National Plumbing Code of Canada 2005

Revisions and Errata

Issued by the Canadian Commission on Building and Fire Codes

The tables that follow identify revisions and errata that apply to the National Plumbing Code of Canada 2005. Certain pages from the Code have been updated for your convenience; they are provided following the tables.

The revisions have been approved by the Canadian Commission on Building and Fire Codes. The following symbol appears following the title of an Article, Appendix Note, Table or Figure containing text that is affected by a revision: ★

The errata are corrections that have been identified; they are provided to facilitate the use of the Code. The following symbol appears following the title of an Article, Appendix Note, Table or Figure containing text that is affected by an erratum: ◊

Contact your local authority having jurisdiction to find out if these revisions and errata apply in your province or territory.

The intent and application statements affected by these revisions and errata have been updated, as applicable, on the CD-ROM version of the Code.

Revisions

Table of Revisions — National Plumbing Code 2005

Provision	Revision	Date of Issue
Division B		
Table 1.3.1.2.	The following entries were added to the Table following the entries for ANSI/CSA: ASME/CSA, ASME A112.18.1/CSA B125.1-05, Plumbing Supply Fittings, 2.2.10.6.(1), 2.2.10.7.(1) ASME/CSA, ASME A112.18.2/CSA B125.2-05, Plumbing Waste Fittings, 2.2.3.3.(1), 2.2.10.6.(2) Entry for CAN/CSA-B125-01 was replaced with the following entry: CSA B125.3-05, Plumbing Fittings, 2.2.10.6.(1), 2.2.10.7.(2), 2.2.10.10.(2)	07-12-01
2.2.3.3.(1)	Standard referenced in this Sentence was changed to ASME A112.18.2/CSA B125.2, “Plumbing Waste Fittings”	07-12-01
2.2.10.6.	Article was changed to read as follows: 1) Supply fittings shall conform to ASME A112.18.1/CSA B125.1, “Plumbing Supply Fittings,” or CSA B125.3, “Plumbing Fittings.” 2) Waste fittings shall conform to ASME A112.18.2/CSA B125.2, “Plumbing Waste Fittings.”	07-12-01

Table of Revisions — National Plumbing Code 2005 (Continued)

Provision	Revision	Date of Issue
2.2.10.7.	Article 2.2.10.7. was replaced with the following text: 2.2.10.7. Water Temperature Control (See Appendix A.) 1) Except as provided in Sentence (2), all valves supplying fixed-location shower heads shall be individual pressure-balanced or thermostatic-mixing valves conforming to ASME A112.18.1/CSA B125.1, "Plumbing Supply Fittings." 2) Individual pressure-balanced or thermostatic-mixing valves shall not be required for showers having a single tempered water supply that is controlled by a master thermostatic-mixing valve conforming to CSA B125.3, "Plumbing Fittings." 3) All mixing valves supplying shower heads shall be of the pressure-balanced, thermostatic, or combination pressure-balanced/thermostatic type capable of a) maintaining a water outlet temperature that does not exceed 49°C, and b) limiting thermal shock. 4) The temperature of water discharging into a bathtub shall not exceed 49°C.	07-12-01
2.2.10.10.(2)	Term "anti-siphon ballcocks" was changed to "anti-siphon fill valves" Standard referenced in Sentence was changed to CSA B125.3, "Plumbing Fittings"	07-12-01
2.6.1.12.	The following Article was added: 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 Appendix A.)	07-12-01
Table 2.8.1.1.	Entry for 2.2.10.6.(1) was changed as follows: [F80–OP5] Entry for 2.2.10.6.(2) was added: [F80–OH2.1,OH2.3] Entry for 2.2.10.7.(3) was changed as follows: (a) [F31–OS3.2] (b) [F30–OS3.1] Entry for 2.6.1.12.(1) was added: [F40–OS3.4]	07-12-01
Table A-1.3.1.2.(1)	Document number for CAN/CSA-B125-01 was changed to CSA B125.3-05	07-12-01
A-2.2.10.7.	The following Appendix Note was added: 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.	07-12-01
A-2.6.1.11.(1)	Standard referenced in Appendix Note was changed to CSA B125.3, "Plumbing Fittings"	07-12-01

Table of Revisions — National Plumbing Code 2005 (Continued)

Provision	Revision	Date of Issue
A-2.6.1.12.(1)	The following Appendix Note was added: A-2.6.1.12.(1) Service Water Heaters. Storing hot water at temperatures below 60°C in the hot water tank or in the delivery system may lead to the growth of legionella bacteria. Contemporary electric water heater tanks experience temperature stratification and thus tend to have legionella bacteria in the lower parts of the tank. Article 2.6.1.12. specifies a thermostat setting of 60°C, which addresses the concern over the growth of legionella bacteria in electric hot water storage tanks and is enforceable without introducing unnecessary complications. The growth of legionella bacteria is not a concern for other types of water heaters with different designs that use different fuels. Electrically heated water heaters are shipped with the thermostat set at 60°C. Article 2.6.1.12. is included in the NPC to formalize this de facto temperature setting as a requirement. The thermostats have graduated temperature markings to allow such a setting, which is not the case with gas- or oil-heated water heaters.	07-12-01

Errata

Table of Errata — National Plumbing Code 2005

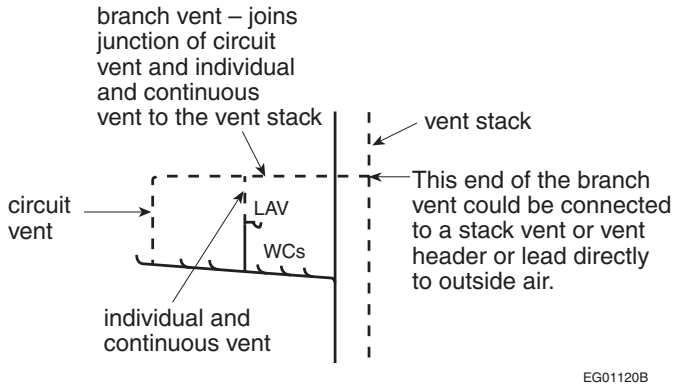
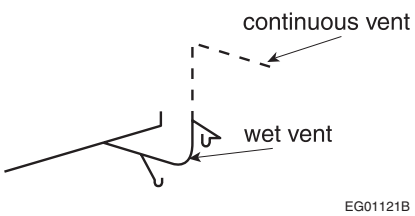
Provision	Erratum	Date of Issue
Preface		
Relationship of the NPC to Standards Development and Conformity Assessment	In the third paragraph under the heading Certification, the wording of the last part of the first sentence was changed to read "…in the field of products for buildings and facilities."	07-12-01
Division A		
1.4.1.2.(1)	"Them" was deleted from the entry for circuit vent so it reads as follows: "... and connects to the fixture drain of the most upstream fixture."	07-12-01
Figure A-1.4.1.2.(1)-D	This Figure was replaced with the following one:  	07-12-01

