BC Building Code
Revision Package 2015

VERSION 1.02

This Revision Package contains the pages that reflect the amendments made to the *2012 British Columbia Building Code*. These revision pages (with VERSION 1.02 and ***"REP"*** in the footer) are complete pages which contain all revisions up to December 21, 2015. These pages will replace the corresponding pages in the existing document.

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Part 1
General

Section 1.1. General

1.1.1. Application

1.1.1.1. Application

1) <Fire safety plans shall conform to the British Columbia Fire Code.>

1.1.2. Objectives and Functional Statements

1.1.2.1. Attributions to Acceptable Solutions

1) For the purpose of compliance with this Code as required in Clause 1.2.1.1.(1)(b) of Division A, the objectives and functional statements attributed to the acceptable solutions in Division B shall be the objectives and functional statements identified in Sections 3.9., 4.5., 5.11., 6.4., 7.2., 8.3., <9.38.> and 10.4. (See Appendix A.)

1.1.3. Climatic and Seismic Data

1.1.3.1. Climatic and Seismic Values

1) <Except as required by Sentence 9.7.4.3.(2), the climatic and seismic values required for the design of *buildings* under this Code shall be in conformance with the values established by the *authority having jurisdiction* or, in the absence of such data, with Sentence (2) and the climatic and seismic values in Appendix C. (See Appendix A.)>

2) The outside winter design temperatures determined from Appendix C shall be those listed for the January 2.5% values. (See Appendix A.)

1.1.3.2. Depth of Frost Penetration

1) Depth of frost penetration shall be established on the basis of local experience.

1.1.4. Fire Safety Plan

1.1.4.1. Fire Safety Plan

1) <Fire safety plans shall conform to the British Columbia Fire Code.>

Section 1.2. Terms and Abbreviations

1.2.1. Definitions of Words and Phrases

1.2.1.1. Non-defined Terms

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

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

3) Where acceptable solutions are referred to in Division B, they shall be the provisions stated in Parts 3 <to 10>.

1.2.1.2. Defined Terms

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

1.2.2. Symbols and Other Abbreviations

1.2.2.1. Symbols and Other Abbreviations

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

Section 1.3. Referenced Documents and Organizations

1.3.1. Referenced Documents

1.3.1.1. Effective Date

1) Unless otherwise specified herein, the documents referenced in this Code shall include all amendments, revisions, reaffirmations, reapprovals, addenda and supplements effective to 30 September 2009.

1.3.1.2. Applicable Editions

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

Table 1.3.1.2.
Documents Referenced in the <Book I (General) of the British Columbia Building Code 2012>
Forming part of Sentence 1.3.1.2.(1)

Issuing Agency	Document Number[1]	Title of Document[2]	Code Reference
<AAMA	1304-02	Voluntary Specification for Forced Entry Resistance of Side-Hinged Door Systems	9.7.5.2.(2)>
<AHAM	ANSI/AHAM RAC-1-1982	Room Air Conditioners	Table 9.36.3.10.>
<AHRI	ANSI/AHRI 210/240-2008	Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment	Table 9.36.3.10.
AHRI	ANSI/AHRI 1060-2005	Performance Rating of Air-to-Air Exchangers for Energy Recovery Ventilation	9.36.3.8.(4)
AHRI	BTS-2000	Efficiency of Commercial Space Heating Boilers	Table 9.36.3.10.>
<AISI>	<S201-07>	<North American Standard for Cold-Formed Steel Framing - Product Data>	<9.24.1.2.(1)>
ANSI	A208.1-<2009>	Particleboard	Table 5.10.1.1. <9.23.15.2.(3)> 9.29.9.1.(1) 9.30.2.2.(1)
<ANSI/CSA	ANSI Z21.10.3-2004/CSA 4.3-04	Gas Water Heaters – Volume III, Storage Water Heaters With Input Ratings Above 75,000 Btu Per Hour, Circulating and Instantaneous	Table 9.36.4.2.>
ANSI/CSA	ANSI Z21.56-2006/CSA 4.7-2006	Gas-Fired Pool Heaters	Table 9.36.4.2.
ANSI/CSA	ANSI Z83.8-2006/CSA 2.6-2006	Gas Unit Heaters, Gas Packaged Heaters, Gas Utility Heaters and Gas-Fired Duct Furnaces	Table 9.36.3.10.>
ANSI/ ASHRAE	62-2001	Ventilation for Acceptable Indoor Air Quality <(except Addendum n)>	6.2.2.1.(2)
<ANSI/ ASHRAE/ IESNA	90.1-2010	Energy Standard for Buildings Except Low-Rise Residential Buildings	10.2.1.1.(1)>
<ASHRAE	ANSI/ASHRAE 103-2007	Annual Fuel Utilization Efficiency of Residential Central Furnaces and Boilers	Table 9.36.3.10.>
<ASHRAE	ANSI/ASHRAE 140-2007	Evaluation of Building Energy Analysis Computer Programs	9.36.5.4.(8)>
ASME	B18.6.1-1981	Wood Screws (Inch Series)	Table 5.10.1.1. <9.23.3.1.(3)>

