

Vancouver Building By-law 2025

Book II: Plumbing Systems Insert Pages

Effective September 15, 2025
By-law 14343

Convenience Copy

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vancouver.ca/building-bylaw

WATER SAFETY, EFFICIENCY AND SEWAGE REQUIREMENTS*

Maximum flush cycle, maximum flow rate and other requirements summarized below.

Updated September 19, 2025



SINGLE-PASS SYSTEMS, INCLUDING ONCE-THROUGH COOLING

Prohibited



TOILETS

4.8 L/flush. Full flush on a dual-flush toilet shall not exceed 4.8 L



URINALS

1.9 L/flush



SHOWER HEADS**

7.6 L/minute



LAVATORY FAUCETS**

Private use 5.7 L/minute
Public use 1.9 L/minute



KITCHEN FAUCETS** + self-closing

Residential use 6.8 L/minute
Non-residential use 8.3 L/minute



PRE-RINSE SPRAY VALVES

4.8 L/minute



CLOTHES WASHERS



DISHWASHERS



ICE MAKERS



COMMERCIAL STEAM COOKERS AND COMBINATION OVENS



GREASE INTERCEPTORS

Must be certified to CSA B481.0 and B481.3; ASME A112.14.3; ASME A112.14.4; or IAPMO Z1001.



RAINWATER MANAGEMENT

Most new buildings must provide on-site rainwater management.



HOT WATER

Domestic hot water must be stored at a minimum of 60°C within a tank. A minimum of 49°C is required within a recirculation loop.



COOLING TOWERS AND EVAPORATIVE CONDENSERS

Operating permit required for new and existing systems. *Legionella pneumophila* reporting required at seasonal start-up and every month of operation.



DECORATIVE WATER FEATURES†

Operating permit required for new and existing systems. *Legionella pneumophila* reporting required at seasonal start-up and at least once annually.



BUILDING WATER TREATMENT SYSTEMS††

Operating permit required for new and existing systems treating potable water.



NON-POTABLE (ALTERNATE) WATER SYSTEMS

Operating permit required for new and existing systems using rainwater or stormwater.†† Water quality reporting required every two months.

Residential greywater reuse systems certified to NSF 350 Class R may be installed, and no operating permit or water quality reporting is required.



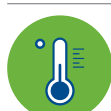
CROSS CONNECTION CONTROL

Backflow preventers must be selected and installed in conformance with CSA B64.10.



PIPE SIZING

IAPMO Water Demand Calculator may be used.



GEOEXCHANGE SYSTEMS

Methanol use prohibited. Open-loop systems must not discharge to sewer.



VEHICLE WASH FACILITIES

Automatic systems: must recycle at least 60% of water.

Self-service: 11.4 L/minute for foam brushes and spray wands.



RESIDENTIAL LANDSCAPE IRRIGATION SYSTEMS

Pressure reducing valve may be required. Fertigation and chemigation prohibited.

For more information visit:

vancouver.ca/operating-permit

vancouver.ca/building-bylaw

vancouver.ca/rainwater



* Summary does not include all applicable Vancouver Building By-law plumbing requirements.

** Exempt are fixtures within treatment and care (Group B) occupancies and those listed in a professional water management plan.

† Exempt are systems for single detached homes, duplexes and multiplexes. Green walls, fish ponds, and natural bodies of water are also exempt.

†† Exempt are systems for single detached homes, duplexes and multiplexes.

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Division A

Part 1 Compliance

Section 1.2. Compliance

Note to reader:

Subsection 1.2.1. below replaces the version in the 2020 National Plumbing Code.

Subsection 1.2.3. below supplements the 2020 National Plumbing Code.

1.2.1. Compliance with this By-law

1.2.1.1. Compliance with this By-law

- 1) Compliance with this By-law shall be achieved by
 - a) complying with the applicable acceptable solutions in Division B (see Note A-1.2.1.1.(1)(a)), or
 - b) except as required by Sentence (3) and Sentence 3.3.1.3.(1) of Division C, using alternative solutions, *accepted* by the *Chief Building Official* under Section 2.3 of Division C, that will achieve at least the minimum level of performance required by Division B in the areas defined by the objectives and functional statements attributed to the applicable acceptable solutions (see Note A-1.2.1.1.(1)(b)).
- 2) For the purposes of compliance with this By-law as required in Clause 1.2.1.1.(1)(b), the objectives and functional statements attributed to the acceptable solutions in Division B shall be the objectives and functional statements referred to in Subsection 1.1.2. of Division B.

3) An alternative solution shall not be used in place of an acceptable solution if the acceptable solution expressly requires conformance to a provincial enactment other than Book I (General) or Book II (Plumbing Systems) of the Vancouver Building By-law.

1.2.1.2. Responsibility of Owner

(Refer to Book I (General) of this By-law.)

1.2.3. Installation of Plumbing Systems

(Refer to Book I (General) of this By-law.)

Section 1.3. Divisions A, B and C of this By-law

1.3.4. Application of Division C

Note to reader:

Article 1.3.4.1. below replaces the version in the 2020 National Plumbing Code.

1.3.4.1. Application of Parts 1, 2 and 3

- 1) Parts 1, 2 and 3 of Division C apply to all *plumbing systems* covered in this By-law. (See Article 1.1.1.1.)

Section 1.4. Terms and Abbreviations

1.4.1. Definitions of Words and Phrases

Note to reader:

The defined terms below supplement or modify those of the 2020 National Plumbing Code.

1.4.1.2. Defined Terms

1) The words and terms in *italics* in this By-law shall have the following meanings (an asterisk (*) following a defined word or term indicates that the definition for that word or term is taken from Book I (General) of this By-law:

Acceptable* means acceptable to the *Chief Building Official*.

Accredited laboratory means a laboratory approved by the BC Provincial Health Officer for drinking water microbiology testing.

Alert means a bell, horn, speaker, light or text display that provides audible, tactile or visible outputs, or any combination thereof.

Alternate water source system means a system designed to collect, treat, and use non-*potable* water from alternate water sources in lieu of *potable* water, but excludes a system in a *building* used exclusively for *residential occupancy* containing no more than 8 principal *dwelling units*, and excludes the use of rain barrels of up to a cumulative capacity of 500 L.

Blackwater means waste water from water closets, urinals and other sanitary fixtures designed for carrying human waste, kitchen sinks, utility sinks, medical sinks, laboratory sinks, and industrial processes, but does not include *clear-water waste*.

Bottle trap means a *trap* that retains water in a closed chamber and that seals the water by submerging the inlet pipe in the liquids or by a partition submerged in the liquids.

Building* means any structure used or intended for supporting or sheltering any use or *occupancy*, including any *float home* or *marina* and any retaining structures greater than 1.2 m in height.

Chief Building Official* means the *City Building Inspector*, and any person authorized to act on behalf of the *City Building Inspector*.

City* means the City of Vancouver.

City Building Inspector* means the person appointed as such by City Council pursuant to the provisions of the Vancouver Charter.

City Engineer* means the person appointed as such by City Council pursuant to the provisions of the Vancouver Charter.

Cooling tower means a direct (open circuit) cooling tower, indirect (closed circuit) cooling tower, evaporative condenser, adiabatic cooler which recirculates non-evaporated water, or fluid cooler that is part of a recirculated *water system* incorporated into a *building's* cooling, industrial process, refrigeration, or energy production system, and may comprise one or more cooling tower cells. (See Note A-1.4.1.2.(1).)

Decorative water feature* means a human-made fountain, waterfall, cascade, spray or the like that uses water for architectural, decorative or aesthetic effects, is not intended for human contact, and is located indoors or outdoors, but excludes a fish pond, natural body of water, natural waterfall, a feature in or associated with a *building* used exclusively for *residential occupancy* containing no more than 8 principal *dwelling units*, or a regulated activity under the BC Pool Regulation. (See Note A-1.4.1.2.(1).)

E. coli means *Escherichia coli*.

Emergency once through cooling equipment* means *once through cooling equipment* that is not normally operated and is only activated in the event of a sudden, unforeseen failure of an otherwise properly designed, operated and maintained primary cooling system.

Existing building* means a *building* lawfully constructed and completed under a permit before submission of the current *permit* application.

Float home* means any structure incorporating a floatation system, intended for use or *occupancy* or being used or occupied for residential purposes, containing one *dwelling unit* only, and not primarily intended for, or useable in, navigation, but does not include any *water craft* designed or intended for navigation.

Greywater means waste water from all sources except *blackwater* and *clear-water waste*.

Groundwater* means a freestanding body of water in the ground.

Maintenance once through cooling equipment* means *once through cooling equipment* that is not normally operated and is only activated to temporarily supplement or replace the primary cooling system during scheduled maintenance on the primary cooling system.

Marina* means any structure or installation, including marina walkways, which provides moorage space for *water craft*.

Once through cooling equipment* means equipment that produces a cooling effect by transfer of heat to water that is only circulated once through the equipment and is then discharged, and includes but is not limited to commercial and industrial air conditioners, refrigerators, freezers, coolers and ice machines.

Operating permit* means permission or authorization in writing by the *Chief Building Official* to install or retain existing equipment or systems for which an operating permit is required under this By-law.

Owner* means a registered owner, a holder of an agreement for sale and purchase and, in the case of Crown-owned lands, owner shall mean the occupier.

Perimeter drainage water means water collected from the foundation of a structure.

Permit* means permission or authorization in writing by the *Chief Building Official* to perform work regulated by this By-law and, in the case of an *occupancy permit*, to occupy any *building* or part thereof, but does not include an *operating permit*.

Press-connect means a permanent mechanical joint incorporating an elastomeric seal or an elastomeric seal and corrosion resistant grip ring, with the joint made with a pressing tool and jaw or ring that complies with the manufacturer's installation instructions.

Public low pressure sewer system means a public sewer in which gravity is insufficient to convey waste water and organic refuse, and pumps on private property are used to provide such force.

Rainwater means rainfall and other natural precipitation, and includes *storm water*.

Residential occupancy* (Group C) means the *occupancy* or use of a *building* or part thereof by persons for whom sleeping accommodation is provided but who are not harboured for the purpose of receiving care or treatment and are not involuntarily detained.

Subsurface investigation* means the appraisal of the general subsurface conditions at a *building* site by analysis of information gained by such methods as geological surveys, in situ testing, sampling, visual inspection, laboratory testing of samples of the subsurface materials and groundwater observations and measurements.

Vegetated roof assembly* ("green roof") means a vegetated roof system (a functional arrangement of interacting components, inclusive of vegetation) that is combined with a roof assembly, is intended to both grow and flourish, and may be installed on a roof to control the rate of rainwater discharged through a *storm drainage system*.
(See Book I, Division A, Note A-1.4.1.1.)

Water craft* means any boat, hull, barge, or houseboat which is afloat, whether self-propelled or not, and includes pleasure and commercial craft.

1.4.2. Symbols and Other Abbreviations

Note to reader:
Article 1.4.2.1. below replaces the version in the 2020 National Plumbing Code.

1.4.2.1. Symbols and Other Abbreviations

1) The symbols and other abbreviations in this By-law shall have the meanings assigned to them in this Article and in Article 1.3.2.1. of Division B.

ABS	acrylonitrile-butadiene-styrene
AL	aluminum
CFU	colony forming unit(s)
cm ²	square centimetre(s)
CPVC	chlorinated polyvinyl chloride
°	degree(s)
°C	degree(s) Celsius
diam.	diameter
DWV	drain, waste and vent
h	hour(s)
IDF	Intensity-Duration-Frequency
in.	inch(es)
kg/m ³	kilogram(s) per cubic metre
kPa	kilopascal(s)
L	litre(s)
Lpf	litre(s) per flush
L/s	litre(s) per second
m	metre(s)
m ²	square metre(s)
max.	maximum
min.	minimum
min	minute(s)
mm	millimetre(s)
MPN	most probable number
n/a	not applicable
No.	number(s)
NTU	nephelometric turbidity unit(s)
PE	polyethylene
PE-RT	polyethylene of raised temperature
PEX	crosslinked polyethylene
PP-R	polypropylene
PVC	polyvinyl chloride
1 in 50	slope of 1 vertical to 50 horizontal

Notes to Part 1

Compliance

Note to reader:

The Notes below supplement those of the 2020 National Plumbing Code.

A-1.4.1.2.(1) Defined Terms.

Cooling Tower

From a Legionnaires' disease prevention perspective, the fluid flow of interest is the water sprayed, evaporated, collected and recirculated within a *cooling tower* (the so-called "external circuit"). It is this water that requires appropriate treatment to keep *Legionella pneumophila* levels controlled.

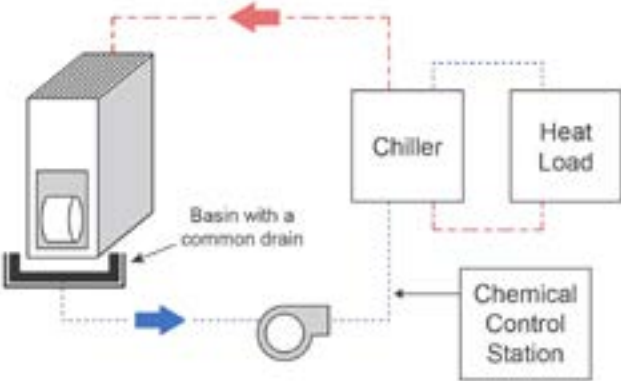
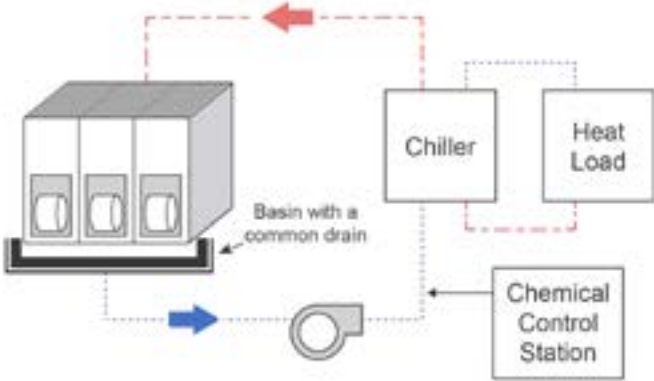
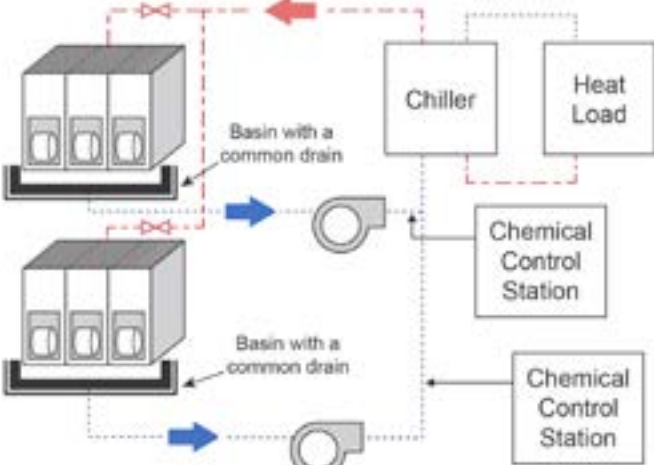
For a *cooling tower* with multiple cells, if all of the cells share the same basin and the same recirculated water, the whole unit can be considered one *cooling tower*. See sample mechanical configurations in Table A-1.4.1.2.(1). However, as a cautionary note for large systems, even with the same water flowing to all parts, it has been found by New York City's Department of Health and Mental Hygiene that different locations within the same *cooling tower* can test positive and others can test negative for *Legionella pneumophila*.