Table of Errata — National Plumbing Code 2005 (Continued)

Provision	Erratum	Date of Issue
Figure A-1.4.1.2.(1)-E	This Figure was replaced with the following one:  	07-12-01
Division B		
1.3.2.1.(1)	The following organization name and address were added: ASME … American Society of Mechanical Engineers (22 Law Drive, P.O. Box 2900, Fairfield, New Jersey 07007-2900 U.S.A.; www.asme.org)	07-12-01
Table 2.6.3.1.	"Bathroom group" in first row of Table was italicized as it is a defined term	07-12-01
Table 2.8.1.1.	Entry for 2.2.7.1.(1): "OH1.1" was deleted from the 1st attribution Entry for 2.2.7.1.(2): "OH1.1" was deleted from the 1st attribution Entry for 2.2.7.2.(1): "OH1.1" was deleted from the 1st attribution Entry for 2.2.7.4.(1): "OH1.1" was deleted from the 1st attribution Entry for 2.4.10.4.(2): "OH2.5" was deleted from the 1st attribution	07-12-01
A-1.3.1.2.(1)	Text was changed from "Where documents are referenced in this Appendix,…" to "Where documents are referenced in the Appendices of this Code,…"	07-12-01
Table A-1.3.1.2.(1)	Title was changed to "Documents Referenced in the Appendices of the National Plumbing Code of Canada 2005" Entry for ASHRAE was changed to read: ASHRAE 2005 ASHRAE Handbook – Fundamentals, Chapter 36, Pipe Sizing	07-12-01
A-2.6.1.1.(1)	List item (a) was changed to read as follows: (a) ASHRAE Handbook – Fundamentals, Chapter 36, Pipe Sizing	07-12-01

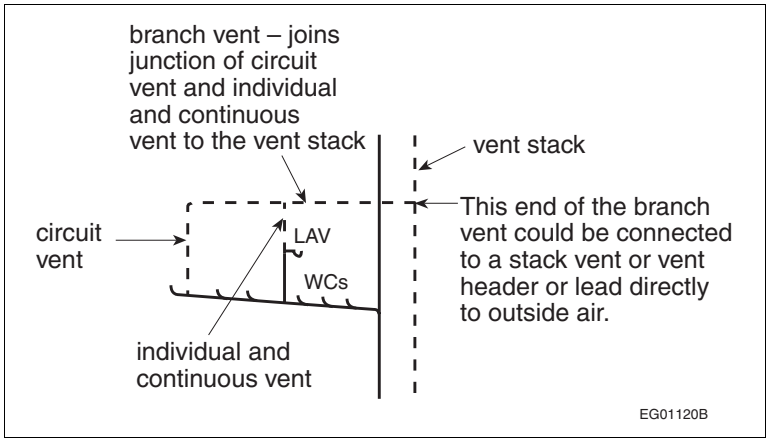


Figure A-1.4.1.2.(1)-D
Branch Vent ◊

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.