Table 1.3.1.2.
Documents Referenced in the <Book I (General) of the British Columbia Building Code 2012>
Forming part of Sentence 1.3.1.2.(1)

Issuing Agency	Document Number[1]	Title of Document[2]	Code Reference
<ASME/CSA	ASME A17.1-2010/ CSA B44-10	Safety Code for Elevators and Escalators	3.2.6.7.(2) 3.2.5.1.(3) 3.5.4.2.(1) 3.8.3.10.(1) Table 4.1.5.11.>
<ASTM	A 123/A 123M-09	Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products	Table 5.10.1.1. Table 9.20.16.1.>
<ASTM	A 153/A 153M-09	Zinc Coating (Hot-Dip) on Iron and Steel Hardware	Table 5.10.1.1. Table 9.20.16.1.>
<ASTM	A 252-10	Welded and Seamless Steel Pipe Piles	4.2.3.8.(1)>
ASTM	A 283/A 283M-03	Low and Intermediate Tensile Strength Carbon Steel Plates	4.2.3.8.(1)
<ASTM	A 653/A 653M-11	Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process	Table 5.10.1.1. 9.3.3.2.(1)>
<ASTM	A 792/A 792M-10	Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process	9.3.3.2.(1)>
<ASTM	A 1008/A 1008M-11	Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, <Solution Hardened, and Bake Hardenable>	4.2.3.8.(1)>
<ASTM	A 1011/A 1011M-10	Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, <and Ultra-High Strength>	4.2.3.8.(1)>
<ASTM	C 4-04	Clay Drain Tile and Perforated Clay Drain Tile	Table 5.10.1.1. 9.14.3.1.(1)>
ASTM	C 27-98	Classification of Fireclay and High-Alumina Refractory Brick	9.21.3.4.(1)
<ASTM	C 73-10	Calcium Silicate Brick (Sand-Lime Brick)	Table 5.10.1.1. 9.20.2.1.(1)>
<ASTM	C 126-11	Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units	Table 5.10.1.1. 9.20.2.1.(1)>
<ASTM	C 177-10	Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus	9.36.2.2.(1)>
<ASTM	C 212-10	Structural Clay Facing Tile	Table 5.10.1.1. 9.20.2.1.(1)>
<ASTM	C 260/C 260M-10a	Air-Entraining Admixtures for Concrete	9.3.1.8.(1)>
<ASTM	C 411-11	Hot-Surface Performance of High-Temperature Thermal Insulation	3.6.5.4.(4) 3.6.5.5.(1) 9.33.6.4.(4) 9.33.8.2.(2)>
<ASTM	C 412M-11	Concrete Drain Tile (Metric)	Table 5.10.1.1. 9.14.3.1.(1)>
ASTM	C 444M-03	Perforated Concrete Pipe (Metric)	Table 5.10.1.1. 9.14.3.1.(1)
<ASTM	C 494/C 494M-11	Chemical Admixtures for Concrete	9.3.1.8.(1)>

Table 1.3.1.2.
Documents Referenced in the <Book I (General) of the British Columbia Building Code 2012>
Forming part of Sentence 1.3.1.2.(1)