For buildings with multiple cooling tower structures, in certain, rare configurations, and at the sole discretion of the *Chief Building Official*, it may be determined that the multiple cooling tower structures can be considered as one *cooling tower* for the purpose of this defined term. To be considered as one *cooling tower*, the recirculating water loops of the multiple cooling tower structures must share the same recirculated water and treatment and the recirculating loops must always operate together. The *Chief Building Official* must be satisfied with the equipment owner's reasoning and supporting evidence that there is a reasonable basis to presume that the water quality should be identical at all times across the multiple cooling tower structures. This assessment would consider the location, size, condition and mechanical configuration of the cooling towers, including valves and pipes; differences in exposure to sunshine, heat sources, neighbouring buildings, potential pollution sources, and mechanical equipment, such as exhaust fans; the control system and operational philosophy for the cooling towers; water quality data and compliance history; and maintenance records.

Decorative Water Feature

A living or green wall is not considered a *decorative water feature*, but should be reviewed to identify hazards and to establish procedures to reduce risks. To preclude the growth of *Legionella*, consideration should be given to including non-chemical water treatment (such as UV), maintaining water temperature below 20°C, and removing organic matter from the water. Water flow should be behind the plant material and airflow should be directed toward the living wall to minimize aerosolization into the occupied space.

Table A-1.4.1.2.(1)
Examples of Cooling Tower Configurations and Operating Permit Requirements
 Forming Part of Note A-1.4.1.2.(1)

Number of Cells	Number of Operating Permits	Mechanical and Plumbing Configuration
1	1	
3	1	
6	2	

Division B

Part 1 General

Section 1.3. Referenced Documents and Organizations

1.3.1. Referenced Documents

Note to reader:

The rows in Table 1.3.1.2. below supplement or modify those of the 2020 National Plumbing Code.

1.3.1.2. Applicable Editions

- 1) Where documents are referenced in this By-law, they shall be the editions or versions designated in Table 1.3.1.2.

Table 1.3.1.2.
Documents Referenced in Book II (Plumbing Systems) of the Building By-law⁽¹⁾
Forming Part of Sentence 1.3.1.2.(1)

Issuing Agency	Document Number ⁽²⁾	Title of Document	By-law Reference
ANSI/ ASHRAE	188-2018	Legionellosis: Risk Management for Building Water Systems	2.2.10.6.(8)
ASHRAE	Guideline 12-2023	Managing the Risk of Legionellosis Associated with Building Water Systems	A-2.2.11.6
ASME/CSA	A112.4.4-2022/CSA B481.5:22	Grease Removal Devices	2.2.3.2.(3)
ASME/CSA	A112.14.3-2022/CSA B481.1:22	Hydromechanical Grease Interceptors	2.2.3.2.(3)
ASME/CSA	A112.6.9-2022/CSA B79.9:22	Siphonic Roof Drains	2.3.6.1.(6) 2.4.10.14.(1)
ASME	B16.51-2021	Copper and Copper Alloy Press-Connect Pressure Fittings	2.2.7.9.(1)
ASPE/ANSI	ASPE/ANSI 45-2018	Siphonic Roof Drainage	2.4.10.14.(1)
ASTM	A778/A778M-24	Standard Specification for Welded, Unannealed Austenitic Stainless Steel Tubular Products	2.2.6.14.(1)
ASTM	D8429-21	Standard Test Method for <i>Legionella pneumophila</i> in Water Samples Using Legiolert	2.2.1.7.(2)
ASTM	F3226/F3226M-19	Standard Specification for Metallic Press-Connect Fittings for Piping and Tubing Systems	2.2.6.17.(1) 2.2.7.9.(1)
BC		Engineers and Geoscientists Act	2.7.6.1.(1)
BC		Heritage Conservation Act	A-2.4.2.5.(9)
BC	B.C. Reg. 133/2022	Contaminated Sites Regulation	A-2.4.2.5.(9)
BC	B.C. Reg. 296/2010	Pool Regulation	1.4.1.2.(1) of Division A

Table 1.3.1.2. (continued)
Documents Referenced in Book II (Plumbing Systems) of the Building By-law
 Forming Part of Sentence 1.3.1.2.(1)

Issuing Agency	Document Number ⁽²⁾	Title of Document	By-law Reference
CoV		Book I (General) of the By-law	1.1.1.1.(3) ⁽³⁾ 1.4.1.2.(1) ⁽³⁾ 2.1.3.1.(1) 2.1.4.1.(1) 2.2.5.11.(2) 2.2.5.11.(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. to 2.2.8. A-2.4.10. A-2.4.10.4.(1) A-3.2.1.1.(1) ⁽³⁾
CoV		Engineering Design Manual ⁽⁴⁾	2.4.2.5.(6)
CoV		Fire By-law ⁽⁴⁾	2.5.5.2. A-2.2.1.1.(1) ⁽³⁾ A-3.2.1.1.(1) ⁽³⁾
CoV		Sewer and Watercourse By-law ⁽⁴⁾	2.4.4.2.(1)
CoV		Standards of Maintenance By-law ⁽⁴⁾	A-2.4.2.4.(2)
CoV		Street and Traffic By-law ⁽⁴⁾	A-2.4.2.4.(2)
CoV		Zoning and Development By-law ⁽⁴⁾	2.4.2.5.(1) 2.4.2.5.(2) A-2.4.2.5.(1)
CSA	CAN/CSA-B128.1-06	Design and Installation of Non-Potable Water Systems	2.7.2.1.(1) 2.7.4.1.(7) 2.7.5.2.(1)(c) 2.7.8.2.(2)
CSA	CAN/CSA-B483.1:21	Drinking Water Treatment Systems	2.2.10.17.(4)
CSA	CAN/CSA-Z317.13-17	Infection Control During Construction, Renovation, and Maintenance of Health Care Facilities	A-2.2.11.6.(9)
EPA		ENERGY STAR® Program Requirements Product Specification for Clothes Washers ⁽⁴⁾	2.2.11.1.(1)
EPA		ENERGY STAR® Program Requirements Product Specification for Residential Dishwashers ⁽⁴⁾	2.2.11.1.(1)
EPA		ENERGY STAR® Program Requirements Product Specification for Commercial Dishwashers ⁽⁴⁾	2.2.11.1.(1)
EPA		ENERGY STAR® Program Requirements Product Specification for Automatic Commercial Ice Makers ⁽⁴⁾	2.2.11.1.(1)
EPA		ENERGY STAR® Program Requirements Product Specification for Commercial Steam Cookers ⁽⁴⁾	2.2.11.1.(1)
EPA		ENERGY STAR® Program Requirements Product Specification for Commercial Ovens ⁽⁴⁾	2.2.11.1.(1)

Table 1.3.1.2. (continued)
Documents Referenced in Book II (Plumbing Systems) of the Building By-law
 Forming Part of Sentence 1.3.1.2.(1)

Issuing Agency	Document Number ⁽²⁾	Title of Document	By-law Reference
IAPMO		Water Demand Calculator ⁽⁴⁾	2.6.3.1.(2) 2.6.3.2.(5) 2.6.3.4.(6) 2.7.6.2.(2)
IAPMO	ANSI/CAN/IAPMO Z1001-2021	Prefabricated Gravity Grease Interceptors	2.2.3.2.(3)
IAPMO	IAPMO/ANSI/CAN Z1117-2022	Standard for Press Connections	2.2.6.17.(1) 2.2.7.9.(1)
ISO	11731:2017	Water Quality — Enumeration of <i>Legionella</i>	2.2.1.7.(2)
ISO/IEC	17025:2017	General Requirements for the Competence of Testing and Calibration Laboratories	2.2.1.7.(2)
NSF	NSF/ANSI 14-2017	Plastics Piping System Components and Related Materials	2.7.2.1.(2)
NSF	NSF/ANSI 55-2022	Ultraviolet Microbiological Water Treatment Systems	2.2.11.3.(3)
NSF	NSF/ANSI 61-2023	Drinking Water System Components – Health Effects	2.2.6.10.(1) 2.2.6.11.(1) 2.2.6.12.(1) 2.2.6.13.(1) 2.2.6.14.(1) 2.2.6.16.(1) 2.2.6.17.(1)
NSF	NSF/ANSI 350-2023	Onsite Residential and Commercial Water Reuse Treatment Systems	2.7.1.2.(3)
PSPC	MD 15161-2013	Control of <i>Legionella</i> in Mechanical Systems	A-2.2.11.6.(8) A-2.2.11.6.(9)

Notes to Table 1.3.1.2.:

- (1) While every effort was made to ensure the accuracy of the information in this Table, the NRC is not responsible for the accuracy, timeliness or reliability of the content presented therein. For all purposes of interpreting and applying the referenced standards, By-law users should refer to the most recent official versions of the referenced editions.
- (2) Some documents may have been reaffirmed or reapproved. Check with the applicable issuing agency for up-to-date information.
- (3) By-law reference is in Division A.
- (4) The current version in effect.

1.3.2. Organizations

Note to reader:
Article 1.3.2.1. below replaces the version in the 2020 National Plumbing Code.

1.3.2.1. Abbreviations of Proper Names

- 1) The abbreviations of proper names in this By-law shall have the meanings assigned to them in this Article.
 - ANSI American National Standards Institute (www.ansi.org)
 - ARCSA American Rainwater Catchment Systems Association (www.arcsa.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 ASTM International (www.astm.org)
 - AWS American Welding Society (www.aws.org)
 - AWWA American Water Works Association (www.awwa.org)
 - BC Province of British Columbia (gov.bc.ca)
 - CAN National Standard of Canada designation (www.scc.ca)
 - CBHCC Canadian Board for Harmonized Construction Codes (cbhcc-cchcc.ca)
 - CCBFC Canadian Commission on Building and Fire Codes (see NRC)
 - CoV City of Vancouver (www.vancouver.ca)
 - CSA CSA Group (www.csagroup.ca)
 - EPA United States Environmental Protection Agency (www.epa.gov)
 - IAPMO International Association of Plumbing and Mechanical Officials (www.iapmo.org)
 - ICC International Code Council (www.iccsafe.org)
 - IEC International Electrotechnical Commission (www.iec.ch)
 - ISO International Organization for Standardization (www.iso.org)
 - NBC National Building Code of Canada 2020
 - NFC National Fire Code of Canada 2020
 - NFPA National Fire Protection Association (www.nfpa.org)
 - NIST National Institute of Standards and Technology (www.nist.gov)
 - NPC National Plumbing Code of Canada 2020
 - NRC National Research Council of Canada (nrc.canada.ca)
 - NSF National Sanitation Foundation International (www.nsf.org)
 - PSPC Public Services and Procurement Canada (www.tpsgc-pwgsc.gc.ca)
 - TIAC Thermal Insulation Association of Canada (www.tiac.ca)
 - ULC ULC Standards (canada.ul.com/ulcstandards)

Part 2

Plumbing Systems

Section 2.2. Materials and Equipment

2.2.1. General

Note to reader:
Articles 2.2.1.7., 2.2.1.8. and 2.2.1.9. below supplement the 2020 National Plumbing Code.

2.2.1.7. Microbiological Testing

- 1) *E. coli* testing shall be conducted by an *accredited laboratory*.
- 2) *Legionella pneumophila* testing shall be conducted by a laboratory
 - a) accredited to ISO/IEC 17025, “General requirements for the competence of testing and calibration laboratories,” or equivalent,
 - b) using a method in accordance with Table 2.2.1.7. to identify all serogroups of *Legionella pneumophila*, and
 - c) enrolled in a bi-annual external proficiency testing program for recognized approval for identifying *Legionella* in environmental water samples.

Table 2.2.1.7.
Acceptable Laboratory Methods to Test for *Legionella pneumophila*
Forming Part of Sentence 2.2.1.7.(2)

<i>Legionella pneumophila</i> Testing Requirement	Acceptable Laboratory Method to Test for <i>Legionella pneumophila</i>	
	ISO 11731, “Water Quality — Enumeration of <i>Legionella</i> ,” or equivalent	ASTM D8429, “Standard Test Method for <i>Legionella pneumophila</i> in Water Samples Using Legiolert”
<i>Cooling towers</i> System start-up Clause 2.2.11.6.(7)(c)	Yes, acceptable for all <i>Legionella pneumophila</i> testing requirements	No
Regular testing Clause 2.2.11.6.(7)(d)		Yes
Re-testing after an exceedance Sentence 2.2.11.6.(8)		No
<i>Decorative water features</i> System start-up & annual testing Clauses 2.2.11.7.(7)(c) and (d)	Yes, acceptable for all <i>Legionella pneumophila</i> testing requirements	No
Re-testing after an exceedance Sentence 2.2.11.7.(8)		No
<i>Alternate water source systems</i> Commissioning Article 2.7.5.2.	Yes, acceptable for all <i>Legionella pneumophila</i> testing requirements	No
Regular testing Article 2.7.7.1.		Yes
Re-testing after an exceedance Sentence 2.7.4.1.(5) Sentence 2.7.7.3.(1)		No

- 3) The owner of a *cooling tower* or *decorative water feature* shall ensure that the laboratory conducting *Legionella pneumophila* testing for the *cooling tower* or *decorative water feature* has agreed to give immediate notice to the owner, the *Chief Building Official*, and the local medical health officer if the result exceeds a standard set out in Table 2.2.11.6. or 2.2.11.7. that requires such notice to be given.

2.2.1.8. Maintenance Logs

- 1) When a maintenance log is required by Book II (Plumbing Systems) of this By-law, it shall include
- a) the address and location of the equipment, device, apparatus, or system,
 - b) the *operating permit* number assigned to the equipment, device, apparatus, or system,
 - c) emergency contact information and the name and contact information of the owner of the equipment, device, apparatus, or system,
 - d) the location of any safety data sheets,
 - e) the location of the operating manual for the equipment, device, apparatus, or system and, as applicable, the location of the water management plan,
 - f) except when included with the operating manual, a single line schematic plan of the equipment, device, apparatus, or system, reflective of the current configuration, and including water sampling locations,
 - g) details of any changes or alterations made to the equipment, device, apparatus, or system at any time,
 - h) a record of inspections and any maintenance performed within the last 24 months,
 - i) a record of operational disruptions within the last 24 months and the corrective actions taken,
 - j) if water treatment chemicals are used, a record of the chemical treatments applied and dosages within the last 24 months,
 - k) a record of all water quality results from analyses performed within the last 24 months, and
 - l) if *Legionella pneumophila* tests are conducted, the name of the person and company collecting the sample and the name of the company conducting the laboratory test.
- 2) A maintenance log described in Sentence (1) shall be
- a) kept on site with the corresponding equipment, device, apparatus, or system,
 - b) maintained in an electronic or paper-based format, and
 - c) made available on such request to the *Chief Building Official*.