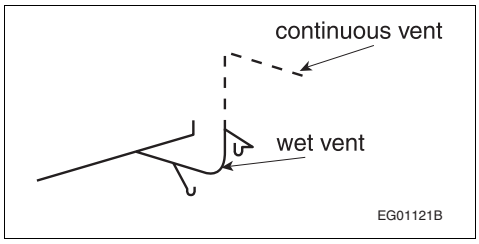


Figure A-1.4.1.2.(1)-E
Continuous Vent ◊

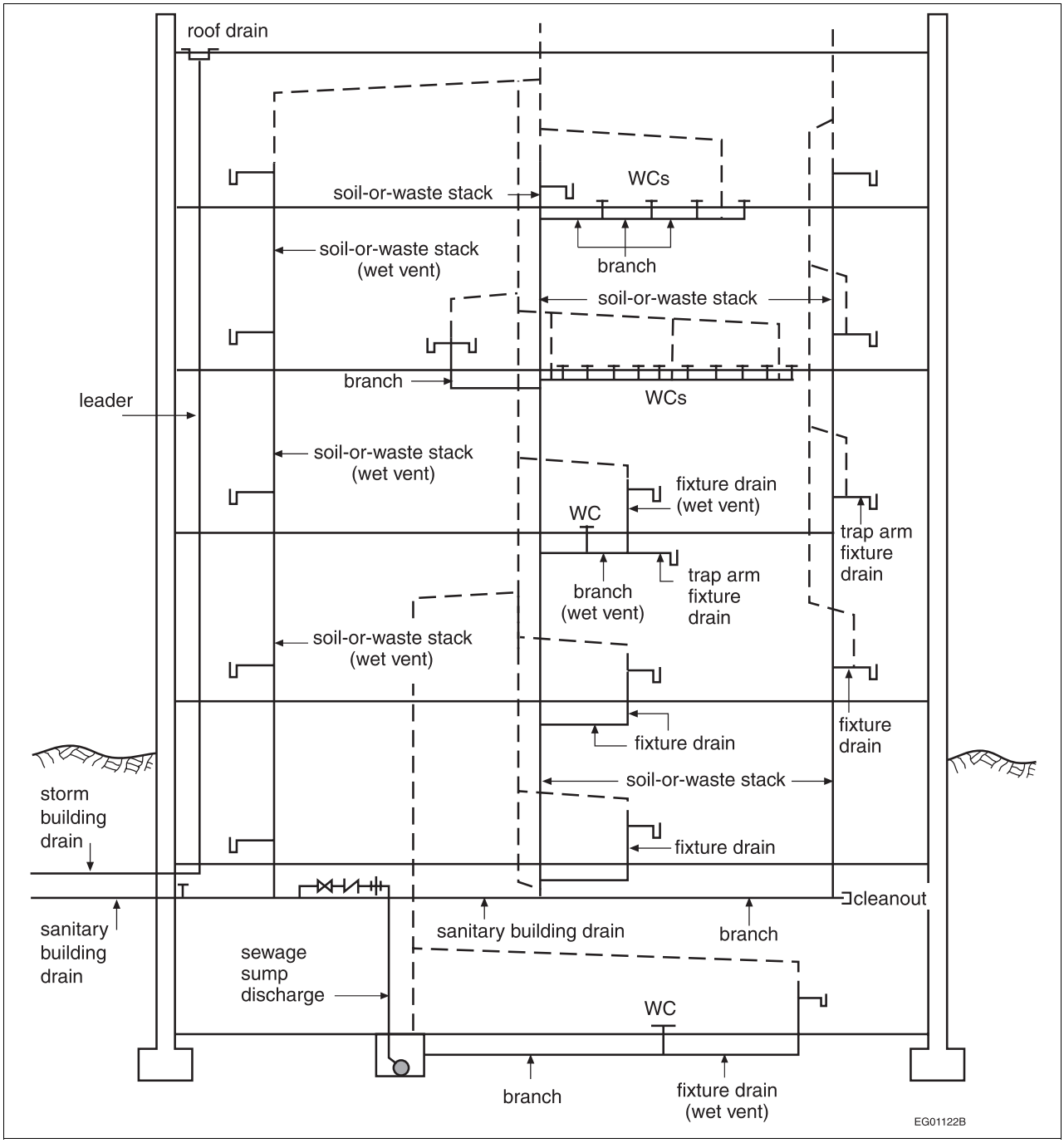


Figure A-1.4.1.2.(1)-F
Drainage System

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 Appendix A.)

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 and supplements effective to 30 June, 2004.

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. (See Appendix A.)

Table 1.3.1.2.
Documents Referenced in the National Plumbing Code of Canada 2005 ★
Forming Part of Sentence 1.3.1.2.(1)

Issuing Agency	Document Number	Title of Document	Code Reference
ANSI/ASME	B16.3-1998	Malleable-Iron Threaded Fittings	2.2.6.6.(1)
ANSI/ASME	B16.4-1998	Gray Iron Threaded Fittings	2.2.6.5.(1)
ANSI/ASME	B16.12-1998	Cast-Iron Threaded Drainage Fittings	2.2.6.3.(1)
ANSI/ASME	B16.15-1985	Cast Bronze Threaded Fittings, Classes 125 and 250	2.2.7.3.(1)
ANSI	B16.18-2001	Cast Copper Alloy Solder-Joint Pressure Fittings	2.2.7.6.(1) 2.2.7.6.(2)
ANSI/ASME	B16.22-2001	Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings	2.2.7.6.(1)
ASME	B16.23-2002	Cast Copper Alloy Solder Joint Drainage Fittings: DWV	2.2.7.5.(1)
ANSI/ASME	B16.24-2001	Cast Copper Alloy Pipe Flanges and Flanged Fittings	2.2.7.2.(1)
ANSI/ASME	B16.26-1988	Cast Copper Alloy Fittings for Flared Copper Tubes	2.2.7.7.(1) 2.2.7.7.(2)
ANSI/ASME	B16.29-2001	Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings – DWV	2.2.7.5.(1)
ANSI/AWWA	C104/A21.4-2004	Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water	2.2.6.4.(2)
ANSI/AWWA	C110/A21.10-2003	Ductile-Iron and Gray-Iron Fittings, 3 in. Through 48 in. (75 mm Through 1200 mm), for Water and Other Liquids	2.2.6.4.(3)
ANSI/AWWA	C111/A21.11-2000	Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings	2.2.6.4.(4)
ANSI/AWWA	C151/A21.51-2002	Ductile-Iron Pipe, Centrifugally Cast, for Water	2.2.6.4.(1)
ANSI/CSA	ANSI Z21.22-1999/CSA 4.4-M99	Relief Valves for Hot Water Supply Systems	2.2.10.11.(1)
ANSI/CSA	ANSI Z21.22a-2000/CSA 4.4a-2000	Addenda 1 to ANSI Z21.22-1999/CSA 4.4-M99, Relief Valves for Hot Water Supply Systems	2.2.10.11.(1)
ANSI/CSA	ANSI Z21.22b-2001/CSA 4.4b-2001	Addenda 2 to ANSI Z21.22-1999/CSA 4.4-M99, Relief Valves for Hot Water Supply Systems	2.2.10.11.(1)
ASME/CSA	ASME A112.18.1/ CSA B125.1-05	Plumbing Supply Fittings	2.2.10.6.(1) 2.2.10.7.(1)
ASME/CSA	ASME A112.18.2/ CSA B125.2-05	Plumbing Waste Fittings	2.2.3.3.(1) 2.2.10.6.(2)
ASSE	1010-2004	Water Hammer Arresters	2.2.10.15.(1)
ASSE	1051-2002	Individual and Branch Type Air Admittance Valves for Sanitary Drainage Systems	2.2.10.16.(1)
ASTM	A 53/A 53M-02	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless	2.2.6.7.(4)

