizing all distribution piping served by the main within the most remote occupancy and then the other occupancies not yet sized using the previously established total developed length and pressure range group in Table A-2.6.3.1.(2)-A.

Table A-2.6.3.1.(2)-A
Pipe Sizes for Water Systems Based on Number of Fixture Units Served Using the Small Building Method(1)

Water Service Pipe, inches	Water Distribution System, inches	Maximum Allowable Length, m														
		12	18	24	30	46	61	76	91	122	152	183	213	244	274	305
		Number of Fixture Units Served														
		Flow Velocity, m/s							3.0	2.4	1.5					
Pressure Range 200 to 310 kPa																
¾	½	6	5	4	3	2	1	1	1	0	0	0	0	0	0	0
¾	⅝	12	10	9	7	5	3	3	3	2	2	1	1	1	1	0
¾	¾	18	16	14	12	9	6	5	5	4	4	3	2	2	2	1
1	1	36	31	27	25	20	17	15	13	12	10	8	6	6	6	6
1½	1¼	83	68	57	48	38	32	28	25	21	18	15	12	12	11	11
1½	1½	151	124	105	91	70	57	49	45	36	31	26	23	21	20	20
2	1½	151	151	132	110	80	64	53	46	38	32	27	23	21	20	20
2	2	359	329	292	265	217	185	164	147	124	96	70	61	57	54	51
2½	2½	445	418	390	370	330	300	280	265	240	220	198	175	158	143	133