2.2.1.9. Operating Manuals

- 1) When an operating manual is required by Book II (Plumbing Systems) of this By-law, it shall include
- a) the address and location of the system or equipment for which the operating manual is required,
 - b) contact details for the system or equipment designer,
 - c) a simplified process flow diagram,
 - d) a schematic of the system or equipment showing the locations of all substantial components,
 - e) instructions on operating, maintaining, and inspecting the system or equipment,
 - f) required frequency of maintenance and inspections,
 - g) instructions on deactivating and restarting the system or equipment for repair or other purposes,
 - h) safety data sheets, and
 - i) for *alternate water source systems*, details on the corrective action that shall be taken if the water quality fails to meet the standards set out in Table 2.7.7.1.
- 2) The operating manual described in Sentence (1) shall be
- a) supplied to the *owner* or representative of the *owner*, and
 - b) made available on such request to the *Chief Building Official*.

2.2.3. Traps and Interceptors

Note to reader:

Articles 2.2.3.1. and 2.2.3.2. below replace the version in the 2020 National Plumbing Code.

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 Notes 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.

- 6) A *bottle trap* may be used on a laboratory sink or other *fixture* equipped with corrosion resistant fittings.

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 CSA B481.3, "Sizing, Selection, Location, and Installation of Grease Interceptors,"
 - b) ASME A112.14.3/CSA B481.1, "Hydromechanical Grease Interceptors,"
 - c) ASME A112.14.4/CSA B481.5, "Grease Removal Devices," or
 - d) ANSI/CAN/IAPMO Z1001, "Prefabricated Gravity Grease Interceptors."

(See Note A-2.2.3.2.(3).)

2.2.6. Ferrous Pipe and Fittings

Note to reader:

Articles 2.2.6.10. to 2.2.6.14. below replace the version in the 2020 National Plumbing Code.
Articles 2.2.6.16. and 2.2.6.17. below supplement the 2020 National Plumbing Code.

2.2.6.10. Stainless Steel Pipe

- 1) Stainless steel pipe shall conform to
 - a) ASME B36.19M, “Stainless Steel Pipe,”
 - b) ASTM A312/A312M, “Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes,” and
 - c) NSF/ANSI 61, “Drinking Water System Components – Health Effects.”
- 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,”
 - b) ASTM A403/A403M, “Standard Specification for Wrought Austenitic Stainless Steel Piping Fittings,” and
 - c) NSF/ANSI 61, “Drinking Water System Components – Health Effects.”
- 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
 - a) ASME B16.5, “Pipe Flanges and Flanged Fittings: NPS ½ Through NPS 24 Metric/Inch Standard,”
 - b) NSF/ANSI 61, “Drinking Water System Components – Health Effects,” and
 - c) ASTM A182/A182M, “Standard Specification for Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service” or ANSI/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 NSF/ANSI 61, “Drinking Water System Components – Health Effects,” and
 - a) ASTM A182/A182M, “Standard Specification for Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service,” or
 - b) ASTM A351/A351M, “Standard Specification for 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,”
 - b) ASTM A269/A269M, “Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service” or ASTM A778/A778M, “Standard Specification for Welded, Unannealed Austenitic Stainless Steel Tubular Products,” and
 - c) NSF/ANSI 61, “Drinking Water System Components – Health Effects.”
- 2) Only grade 304/304L or 316/316L stainless steel tube shall be used.

2.2.6.16. Welded Stainless Steel

- 1) Welded stainless steel piping assemblies shall conform to NSF/ANSI 61, “Drinking Water System Components – Health Effects.”
- 2) Welding of stainless steel pipe for *plumbing systems* shall use a gas tungsten arc welding process or a gas metal arc welding process.

2.2.6.17. Stainless Steel Press-Connect Fittings

- 1) Stainless steel *press-connect* fittings shall conform to
 - a) ASTM F3226/F3226M “Standard Specification for Metallic Press-Connect Fittings for Piping and Tubing Systems” or IAPMO/ANSI/CAN Z1117 “Standard for Press Connections” and
 - b) NSF/ANSI 61, “Drinking Water System Components – Health Effects.”

2.2.7. Non-Ferrous Pipe and Fittings

Note to reader:
Article 2.2.7.9. below supplements the 2020 National Plumbing Code.

2.2.7.9. Press-Connect Water Fittings

- 1) Except as required by Sentence 2.2.6.17.(1), *press-connect* fittings for *water distribution systems* shall conform to
 - a) ASME B16.51 “Copper and Copper Alloy Press-Connect Pressure Fittings,”
 - b) ASTM F3226/F3226M “Standard Specification for Metallic Press-Connect Fittings for Piping and Tubing Systems,” or
 - c) IAPMO/ANSI/CAN Z1117 “Standard for Press Connections.”

2.2.10. Miscellaneous Materials

Note to reader:
Articles 2.2.10.6. and 2.2.10.17. below replace the version in the 2020 National Plumbing Code.

2.2.10.6. Valves, and Supply and Waste Fittings

- 1) Supply fittings shall conform to
 - a) ASME A112.18.1/CSA B125.1, “Plumbing Supply Fittings,” or
 - b) CSA B125.3, “Plumbing Fittings.”
- 2) Except as provided in Sentence (8), supply fittings and individual shower heads shall have an integral means of limiting the maximum water flow rate to that specified in Table 2.2.10.6. (See Note A-2.2.10.6.(2).)

Table 2.2.10.6.
Water Flow Rates from Supply Fittings
 Forming Part of Sentence 2.2.10.6.(2)

Supply Fittings	Maximum Water Flow Rate, L/min
Lavatory supply fittings	
private	5.7
public	1.9
Kitchen supply fittings (except for pre-rinse spray valves)	
non-residential	8.3
residential	6.8 ⁽¹⁾
Pre-rinse spray valves ⁽²⁾	4.8
Shower heads ⁽³⁾	7.6

Notes to Table 2.2.10.6.:

- (1) May be temporarily increased to a maximum flow rate of 8.3 L/min but must default to the lower flow rate upon release of the activation mechanism or closure of the faucet valve.
- (2) A pre-rinse spray valve means a handheld device for use with commercial dishwashing and ware washing equipment that sprays water on dishes, flatware, and other food service items for the purpose of removing food residue before cleaning and sanitizing the items. Each pre-rinse spray valve shall be equipped with an automatic shut-off.
- (3) A shower head means any fitting that transmits water for the purposes of showering and includes rain heads, rain tiles, rain systems, waterfalls, body sprays and jets.

3) An automatic compensating valve serving an individual shower head addressed in Sentence (1) shall have a water flow rate equal to or less than the shower head it serves. (See Note A-2.2.10.6.(3).)

4) Where multiple shower heads installed in a public showering facility are served by one temperature control, each shower head shall be equipped with a device capable of automatically shutting off the flow of water when the shower head is not in use. (See Note A-2.2.10.6.(4) and (5).)

5) Except as provided in Sentence (8), each lavatory in a public washroom shall be equipped with a device capable of automatically shutting off the flow of water when the lavatory is not in use. (See Note A-2.2.10.6.(4) and (5).)

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

7) Manually operated valves of NPS 4 or less for use in *plumbing systems* shall conform to ASME A112.4.14/CSA B125.14, "Manually Operated Valves for Use in Plumbing Systems." (See Note A-2.2.10.6.(7).)

8) The requirements of Sentences (2) and (5) do not apply to

- a) any part of a *building* classified as Group B *occupancy* by Part 3 of Division B of Book I (General) of this By-law,
- b) first aid rooms,
- c) emergency eye washes or emergency showers, or
- d) a plumbing fixture specifically identified in a *building's* water management plan that both conforms to ANSI/ASHRAE 188, "Legionellosis: Risk Management for Building Water Systems" and is signed by a registered professional.

2.2.10.17. Water Treatment Systems

(See Article 2.6.2.1. and Note A-2.2.10.17.)

1) Except as provided in Sentence (3), a point-of-entry water treatment device or apparatus may be connected to the *City* water system at the discretion of the *Chief Building Official* and, if permitted

- a) an *operating permit* shall be obtained, and the owner of the point-of-entry water treatment device or apparatus shall comply with the requirements of this Sentence,
- b) the *operating permit* number assigned to a point-of-entry water treatment device or apparatus shall be posted on a sign or plate that is a minimum of 8.5 in by 11 in in size and securely fastened to the point-of-entry water treatment device or apparatus in a location that is conspicuously visible and constructed of a durable, weather resistant material,
- c) the *Chief Building Official* shall be notified within 30 days of any changes to the information that was last provided to the *City* with regard to the *operating permit*, in the form prescribed by the *Chief Building Official*, and
- d) a maintenance log conforming to Article 2.2.1.8. shall be maintained for each point-of-entry water treatment device or apparatus.

2) Except as provided in Sentence (3), an existing point-of-entry water treatment device or apparatus shall comply with Clauses (1)(a), (b), (c) and (d).

3) The requirements in Sentences (1) and (2) do not apply to a *building* used exclusively for *residential occupancy* containing no more than 8 principal *dwelling units*.

4) Point-of-use devices, including their disposable parts, used in *potable* water treatment systems shall conform to CAN/CSA-B483.1, "Drinking Water Treatment Systems."

Note to reader:
Subsection 2.2.11. below supplements the 2020 National Plumbing Code.

2.2.11. Building Appliances and Mechanical Systems

2.2.11.1. Building Appliances

1) Except when a clothes washer is supplied by an *alternate water source system*, appliances listed in Table 2.2.11.1. shall comply with the applicable Energy Star program requirements.

Table 2.2.11.1.
Appliance Energy Star Program Requirements
Forming Part of Sentence 2.2.11.1.(1)

Appliance	Energy Star Program Requirements
Residential clothes washer ⁽¹⁾	Product Specification for Clothes Washers
Commercial clothes washer ⁽¹⁾	Product Specification for Clothes Washers
Residential dishwasher ⁽²⁾	Product Specification for Residential Dishwashers
Commercial dishwasher ⁽³⁾	Product Specification for Commercial Dishwashers
Commercial ice maker ⁽⁴⁾	Product Specification for Automatic Commercial Ice Makers
Commercial steam cooker ⁽⁵⁾	Product Specification for Commercial Steam Cookers
Combination oven ⁽⁶⁾	Product Specification for Commercial Ovens

Notes to Table 2.2.11.1.:

- (1) "Residential clothes washer" and "commercial clothes washer" are as defined by the Energy Star Program Requirements Product Specification for Clothes Washers.
- (2) "Residential dishwasher" is as per the definition of "dishwasher" by the Energy Star Program Requirements Product Specification for Residential Dishwashers.
- (3) "Commercial dishwasher" is as per the definition of "dishwashing machine" by the Energy Star Program Requirements Product Specification for Commercial Dishwashers. Dishwashers intended for laboratory applications are exempted.
- (4) "Commercial ice maker" is as per the definition of "automatic commercial ice maker" by the Energy Star Program Requirements Product Specification for Automatic Commercial Ice Makers.
- (5) "Commercial steam cooker" is as per the definition of "commercial steam cooker" by the Energy Star Program Requirements Product Specification for Commercial Steam Cookers.
- (6) "Combination oven" is as per the definition of "combination oven" by the Energy Star Program Requirements Product Specification for Commercial Ovens.

2) Except when a clothes washer is supplied by an *alternate water source system*, clothes washers with a top-loading design that are designed for use in applications in which the occupants of more than one household will be using the clothes washer, such as multi-family housing common areas and coin laundries, shall not be installed.

2.2.11.2. Reserved

2.2.11.3. Vehicle Wash Facilities

- 1) Except when a vehicle wash facility is supplied by an *alternate water source system*, the maximum flow rate of a spray wand, foam brush or similar plumbing fixture used at a vehicle wash facility shall not exceed 11.4 L/min.
- 2) Where a machine cleans a vehicle at a vehicle wash facility,
 - a) except when a vehicle wash facility is supplied by an *alternate water source system*, a water recycling system that recycles and reuses at least 60% of the water and rinse water shall be installed, used and maintained, and
 - b) discharge shall be directed to an *interceptor* dedicated exclusively to the vehicle wash facility and designed to trap oil, gasoline, sand, grit and similar materials. (See Article 2.4.4.3.)

3) Where a vehicle wash facility is supplied by an *alternate water source system*, disinfection of the non-potable water shall be provided at the vehicle wash facility at point-of-use by ultraviolet light and conform to NSF/ANSI 55, “Ultraviolet Microbiological Water Treatment Systems,” Class A.

2.2.11.4. Non-recirculating Applications

- 1) Except as provided in Sentence (3), the *City* water system shall not be connected to
 - a) *once through cooling equipment*,
 - b) a venturi-type flow-through vacuum generator or aspirator in which running water is used solely for the venturi effect,
 - c) a vacuum pump that uses water to cool the pump or to create a seal and recirculates less than 60% of the water that passes through the pump,
 - d) a non-recirculating wet-hood scrubber,
 - e) machinery powered by water,
 - f) a non-recirculating water feature, ornamental fountain, or swimming pool,
 - g) a non-recirculating system or equipment that uses water for thermal conditioning of building surfaces or roofs, except that this does not apply to emergency fire protection of buildings, or
 - h) a non-recirculating system or equipment that uses water for melting or thawing.

(See also Sentence 2.4.4.2.(2).)

2) Except as provided in Sentences (3) and (4), all equipment, machinery, appliances or fixtures listed in Clauses (1)(a) through (d) that are connected to the *City's* water system shall be disconnected.

3) *Emergency once through cooling equipment* or *maintenance once through cooling equipment* may be connected to the *City* water system or may retain an existing connection to the *City's* water system at the discretion of the *Chief Building Official* and, if permitted

- a) an *operating permit* shall be obtained, and the owner of the *once through cooling equipment* shall comply with the requirements of this Sentence,
- b) the *operating permit* number assigned to the *once through cooling equipment* shall be posted on a sign or plate that is a minimum of 8.5 in by 11 in in size and securely fastened to the *once through cooling equipment* in a location that is conspicuously visible and constructed of a durable, weather resistant material,
- c) the *Chief Building Official* shall be notified within 30 days of any changes to the information that was last provided to the *City* with regard to the *operating permit*, in the form prescribed by the *Chief Building Official*,
- d) a water meter shall be installed on the *potable* water supply to the *once through cooling equipment* and shall be capable of recording the volume of *potable* water being supplied, and
- e) the *once through cooling equipment* shall be capable of activating an *alert* whenever *potable* water is supplied to the *once through cooling equipment*. (See Note A-2.2.11.4.(3).)