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number	Title of Document	Code Reference
ASTM	A 518/A 518M-99	Corrosion-Resistant High-Silicon Iron Castings	2.2.8.1.(1)
ASTM	B 32-03	Solder Metal	2.2.9.2.(1)
ASTM	B 42-02e1	Seamless Copper Pipe, Standard Sizes	2.2.7.1.(1)
ASTM	B 43-98e1	Seamless Red Brass Pipe, Standard Sizes	2.2.7.1.(2)
ASTM	B 88-03	Seamless Copper Water Tube	2.2.7.4.(1)
ASTM	B 306-02	Copper Drainage Tube (DWV)	2.2.7.4.(1)
ASTM	B 813-00e1	Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube	2.2.9.2.(3)
ASTM	B 828-02	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 2466-02	Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40	2.2.5.8.(2)
ASTM	D 2467-02	Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80	2.2.5.8.(2)
ASTM	D 3261-03	Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing	2.2.5.5.(3)
ASTM	F 628-01	Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe With a Cellular Core	2.2.5.10.(1) 2.2.5.12.(1)
ASTM	F 714-03	Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter	2.2.5.6.(1)
CCBFC	NRCC 47666	National Building Code of Canada 2005	1.1.1.1.(3)(1) 1.4.1.2.(1)(1) 2.1.3.1.(1) 2.2.5.12.(2) 2.2.5.12.(3) 2.2.6.7.(3) 2.4.3.1.(1) 2.4.10.4.(1)
CCBFC	NRCC 47667	National Fire Code of Canada 2005	2.5.5.2.
CGSB	CAN/CGSB-34.1-94	Asbestos-Cement Pressure Pipe	2.2.5.2.(1)
CGSB	CAN/CGSB-34.9-94	Asbestos-Cement Sewer Pipe	2.2.5.1.(2)
CGSB	CAN/CGSB-34.22-94	Asbestos-Cement Drain Pipe	2.2.5.1.(1)
CGSB	CAN/CGSB-34.23-94	Asbestos-Cement House Connection Sewer Pipe	2.2.5.1.(2)
CSA	A60.1-M1976	Vitrified Clay Pipe	2.2.5.4.(1)
CSA	A60.3-M1976	Vitrified Clay Pipe Joints	2.2.5.4.(2)
CSA	A257.1-03	Non-Reinforced Circular Concrete Culvert, Storm Drain, Sewer Pipe, and Fittings	2.2.5.3.(1)
CSA	A257.2-03	Reinforced Circular Concrete Culvert, Storm Drain, Sewer Pipe, and Fittings	2.2.5.3.(1)
CSA	A257.3-03	Joints for Circular Concrete Sewer and Culvert Pipe, Manhole Sections, and Fittings Using Rubber Gaskets	2.2.5.3.(2)
CSA	A257.4-03	Precast Reinforced Circular Concrete Manhole Sections, Catch Basins, and Fittings	2.2.5.3.(5)
CSA	CAN/CSA-B45 Series-02	Plumbing Fixtures	2.2.2.2.(1)
CSA	CAN/CSA-B45.1-02	Ceramic Plumbing Fixtures	2.2.2.2.(2)
CSA	CAN/CSA-B45.2-02	Enamelled Cast Iron Plumbing Fixtures	2.2.2.2.(3)
CSA	CAN/CSA-B45.3-02	Porcelain-Enamelled Steel Plumbing Fixtures	2.2.2.2.(4)
CSA	CAN/CSA-B45.4-02	Stainless Steel Plumbing Fixtures	2.2.2.2.(5)

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number	Title of Document	Code Reference
CSA	CAN/CSA-B45.5-02	Plastic Plumbing Fixtures	2.2.2.2.(6)
CSA	CAN/CSA-B45.9-02	Macerating Systems and Related Components	2.2.2.2.(8)
CSA	CAN/CSA-B45.10-01	Hydromassage Bathtubs	2.2.2.2.(7)
CSA	CAN/CSA-B64.0-01	Definitions, General Requirements, and Test Methods for Vacuum Breakers and Backflow Preventers	2.2.10.10.(1)
CSA	CAN/CSA-B64.1.1-01	Vacuum Breakers, Atmospheric Type (AVB)	2.2.10.10.(1)
CSA	CAN/CSA-B64.1.2-01	Vacuum Breakers, Pressure Type (PVB)	2.2.10.10.(1)
CSA	CAN/CSA-B64.2-01	Vacuum Breakers, Hose Connection Type (HCVB)	2.2.10.10.(1)
CSA	CAN/CSA-B64.2.1-01	Vacuum Breakers, Hose Connection Type (HCVB) with Manual Draining Feature	2.2.10.10.(1)
CSA	CAN/CSA-B64.2.2-01	Vacuum Breakers, Hose Connection Type (HCVB) with Automatic Draining Feature	2.2.10.10.(1)
CSA	CAN/CSA-B64.3-01	Backflow Preventers, Dual Check Valve Type with Atmospheric Port (DCAP)	2.2.10.10.(1)
CSA	CAN/CSA-B64.4-01	Backflow Preventers, Reduced Pressure Principle Type (RP)	2.2.10.10.(1)
CSA	CAN/CSA-B64.4.1-01	Backflow Preventers, Reduced Pressure Principle Type for Fire Systems (RPF)	2.6.2.4.(2) 2.6.2.4.(4)
CSA	CAN/CSA-B64.5-01	Backflow Preventers, Double Check Valve Type (DCVA)	2.2.10.10.(1)
CSA	CAN/CSA-B64.5.1-01	Backflow Preventers, Double Check Valve Type for Fire Systems (DCVAF)	2.6.2.4.(2)
CSA	CAN/CSA-B64.6-01	Backflow Preventers, Dual Check Valve Type (DuC)	2.2.10.10.(1)
CSA	CAN/CSA-B64.6.1-01	Backflow Preventers, Dual Check Valve Type for Fire Systems (DuCF)	2.6.2.4.(2)
CSA	CAN/CSA-B64.7-01	Vacuum Breakers, Laboratory Faucet Type (LFVB)	2.2.10.10.(1)
CSA	CAN/CSA-B64.8-01	Backflow Preventers, Dual Check Valve Type with Intermediate Vent (DuCV)	2.2.10.10.(1)
CSA	CAN/CSA-B64.9-01	Backflow Preventers, Single Check Valve Type for Fire Systems (SCVAF)	2.6.2.4.(2)
CSA	CAN/CSA-B64.10-01	Manual for the Selection and Installation of Backflow Prevention Devices	2.6.2.1.(3)
CSA	CAN/CSA-B70-02	Cast Iron Soil Pipe, Fittings, and Means of Joining	2.2.6.1.(1) 2.4.6.4.(2)
CSA	B125.3-05	Plumbing Fittings	2.2.10.6.(1) 2.2.10.7.(2) 2.2.10.10.(2)
CSA	B127.1-99	Asbestos Cement Drain, Waste and Vent Pipe and Pipe Fittings	2.2.5.1.(1) 2.2.6.2.(1)
CSA	B127.2-M1977	Components for Use in Asbestos Cement Building Sewer Systems	2.2.5.1.(2) 2.2.6.2.(1)
CSA	CAN/CSA-B137.1-02	Polyethylene Pipe, Tubing, and Fittings for Cold-Water Pressure Services	2.2.5.5.(1)
CSA	CAN/CSA-B137.2-02	PVC Injection-Moulded Gasketed Fittings for Pressure Applications	2.2.5.8.(3)
CSA	CAN/CSA-B137.3-02	Rigid Polyvinyl Chloride (PVC) Pipe for Pressure Applications	2.2.5.8.(1)
CSA	CAN/CSA-B137.5-02	Crosslinked Polyethylene (PEX) Tubing Systems for Pressure Applications	2.2.5.7.(1)
CSA	CAN/CSA-B137.6-02	CPVC Pipe, Tubing, and Fittings for Hot- and Cold-Water Distribution Systems	2.2.5.9.(1)