Issuing Agency	Document Number[1]	Title of Document[2]	Code Reference
<ASTM	C 518-10	Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus	9.36.2.2.(1)>
<ASTM	C 553-11	Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications	Table 5.10.1.1.>
<ASTM	C 612-10	Mineral Fiber Block and Board Thermal Insulation	Table 5.10.1.1.>
<ASTM	C 700-11	Standard Specification for Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated	Table 5.10.1.1. 9.14.3.1.(1)>
<ASTM	C 834-10	Latex Sealants	Table 5.10.1.1. 9.27.4.2.(2)>
<ASTM	C 920-11	Elastomeric Joint Sealants	Table 5.10.1.1. 9.27.4.2.(2)>
<ASTM	C 954-11	Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness	9.24.1.4.(1)>
<ASTM	C 991-08e1	Flexible Fibrous Glass Insulation for Metal Buildings	Table 5.10.1.1.>
ASTM	C 1002-<07>	Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs	Table 5.10.1.1. 9.24.1.4.(1) 9.29.5.7.(1)
ASTM	C 1177/C 1177M-<08>	Glass Mat Gypsum Substrate for Use as Sheathing	Table 5.10.1.1. <Table 9.23.17.2.A>
<ASTM	C 1178/C 1178M-11	Coated Glass Mat Water-Resistant Gypsum Backing Panel	Table 5.10.1.1. 9.29.5.2.(1)>
<ASTM>	<C 1184-05>	<Structural Silicone Sealants>	<Table 5.10.1.1. 9.27.4.2.(2)>
<ASTM	C 1311-10	Solvent Release Sealants	Table 5.10.1.1. 9.27.4.2.(2)>
<ASTM>	<C 1330-02>	<Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants>	<Table 5.10.1.1. 9.27.4.2.(3)>
<ASTM	C 1363-05	Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus	9.36.2.2.(4)>
<ASTM	C 1396/C 1396M-11	Gypsum Board	3.1.5.12.(4) Table 5.10.1.1. Table 9.23.17.2.A 9.29.5.2.(1) Table 9.29.5.3.>
ASTM	D 323-<08>	Vapor Pressure of Petroleum Products (Reid Method)	<1.4.1.2.(1)[3]>
ASTM	D 2178-<04>	Asphalt Glass Felt Used in Roofing and Waterproofing	Table 5.10.1.1.
<ASTM	D 2898-10	Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing	3.1.5.5.(5) 3.1.5.21.(1) 3.2.2.50.(3) 3.2.3.7.(4) 9.10.14.5.(3) 9.10.15.5.(3)>
ASTM	E 90-04	Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements	5.9.1.1.(1) 9.11.1.1.(1)

Table 1.3.1.2.
Documents Referenced in the <Book I (General) of the British Columbia Building Code 2012>
Forming part of Sentence 1.3.1.2.(1)

Issuing Agency	Document Number[1]	Title of Document[2]	Code Reference
<ASTM	E 96/E 96M-10	Water Vapor Transmission of Materials	5.5.1.2.(3) 9.25.4.2.(1) <9.25.5.1.(1)> 9.30.1.2.(1)>
ASTM	E 336-<05>	Measurement of Airborne Sound <Attenuation between Rooms in Buildings>	5.9.1.1.(1) 9.11.1.1.(1)
ASTM	E 413-<04>	Classification for Rating Sound Insulation	5.9.1.1.(1) 9.11.1.1.(1)
<ASTM	E 1300-04e1	Standard Practice for Determining Load Resistance of Glass in Buildings	4.3.6.1.(1) 9.6.1.3.(1)>
<ASTM	E 2190-10	Insulating Glass Unit Performance and Evaluation	Table 5.10.1.1. 9.6.1.2.(1)>
<ASTM	E 2357-11	Determining Air Leakage of Air Barrier Assemblies	9.36.2.9.(1)>
<ASTM	F 842-04	Standard Test Methods for Measuring the Forced Entry Resistance of Sliding Door Assemblies, Excluding Glazing Impact	9.7.5.1.(3)>
<ASTM	F 1667-05	Driven Fasteners: Nails, Spikes, and Staples	9.23.3.1.(1) 9.26.2.2.(1) 9.29.5.6.(1)>
<AWPA	M4-11	Care of Preservative-Treated Wood Products	4.2.3.2.(2) Table 5.10.1.1.>
<BC>	B.C. Reg. 263/2012	<British Columbia Fire Code 2012>	<1.1.1.1.(1)[3] 1.1.4.1.(1) 1.4.1.2.(1)[3] 2.1.1.2.(4)[3] 3.1.13.1.(1) 3.2.3.21.(1) 3.2.4.6.(1) 3.2.5.16.(1) 3.3.1.2.(1) 3.3.1.10.(1) 3.3.2.3.(1) 3.3.2.15.(1) 3.3.4.3.(4) 3.3.5.2.(1) 3.3.6.1.(1) 3.3.6.3.(1) 3.3.6.3.(2) 3.3.6.4.(1) 3.3.6.4.(2) 3.3.6.6.(1) 6.2.2.6.(1) 6.2.12.2.(3) 6.2.12.3.(1) 6.2.12.4.(1) 8.1.1.1.(3) 8.1.1.3.(1) 9.10.1.2.(1) 9.10.20.4.(1) 9.10.21.8.(1)>