4) Where, in the opinion of the *Chief Building Official* in consultation with the *City Engineer*, the cost of disconnecting *once through cooling equipment* from the *City's* water system and replacing it with other cooling equipment is unreasonable, taking into account any relevant factors, which may include the following

- a) the current water flow rate compared to the expected reduction in water consumption if the equipment is disconnected,
- b) where the equipment is in its life cycle,
- c) the potential impact the disconnection and replacement of the equipment, including any required renovations, will have on business operations,
- d) the cost to replace the equipment relative to the expected reduction in water and sewer costs, and
- e) where applicable, the cost to replace the equipment relative to the operational size,

the *once through cooling equipment* may retain an existing connection to the *City's* water system at the discretion of the *Chief Building Official* until a specified expiry date and, if permitted, Clauses 2.2.11.4.(3)(a) through (c) shall apply.

2.2.11.5. Geoexchange Systems

- 1) Make-up water for a closed loop geoexchange (geothermal) ground heat exchanger shall be provided by a feeder tank isolated from the domestic water supply.
- 2) The use of a direct connection to the domestic water supply as a source of make-up water for a closed loop geoexchange (geothermal) ground heat exchanger is prohibited.
- 3) Methanol shall not be used for geoexchange (geothermal) applications.
- 4) An open loop geoexchange (geothermal) system serving a *building* used exclusively for residential occupancy containing no more than 8 principal *dwelling units* shall not be installed.
- 5) An open loop geoexchange (geothermal) system shall not discharge into the sewer.

2.2.11.6. Cooling Towers

(See Note A-2.2.11.6.)

- 1) An *operating permit* shall be obtained for the installation of a *cooling tower*, or the retention of an existing *cooling tower*, and the owner of the *cooling tower* shall comply with the requirements of this Article.
- 2) In order to obtain an *operating permit* for the installation of a *cooling tower*, a service contract must be in place with a qualified service provider to perform maintenance of the *cooling tower* for a minimum of 1 year.
- 3) The *operating permit* number assigned to the *cooling tower* shall be posted on a sign or plate that is a minimum of 8.5 in by 11 in in size and securely fastened to the *cooling tower* in a location that is conspicuously visible and constructed of a durable, weather resistant material.
- 4) The owner of a *cooling tower*, or their authorized representative, shall notify the *Chief Building Official*, in the form prescribed by the *Chief Building Official*,
 - a) within 5 days of any start-up or shut down of a *cooling tower*,
 - b) within 5 days of any *Legionella pneumophila* test result from a *cooling tower*, or sooner as required by Sentence (8), and
 - c) within 30 days of any changes to the information that was last provided to the *City* with regard to the *operating permit*.
- 5) A maintenance log conforming to Article 2.2.1.8. shall be maintained for each *cooling tower* and, if a laboratory result fails to meet a standard defined in Table 2.2.11.6., the maintenance log shall also include a description of the extent of the deviation from the standard, the corrective action taken, a record of any required notification, and the outcome of the corrective action, including all applicable dates and times.
- 6) Reserved.
- 7) *Legionella pneumophila* testing shall be conducted
 - a) in accordance with Article 2.2.1.7.,
 - b) on water samples collected at a point in the recirculation loop just prior to the point where treatment chemicals are injected, or where this is not feasible, from a location representative of water in the system,
 - c) no less than 48 hours and no more than 5 days after completion of system start-up and disinfection,
 - d) at minimum, while the *cooling tower* is in operation, each calendar month of operation, with not more than 33 days between samples, and
 - e) as required by Sentence (8).
- 8) If a laboratory test shows that a *Legionella* result exceeds a standard set out in Table 2.2.11.6., the owner of a *cooling tower*, or their authorized representative, shall undertake the response set out in Table 2.2.11.6. (See Note A-2.2.11.6.(8).)

Table 2.2.11.6.
Required Response to Failure to Meet *Legionella* Standards for Cooling Towers
 Forming Part of Sentence 2.2.11.6.(8)

Test Type	Test Result	Required Response
<i>Legionella pneumophila</i> ⁽¹⁾	10 or more CFU per mL and less than or equal to 1,000 CFU per mL or 10 or more MPN per mL and less than or equal to 1,000 MPN per mL	1. Within 24 hours, give notice to the <i>Chief Building Official</i> and a) shut down the <i>cooling tower</i> system and perform offline cleaning and disinfection, or b) perform online remedial treatment ⁽²⁾ and within 7 days shut down the <i>cooling tower</i> system and perform offline cleaning and disinfection; and 2. No less than 48 hours and no more than 5 days after cleaning and disinfection, perform a <i>Legionella pneumophila</i> test ⁽¹⁾ .
	Greater than 1,000 CFU per mL or Greater than 1,000 MPN per mL	1. Immediately, give notice ⁽⁴⁾ to the <i>Chief Building Official</i> , the medical health officer and the <i>owner</i> ; 2. Immediately, the laboratory ⁽³⁾ shall also give notice ⁽⁴⁾ to the owner of the <i>cooling tower</i> , the <i>Chief Building Official</i> and the medical health officer; 3. Immediately, implement measures that will eliminate water dispersion by aerosol from the affected <i>cooling tower</i> system and then perform offline cleaning and disinfection of the system before putting the system back into service; and 4. No less than 48 hours and no more than 5 days after cleaning and disinfection, perform a <i>Legionella pneumophila</i> test ⁽¹⁾ .

Notes to Table 2.2.11.6.:

(1) The *Legionella pneumophila* test shall conform to the requirements of Article 2.2.1.7.

(2) Online remedial treatment is also known as “running disinfection.”

(3) See Sentence 2.2.1.7.(3).

(4) For the person giving the immediate notice to the *Chief Building Official*, the *owner*, and the owner of the equipment, the person shall take all reasonable steps to give notice by speaking directly to or by telephone with each person required to be notified, a person designated for this purpose by the person required to be notified, or a person answering the telephone number designated for this purpose by the person required to be notified, and follow with notice in writing to each person within 24 hours. For the person giving immediate notice to the medical health officer, the person shall provide notice in writing immediately.

9) Offline cleaning and disinfection of a *cooling tower* shall be carried out

- a) a minimum of once every calendar year,
- b) for any start-up at any time, and
- c) as required by Sentence (8). (See Note A-2.2.11.6.(9).)

10) When a *cooling tower* has been shut down for more than 3 days, it shall be drained within 5 days of being shut down, or when this is not practical during shut downs of short duration, stagnant water shall be pre-treated with an appropriate biocide regimen before start-up, allowing for proper contact time according to the supplier's recommendations.

11) If a *cooling tower* is removed or its use is permanently discontinued, it shall be safely drained, thoroughly sanitized, and the make-up water line shall be disconnected and capped.

2.2.11.7. Decorative Water Features

- 1) An *operating permit* shall be obtained for the installation of a *decorative water feature*, or the retention of an existing *decorative water feature*, and the owner of the *decorative water feature* shall comply with the requirements of this Article.
- 2) The following shall be posted in a location that is conspicuously visible:
 - a) the *operating permit* number assigned to the *decorative water feature*, on a sign or plate that is a minimum of 8.5 in by 11 in in size, constructed of a durable, weather resistant material and securely fastened to the *decorative water feature* or its associated mechanical equipment, and,
 - b) an advisory that the *decorative water feature* is not intended for human access, located around the perimeter of, or near an obvious access point to, the *decorative water feature*, using graphical symbols or words written in letters at least 100 mm high. (See Note A-2.2.11.7.(2)(b).)
- 3) The owner of a *decorative water feature*, or their authorized representative, shall notify the *Chief Building Official*, in the form prescribed by the *Chief Building Official*,
 - a) within 5 days of any start-up of a *decorative water feature* that had been shut down for 3 or more consecutive days,
 - b) within 5 days of any *decorative water feature* shut down for 3 or more consecutive days,
 - c) within 5 days of any *Legionella pneumophila* test result from a *decorative water feature*, or sooner as required by Sentence (8), and
 - d) within 30 days of any changes to the information that was last provided to the *City* with regard to the *operating permit*.
- 4) Where an outdoor *decorative water feature* is provided as an auxiliary system to a *building*, then the outdoor *decorative water feature* shall be considered part of the *building* for the purposes of this Article.
- 5) A maintenance log conforming to Article 2.2.1.8. shall be maintained for each *decorative water feature* and, if a laboratory result fails to meet a standard defined in Table 2.2.11.7., the maintenance log shall also include a description of the extent of the deviation from the standard, the corrective action taken, a record of any required notification, and the outcome of the corrective action, including all applicable dates and times.
- 6) Reserved.
- 7) *Legionella pneumophila* testing shall be conducted
 - a) in accordance with Article 2.2.1.7.,
 - b) on water samples collected at a point representative of water that is aerosolized, or where this is not feasible or aerosolization is not obvious, from a location
 - i) prior to the point where treatment chemicals are injected in a recirculating system, or
 - ii) representative of water in the system in a non-recirculating system,
 - c) no less than 48 hours and no more than 5 days after completion of start-up and disinfection,
 - d) at minimum, once each calendar year before July 1, unless the *decorative water feature* is shut down and drained for the entirety of the period of January 1 to July 1 of that calendar year,
 - e) as required by Sentence (8).
- 8) If a laboratory test shows that a *Legionella* result exceeds a standard set out in Table 2.2.11.7., the owner of a *decorative water feature*, or their authorized representative, shall undertake the response set out in Table 2.2.11.7.

Table 2.2.11.7.
Required Response to Failure to Meet *Legionella* Standards for *Decorative Water Features*
 Forming Part of Sentence 2.2.11.7.(8)

Test Type	Test Result	Required Response
<i>Legionella pneumophila</i> (1)	10 or more CFU per mL and less than or equal to 1,000 CFU per mL	1. Within 24 hours, give notice to the <i>Chief Building Official</i> , shut down the <i>decorative water feature</i> and perform offline cleaning and disinfection; and 2. No less than 48 hours and no more than 5 days after cleaning and disinfection, perform a <i>Legionella pneumophila</i> test ⁽¹⁾ .
	Greater than 1,000 CFU per mL	1. Immediately, give notice ⁽³⁾ to the <i>Chief Building Official</i> , the medical health officer and the <i>owner</i> ; 2. Immediately, the laboratory ⁽²⁾ shall also give notice ⁽³⁾ to the owner of the <i>decorative water feature</i> , the <i>Chief Building Official</i> and the medical health officer; 3. Immediately, implement measures that will eliminate water dispersion by aerosol from the affected <i>decorative water feature</i> and then perform offline cleaning and disinfection of the system before putting the feature back into service; and 4. No less than 48 hours and no more than 5 days after cleaning and disinfection, perform a <i>Legionella pneumophila</i> test ⁽¹⁾ .

Notes to Table 2.2.11.7.:

(1) The *Legionella pneumophila* test shall conform to the requirements of Article 2.2.1.7.

(2) See Sentence 2.2.1.7.(3).

(3) For the person giving the immediate notice to the *Chief Building Official*, the *owner*, and the owner of the equipment, the person shall take all reasonable steps to give notice by speaking directly to or by telephone with each person required to be notified, a person designated for this purpose by the person required to be notified, or a person answering the telephone number designated for this purpose by the person required to be notified, and follow with notice in writing to each person within 24 hours. For the person giving immediate notice to the medical health officer, the person shall provide notice in writing immediately.

9) Offline cleaning and disinfection of a *decorative water feature* shall be carried out

- a) as recommended by the manufacturer, and at minimum of once every calendar year,
- b) for any start-up after having been shut down for 3 or more consecutive days, and
- c) as required by Sentence (8).

10) When a *decorative water feature* has been shut down for 3 or more consecutive days, it shall be drained within 5 days of being shut down.

11) If a *decorative water feature* is removed or its use is permanently discontinued, it shall be safely drained, thoroughly sanitized, and the make-up water line shall be disconnected and capped.

Section 2.3. Piping

2.3.6. Testing of Drainage or Venting Systems

Note to reader:
Article 2.3.6.1. below replaces the version in the 2020 National Plumbing Code.

2.3.6.1. Tests and Inspection of Drainage or Venting Systems

- 1) Except in the case of an external *leader*, after a section of a *drainage system* or a *venting system* has been roughed in, and before any *fixture* is installed or piping is covered, a water pressure test or an air pressure test shall be conducted.
- 2) After every *fixture* is installed and before any part of the *drainage system* or *venting system* is placed in operation, a final test shall be carried out when requested.
- 3) Where a prefabricated system is assembled off the *building* site in such a manner that it cannot be inspected and tested on site, off-site inspections and tests shall be conducted.
- 4) Where a prefabricated system is installed as part of a *drainage system* or *venting system*, all other plumbing work shall be tested and inspected and a final test shall be carried out on the complete system when requested.
- 5) When requested, a ball test shall be made to any pipe in a *drainage system*.
- 6) Siphonic roof drainage systems shall be tested in accordance with ASME A112.6.9/CSA B79.9 “Siphonic Roof Drains.”

Section 2.4. Drainage Systems

2.4.2. Connections to Drainage Systems

Note to reader:
Articles 2.4.2.4. and 2.4.2.5. below supplement the 2020 National Plumbing Code.

2.4.2.4. Connections to Storm Drainage Systems

- 1) Except as provided in Sentence (2), *building* and site drainage shall connect to a *storm drainage system*.
 - 2) *Building* and site drainage need not connect to a *storm drainage system* if
 - a) on-site *rainwater* management practices are employed and overflow is connected to a *storm drainage system*, and
 - b) *rainwater* does not create a hazardous condition or discharge upon or impact other lands or sites.
- (See Note A-2.4.2.4.(2).)

2.4.2.5. Rainwater Management

- 1) Except as provided in Sentence (2), all *buildings* shall manage *rainwater* on-site through one of the applicable compliance pathways in Table 2.4.2.5.-A, in which
 - a) “small site pathway” means Sentence (4) applies, and Sentences (5), (6), (7) and (8) do not apply, and
 - b) “engineered pathway” means Sentences (5), (6), (7) and (8) apply, and Sentence (4) does not apply.
- (See Note A-2.4.2.5.(1).)

Table 2.4.2.5.-A
Compliance Pathways for On-Site Rainwater Management
Forming Part of Sentence 2.4.2.5.(1)

Site Area (m ²)	Floor Space Ratio ⁽¹⁾	Compliance Pathway
No greater than 1000	No greater than 1.0	Small site pathway
	Greater than 1.0	Engineered pathway
Greater than 1000	Any	Engineered pathway

Notes to Table 2.4.2.5.-A:

(1) As computed according to the Zoning and Development By-law.