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number	Title of Document	Code Reference
CSA	B137.9-99	Polyethylene/Aluminum/Polyethylene Composite Pressure-Pipe Systems	2.2.5.13.(1)
CSA	CAN/CSA-B137.10-02	Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene Composite Pressure-Pipe Systems	2.2.5.14.(1)
CSA	CAN/CSA-B137.11-02	Polypropylene (PP-R) Pipe and Fittings for Pressure Applications	2.2.5.15.(1)
CSA	B158.1-1976	Cast Brass Solder Joint Drainage, Waste and Vent Fittings	2.2.10.1.(1)
CSA	CAN/CSA-B181.1-02	ABS Drain, Waste, and Vent Pipe and Pipe Fittings	2.2.5.10.(1) 2.2.5.11.(1) 2.2.5.12.(1) 2.4.6.4.(2)
CSA	CAN/CSA-B181.2-02	PVC Drain, Waste, and Vent Pipe and Pipe Fittings	2.2.5.10.(1) 2.2.5.11.(1) 2.2.5.12.(1) 2.4.6.4.(2)
CSA	CAN/CSA-B181.3-02	Polyolefin Laboratory Drainage Systems	2.2.8.1.(1)
CSA	CAN/CSA-B182.1-02	Plastic Drain and Sewer Pipe and Pipe Fittings	2.2.5.10.(1) 2.4.6.4.(2)
CSA	CAN/CSA-B182.2-02	PVC Sewer Pipe and Fittings (PSM Type)	2.2.5.10.(1)
CSA	CAN/CSA-B182.4-02	Profile PVC Sewer Pipe and Fittings	2.2.5.10.(1)
CSA	CAN/CSA-B182.6-02	Profile Polyethylene Sewer Pipe and Fittings For Leak-Proof Sewer Applications	2.2.5.10.(1)
CSA	CAN/CSA-B182.7-02	Multilayer PVC Sewer Pipe (PSM Type) Having Reprocessed-Recycled Content	2.2.5.10.(1)
CSA	B242-M1980	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-B356-00	Water Pressure Reducing Valves for Domestic Water Supply Systems	2.2.10.12.(1)
CSA	CAN/CSA-B602-99	Mechanical Couplings for Drain, Waste, and Vent Pipe and Sewer Pipe	2.2.10.4.(2)
CSA	CAN/CSA-F379.1-88	Solar Domestic Hot Water Systems (Liquid to Liquid Heat Transfer)	2.2.10.13.(1)
CSA	CAN/CSA-F383-87	Installation Code for Solar Domestic Hot Water Systems	2.6.1.8.(1)
CSA	G401-01	Corrugated Steel Pipe Products	2.2.6.8.(1)
ULC	CAN4-S114-M80	Test for Determination of Non-Combustibility in Building Materials	1.4.1.2.(1)[1]

Notes to Table 1.3.1.2.:
[1] 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 (the appropriate addresses of the organizations are shown in brackets).

ANSI ..... American National Standards Institute (25 West 43rd Street, 4th Floor, New York, New York 10036 U.S.A.; www.ansi.org)

ASHRAE ..... American Society of Heating, Refrigerating and Air-Conditioning Engineers (1791 Tullie Circle, N.E., Atlanta, Georgia 30329-2305 U.S.A.; www.ashrae.org)

ASME ..... American Society of Mechanical Engineers (22 Law Drive, P.O. Box 2900, Fairfield, New Jersey 07007-2900 U.S.A.; www.asme.org)

ASPE ..... American Society of Plumbing Engineers (8614 Catalpa Avenue, Suite 1007, Chicago, Illinois 60656-1116 U.S.A.; www.aspe.org)

ASSE ..... American Society of Sanitary Engineering (A-901 Canterbury Road, West Lake, Ohio 44145 U.S.A.; www.asse-plumbing.org)

ASTM ..... American Society for Testing and Materials International (100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428-2959 U.S.A.; www.astm.org)

AWWA ..... American Water Works Association (6666 West Quincy Avenue, Denver, Colorado 80235 U.S.A.; www.awwa.org)

CAN ..... National Standard of Canada designation (The number or name following the CAN designation represents the agency under whose auspices the standard is issued.
CAN 1 designates CGA,
CAN 2 designates CGSB,
CAN 3 designates CSA, and
CAN 4 designates ULC.)

CCBFC ..... Canadian Commission on Building and Fire Codes (National Research Council of Canada, Ottawa, Ontario KlA 0R6; www.nationalcodes.ca)

CGSB ..... Canadian General Standards Board (Place du Portage, Phase III, 6B1, 11 Laurier Street, Gatineau, Quebec K1A 1G6; www.pwgsc.gc.ca/cgsb)

CSA ..... Canadian Standards Association (5060 Spectrum Way, Suite 100, Mississauga, Ontario L4W 5N6; www.csa.ca)

IRC ..... Institute for Research in Construction (National Research Council of Canada, Ottawa, Ontario K1A 0R6; irc.nrc-cnrc.gc.ca)

MSC ..... Meteorological Service of Canada [formerly AES – Atmospheric Environment Service] (Environment Canada, 4905 Dufferin Street, Toronto, Ontario M3H 5T4; www.msc-smc.ec.gc.ca)

NBC ..... National Building Code of Canada 2005 (see CCBFC)

NFC ..... National Fire Code of Canada 2005 (see CCBFC)

NFPA ..... National Fire Protection Association (1 Batterymarch Park, Quincy, Massachusetts 02169-7471 U.S.A.; www.nfpa.org)

NIST ..... National Institute of Standards and Technology (100 Bureau Drive, Stop 1070, Gaithersburg, Maryland 20899-1070 U.S.A.; www.nist.gov)

NPC ..... National Plumbing Code of Canada 2005 (see CCBFC)

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

ULC ..... Underwriters' Laboratories of Canada (7 Underwriters Road, Toronto, Ontario M1R 3B4; www.ulc.ca)

2.2.8. Corrosion-Resistant Materials

2.2.8.1. Pipes and Fittings

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

a) ASTM A 518/A 518M, "Corrosion-Resistant High-Silicon Iron Castings,"
b) ASTM C 1053, "Borosilicate Glass Pipe and Fittings for Drain, Waste, and Vent (DWV) Applications," or
c) CAN/CSA-B181.3, "Polyolefin Laboratory Drainage Systems."

2.2.9. Jointing Materials

2.2.9.1. Cement Mortar

1) Cement mortar shall not be used for jointing.