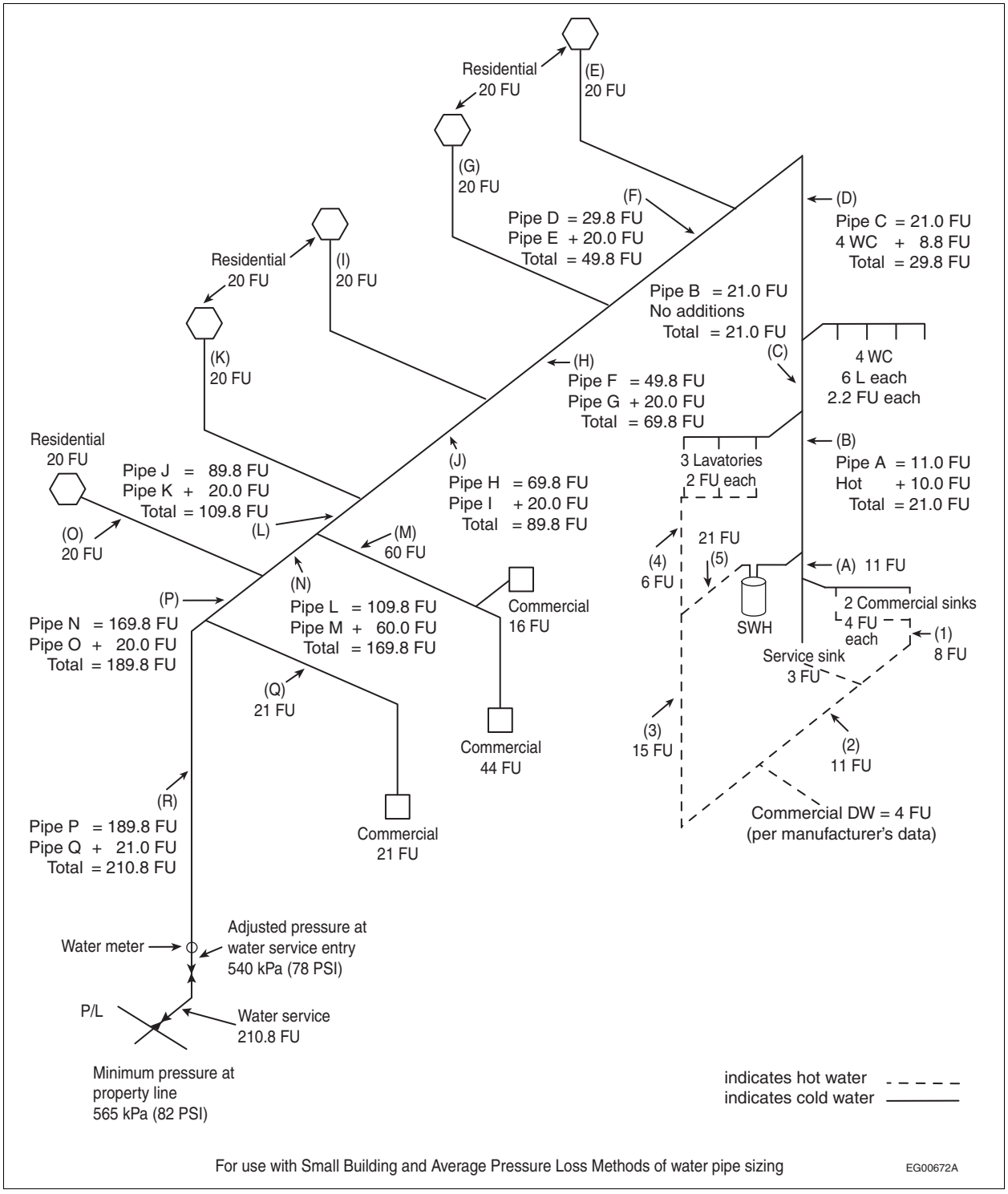


Figure A-2.6.3.1.(2)-A

Example of Commercial and Residential Development to be Used with Water Pipe Sizing Methods

Notes to Figure A-2.6.3.1.(2)-A:

(1) This example is a development with 4 commercial occupancies on the lower floor and 5 residential occupancies on the upper floor, all with separate service water heaters.

(2) For the purpose of water pipe sizing:

- the minimum adjusted pressure available at building entry is 540 kPa (78 PSI);
- the developed length of the water service is 30 m (98 ft); and
- the developed length of the water distribution system is 76 m (249 ft).

Table A-2.6.3.1.(2)-E
Fixture Units Summary for Figure A-2.6.3.1.(2)-A Using Tables 2.6.3.2.-A, -B, -C and -D

Fixtures	Quantity	100% Fixture Unit Values	Total Demand (Quantity x Fixture Unit Values)
Lavatory, 8.3 LPM or less	3	2	6
Commercial sink	2	4	8
Service sink	1	3	3
W.C., 6 LPF or less	4	2.2	8.8
Other	–	–	–
Commercial dishwasher	1	4	4
Commercial occupancy	1	16	16
Commercial occupancy	1	44	44
Commercial occupancy	1	21	21
Residential occupancy	5	20	100
		Total Fixture Units	210.8

Average Pressure Loss Method

Information required if using this method:

(a) The developed length:
  (i) from the property line or private water system when located outside the building to the water service entry point to the building, and
  (ii) from the building entry of the water service to the most remote water outlet.

(b) Minimum static pressure:
  (i) the minimum static pressure available at the property line or other water source (private water supply system), or
  (ii) where there is a wide fluctuation of pressure in the main throughout the day, the minimum static pressure available.

(c) Pressure losses:
  (i) losses for meters, pressure-reducing valves, backflow preventers, water treatment systems, and any other devices, and
  (ii) losses or gains due to changes in elevation.

(d) The number of fixture units as determined by using the sum of the total values given in Tables 2.6.3.2.-A, 2.6.3.2.-B, 2.6.3.2.-C and 2.6.3.2.-D.

(e) The maximum velocities permitted in accordance with the manufacturer's recommendations for the pipe and fittings chosen for the installation.

Note: The private water supply system must be capable of meeting the demands of the water distribution system.

To use this method, calculate the pressure available for friction loss which must be 2.6 kPa per metre or more; if it is less than that, the system must be designed according to a detailed engineering design method.

Calculating Pressure Available for Friction Loss (see Figure A-2.6.3.1.(2)-B)

(a) Obtain the water service size, including pressure losses, and the design of the private water supply system if it is separate from the water distribution system.

(b) To calculate the total equivalent length for the water distribution system, determine the developed length from the water service entry point to the building to the most remote water outlet, and
  (i) where fitting inside diameter dimensions are at least equal to the pipe size, multiply the developed length by 1.5 to allow for friction losses, and
  (ii) where insert fittings are used, apply additional losses in accordance with the fitting manufacturer's data.

(c) To determine the adjusted pressure available at the water service entry for sizing the water distribution system, deduct the pressure losses for the water service from the minimum static pressure available at the property line or private water source.