- 2) The requirements of this Article do not apply to
 - a) “laneway houses” or “infill” as defined by the Zoning & Development By-law, when the site area is no greater than 1000 m²,
 - b) “accessory buildings” as defined by the Zoning & Development By-law,
 - c) *float homes*,
 - d) *marinas*,
 - e) retaining structures, or
 - f) temporary *buildings* approved according to Subsection 1.6.8. of Division C.
- 3) The *Chief Building Official* shall be provided with a document demonstrating that the *rainwater* management requirements of Sentence (1) have been satisfied, in the form prescribed by the *Chief Building Official*.
- 4) Except as provided in Sentence (9), a detention tank shall be installed with
 - a) the minimum active storage capacity specified in Table 2.4.2.5.-B,
 - b) an orifice plate with the diameter specified in Table 2.4.2.5.-B,
 - c) overflow protection,

- d) one or more *cleanouts* providing access to the outlet and overflow, and
 - e) for subsurface detention tanks, the capability of supporting the design depth of cover and surface loads.
- (See Note A-2.4.2.5.(4).)

Table 2.4.2.5.-B
Detention Tank Specifications for the Small Site Pathway
 Forming Part of Sentence 2.4.2.5.(4)

Site Area (m ²)	Minimum Active Storage Capacity (L)	Orifice Plate Diameter (mm)
No greater than 400	3,400	30
Greater than 400 to no greater than 500	3,900	35
Greater than 500 to no greater than 750	4,600	45
Greater than 750 to no greater than 1000	7,200	50

- 5)** Except as provided in Sentences (8) and (9), the first 24 mm of *rainwater* in a 24 hour period from the site area shall be detained, and the minimum detention volume requirement
- a) shall be calculated as the volume of water that would be present if water 24 mm deep covered the entire site, and
 - b) may be reduced by any combination of the retention or other practices listed in Table 2.4.2.5.-C, by the amounts in Column C of Table 2.4.2.5.-C.

Table 2.4.2.5.-C
Permitted Reductions to the Minimum Detention Volume Requirement for the Engineered Pathway
 Forming Part of Sentence 2.4.2.5.(5)

Retention or Other Practice	Reduction to the Detention Volume Requirement		
	Maximum Permitted Reduction Column A	Limit to Permitted Reduction Column B	Permitted Reduction Column C
Landscape feature ⁽¹⁾	Area of, and area routed to, the landscape feature multiplied by 24 mm	<i>Rainwater</i> capture potential, calculated as <i>rainwater</i> storage potential in the growing medium (%) multiplied by the growing medium volume, plus as applicable the storage volume within a subsurface reservoir layer and the volume infiltrated into the subgrade during a 24 hour period. ⁽³⁾	The lesser of Columns A and B
<i>Vegetated roof assembly</i> ⁽²⁾	Area of, and area routed to, the <i>vegetated roof assembly</i> multiplied by 24 mm		The lesser of Columns A and B ⁽⁴⁾
<i>Alternate water source system</i>	Area routed to the <i>alternate water source system</i> multiplied by 24 mm	Storage volume of the <i>alternate water source system</i>	The lesser of Columns A and B

Notes to Table 2.4.2.5.-C:

- (1) Or other *acceptable* ground-level or subsurface based practice, such as permeable pavement or an infiltration tank.
- (2) Or other *acceptable* roof-top based practice. For *vegetated roof assemblies*, see Article 3.1.14.4. and Article 5.6.1.2. of Division B of Book I (General) of this By-law.
- (3) “*Rainwater* storage potential in the growing medium”, “volume infiltrated into the subgrade during a 24 hour period” and “storage volume within a subsurface reservoir layer” shall be demonstrated by *acceptable* data or references.
- (4) For a *vegetated roof assembly* from which the runoff is directed to an *alternate water source system*, the permitted reduction in the volume requirement shall equal Column A.

- 6)** Except as provided in Sentences (8) and (9), the peak flow rate discharged to the *combined sewer* or *storm sewer* under post-development conditions shall not be greater than the peak flow rate discharged to the *combined sewer* or *storm sewer* under pre-development conditions, and shall be calculated using
- a) the Rational Method,

- b) the IDF curves in the City of Vancouver Engineering Design Manual, applying
 - i) for pre-development, the IDF curve prepared for pre-development estimates with a 5 year return period,
 - ii) for post-development, the 2100 IDF curve with a 10 year return period, and
 - iii) the inlet time specified in the City of Vancouver Engineering Design Manual, and
- c) a composite runoff based on the percentages of different surfaces of the site area, applying the runoff coefficients from the City of Vancouver Engineering Design Manual.

(See Note A-2.4.2.5.(3).)

7) An operations and maintenance manual conforming to Article 2.2.1.9. is required for each of the *rainwater* management practices employed to satisfy the requirements of Sentences (5) and (6).

8) When there is an *existing building* on the same property, the site area used in Clauses (5)(a) and (6)(c) may be reduced to be proportional to the ratio of the *buildings'* greatest horizontal area within the outside surface of exterior walls.

9) The *Chief Building Official* may relax the requirements of Sentences (4), (5) or (6) in accordance with Sentence 1.5.2.10.(2) of Division C if

- a) the *owner* demonstrates to the satisfaction of the *Chief Building Official* by a *subsurface investigation* that excavation is precluded or limited by soil contamination or other factors, and
- b) it is impractical, in the opinion of the *Chief Building Official*, to meet the *rainwater* management requirements of Sentences (4), (5) or (6).

(See Note A-2.4.2.5.(9).)

2.4.3. Location of Fixtures

Note to reader:
Article 2.4.3.6. below replaces the version in the 2020 National Plumbing Code.

2.4.3.6. Drains Serving Elevator Pits

- 1) Where a drain is provided in an elevator pit,
 - a) if the elevator pit extends below the minimum elevation of the underside of a *building's* lowest floor system or the top of the *building's* lowest concrete slab, it shall be connected directly to a sump located outside the elevator pit, and
 - b) if the drain is subject to backflow, the drain pipe shall have a *backwater valve*.
- (See Note A-2.4.3.6.(1).)

2.4.4. Treatment of Sewage and Waste

Note to reader:
Article 2.4.4.2. below replaces the version in the 2020 National Plumbing Code.

2.4.4.2. Sewer Discharge

- 1) Sanitary and storm discharge shall conform to the Sewer and Watercourse By-law.
- 2) Except within health care facilities or for medical sterilization devices, no system or equipment shall be installed that allows for the use of *potable* water to temper or dilute condensate discharged to the sewer.

2.4.5. Traps

Note to reader:

Articles 2.4.5.2. and 2.4.5.3. below replace the version in the 2020 National Plumbing Code.

2.4.5.2. Traps for Storm Drainage Systems

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

- a) at a roof that is used only for weather protection,
- b) not less than 1 m above or not less than 3.5 m in any other direction from any air inlet, openable window or door, and
- c) not less than 1.8 m from a property line.

(See Note A-2.4.5.2.(1).)

2) A *drain* that drains to a *storm drainage system* shall be protected by a *trap* that

- a) is located between the *drain* and a *leader*, *storm building drain* or *storm building sewer*,
- b) may serve all *drains* located in the same room, and
- c) need not be protected by a *vent pipe*.

3) Where freezing conditions could cause *storm drainage systems* to freeze due to air circulation within the piping, a *trap* with a *cleanout* shall be installed in a heated location.

2.4.5.3. Connection of Subsoil Drainage Pipe to a Storm Drainage System

- 1) A *subsoil drainage pipe* shall be connected to a sump. (See Note A-2.4.5.3.(1).)
- 2) The sump referred to in Sentence (1) shall be connected to a *storm sewer* or to a *combined sewer*.
- 3) The sump referred to in Sentence (1) shall not be connected to a *sanitary sewer*.

2.4.6. Arrangement of Drainage Piping

Note to reader:
Article 2.4.6.3. below replaces the version in the 2020 National Plumbing Code.

2.4.6.3. Sumps or Tanks

(See Note A-2.4.6.3.)

- 1) Except as permitted by Sentence (9), piping that is too low to drain into a *building sewer* by gravity shall be drained to a sump or receiving tank provided that
 - a) *fixtures* located above the public sewer connection shall drain by gravity, and
 - b) any overflow piping shall drain to the public sewer connection by gravity except overflow piping from an *alternate water source system*.
- 2) Where the sump or tank receives *sewage*, it shall be water- and air-tight and shall be vented.
- 3) Where the sump or tank receives subsurface water from a *subsoil drainage pipe*, it shall be provided with a water- and air-tight cover.
- 4) Equipment such as a pump or ejector that can lift the contents of the sump or tank and discharge it into the *building drain* or *building sewer* shall be installed.
- 5) Where the equipment does not operate automatically, the capacity of the sump shall be sufficient to hold at least a 24 h accumulation of liquid.
- 6) Where there is a *building trap*, the discharge pipe from the equipment shall be connected to the *building drain* downstream of the *trap* and *backwater valve*.
- 7) The discharge pipe from every pumped sump shall be equipped with a union, a *backwater valve* and a shut-off valve installed in that sequence in the direction of discharge.
- 8) The discharge piping from a pump or ejector shall be sized for optimum flow velocities at pump design conditions.
- 9) The requirements of Sentence (1) do not apply
 - a) to *buildings* connected to a *public low pressure sewer system*, or
 - b) to any *fixture* installed after occupancy of a *building*.

2.4.10. Hydraulic Loads

(See Note A-2.4.10. for determination of hydraulic loads and drainage pipe sizes.)

Note to reader:

Article 2.4.10.8. below replaces the version in the 2020 National Plumbing Code.

Article 2.4.10.14. below supplements the 2020 National Plumbing Code.

2.4.10.8. Hydraulic Loads on Sanitary Building Drains or Sewers

1) Except as permitted by Sentence (2), the hydraulic load that is drained to a *sanitary building drain* or a *sanitary building sewer* shall conform to Table 2.4.10.6.-C.

2) The requirements of Sentence (1) do not apply to a *sanitary building sewer* for a *building* connected to a *public low pressure sewer system*.

2.4.10.14. Design of Siphonic Roof Drainage Systems

1) Siphonic roof drainage systems are to be designed in accordance with ASPE/ANSI 45 “Siphonic Roof Drainage,” and ASME A112.6.9/CSA B79.9, “Siphonic Roof Drains.”

Section 2.5. Venting Systems

2.5.6. Arrangement of Vent Pipes

Note to reader:

Article 2.5.6.3. below replaces the version in the 2020 National Plumbing Code.

2.5.6.3. Location of Vent Pipes

- 1) Except as provided in Sentences (2) and (3), *vent pipes* that protect a *fixture trap* shall be located so that
 - a) the *developed length* of the *trap arm* is not less than twice the *NPS* of the *fixture drain*,
 - b) the total fall of the *trap arm* is not greater than its inside diameter, and
 - c) the *trap arm* does not have a cumulative change in direction of more than 135°.

(See Note A-2.5.6.3.(1).)

- 2) The *trap arm* of water closets, of *S-trap standards* or of any other *fixture* that also discharges vertically and depends on siphonic action for its proper functioning shall not have a cumulative change in direction of more than 225°. (See Note A-2.5.6.3.(2).)

- 3) A *vent pipe* that protects a water closet or any other *fixture* that also depends on siphonic action for its proper functioning shall be located so that the distance between the connections of the *fixture drain* to the *fixture* and the *vent pipe* does not exceed
 - a) 1 m in the vertical plane, and
 - b) 3 m in the horizontal plane.

(See Note A-2.5.6.3.(3).)

- 4) The maximum length of every *trap arm* shall conform to Table 2.5.6.3.

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

Nominal Pipe Size of Trap Served, NPS	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

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

Section 2.6. Potable Water Systems

2.6.1. Arrangement of Piping

Note to reader:

Articles 2.6.1.1., 2.6.1.6. and 2.6.1.12. below replace the version in the 2020 National Plumbing Code.

2.6.1.1. Design

- 1) *Fixtures* supplied with separate hot and cold water controls shall have the hot water control on the left and the cold on the right.
- 2) In a hot *water distribution system* of a *developed length* of more than 30 m or supplying more than 4 *storeys*, the water temperature shall be maintained by
 - a) recirculation, or
 - b) a self-regulating heat tracing system.
- 3) In a hot *water distribution system* with a recirculation loop, the temperature of the water being recirculated shall not be less than 49°C at any point of the system.
- 4) The recirculation loop described in Sentence (3) may be replaced by a self-regulating heat tracing system.

2.6.1.6. Flushing Devices

- 1) Flushing devices that serve water closets or urinals shall have sufficient capacity and be adjusted to deliver at each operation a volume of water that will thoroughly flush the *fixture* or *fixtures* they serve.
- 2) Where a manually operated flushing device is installed, it shall serve only one *fixture*.
- 3) Except as provided in Sentence (4), water closets and urinals shall have an integral means of limiting the maximum amount of water used in each flush cycle to that specified in Table 2.6.1.6.

Table 2.6.1.6.
Water Usage per Flush Cycle
Forming Part of Sentence 2.6.1.6.(3)

<i>Fixtures</i>	Maximum Water Usage per Flush Cycle, Lpf
Water closets ⁽¹⁾	4.8
Urinals	1.9

Notes to Table 2.6.1.6.:

(1) The full flush mode of a dual-flush toilet shall not exceed 4.8 L.

- 4) A maximum flush cycle of 6.0 L may be permitted for a water closet where, in the opinion of the *Chief Building Official*, the existing *plumbing system* cannot accommodate and cannot be updated to accommodate the required flush cycle.
- 5) Except where installed in *buildings* not intended to be occupied year-round, flush-tank-type urinals shall be equipped with a device capable of preventing flush cycles when they are not in use. (See Note A-2.6.1.6.(5).)

2.6.1.12. Service Water Heaters

- 1) *Storage-type service water heaters* shall operate at a temperature not lower than 60°C.
(See Note A-2.6.1.12.(1).)
- 2) Drain water heat recovery units shall only be used to supply *service water heaters*.

2.6.2. Protection from Contamination

Note to reader:

Article 2.6.2.1. below replaces the version in the 2020 National Plumbing Code.

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. (See Article 2.2.10.17.)
- 3) *Backflow preventers* shall be selected and installed in conformance with CSA B64.10, “Selection and installation of backflow preventers.”
- 4) Residential landscape irrigation systems that apply herbicides, fungicides, insecticides, fertilizers, soil amendments or other chemicals or pesticides by means of irrigation water are prohibited.

2.6.3. Size and Capacity of Pipes

(See Note A-2.6.3.)

Note to reader:

Articles 2.6.3.1. to 2.6.3.4 below replace the version in the 2020 National Plumbing Code, except for Tables 2.6.3.2.-A, 2.6.3.2.-B, 2.6.3.2.-C, 2.6.3.2.-D and 2.6.3.4.

2.6.3.1. Design, Fabrication and Installation

(See Note A-2.6.3.1.)

- 1) *Water distribution systems* shall be designed to provide peak demand flow when the flow pressures at the supply openings conform to the plumbing supply fitting manufacturer's specifications.
- 2) *Potable water systems* shall be designed, fabricated and installed in accordance with good engineering practice, such as that described in the ASHRAE Handbooks and ASPE Plumbing Engineering Design Handbooks, and for *dwelling units*, may be sized using the IAPMO Water Demand Calculator. (See Note A-2.6.3.1.(2).)
- 3) In one- and two-family *dwelling units* and manufactured homes, multi-purpose systems that combine *potable water systems* and residential fire sprinkler systems shall be designed, fabricated and installed in accordance with NFPA 13D, "Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes."