2.2.9.2. Solders and Fluxes

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

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

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

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

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

2.2.10. Miscellaneous Materials

2.2.10.1. Brass Floor Flanges

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

2.2.10.2. Screws, Bolts, Nuts and Washers

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

a) to connect a water closet to a water closet flange,
b) to anchor the water closet flange to the floor, or
c) to anchor the water closet to the floor.

2.2.10.3. Cleanout Fittings

1) Every plug, cap, nut or bolt that is intended to be removable from a ferrous fitting shall be of a non-ferrous material.

2) A *cleanout* fitting that, as a result of normal maintenance operations, cannot withstand the physical stresses of removal and reinstallation or cannot ensure a gas-tight seal shall not be installed.

2.2.10.4. Mechanical Couplings

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

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

2.2.10.5. Saddle Hubs

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

2.2.10.6. Supply and Waste Fittings ★

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

2) Waste fittings shall conform to ASME A112.18.2/CSA B125.2, "Plumbing Waste Fittings."

2.2.10.7. Water Temperature Control ★

(See Appendix A.)

1) Except as provided in Sentence (2), all valves supplying fixed-location shower heads shall be individual pressure-balanced or thermostatic-mixing valves conforming to ASME A112.18.1/CSA B125.1, "Plumbing Supply Fittings."

2) Individual pressure-balanced or thermostatic-mixing valves shall not be required for showers having a single tempered water supply that is controlled by a master thermostatic-mixing valve conforming to CSA B125.3, "Plumbing Fittings."

3) All mixing valves supplying shower heads shall be of the pressure-balanced, thermostatic, or combination pressure-balanced/thermostatic type capable of

a) maintaining a water outlet temperature that does not exceed 49°C, and
b) limiting thermal shock.

4) The temperature of water discharging into a bathtub shall not exceed 49°C.

2.2.10.8. Direct Flush Valves

1) Every direct flush valve shall

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

2.2.10.9. Drinking Fountain Bubblers

1) The orifice of every drinking fountain bubbler shall

a) be of the shielded type, and
b) direct the water upward at an angle of approximately 45°.

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

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

2.2.10.10. Back-Siphonage Preventers and Backflow Preventers ★

1) Except as provided in Sentence (2), *back-siphonage preventers* and *backflow preventers* shall conform to

a) CAN/CSA-B64.0, "Definitions, General Requirements, and Test Methods for Vacuum Breakers and Backflow Preventers,"
b) CAN/CSA-B64.1.1, "Vacuum Breakers, Atmospheric Type (AVB),"
c) CAN/CSA-B64.1.2, "Vacuum Breakers, Pressure Type (PVB),"
d) CAN/CSA-B64.2, "Vacuum Breakers, Hose Connection Type (HCVB),"
e) CAN/CSA-B64.2.1, "Vacuum Breakers, Hose Connection Type (HCVB) with Manual Draining Feature,"
f) CAN/CSA-B64.2.2, "Vacuum Breakers, Hose Connection Type (HCVB) with Automatic Draining Feature,"
g) CAN/CSA-B64.3, "Backflow Preventers, Dual Check Valve Type with Atmospheric Port (DCAP),"

h) CAN/CSA-B64.4, "Backflow Preventers, Reduced Pressure Principle Type (RP),"
i) CAN/CSA-B64.5, "Backflow Preventers, Double Check Valve Type (DCVA),"
j) CAN/CSA-B64.6, "Backflow Preventers, Dual Check Valve Type (DuC),"
k) CAN/CSA-B64.7, "Vacuum Breakers, Laboratory Faucet Type (LFVB)," or
l) CAN/CSA-B64.8, "Backflow Preventers, Dual Check Valve Type with Intermediate Vent (DuCV)."

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

2.2.10.11. Relief Valves

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

2.2.10.12. Reducing Valves

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

2.2.10.13. Solar Domestic Hot Water

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

2.2.10.14. Vent Pipe Flashing

1) Flashing fabricated on-site for *vent pipes* shall be fabricated from
a) copper sheet not less than 0.33 mm thick,
b) aluminum sheet not less than 0.61 mm thick,
c) *alloyed zinc* sheet not less than 0.35 mm thick,
d) lead sheet not less than 2.16 mm thick,
e) galvanized steel sheet not less than 0.41 mm thick, or
f) polychloroprene (neoprene) not less than 2.89 mm thick.

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

2.2.10.15. Water Hammer Arresters

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

2.2.10.16. Air admittance valves

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

Section 2.3. Piping

2.3.1. Application

2.3.1.1. General

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

2.3.2. Construction and Use of Joints

2.3.2.1. Caulked Lead Drainage Joints

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

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

2) Every caulked lead drainage joint shall be firmly packed with oakum and tightly caulked with lead to a depth of not less than 25 mm.

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

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

2.3.2.2. Wiped Joints

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

2) Every wiped joint in straight pipe shall

a) be made of solder,
b) have an exposed surface on each side of the joint at least 19 mm wide, and
c) be not less than 10 mm thick at the thickest part.

3) Every wiped flanged joint shall be reinforced with a lead flange that is not less than 19 mm wide.

2.3.2.3. Screwed Joints

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

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

2.3.2.4. Soldered Joints

1) Soldered joints shall be made in accordance with ASTM B 828, "Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings."

2.3.2.5. Flared Joints

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

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

2.3.2.6. Mechanical Joints

1) Mechanical joints shall be made with compounded elastomeric rings that are held in compression by

a) stainless steel or cast-iron clamps, or
b) groove and shoulder type mechanical couplings.

(See Appendix A.)

2.3.2.7. Cold-Caulked Joints

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

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

3) Every cold-caulked joint in a *drainage system* shall be firmly packed with oakum and tightly caulked with cold caulking compound to a depth of not less than 25 mm.

2.6.1.11. Thermal Expansion

1) Protection against thermal expansion shall be required when a *check valve* is required by Article 2.6.1.5., a *backflow preventer* by Article 2.6.2.6., or a pressure-reducing valve by Article 2.6.3.3. (See Appendix A.)

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 Appendix A.)

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 CAN/CSA-B64.10, "Manual for the Selection and Installation of Backflow Prevention Devices." (See Appendix A.)