Table 1.3.1.2.
Documents Referenced in the <Book I (General) of the British Columbia Building Code 2012>
Forming part of Sentence 1.3.1.2.(1)

Issuing Agency	Document Number[1]	Title of Document[2]	Code Reference
<BC>	B.C. Reg. 264/2012	<Book II (Plumbing Systems) of the British Columbia Building Code 2012>	<2.1.1.2.(4)[3] 5.6.2.2.(2) 7.1.2.1.(1) 9.31.6.2.(1)>
<BC>	<R.S.B.C. 1996, c. 17>	<Architects Act>	<1.4.1.2.(1)[3]>
<BC>	<B.C. Reg. 100/2004>	<Electrical Safety Regulation>	<3.3.6.2.(4) 3.6.1.2.(1) 3.6.2.1.(6) 3.6.2.7.(1) 6.2.1.4.(1) 9.31.6.2.(2) 9.33.5.2.(1) 9.34.1.1.(1)>
<BC>	<B.C. Reg. 101/2004>	<Elevating Devices Safety Regulation>	<3.5.2.1.(1) 3.5.2.1.(2)>
<BC>	<R.S.B.C. 1996, c. 116>	<Engineers and Geoscientists Act>	<1.4.1.2.(1)[3]>
<BC>	<B.C. Reg. 103/2004>	<Gas Safety Regulation>	<6.2.1.4.(1) 9.10.22.1.(1) 9.31.6.2.(2) 9.33.5.2.(1)>
<BC>	<R.S.B.C. 1996, c. 323>	<Local Government Act>	<2.2.1.1.(1)[4]>
<BC>	<R.S.B.C. 1996, c. 293>	<Mines Act>	<1.4.1.2.(1)[3]>
<BC>	<S.B.C. 2003, c. 39>	<Safety Standards Act>	<6.2.1.4.(1) 6.2.1.4.(2) 9.31.6.2.(2) 9.33.5.2.(1) 9.33.5.2.(2)>
<BC>	<B.C. Reg. 104/2004>	<Power Engineers, Boiler, Pressure Vessel and Refrigeration Safety Regulation>	<6.2.1.4.(1) 9.31.6.2.(2) 9.33.5.2.(1)>
<BNQ	BNQ 3624-115/2007	Polyethylene (PE) Pipe and Fittings – Flexible Pipes for Drainage – Characteristics and Test Methods	Table 5.10.1.1. 9.14.3.1.(1)>
<CCBFC	NRCC 38732	National Farm Building Code of Canada 1995	1.1.1.1.(4)[3]>
<CCBFC	NRCC 54435-2011	National Energy Code of Canada for Buildings	10.2.1.1.(1) 9.36.1.3.(1) 9.36.1.3.(4) 9.36.3.1.(2) 9.36.4.1.(2)>
CGSB	CAN/CGSB-1.501-M89	Method for Permeance of Coated Wallboard	5.5.1.2.(2) <9.25.4.2.(5)>
CGSB	CAN/CGSB-7.2-9<4>	Adjustable Steel Columns	9.17.3.4.(1)
CGSB	CAN/CGSB-10.3-92	Air Setting Refractory Mortar	9.21.3.4.(2) 9.21.3.9.(1) 9.22.2.2.(2)