2.6.3.2. Hydraulic Load

- 1) Except as provided in Sentence (3), the hydraulic load of a *fixture* or device that is listed in Table 2.6.3.2.-A shall be the number of *fixture units* given in the Table.
- 2) Except as provided in Sentences (1) and (3), the hydraulic load of a *fixture* that is not listed in Table 2.6.3.2.-A is the number of *fixture units* listed in Table 2.6.3.2.-D.
- 3) Where *fixtures* are supplied with both hot and cold water, the hydraulic loads for maximum separate demands shall be 75% of the hydraulic load of the *fixture units* given in Tables 2.6.3.2.-A and 2.6.3.2.-D when using a detailed engineering design method.
- 4) The hydraulic load of urinals and water closets with direct flush valves shall be the number of *fixture units* listed in Tables 2.6.3.2.-B and 2.6.3.2.-C. (See Note A-2.6.3.2.(4).)
- 5) Notwithstanding the provisions of Sentences (1) through (4), the determination of hydraulic load is not a requirement for *water distribution systems* in *dwelling units* that have been designed in accordance with the IAPMO Water Demand Calculator.

2.6.3.3. Static Pressure

- 1) Where the static pressure at any *fixture* or supplied to a residential landscape irrigation system may exceed 550 kPa, a pressure-reducing valve shall be installed to limit the maximum static pressure at the *fixture* or for the residential landscape irrigation system to 550 kPa.

2.6.3.4. Size

- 1) *Water service pipes* shall be sized according to the peak demand flow but shall not be less than NPS $\frac{3}{4}$.
- 2) Except as provided in Sentences (3) and (6), the *nominal pipe size* of a supply pipe that serves a *fixture* shall conform to Table 2.6.3.2.-A.
- 3) For *fixtures* listed in Table 2.6.3.2.-A that are permitted to have an NPS $\frac{3}{8}$ supply pipe, a connector not more than 750 mm long and not less than NPS $\frac{1}{4}$ may be used to supply water to the *fixture*.
- 4) No *water system* between the point of connection with the *water service pipe* or the water meter and the first water distribution pipe that supplies a water heater that serves more than one *fixture* shall be sized less than NPS $\frac{3}{4}$.

5) Where both hot and cold water is supplied to *fixtures* in residential *buildings* containing one or two *dwelling units* or row houses with separate *water service pipes*, the *water system* may be sized in accordance with Table 2.6.3.4., where

- a) the hydraulic loads for maximum separate demands on *water distribution system* piping are not less than 100% of the total hydraulic load of the *fixture units* given in Table 2.6.3.2.-A, 2.6.3.2.-B, 2.6.3.2.-C or 2.6.3.2.-D for *private use*,
- b) the minimum water pressure at the entry to the *building* is 200 kPa, and
- c) the total maximum length of *water system* is 90 m.

(See Note A-2.6.3.4.(5).)

6) The *nominal pipe size* of a supply pipe that serves a *fixture* in a *dwelling unit* shall conform to

- a) the IAPMO Water Demand Calculator, or
- b) except as provided in Sentence (3), Table 2.6.3.2.-A.

Section 2.7. Non-Potable Water Systems

Note to reader:
Section 2.7. below replaces the version in the 2020 National Plumbing Code.

2.7.1. Connection

2.7.1.1. General

- 1) A non-*potable* water system shall not be connected to a *potable* water system.
- 2) For the purpose of this Section
 - a) all non-*potable* water systems shall comply with Subsections 2.7.1., 2.7.2. and 2.7.3.,
 - b) an *alternate water source system* installed prior to January 1, 2019 shall comply with Subsection 2.7.4., and
 - c) an *alternate water source system* installed on or after January 1, 2019 shall comply with Subsections 2.7.5., 2.7.6., 2.7.7., and 2.7.8.

2.7.1.2. Non-Potable Water Sources

- 1) Except as prohibited by Sentence (2), a non-*potable water system* shall collect only
 - a) *rainwater*,
 - b) *clear-water waste*,
 - c) *greywater* as permitted by Sentence (3), or
 - d) a combination thereof.
- 2) A non-*potable water system* shall not collect
 - a) runoff from a public road,
 - b) runoff from an area on which fertilizer is used or stored,
 - c) *groundwater*,
 - d) *perimeter drainage water*,
 - e) *greywater* not permitted by Sentence (3), or
 - f) *blackwater*.
- 3) A non-*potable water system* may collect *greywater* if it conforms to NSF/ANSI 350, “Onsite Residential and Commercial Water Reuse Treatment Systems,” Class R (single-family residential), and the treated water is used within the same *dwelling unit* from which the *greywater* is collected.

2.7.1.3. Non-Potable Water Uses

- 1) Except as provided in Sentences (2) and (5), a non-*potable water system* may use treated non-*potable* water for any of the uses set out in Columns A or B of Table 2.7.1.3.
- 2) An *alternate water source system* shall use treated non-*potable* water in lieu of *potable* water for all of the uses set out in Column A of Table 2.7.1.3.
- 3) Non-*potable* water shall not be used in lieu of *potable* water for any other uses.

Table 2.7.1.3.
Uses for Treated Non-potable Water
 Forming Part of Sentences 2.7.1.3.(1), (2) and (3)

Non-potable Water Source	Uses for Treated Non-potable Water	
	Column A	Column B
Rainwater	Water closets, urinals and trap primers	Irrigation of non-food purpose plants, clothes washers, vehicle wash facilities ⁽¹⁾ , make-up water for hydronic systems, make-up water for <i>cooling towers</i> , adiabatic cooling systems, and tempering of discharge.
Clear-water waste		
Greywater (conforming to Sentence 2.7.1.2.(3))	—	Water closets, urinals and clothes washers.
Groundwater	Not permitted	
Perimeter drainage water		
Blackwater		

Notes to Table 2.7.1.3.:

(1) See Article 2.2.11.3.

4) Where the static pressure at any *fixture* in a non-potable water system may exceed 550 kPa, a pressure-reducing valve shall be installed to limit the maximum static pressure at the *fixture* to 550 kPa.

5) Non-potable water systems shall not be used to supply *fixtures* in healthcare facilities.

2.7.2. Identification

2.7.2.1. Piping and Outlet Identification

1) Except as required by Sentence (2), all non-potable water pipes shall be identified and marked in accordance with CAN/CSA-B128.1, “Design and Installation of Non-Potable Water Systems.”

2) All non-potable water distribution pipes with a *nominal pipe size* of 2 in and smaller shall be purple in colour and conform to the requirements of NSF/ANSI 14, “Plastics Piping System Components and Related Materials.”

3) Non-potable water outlets shall be identified by a sign or plate in a location that is conspicuously visible and constructed of a durable, weather resistant material. (See Note A-2.7.2.1.(3).)

2.7.3. Location

2.7.3.1. Pipes

1) Non-potable water piping shall not be located directly above

- areas where food, drink or products that are intended for human consumption are prepared, handled, dispensed or stored, or
- a non-pressurized or pressurized *potable* water tank.

2.7.3.2. Outlets

1) An outlet from a non-potable water system shall not be located where it can discharge into

- a sink or lavatory,
- a *fixture* into which an outlet from a *potable water system* is discharged, or
- a *fixture* that is used for the preparation, handling or dispensing of food, drink or products that are intended for human consumption.

(See Note A-2.7.3.2.(1).)

2.7.4. Alternate Water Source Systems Installed Prior to January 1, 2019

2.7.4.1. Requirements for Alternate Water Source Systems Installed Prior to January 1, 2019

- 1) An *operating permit* shall be obtained, and the owner of the *alternate water source system* shall comply with the requirements of this Subsection.
- 2) The *operating permit* number assigned to the *alternate water source system* shall be posted on a sign or plate that is a minimum of 8.5 in by 11 in in size and securely fastened to the *alternate water source system* in a location that is conspicuously visible and constructed of a durable, weather resistant material.
- 3) The *Chief Building Official* shall be notified within 30 days of any changes to the information that was last provided to the *City* with regard to the *operating permit*, in the form prescribed by the *Chief Building Official*.
- 4) Water quality shall comply with the water quality standards, testing, documentation, and reporting requirements set out in Articles 2.7.7.1. and 2.7.7.2.
- 5) If a test result shows that the water quality fails to meet any of the standards set out in Table 2.7.7.1., the owner of an *alternate water source system*, or their authorized representative, shall undertake the response set out in Table 2.7.4.1.

Table 2.7.4.1.
Required Response to Failure to Meet Water Quality Standards for Alternate Water Source Systems Installed Prior to January 1, 2019
 Forming Part of Sentence 2.7.4.1.(5)

Parameter	Test Result	Required Response
<i>E. coli</i> ⁽¹⁾	100 or more CFU per 100 mL or 100 or more MPN per 100 mL	1. Immediately, supply the <i>alternate water source system</i> with <i>potable</i> water only; 2. Within 24 hours, give notice to the <i>Chief Building Official</i> and the <i>owner</i> ; and 3. Within 5 days, but no less than 48 hours after any cleaning or disinfection, perform an <i>E. coli</i> test ⁽¹⁾ and, if the water quality standard for <i>Legionella pneumophila</i> had been exceeded, a <i>Legionella pneumophila</i> test ⁽¹⁾ .
<i>Legionella pneumophila</i> ⁽¹⁾	10 or more CFU per mL or 10 or more MPN per mL	
Turbidity	> 15 NTU	
Temperature	> 25°C	

Notes to Table 2.7.4.1.:

(1) The *E. coli* and *Legionella pneumophila* test shall conform to the requirements of Article 2.2.1.7.

- 6) The *alternate water source system* shall be maintained in accordance with any manufacturer's specifications.
- 7) If the *alternate water source system* is in use, cross connection control tests shall be performed as required by CAN/CSA-B128.1, "Design and Installation of Non-Potable Water Systems."
- 8) A maintenance log shall be maintained in accordance with Sentence 2.7.8.2.(3).
- 9) An *alternate water source system* commissioned after January 1, 2019 shall comply with the requirements of Article 2.7.5.2.

2.7.4.2. No Other Requirements

- 1) *Alternate water source systems* installed prior to January 1, 2019 need not comply with any other requirements set out in Subsections 2.7.5. through 2.7.8.

2.7.5. Alternate Water Source Systems

2.7.5.1. Occupancy

- 1) Before *occupancy* of a *building* is permitted, an *alternate water source system* shall be commissioned within 8 weeks of *occupancy* in accordance with Article 2.7.5.2., and an *operating permit* shall be obtained in accordance with Article 2.7.5.3.
- 2) After an *alternate water source system* has been commissioned, the requirements of Subsections 2.7.7. and 2.7.8. shall be met.
- 3) An *alternate water source system* shall be considered commissioned on the date that the final water sample was collected to fulfill the requirements of Article 2.7.5.2.

2.7.5.2. Commissioning

- 1) In order to commission an *alternate water source system*
 - a) the treated non-potable water shall be tested for *E. coli*, turbidity and *Legionella pneumophila*,
 - i) in accordance with Article 2.2.1.7.,
 - ii) on water samples collected from the sampling port required by Article 2.7.6.6.,
 - iii) weekly for a period of 4 weeks for *E. coli* and turbidity, and
 - iv) once for *Legionella pneumophila*,
 - b) test results shall be provided to the *Chief Building Official*, and
 - c) a cross connection control test shall be performed as required by CAN/CSA-B128.1, “Design and Installation of Non-Potable Water Systems” and witnessed by the *Chief Building Official*.
- 2) Except as required by Sentence (3), if a water sample required by this Article fails to meet any of the standards set out in Table 2.7.7.1., an additional water sample for *E. coli* shall be collected no less than 48 hours and not more than 5 days after any cleaning or disinfection, tested, and reported.
- 3) If a *Legionella pneumophila* sample required by this Article fails to meet the standard set out in Table 2.7.7.1., an additional water sample for *Legionella pneumophila* and *E. coli* shall be collected no less than 48 hours and not more than 5 days after any cleaning or disinfection, tested, and reported.

2.7.5.3. Operating Permit

- 1) An *operating permit* shall be obtained, and the owner of the *alternate water source system* shall comply with the requirements of this Subsection.
- 2) The *operating permit* number assigned to the *alternate water source system* shall be posted on a sign or plate that is a minimum of 8.5 in by 11 in in size and securely fastened to the *alternate water source system* in a location that is conspicuously visible and constructed of a durable, weather resistant material.
- 3) The *Chief Building Official* shall be notified within 30 days of any changes to the information that was last provided to the *City* with regard to the *operating permit*, in the form prescribed by the *Chief Building Official*.

2.7.5.4. Continued Operation

- 1) Once an *operating permit* has been issued, an *alternate water source system* shall operate continuously unless written approval to discontinue its use has been obtained from the *Chief Building Official* or *City Engineer*.

2.7.6. Design

2.7.6.1. Professional Design

- 1) An *alternate water source system* shall be designed by a person who is registered or licensed to practice as a professional engineer under the Engineers and Geoscientists Act, and shall be designed to prioritize the use of non-potable water.

2.7.6.2. Pipe Sizing

- 1) Except as required by Sentence (2), non-*potable* distribution piping shall be sized according to Subsection 2.6.3.
- 2) *Dwelling units* within a *building* with an *alternate water source system* shall be equipped with
 - a) tank type water closets, and
 - b) non-*potable* distribution piping sized in conformance with the IAPMO Water Demand Calculator.

2.7.6.3. Continuity of Supply and Backflow Prevention

- 1) A secondary water supply shall be provided.
- 2) Where a non-*potable water system* is supplied by a *potable water system*, the *potable water system* shall be protected in accordance with Article 2.6.2.1.
- 3) Where a *fixture* combines water from a non-*potable* rainwater harvesting system and *potable* water at the *fixture* supply fitting, the *potable water system* shall be protected by a *backflow preventer* as described in Sentence 2.6.2.1.(3).

2.7.6.4. Storage Tanks

(See Article 2.4.2.2. and Note A-2.7.6.4., 2.7.6.5. and 2.7.6.6.)

- 1) Provision shall be made upstream of the storage tank to remove the accumulation of particulates and impurities before they enter the storage tank.
- 2) Storage tanks shall be secured to prevent tampering and unintended or unauthorized entry either by a lockable device or another *approved* method, and all penetrations shall be sealed to prevent insect or vermin entry.
- 3) Water shall be withdrawn a minimum of 0.3 m from the base of the storage tank.
- 4) Storage tanks in *alternate water source systems* shall be equipped with an overflow that directs excess rainwater to
 - a) a public *storm sewer*,
 - b) a public *combined sewer*,
 - c) a *storm water* management system, or
 - d) a designated *storm water* disposal location.
- 5) Where the storage tank outlet is located below the level of the adjoining street, the storage tank overflow required by Sentence (4) shall
 - a) terminate with an indirect connection that is not located within the *building*, or
 - b) be equipped with a *backwater valve*.