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 hose connection *vacuum breaker*,
e) a dual *check valve backflow preventer* with atmospheric port,
f) a double *check valve* assembly,
g) a reduced pressure principle *backflow preventer* ,
h) a dual *check valve backflow preventer*,
i) a laboratory faucet type *vacuum breaker*, or
j) 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 CAN/CSA-B64.6.1, "Backflow Preventers, Dual Check Valve Type for Fire Systems (DuCF),"

b) *Class 1 fire sprinkler/standpipe systems* shall be protected by a single *check valve backflow preventer* conforming to CAN/CSA-B64.9, "Backflow Preventers, Single Check Valve Type for Fire 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 CAN/CSA-B64.5.1, "Backflow Preventers, Double Check Valve Type for Fire 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 CAN/CSA-B64.4.1, "Backflow Preventers, Reduced Pressure Principle Type for Fire 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 Clauses (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 CAN/CSA-B64.4.1, "Backflow Preventers, Reduced Pressure Principle Type for Fire Systems (RPF)," or

f) *Class 6 fire sprinkler/standpipe systems* shall be protected

   i) by a double *check valve backflow preventer* conforming to CAN/CSA-B64.5.1, "Backflow Preventers, Double Check Valve Type for Fire Systems (DCVAF)," or

   ii) where a potentially severe health hazard may be caused by *backflow*, by a reduced pressure principle *backflow preventer* conforming to CAN/CSA-B64.4.1, "Backflow Preventers, Reduced Pressure Principle Type for Fire Systems (RPF)."

(See Appendix A.)

3) *Backflow preventers* required by Sentence (2) shall be installed upstream of the fire department pumper connection. (See Appendix A.)

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

2.6.2.5. Separation of Water Supply Systems

1) No *private water supply system* shall be interconnected with a public water supply system.

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

(2) Cold water only.
(3) Gasketted joints required.
(4) Permitted only for water service pipe.
(5) Combustible piping in noncombustible construction is subject to the requirements of Sentence 3.1.5.16.(1) of Division B of the NBC.
(6) 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.
(7) Not permitted in hot water systems.
(8) Not to exceed design temperature and design pressure stated in Sentence 2.2.5.9.(2).
(9) Permitted only in buildings of industrial occupancy as described in the NBC, or for the repair of existing galvanized steel piping systems.
(10) Permitted underground only in a storm drainage system.
(11) Permitted only for an external leader.
(12) Not permitted for the fixture drain or vent below the flood level rim of a flush-valve-operated urinal.

A-2.2.5.3.(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-2.2.5.6.(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-2.2.5.7.(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 CAN/CSA-B137.5, "Crosslinked Polyethylene (PEX) Tubing Systems for Pressure Applications."

A-2.2.5.10. to 2.2.5.12. Solvent Cement. The CAN/CSA standards B137.6, "CPVC Pipe, Tubing, and Fittings for Hot- and Cold-Water Distribution Systems," B181.1, "ABS Drain, Waste, and Vent Pipe and Pipe Fittings," and B181.2, "PVC Drain, Waste, and Vent Pipe and Pipe Fittings," reference ASTM standard 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-2.2.5.13.(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 Composite Pressure-Pipe Systems."

A-2.2.5.14.(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 CAN/CSA-B137.10, "Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene Composite Pressure-Pipe Systems."

A-2.2.5.15.(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 CAN/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-2.2.10.7. 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 sewer gases from leaking into the building.

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.

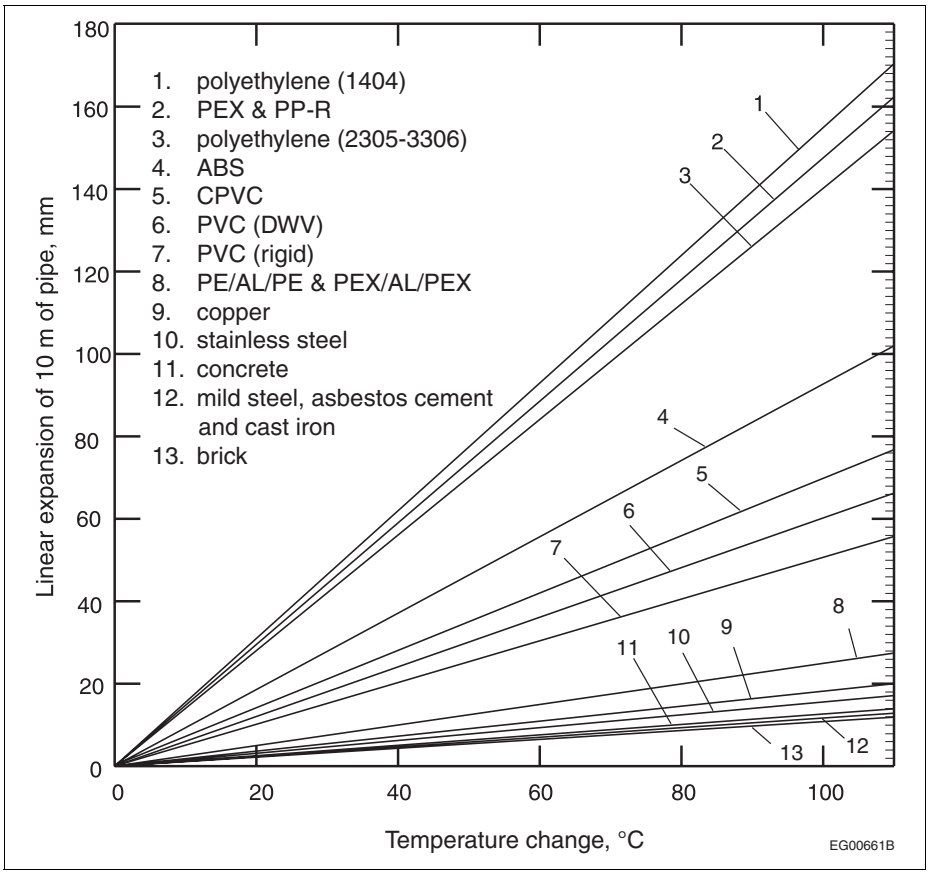


Figure A-2.3.3.9.
Linear Expansion

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.

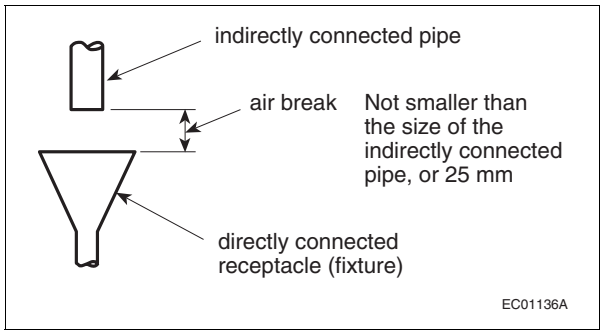


Figure A-2.3.3.11.(2)
Air Break

Step 4. The available pressure is given as 413 kPa.

$$413 - 36.5 = 376\,\text{kPa}$$

Step 5. A building with 376 kPa static water pressure is sized from the second portion of Table A-2.6.1.1.(1) – the 311 to 413 kPa pressure range.