Table 1.3.1.2.
Documents Referenced in the <Book I (General) of the British Columbia Building Code 2012>
Forming part of Sentence 1.3.1.2.(1)

Issuing Agency	Document Number[1]	Title of Document[2]	Code Reference
CGSB	CAN/CGSB-11.3-M87	Hardboard	Table 5.10.1.1. <9.27.9.1.(2)> 9.29.7.1.(1) 9.30.2.2.(1)
CGSB	CAN/CGSB-11.5-M87	Hardboard, Precoated, Factory Finished, for Exterior Cladding	Table 5.10.1.1. <9.27.9.1.(1)>
CGSB	CAN/CGSB-12.1-M90	Tempered or Laminated Safety Glass	3.3.1.19.(2) <3.4.6.15.(1) 3.4.6.15.(3)> Table 5.10.1.1. <9.6.1.2.(1) 9.6.1.4.(1)> 9.8.8.7.(1)
CGSB	CAN/CGSB-12.2-M91	Flat, Clear Sheet Glass	Table 5.10.1.1. <9.6.1.2.(1)>
CGSB	CAN/CGSB-12.3-M91	Flat, Clear Float Glass	Table 5.10.1.1. <9.6.1.2.(1)>
CGSB	CAN/CGSB-12.4-M91	Heat Absorbing Glass	Table 5.10.1.1. <9.6.1.2.(1)>
CGSB	CAN/CGSB-12.8-97	Insulating Glass Units	Table 5.10.1.1. <9.6.1.2.(1)>
CGSB	CAN/CGSB-12.10-M76	Glass, Light and Heat Reflecting	Table 5.10.1.1. <9.6.1.2.(1)>
CGSB	CAN/CGSB-12.11-M90	Wired Safety Glass	3.3.1.19.(2) <3.4.6.15.(1) 3.4.6.15.(3)> Table 5.10.1.1. <9.6.1.2.(1) 9.6.1.4.(1)> 9.8.8.7.(1)
CGSB	CAN/CGSB-12.20-M89	Structural Design of Glass for Buildings	4.3.6.1.(1) <9.6.1.3.(1)>
CGSB	CAN/CGSB-19.22-M89	Mildew-Resistant Sealing Compound for Tubs and Tiles	9.29.10.5.(1)
CGSB	CAN/CGSB-34.22-94	Asbestos-Cement Drain Pipe	Table 5.10.1.1. 9.14.3.1.(1)
CGSB	CAN/CGSB-37.1-M89	Chemical Emulsifier Type, Emulsified Asphalt for Dampproofing	Table 5.10.1.1. 9.13.2.2.(1)
CGSB	CAN/CGSB-37.2-M88	Emulsified Asphalt, Mineral-Colloid Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings	Table 5.10.1.1. 9.13.2.2.(1) 9.13.3.2.(1)
CGSB	CAN/CGSB-37.3-M89	Application of Emulsified Asphalts for Dampproofing or Waterproofing	5.8.2.3.(1) Table 5.10.1.1. 9.13.2.3.(1) 9.13.3.3.(1)
CGSB	CAN/CGSB-37.4-M89	Fibrated, Cutback Asphalt, Lap Cement for Asphalt Roofing	Table 5.10.1.1. 9.26.2.1.(1)
CGSB	CAN/CGSB-37.5-M89	Cutback Asphalt Plastic, Cement	Table 5.10.1.1. 9.26.2.1.(1)

Table 1.3.1.2.
Documents Referenced in the <Book I (General) of the British Columbia Building Code 2012>
Forming part of Sentence 1.3.1.2.(1)