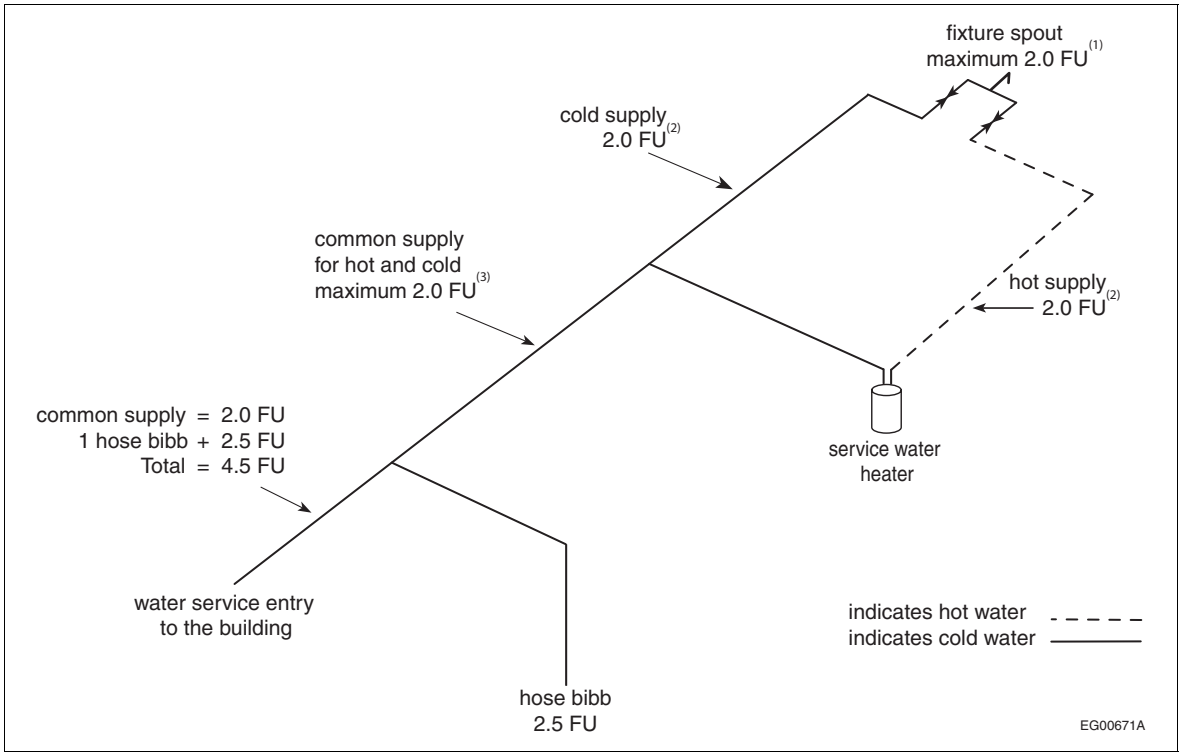


Figure A-2.6.3.4.(5)-A
Determining the Hydraulic Needs of a Fixture

Notes to Figure A-2.6.3.4.(5)-A:

(1) The fixture spout delivers a maximum of 2.0 fixture units.
(2) This would apply if only the hot side or the cold side were fully opened.
(3) The common pipe that serves both the hot and cold sides of the faucet also delivers a maximum of 2.0 fixture units even if both the hot and cold valves at the faucet are fully opened at the same time.

Table A-2.6.3.4.(5)-A
Fixture Units Summary Using Figure A-2.6.3.4.(5)-B and Tables 2.6.3.2.-A, -B, -C and -D

Fixtures	Number of Fixtures	100% Fixture Unit Values	Total Demand (Quantity x Fixture Unit Values)
Bathtub	2	1.4	2.8
Clothes washer	2	1.4	2.8
Dishwasher	2	1.4	2.8
Hose bibb	1	2.5	2.5
Lavatory, 8.3 LPM or less	3	0.7	2.1
Shower, 9.5 LPM or less	1	1.4	1.4
Sink, 8.3 LPM or less	2	1.4	2.8
W.C., 6 LPF or less	3	2.2	6.6
Other			
		Total Fixture Units	23.8