Step 6. The water piping for this entire building will be sized from the 18 m column of the 311 to 413 kPa pressure range portion of Table A-2.6.1.1.(1).

Step 7. The size of the water service is determined to be 1-inch pipe because the cold water supply fixture unit value calculated in Step 1A (41 cwsfu) falls between the 40 and 47 fixture unit values on the chart, and the higher 47 fixture unit value must be used.

Step 8. The size of the building supply pipe is also determined to be 1 inch from this same line of the Table.

Step 9. Since the fixtures in apartment 3 are most remote from the water service pipe, the sizing will begin in apartment 3 and proceed back toward the water service pipe.

With a demand of 8 cwsfu on the pipe supplying the cold water to apartment 3, it is sized as three-quarter inch pipe. However, the individual fixtures in apartment 3 are all supplied with half-inch fixture branch piping. (The sizing of the cold water piping of the other 3 individual apartments is identical to that of apartment 3.)

At the point where the cold water supply to apartment 3 joins the supply to apartment 4, the pipe serves a demand of 16 cwsfu. However, it does not increase in size, since a three-quarter inch pipe will supply 23 cwsfu. (This sizing also applies to the point where the cold water supply for apartments 1 and 2 join.)

A three-quarter inch pipe will adequately serve the 9 cwsfu demand of the service sink and two automatic clothes washers located in the basement laundry room.

Step 10. The hot water supply fixture unit demand of the water heater is 29 hwsfu (as calculated in Step 1), which requires a 1-inch cold water supply pipe.

Step 11. At the point where the cold water supply to the water heater is taken from the cold water main, the cold water supply fixture unit demand increases to 45 cwsfu and the Table indicates that the pipe size is 1 inch.

Step 12. Referring to Figure A-2.6.1.1.(1)-B (which illustrates the sizing of the hot water piping in the 4-unit apartment building of this example), the sizing begins in apartment 1, which is the apartment most remote from the water heater. A half-inch size branch pipe will adequately serve the 3 fixtures in this apartment that require a hot water supply. (A half-inch pipe serves the other 3 apartments' hot water needs as well.)

At the point where the hot water supply to apartments 1 and 2 joins the hot water main, the piping is increased to three-quarter inch. This same three-quarter inch pipe is also large enough to supply the combined 19 hwsfu demand of apartments 1 and 2 plus the basement laundry room.

The 9 hwsfu demand of the laundry room fixtures requires only a three-quarter inch size branch pipe.

The sizing of the hot water supply piping to apartments 3 and 4 is identical to that for apartments 1 and 2.

At the point where the hot water supply pipe for apartments 1 and 2 and the laundry room joins the supply to apartments 3 and 4, the pipe is increased to 1-inch size. The 1-inch size pipe is continued back to the hot water outlet of the heater.

A-2.6.1.3.(5) Where multiple risers convey the water supply to dwelling units, each dwelling unit's water distribution system shall be provided with a shut-off valve located immediately where the water piping enters the suite so as to isolate the fixtures as well as the water distribution piping serving the dwelling unit's fixtures. Fixture stopcocks or shut-off valves located immediately adjacent to a fixture may not be adequate to protect the water distribution piping. Where a dwelling unit is served by a single shut-off valve on the water supply, additional shut-off valves may be required to achieve compliance with Sentences 2.6.1.3.(4) and (7).

A-2.6.1.7.(5) Relief Valves. If the discharge piping is longer than 2 m or more than two 90° elbows are used, the valve manufacturer's installation instructions should be followed to ensure that the piping does not affect the relief valves' discharge capacity.

A-2.6.1.9.(1) Water Hammer Prevention. Water hammer is a buildup of pressure in a length of horizontal or vertical pipe that occurs when a valve or faucet is closed suddenly. The longer the pipe and the greater the water velocity, the greater the pressure exerted on the pipe, which can be many times the normal static water pressure and be sufficient to damage the piping system. Since air chambers made from a piece of vertical pipe do not provide acceptable protection, pre-manufactured water hammer arresters are required to address this potential problem. Water hammer arresters need not be installed at every valve or faucet, nor in every piping system.

A-2.6.1.11.(1) Thermal Expansion. ★ To accommodate the increase in pressure caused by thermal expansion within a closed water distribution system, one of the following should be installed:

(1) a suitably sized diaphragm expansion tank designed for use within a potable water system,
(2) an auxiliary thermal expansion relief valve (T.E.R. valve) conforming to CSA B125.3, "Plumbing Fittings," set at a pressure of 550 kPa or less and designed for repeated use, or
(3) other means acceptable to the authority having jurisdiction.

A-2.6.1.12.(1) Service Water Heaters. ★ Storing hot water at temperatures below 60°C in the hot water tank or in the delivery system may lead to the growth of legionella bacteria. Contemporary electric water heater tanks experience temperature stratification and thus tend to have legionella bacteria in the lower parts of the tank. Article 2.6.1.12. specifies a thermostat setting of 60°C, which addresses the concern over the growth of legionella bacteria in electric hot water storage tanks and is enforceable without introducing unnecessary complications. The growth of legionella bacteria is not a concern for other types of water heaters with different designs that use different fuels.

Electrically heated water heaters are shipped with the thermostat set at 60°C. Article 2.6.1.12. is included in the NPC to formalize this de facto temperature setting as a requirement. The thermostats have graduated temperature markings to allow such a setting, which is not the case with gas- or oil-heated water heaters.

A-2.6.2.1.(3) Backflow Preventers. CAN/CSA B64.10.1, "Manual for the Maintenance and Field Testing of Backflow Prevention Devices," is considered to represent good practice as regards procedures for the maintenance and field testing of backflow preventers.

A-2.6.2.4.(2) Backflow from Fire Protection Systems. The following document is considered to be good engineering practice when selecting a backflow preventer for installation on a fire protection system: Manual M14, "Recommended Practice for Backflow Prevention and Cross-Connection Control."

Table A-2.6.2.4.(2)
Selection Guide for Backflow Prevention Devices on Fire Sprinkler and Standpipe Systems

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

Notes to Table A-2.6.2.4.(2):

(1) The "F" indicates that the product is only recommended for use on fire sprinkler and standpipe systems.