2.7.6.5. Water Metering

(See Note A-2.7.6.4., 2.7.6.5. and 2.7.6.6.)

- 1) A water meter shall be installed and located within 1.5 m of the *potable* water make-up supply and shall be capable of recording the volume of *potable* water being supplied.
- 2) A water meter shall be installed and located on the non-*potable* water outlet prior to distribution and shall be capable of recording the volume of non-*potable* water being supplied to the distribution piping.
- 3) Water meters required by Sentences (1) and (2) shall be capable of displaying volumes in units of L or cubic m.

2.7.6.6. Water Quality Sampling and Alerts

(See Article 2.2.1.7. and Note A-2.7.6.4., 2.7.6.5. and 2.7.6.6.)

1) A sampling port, and provision for continuous in-line measurements required in order to conform with Table 2.7.7.1., shall be installed and located downstream of the water meter at the non-*potable* water outlet and prior to distribution.

2) All monitoring devices referred to in Sentence (1) above shall be capable of activating an *alert* that is designed to activate continuously for the duration of the *alert* condition whenever the water quality fails to meet the standards set out in Table 2.7.7.1.

2.7.6.7. Power Interruption

1) If a *building* is required to have an emergency system generator, provision shall be made for the continued operation of any mandatory uses for non-*potable* water described in Sentence 2.7.1.3.(2) in the event of a power interruption.

2.7.7. Water Quality Standards**2.7.7.1. Water Quality Standards, Testing, and Documentation**

- 1) Water quality shall meet the standards set out in Table 2.7.7.1.
- 2) Water quality shall be tested as set out in Table 2.7.7.1.
- 3) All test results shall be documented as set out in Table 2.7.7.1., and documentation shall be retained for no less than 24 months.

Table 2.7.7.1.
Water Quality Standards, Testing, and Documentation
Forming Part of Sentences 2.7.7.1.(1), (2), and (3)

Applicability	Parameter	Standard	Testing Type and Frequency	Testing Result Documentation Requirement
Any non- <i>potable</i> water source	Temperature	< 20°C	Continuous	Daily ⁽¹⁾
	Turbidity	< 10 NTU	Daily ⁽¹⁾ , and 1 sample tested by a laboratory every 2 calendar months with not more than 63 days between samples	Daily ⁽¹⁾ , plus all laboratory tests
	<i>E. coli</i> ⁽²⁾	< 100 CFU per 100 mL or < 100 MPN per 100 mL	1 sample tested every 2 calendar months with not more than 63 days between samples	All laboratory tests
	<i>Legionella pneumophila</i> ⁽²⁾	< 10 CFU per mL or < 10 MPN per mL	1 sample tested every 2 calendar months with not more than 63 days between samples	All laboratory tests
Rainwater from surfaces that allow the passage of vehicular traffic or where hydrocarbon-based fuels or hazardous materials are stored	Benzene	< 0.005 mg/L	1 sample tested every 2 calendar months with not more than 63 days between samples	All laboratory tests
	Toluene	< 0.024 mg/L		
	Ethylbenzene	< 0.0016 mg/L		
	Xylenes (total)	< 0.02 mg/L		
	Total suspended solids	< 20 mg/L		

Notes to Table 2.7.7.1.:

- (1) For the purpose of this Table, the term “daily” shall mean once per day when the *building* is normally occupied.
- (2) The *E. coli* and *Legionella pneumophila* test shall conform to the requirements of Article 2.2.1.7.

2.7.7.2. Water Quality Reporting

1) Water quality reports shall be submitted by the owner of an *alternate water source system*, or their authorized representative, to the *Chief Building Official* before the end of the second month following the issuance of an *operating permit*, and then every 2 calendar months thereafter, and shall include

- a) all documentation required by Sentence 2.7.7.1.(3) and
- b) except as provided in Sentence 2.7.4.2.(1), readings from the water meters required by Article 2.7.6.5.

2.7.7.3. Required Response to Failure to Meet Water Quality Standards

1) If a test result shows that the water quality fails to meet a standard set out in Table 2.7.7.1., the owner of an *alternate water source system*, or their authorized representative, shall undertake the response set out in Table 2.7.7.3.

Table 2.7.7.3.
Required Response to Failure to Meet Water Quality Standards for Alternate Water Source Systems
 Forming Part of Sentence 2.7.7.3.(1)

Parameter	Test Result	Required Response
Turbidity	Between 10 and 15 NTU	Take the appropriate corrective action as set out in the operating manual.
Temperature	20°C to 25°C	
Total suspended solids	Between 20 and 45 mg/L	
<i>E. coli</i> ⁽¹⁾	100 or more CFU per 100 mL or 100 or more MPN per 100 mL	1. Immediately, supply the <i>alternate water source system</i> with <i>potable</i> water only; 2. Within 24 hours, give notice to the <i>Chief Building Official</i> and the owner; 3. Take the appropriate corrective action as set out in the operating manual; and 4. Within 5 days, but no less than 48 hours after any cleaning or disinfection, perform an <i>E. coli</i> test ⁽¹⁾ and, if the water quality standard for <i>Legionella pneumophila</i> had been exceeded, a <i>Legionella pneumophila</i> test ⁽¹⁾ .
<i>Legionella pneumophila</i> ⁽¹⁾	10 or more CFU per mL or 10 or more MPN per mL	
Turbidity	> 15 NTU	
Temperature	> 25°C	
Benzene	> 0.005 mg/L	1. Immediately, supply the <i>alternate water source system</i> with <i>potable</i> water only; 2. Within 24 hours, give notice to the <i>Chief Building Official</i> and the owner; 3. Take the appropriate corrective action as set out in the operating manual; and 4. Within 3 days of the corrective action, perform a test for benzene, toluene, ethylbenzene and xylenes (total).
Toluene	> 0.024 mg/L	
Ethylbenzene	> 0.0016 mg/L	
Xylenes (total)	> 0.02 mg/L	
Total suspended solids	> 45 mg/L	1. Immediately, supply the <i>alternate water source system</i> with <i>potable</i> water only; 2. Within 24 hours, give notice to the <i>Chief Building Official</i> and the owner; 3. Take the appropriate corrective action as set out in the operating manual; and 4. Within 3 days of the corrective action, perform a test for total suspended solids.

Notes to Table 2.7.7.3.:

(1) The *E. coli* and *Legionella pneumophila* test shall conform to the requirements of Article 2.2.1.7

2.7.8. Operating Manual and Maintenance

2.7.8.1. Operating Manual

1) An operating manual conforming to Article 2.2.1.9. is required for an *alternate water source system*, and shall be sealed by a registered professional.

2.7.8.2. Maintenance

1) *Alternate water source systems* shall be maintained in accordance with the operating manual and any manufacturer's specifications.

2) Cross connection control tests shall be performed as required by CAN/CSA-B128.1, "Design and Installation of Non-Potable Water Systems."

3) A maintenance log conforming to Article 2.2.1.8. shall be maintained, and shall also include

- a) the documentation required by Sentence 2.7.7.1.(3), and
- b) if a water quality test fails to meet a standard defined in Table 2.7.7.1., a description of the extent of the deviation from the standard, the corrective action taken, a record of any required notification, and the outcome of the corrective action, including all applicable dates and times.

Section 2.8. Objectives and Functional Statements

2.8.1. Objectives and Functional Statements

Note to reader:

The Table 2.8.1.1. rows below supplement or modify those of the 2020 National Plumbing Code.

2.8.1.1. Attribution to Acceptable Solutions

1) For the purposes of compliance with this By-law as required in Clause 1.2.1.1.(1)(b) of Division A, the objectives and functional statements attributed to the acceptable solutions in this Part shall be the objectives and functional statements listed in Table 2.8.1.1. (See Note A-1.1.2.1.(1).)

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)

Provision	Functional Statements and Objectives ⁽¹⁾
2.2.1.7. Microbiological Testing	
(1)	[F40,F41,F43,F81,F82-OS3.4,OH5]
(2)	[F40,F41,F43,F81,F82-OS3.4,OH5]
(3)	[F30,F40,F41,F43,F81,F82-OS3.1,OS3.4,OH1.1,OH2.1,OH2.3,OH5]
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]
(6)	[F81-OH1.1]
2.2.6.16. Welded Stainless Steel	
(1)	[F80-OH2.1,OH2.2,OH2.3]
(2)	[F80-OH2.1,OH2.2,OH2.3]
2.2.6.17. Stainless Steel Press-Connect Fittings	
(1)	[F20-OP5]
2.2.7.9. Press-Connect Water Fittings	
(1)	[F20-OP5]
2.2.10.6. Valves, and 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]

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

Provision	Functional Statements and Objectives ⁽¹⁾
(7)	[F81-OP5] [F46-OH2.2]
(8)	[F40,F41,F43,F46,F71,F81,F82-OS3.4,OH1.1,OH2.3,OH5]
2.2.10.17. Water Treatment Systems	
(1)	[F46,F70-OH2.2] [F30-OS3.1] [F46,F70-OS3.4] [F20,F30-OS2.1] [F40,F41,F43,F46,F70,F80,F81,F82-OS3.4,OH2.1,OH2.2,OH2.3,OH2.4,OH5,OP5,OE1.2]
(2)	[F46,F70-OH2.2] [F30-OS3.1] [F46,F70-OS3.4] [F20,F30-OS2.1] [F40,F41,F43,F46,F70,F80,F81,F82-OS3.4,OH2.1,OH2.2,OH2.3,OH2.4,OH5,OP5,OE1.2]
(4)	[F46-OH2.2] [F30-OS3.1] [F46,F70-OS3.4] [F20,F30-OS2.1]
2.2.11.1. Building Appliances	
(1)	[F130-OE1.2]
(2)	[F130-OE1.2]
2.2.11.3. Vehicle Wash Facilities	
(1)	[F130-OE1.2]
(2)	(a) [F130-OE1.2] (b) [F81-OS1.1,OH2.1] [F43-OH5]
(3)	[F40,F41,F43,F81,F82-OS3.4,OH1.1,OH5]
2.2.11.4. Non-recirculating Applications	
(1)	[F81,F82,F130-OP5,OE1.2]
(2)	[F81,F82,F130-OP5,OE1.2]
2.2.11.5. Geoexchange Systems	
(1)	[F46,F81,F130-OH2.2,OH5,OP5,OE1.2]
(2)	[F46,F81,F130-OH2.2,OH5,OP5,OE1.2]
(3)	[F40,F43,F46-OS3.4,OH2.4,OH5]
(4)	[F72,F81,F82-OS3.4,OH2.1,OP5]
(5)	[F72,F81,F82-OS3.4,OH2.1,OP5]
2.2.11.6. Cooling Towers	
(1)	[F40,F41,F43,F46,F81,F82-OS3.4,OH1.1,OH2.2,OH5,OP5]
(2)	[F40,F41,F43,F46,F81,F82,F130-OS3.4,OH1.1,OH2.2,OH5,OP5,OE1.2]
(4)	[F40,F41,F43,F46,F81,F82-OS3.4,OH1.1,OH2.2,OH5,OP5]
(5)	[F40,F41,F43,F46,F81,F82,F130-OS3.4,OH1.1,OH2.2,OH5,OP5,OE1.2]
(7)	[F40,F41,F43,F81,F82-OS3.4,OH1.1,OH5]

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

Provision	Functional Statements and Objectives ⁽¹⁾
(8)	[F40,F41,F43,F81,F82-OS3.4,OH1.1,OH5]
(9)	[F40,F41,F43,F81,F82-OS3.4,OH1.1,OH5]
(10)	[F40,F41,F43,F81,F82-OS3.4,OH1.1,OH5]
(11)	[F40,F41,F43,F46,F81,F82,F130-OS3.4,OH1.1,OH2.2,OH5,OP5,OE1.2]
2.2.11.7. Decorative Water Features	
(1)	[F40,F41,F43,F46,F81,F82-OS3.4,OH1.1,OH2.2,OH5,OP5]
(2)	[F30-OS3.1,OS3.4,OH2.2,OH2.4,OH5]
(3)	[F40,F41,F43,F46,F81,F82-OS3.4,OH1.1,OH2.2,OH5,OP5]
(5)	[F40,F41,F43,F46,F81,F82,F130-OS3.4,OH1.1,OH2.2,OH5,OP5,OE1.2]
(7)	[F40,F41,F43,F81,F82-OS3.4,OH1.1,OH5]
(8)	[F40,F41,F43,F81,F82-OS3.4,OH1.1,OH5]
(9)	[F40,F41,F43,F81,F82-OS3.4,OH1.1,OH5]
(10)	[F40,F41,F43,F81,F82-OS3.4,OH1.1,OH5]
(11)	[F40,F41,F43,F46,F81,F82,F130-OS3.4,OH1.1,OH2.2,OH5,OP5,OE1.2]
2.4.2.4. Connections to Storm Drainage Systems	
(1)	[F30,F62,F81,F82-OS3.1,OP5]
2.4.2.5. Rainwater Management	
(4)	[F40,F62,F80,F81-OP5,OE1.2]
(5)	[F40,F62,F80,F81-OP5,OE1.2]
(6)	[F40,F62,F80,F81-OP5]
(7)	[F80,F81,F82-OP5,OS3.4]
2.4.4.2. Sewer Discharge	
(1)	[F81-OH2.1]
(2)	[F130-OE1.2]
2.4.10.14. Design of Siphonic Roof Drainage Systems	
(1)	[F81-OH2.1]
2.4.5.3. Connection of Subsoil Drainage Pipe to a Storm Drainage System	
(1)	[F81-OH2.1]
(2)	[F81-OH2.1]
(3)	[F81-OH2.1]
2.6.1.1. Design	
(1)	[F31-OS3.2]
(2)	[F71-OH2.3]
(3)	[F40-OH1.1]
(4)	[F40-OH1.1]
2.6.1.12. Service Water Heaters	
(1)	[F40-OS3.4]
(2)	[F30,F31-OS3.1,OS3.2] [F46-OH1.1,OH2.2]