Issuing Agency	Document Number[1]	Title of Document[2]	Code Reference
CGSB	37-GP-6Ma-1983	Asphalt, Cutback, Unfilled, for Dampproofing	5.8.2.2.(6) 5.8.2.2.(7) Table 5.10.1.1. 9.13.2.2.(1)
CGSB	CAN/CGSB-37.8-M88	Asphalt, Cutback, Filled, for Roof Coating	Table 5.10.1.1. 9.26.2.1.(1)
CGSB	37-GP-9Ma-1983	Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing	Table 5.10.1.1. 9.26.2.1.(1)
CGSB	37-GP-12Ma-1984	Application of Unfilled Cutback Asphalt for Dampproofing	5.8.2.3.(2) Table 5.10.1.1. 9.13.2.3.(1)
CGSB	CAN/CGSB-37.16-M89	Filled, Cutback Asphalt for Dampproofing and Waterproofing	Table 5.10.1.1. 9.13.2.2.(1) 9.13.3.2.(1)
CGSB	37-GP-18Ma-1985	Tar, Cutback, Unfilled, for Dampproofing	5.8.2.2.(6) 5.8.2.2.(7) Table 5.10.1.1. 9.13.2.2.(1)
CGSB	37-GP-21M-1985	Tar, Cutback, Fibrated, for Roof Coating	Table 5.10.1.1. 9.26.2.1.(1)
CGSB	CAN/CGSB-37.22-M89	Application of Unfilled, Cutback Tar Foundation Coating for Dampproofing	5.8.2.3.(2) Table 5.10.1.1. 9.13.2.3.(1)
CGSB	37-GP-36M-1976	Application of Filled Cutback Asphalts for Dampproofing and Waterproofing	5.8.2.3.(1) Table 5.10.1.1.
CGSB	37-GP-37M-1977	Application of Hot Asphalt for Dampproofing or Waterproofing	5.8.2.3.(1) Table 5.10.1.1.
CGSB	CAN/CGSB-37.50-M89	Hot-Applied, Rubberized Asphalt for Roofing and Waterproofing	Table 5.10.1.1. 9.26.2.1.(1)
CGSB	CAN/CGSB-37.51-M90	Application for Hot-Applied Rubberized Asphalt for Roofing and Waterproofing	<5.6.1.2.(1)> 5.8.2.3.(1) Table 5.10.1.1. 9.26.15.1.(1)
CGSB	37-GP-52M-1984	Roofing and Waterproofing Membrane, Sheet Applied, Elastomeric	Table 5.10.1.1. 9.26.2.1.(1)
CGSB	CAN/CGSB-37.54-95	Polyvinyl Chloride Roofing and Waterproofing Membrane	Table 5.10.1.1. 9.26.2.1.(1)
CGSB	37-GP-55M-1979	Application of Sheet Applied Flexible Polyvinyl Chloride Roofing Membrane	<5.6.1.2.(1)> Table 5.10.1.1. 9.26.16.1.(1)
CGSB	37-GP-56M-1985	Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing	Table 5.10.1.1. 9.26.2.1.(1)
CGSB	37-GP-64M-1977	Mat Reinforcing, Fibrous Glass, for Membrane Waterproofing Systems and Built-Up Roofing	Table 5.10.1.1.
CGSB	41-GP-6M-1983	Sheets, Thermosetting Polyester Plastics, Glass Fiber Reinforced	Table 5.10.1.1. 9.26.2.1.(1)

Table 1.3.1.2.
Documents Referenced in the <Book I (General) of the British Columbia Building Code 2012>
Forming part of Sentence 1.3.1.2.(1)