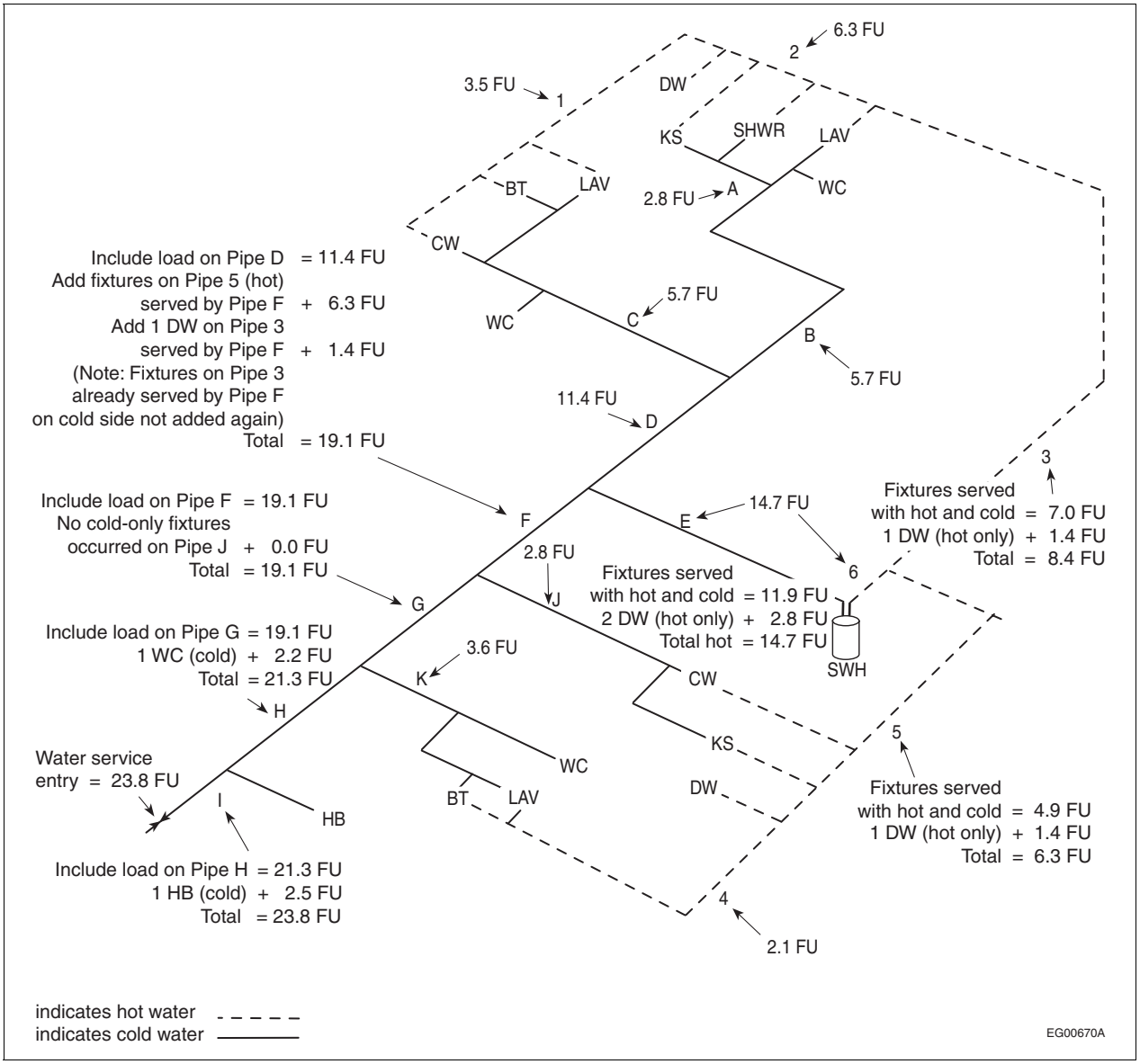


Figure A-2.6.3.4.(5)-B

Example of Water Pipe Sizing for Buildings Containing One or Two Dwelling Units or Row Houses with Separate Water Services

Table A-2.6.3.4.(5)-B
Sizing of Water Service Pipe Using Figure A-2.6.3.4.(5)-B and Table 2.6.3.4.

Fixture Units		Water Velocity, m/s		
		3.0	2.4	1.5
		Pipe Size, inches		
Total fixture units	23.8	–	–	–
Fire sprinkler system	n/a	–	–	–
Irrigation system	n/a	–	–	–
Other	n/a	–	–	–
Total demand on water service	23.8	1	1	1¼

Symbols and Abbreviations

The following symbols and abbreviations are used in the figures:

Water and drainage pipe _____

Subsoil drains __ _ __ _

Vent pipe _ _ _ _ _ _ _ _

BG	Bathroom group	KS	Kitchen sink
BT	Bathtub	LAV	Lavatory
CO	Cleanout	LT	Laundry tray
CW	Clothes washer	RD	Roof drain
DF	Drinking fountain	SHWR	Shower
DW	Dishwasher	SS	Slop sink
FD	Floor drain	SWH	Service water heater
FS	Floor sink	UR	Urinals
HB	Hose bibb	WC	Water closet

Conversion Factors

To Convert	To	Multiply by
°C	°F	1.8 and add 32
kg	lb.	2.205
kg/m^3	$lbf/ft.^3$	0.06243
kN	lb.	224.81
kN/m	lbf/ft.	68.52
kN/m^3	$lbf/ft.^3$	6.360
kPa	$lbf/in.^2$ (psi)	0.1450
kPa	$lbf/ft.^2$	20.88
L	gal. (imp.)	0.2200
L/s	gal./min (gpm)	13.20
m	ft.	3.281
m^2	$ft.^2$	10.76
mm	in.	0.03937
m/s^2	$ft./s^2$	3.281