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

Provision	Functional Statements and Objectives ⁽¹⁾
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]
(4)	[F40,F43,F46,F81-OS3.4,OH2.2,OH5]
2.7.1.1. General	
(1)	[F46-OH2.2]
2.7.1.2. Non-Potable Water Sources	
(1)	[F40,F43,F46,F81-OS3.4,OH2.1,OH2.2,OH5,OE1.2]
(2)	[F40,F43,F46,F81-OS3.4,OH2.1,OH2.2,OH5,OE1.2]
(3)	[F40,F43,F46,F81-OS3.4,OH2.1,OH2.2,OH5,OE1.2]
2.7.1.3. Non-Potable Water Uses	
(1)	[F130-OE1.2]
(2)	[F130-OE1.2]
(3)	[F46,F70-OS3.4,OH2.2,OH2.3]
(4)	[F81-OS3.2]
(5)	[F40-OH2.2]
2.7.2.1. Piping and Outlet Identification	
(1)	[F46-OH2.2]
(2)	[F46-OH2.2]
(3)	[F46-OH2.2]
2.7.3.1. Pipes	
(1)	[F46-OH2.2]
2.7.3.2. Outlets	
(1)	[F46-OH2.2]
2.7.4.1. Requirements for Alternate Water Source Systems Installed Prior to January 1, 2019	
(1)	[F46,F81,F82,F130-OS3.4,OH2.1,OH2.2,OH5,OE1.2]
(2)	[F81-OH2.2]
(3)	[F46,F81,F82,F130-OS3.4,OH2.1,OH2.2,OH5,OE1.2]
(4)	[F46,F81,F82,F130-OS3.4,OH2.1,OH2.2,OH5,OE1.2]
(5)	[F46,F81,F82,F130-OS3.4,OH2.1,OH2.2,OH5,OE1.2]
(6)	[F46,F81,F82,F130-OS3.4,OH2.1,OH2.2,OH5,OE1.2]
(7)	[F46,F81,F82-OS3.4,OH2.1,OH2.2,OH5]
2.7.5.1. Occupancy	
(1)	[F46,F81,F82,F130-OS3.4,OH2.1,OH2.2,OH5,OE1.2]
(2)	[F46,F81,F82,F130-OS3.4,OH2.1,OH2.2,OH5,OE1.2]
2.7.5.2. Commissioning	
(1)	[F46,F81,F82-OS3.4,OH2.1,OH2.2,OH5]
(2)	[F46,F81,F82-OS3.4,OH2.1,OH2.2,OH5]

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

Provision	Functional Statements and Objectives ⁽¹⁾
2.7.5.3. Operating Permit	
(1)	[F40,F41,F43,F46,F81,F82,F130-OS3.4,OH2.1,OH2.2,OH5,OE1.2]
(3)	[F40,F41,F43,F46,F81,F82,F130-OS3.4,OH2.1,OH2.2,OH5,OE1.2]
2.7.5.4. Continued Operation	
(1)	[F81,F82,F130-OH5,OP5,OE1.2]
2.7.6.1. Professional Design	
(1)	[F46,F81,F82,F130-OS3.4,OH2.1,OH2.2,OH5,OE1.2]
2.7.6.2. Pipe Sizing	
(1)	[F71,F72-OH2.1,OH2.3]
(2)	[F71,F72-OH2.1,OH2.3]
2.7.6.3. Continuity of Supply and Backflow Prevention	
(1)	[F71,F72-OH2.1,OH2.3]
(2)	[F46,F81,F82-OS3.4,OH2.1,OH2.2,OH5]
(3)	[F46-OH2.2]
2.7.6.4. Storage Tanks	
(1)	[F40,F81-OH2.1,OH2.3]
(2)	[F40,F81-OH2.1,OH2.3]
(3)	[F40,F81-OH2.1,OH2.3]
(4)	[F81-OH2.2]
	[F81-OP5]
(5)	[F81-OH2.2]
	[F81-OP5]
2.7.6.5. Water Metering	
(1)	[F130-OE1.2]
2.7.6.6. Water Quality Sampling and Alerts	
(1)	[F82-OS3.4,OH2.1,OH2.3,OH5]
(2)	[F82-OS3.4,OH2.1,OH2.3,OH5]
2.7.6.7. Power Interruption	
(1)	[F71,F72,F81-OS3.4,OH2.1,OH2.3,OH5]
2.7.7.1. Water Quality Standards, Testing, and Documentation	
(1)	[F40,F43,F71,F72,F81,F82-OS3.4,OH2.1,OH2.3,OH5]
(2)	[F40,F43,F71,F72,F81,F82-OS3.4,OH2.1,OH2.3,OH5]
(3)	[F40,F43,F71,F72,F81,F82-OS3.4,OH2.1,OH2.3,OH5]
2.7.7.2. Water Quality Reporting	
(1)	[F40,F43,F71,F72,F81,F82-OS3.4,OH2.1,OH2.3,OH5]
2.7.7.3. Required Response to Failure to Meet Water Quality Standards	
(1)	[F40,F43,F71,F72,F81,F82-OS3.4,OH2.1,OH2.3,OH5]

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

Provision	Functional Statements and Objectives ⁽¹⁾
2.7.8.1. Operating Manual	
(1)	[F82-OS3.4, OH2.1, OH2.3, OH5, OE1.2]
2.7.8.2. Maintenance	
(1)	[F82-OS3.4, OH2.1, OH2.3, OH5, OE1.2]
(2)	[F46, F81, F82-OS3.4, OH2.1, OH2.2, OH5]
(3)	[F82-OS3.4, OH2.1, OH2.3, OH5, OE1.2]

Notes to Table 2.8.1.1.:

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

Notes to Part 2

Plumbing Systems

Note to reader:

The Notes below supplement or replace the version in the 2020 National Plumbing Code.

A-2.2.3.2.(3) Grease Interceptors. Metro Vancouver provides resources on-line for grease interceptor selection and sizing. CSA B481.4, “Maintenance of grease interceptors,” is considered to represent good practice regarding procedures for the maintenance of grease interceptors.

A-2.2.10.4.(1) Fittings in Pressure Piping Applications. Piping used in pressure applications are to be grooved and constructed using tools specifically designed for that piping material. It is important that all groove profiles are to meet the fitting manufacturer's guidelines and conform to CSA-B242 “Groove and Shoulder-Type Mechanical Pipe Couplings.” Overly shallow roll grooved or cut connections may result in reduced working pressures at the joint or the failure of the connection due to insufficient engagement of the coupling or from slippage at the joint. Conversely, grooves or cuts that are overly deep may result in failures of the pipe stemming from corrosion or stress concentrations at the joints.



Note: Image is exaggerated for clarity

Figure A-2.2.10.4.(1)
Insufficient Key Engagement of Fitting in Roll Grooved Connection

A-2.2.10.17. Water Treatment Systems. The potential risk for substances to be introduced into the drinking water that may endanger health must be considered. All proposals to install water treatment devices shall address:

- Seismic and environmental concerns,
- Monitoring and tampering detection,
- Protection of the city water supply and interface with the existing distribution system,
- Notification of end users and record keeping,
- Chemical storage and security, and
- Spill containment and procedures in the event of an equipment malfunction such as incorrect dosing.

For proposed new installations, the *Chief Building Official* will require:

- A technical report from a registered professional with appropriate qualifications and training identifying the context of installation, performance specifications of the proposed equipment, and the technical basis for the installation and means to protect the general public and end users,
- A piping diagram of the proposed water distribution system showing the type of existing piping and equipment, and
- A letter from the owner(s) stating that all end users have been informed of the proposal to introduce such chemicals into the drinking water and a sign has been posted in a conspicuous place 30 days before the proposed date of installation detailing the scope of the installation, the name of the chemicals being introduced and the relevant safety data sheets (SDS).

A-2.2.11.4.(3) Non-recirculating Applications. Non-recirculating water systems, such as *once-through cooling equipment*, waste large volumes of drinking water. Only in exceptional circumstances will a request for an *operating permit* be considered, such as a life safety application for which a *registered professional* has formally documented that there is no practical alternative to once-through cooling.

A-2.2.11.6. Cooling Tower Start-up and Shut-down. It is not the intention that the undefined terms “start-up” and “shut down” within Clause (4)(a), Clause (7)(c), Clause (9)(b) or Sentence (10) be interpreted to include a brief shutdown for the purposes of physical cleaning, system maintenance or inspection, or a “Standby (wet)” mode of *cooling tower* operation as defined by ASHRAE Guideline 12-2023. Operating a *cooling tower* in a “Standby (wet)” mode should include maintaining the water treatment program and circulating water to control biological growth, as described in ASHRAE Guideline 12-2023.

A-2.2.11.6.(8) Required Response to Failure to Meet *Legionella* Standards. This Sentence is based on Public Services and Procurement Canada’s standard MD 15161, “Control of *Legionella* in Mechanical Systems.”

A-2.2.11.6.(9) Offline Cleaning and Disinfection. The terms “cleaning” and “disinfection” have the meanings defined by Public Services and Procurement Canada’s standard MD 15161, “Control of *Legionella* in Mechanical Systems.”

More frequent *cooling tower* cleaning and disinfection may be necessary, especially for buildings with or near vulnerable populations. For health care facilities, refer to CAN/CSA-Z317.13, “Infection Control During Construction, Renovation, and Maintenance of Health Care Facilities” Clause 6.4.2.

A-2.2.11.7.(2)(b) Health Advisory. Examples of acceptable graphical symbols include:



Figure A-2.2.11.7.(2)(b)
Examples of acceptable graphical symbols

A-2.4.2.4.(2) Water Flow and Hazardous Conditions. Refer to the *Street and Traffic By-law* and *Standards of Maintenance By-law* for restrictions on water flow to streets, sidewalks, driveways, stairways and landings, and for prohibitions on ponding or entrance of water into a *building*.

A-2.4.2.5.(1) Rainwater Management Requirements. Area-specific rainwater management requirements exist within the Zoning and Development By-law, and site-specific rainwater management requirements may apply as conditions of a rezoning approval or through a CD-1 by-law. Where such requirements differ from those of this Article, the *building’s* design must meet the more restrictive of the release rate requirement and the greater of the volumetric detention requirement.

A-2.4.2.5.(4) Small Site Pathway. The detention tank “minimum active storage capacity” excludes the volume below the orifice and above the emergency overflow. The overflow must bypass the outlet flow control mechanism. The orifice flow control should have appropriate debris protection to prevent blockages. The detention tank should be inspected and cleaned regularly following the manufacturer’s instructions.

A-2.4.2.5.(6) Peak Flow Rate Calculation. Pre-development means the site’s use immediately preceding development.

A-2.4.2.5.(9) Relaxation to Rainwater Management Requirements. When an *owner* ascertains that site conditions preclude compliance with the rainwater management requirements of this Article, the *Chief Building Official* may relax a portion or all of the requirements of the “Engineered pathway” or the “Small site pathway.” Generally, the *Chief Building Official* may:

- consult with the *City Engineer*,
- consider evidence provided by the *owner* (Table A-2.4.2.5.(9)), and
- determine whether the *owner* has made a reasonable attempt to meet a portion or all of the rainwater management requirements by installing infrastructure above-ground or as part of the *building*.

The decision to relax requirements shall be made by the *Chief Building Official*.

Table A-2.4.2.5.(9)
Examples of Documentation that may be Provided by the Owner to the Chief Building Official
 Forming Part of Note A-2.4.2.5.(9)

Potential Site Condition Precluding Compliance with Rainwater Management Requirements	Examples of Documentation Provided by the Owner Regarding a Relaxation to Rainwater Management Requirements
Archaeological resources	<i>Archaeological Impact Assessment</i> , prepared in conformance with the Heritage Conservation Act.
Artesian groundwater conditions	Hydrogeological or geotechnical engineering report.
Contamination	<i>Notification of Likely or Actual Migration</i> , prepared in conformance with the Contaminated Sites Regulation.
Geotechnical limitations	Geotechnical engineering report.

A-2.4.3.6.(1) Elevator Pit Drains. Protection from sewer gases is required in accordance with Articles 2.4.5.1. and 2.4.5.5.

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.

A-2.7.2.1.(3) Non-potable Water Outlet Identification. An example of an acceptable graphical symbol is:



Figure A-2.7.2.1.(3)
Example of an acceptable graphical symbol

It is suggested that public education material also be posted to assist with risk perception and acceptance of treated non-*potable* water use.

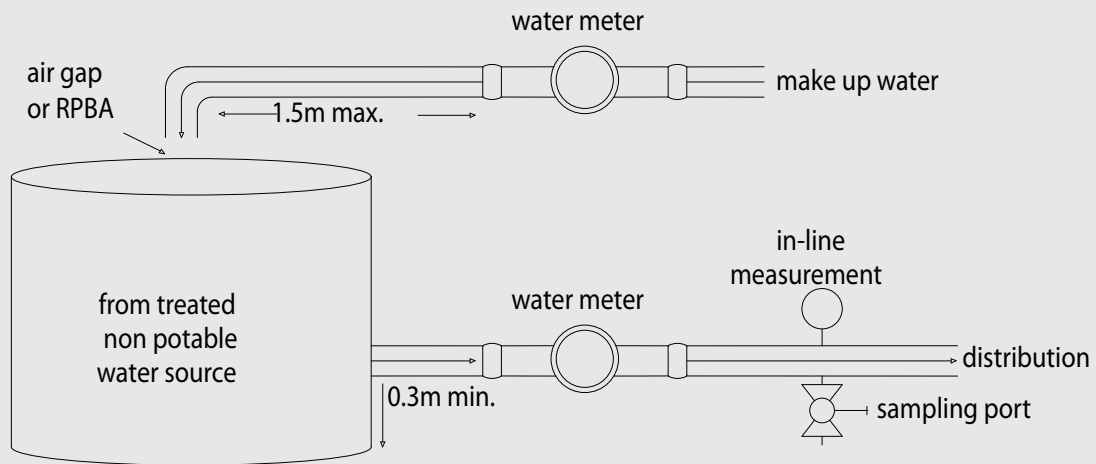
A-2.7.6.4, 2.7.6.5. and 2.7.6.6. Non-potable Water System Design

Figure A-2.7.6.4., 2.7.6.5. and 2.7.6.6.
Schematic example of a non-potable water system

Division C

Part 1 General

Note to reader:

Sections 1.3 to 1.10 and the Notes to Part 1 below supplement the 2020 National Plumbing Code.

Section 1.3. Interpretation, Intent and Prohibitions

(Refer to Book I (General) of this By-law.)

Section 1.4. Obligations of the Owner and Contractor

(Refer to Book I (General) of this By-law.)

Section 1.5. Authority of the Chief Building Official

(Refer to Book I (General) of this By-law.)

Section 1.6. Permits, Applications and Fees

(Refer to Book I (General) of this By-law.)

Section 1.7. Permission to Occupy Buildings

(Refer to Book I (General) of this By-law.)

Section 1.8. Street Regulations

(Refer to Book I (General) of this By-law.)

Section 1.9. Temporary Occupancy of a Street for Construction Purposes

(Refer to Book I (General) of this By-law.)

Section 1.10. Addressing Buildings and Parcels of Land

(Refer to Book I (General) of this By-law.)

Notes to Part 1

(Refer to Book I (General) of this By-law.)

Part 2

Administrative Provisions

Note to reader:

Sections 2.2 and 2.3 below replace the version in the 2020 National Plumbing Code.

Section 2.2. Administration

(Refer to Book I (General) of this By-law.)

Section 2.3. Alternative Solutions

(Refer to Book I (General) of this By-law.)

Note to reader:

Notes to Part 2 below supplements the 2020 National Plumbing Code.

Notes to Part 2

(Refer to Book I (General) of this By-law.)

Note to reader:
Part 3 below supplements the 2020 National Plumbing Code.

Part 3

Appeals, Offences and Penalties and Transition Provisions

(Refer to Book I (General) of this By-law.)