Issuing Agency	Document Number[1]	Title of Document[2]	Code Reference
CGSB	CAN/CGSB-41.24-95	Rigid Vinyl Siding, Soffits and Fascia	Table 5.10.1.1. <9.27.12.1.(1)>
CGSB	CAN/CGSB-51.25-M87	Thermal Insulation, Phenolic, Faced	<Table 9.23.17.2.A> 9.25.2.2.(1)
CGSB	51-GP-27M-1979	Thermal Insulation, Polystyrene, Loose Fill	9.25.2.2.(1)
CGSB	CAN/CGSB-51.32-M77	Sheathing, Membrane, Breather Type	Table 5.10.1.1. 9.20.13.9.(1) 9.26.2.1.(1) 9.27.3.2.(1)
CGSB	CAN/CGSB-51.33-M89	Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction	Table 5.10.1.1. <9.25.4.2.(4)>
CGSB	CAN/CGSB-51.34-M86	Vapour Barrier, Polyethylene Sheet for Use in Building Construction	Table 5.10.1.1. 9.13.2.2.(1) 9.18.6.2.(1) 9.25.3.2.(2) <9.25.3.6.(1) 9.25.4.2.(3)>
CGSB	CAN/CGSB-82.6-M86	Doors, Mirrored Glass, Sliding or Folding, Wardrobe	<9.6.1.2.(2)>
CGSB	CAN/CGSB-93.1-M85	Sheet, Aluminum Alloy, Prefinished, Residential	Table 5.10.1.1. <9.27.11.1.(4)>
CGSB	CAN/CGSB-93.2-M91	Prefinished Aluminum Siding, Soffits, and Fascia, for Residential Use	<3.2.3.6.(4)> Table 5.10.1.1. <9.10.14.5.(8) 9.10.14.5.(11) 9.10.15.5.(7) 9.10.15.5.(10) 9.27.11.1.(3)>
CGSB	CAN/CGSB-93.3-M91	Prefinished Galvanized and Aluminum-Zinc Alloy Steel Sheet for Residential Use	Table 5.10.1.1. <9.27.11.1.(2)>
CGSB	CAN/CGSB-93.4-92	Galvanized Steel and Aluminum-Zinc Alloy Coated Steel Siding, Soffits and Fascia, Prefinished, Residential	Table 5.10.1.1. <9.27.11.1.(1)>
<CGSB	CAN/CGSB-149.10-M86	Determination of the Airtightness of Building Envelopes by the Fan Depressurization Method	9.36.5.10.(11)>
CSA	CAN/CSA-6.19-01	Residential Carbon Monoxide Alarming Devices	6.2.4.1.(2) <9.32.4.2.(2) 9.32.4.2.(3)>
CSA	A23.1-<09>	Concrete Materials and Methods of Concrete Construction	4.2.3.6.(1) 4.2.3.9.(1) Table 5.10.1.1. <9.3.1.1.(1)> 9.3.1.1.(4) 9.3.1.3.(1) 9.3.1.4.(1)
CSA	<CAN/CSA->A23.3-04	Design of Concrete Structures	Table 4.1.8.9. 4.3.3.1.(1)
CSA	CAN/CSA-A82.1-M87	Burned Clay Brick (Solid Masonry Units Made from Clay or Shale)	Table 5.10.1.1. 9.20.2.1.(1)

Table 1.3.1.2.
Documents Referenced in the <Book I (General) of the British Columbia Building Code 2012>
Forming part of Sentence 1.3.1.2.(1)

Issuing Agency	Document Number[1]	Title of Document[2]	Code Reference
CSA	A82.4-M1978	Structural Clay Load-Bearing Wall Tile	Table 5.10.1.1. 9.20.2.1.(1)
CSA	A82.5-M1978	Structural Clay Non-Load-Bearing Tile	Table 5.10.1.1. 9.20.2.1.(1)
CSA	CAN3-A82.8-M78	Hollow Clay Brick	Table 5.10.1.1. 9.20.2.1.(1)
CSA	CAN/CSA-A82.27-M91	Gypsum Board	3.1.5.12.(4) Table 5.10.1.1. Table 9.23.17.2.A 9.29.5.2.(1)
CSA	A82.30-M1980	Interior Furring, Lathing and Gypsum Plastering	Table 5.10.1.1. 9.29.4.1.(1)
CSA	A82.31-M1980	Gypsum Board Application	<3.2.3.6.(4)> Table 5.10.1.1. 9.10.12.4.(3) <9.10.14.5.(8) 9.10.14.5.(11) 9.10.15.5.(7) 9.10.15.5.(10)> 9.29.5.1.(2)
CSA	CAN3-A93-M82	Natural Airflow Ventilators for Buildings	Table 5.10.1.1. 9.19.1.2.(5)
CSA	A123.1-<05/A123.5-05>	Asphalt Shingles Made From Organic Felt and Surfaced with Mineral Granules</Asphalt Shingles Made From Glass Felt and Surfaced with Mineral Granules>	Table 5.10.1.1. 9.26.2.1.(1)
CSA	<CAN/CSA-A123.2-03>	Asphalt-Coated Roofing Sheets	Table 5.10.1.1. 9.26.2.1.(1)
CSA	A123.3-<05>	Asphalt Saturated Organic Roofing Felt	Table 5.10.1.1. 9.26.2.1.(1)
CSA	CAN/CSA-A123.4-04	Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems	Table 5.10.1.1. 9.13.2.2.(1) 9.13.3.2.(1) 9.26.2.1.(1)
<CSA>	<A123.17-05>	<Asphalt Glass Felt Used in Roofing and Waterproofing>	<Table 5.10.1.1. 9.26.2.1.(1)>
CSA	CAN3-A123.51-M85	Asphalt Shingle Application on Roof Slopes 1:3 and Steeper	<5.6.1.2.(1)> Table 5.10.1.1. 9.26.1.2.(1)
CSA	CAN3-A123.52-M85	Asphalt Shingle Application on Roof Slopes 1:6 to Less Than 1:3	<5.6.1.2.(1)> Table 5.10.1.1. 9.26.1.2.(1)
CSA	<CAN/CSA->A165.1-04	Concrete Block Masonry Units	Table 5.10.1.1. 9.15.2.2.(1) 9.17.5.1.(1) 9.20.2.1.(1) 9.20.2.6.(1)
CSA	<CAN/CSA->A165.2-04	Concrete Brick Masonry Units	Table 5.10.1.1. 9.20.2.1.(1)

Table 1.3.1.2.
Documents Referenced in the <Book I (General) of the British Columbia Building Code 2012>
Forming part of Sentence 1.3.1.2.(1)

Issuing Agency	Document Number[1]	Title of Document[2]	Code Reference
CSA	<CAN/CSA->A165.3-04	Prefaced Concrete Masonry Units	Table 5.10.1.1. 9.20.2.1.(1)
CSA	CAN3-A165.4-M85	Autoclaved Cellular Units	Table 5.10.1.1. 9.20.2.1.(1)
CSA	<CAN/CSA->A179-04	Mortar and Grout for Unit Masonry	Table 5.10.1.1. 9.15.2.2.(3) 9.20.3.1.(1)
<CSA	CAN/CSA-A220 Series-06	Concrete Roof Tiles	Table 5.10.1.1. 9.26.2.1.(1) 9.26.17.1.(1)>
CSA	CAN/CSA-A324-M88	Clay Flue Liners	9.21.3.3.(1)
CSA	<CAN/CSA->A371-04	Masonry Construction for Buildings	<5.6.1.2.(2)> Table 5.10.1.1. 9.15.2.2.(3) 9.20.3.2.(7) 9.20.15.2.(1)
CSA	CAN/CSA-A405-M87	Design and Construction of Masonry Chimneys and Fireplaces	9.21.3.5.(1) 9.22.1.4.(1) 9.22.5.2.(2)
<CSA	AAMA/WDMA/CSA 101/I.S.2/A440-08	NAFS – North American Fenestration Standard/Specification for Windows, Doors, and Skylights	5.10.2.2.(1) 9.7.4.2.(1) 9.7.4.2.(2) 9.7.5.3.(1) 9.36.2.9.(3)>
<CSA	A440.2-09/A440.3-09	Fenestration Energy Performance/User Guide to CSA A440.2-09, Fenestration Energy Performance	9.36.2.2.(3)>
<CSA	A440S1-09	Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440, NAFS – North American Fenestration Standard/Specification for Windows, Doors, and Skylights, as updated by Update No. 1 (July 2013)	5.10.2.2.(1) 5.10.2.2.(3) 9.7.4.2.(1) 9.7.4.3.(1) 9.7.4.3.(2) 9.36.2.9.(3)>
<CSA	CAN/CSA-A660-10	Certification of Manufacturers of Steel Building Systems	4.3.4.3.(1)>
CSA	CAN/CSA-A3001-<08>	Cementitious Materials for Use in Concrete	Table 5.10.1.1. 9.3.1.2.(1) 9.28.2.1.(1)
CSA	CAN/CSA-B72-M87	Installation Code for Lightning Protection Systems	6.3.1.4.(1)
CSA	B111-1974	Wire Nails, Spikes and Staples	9.23.3.1.(1) 9.26.2.2.(1) 9.29.5.6.(1)
CSA	B139-04	Installation Code for Oil-Burning Equipment	6.2.1.4.(1) 9.31.6.2.(2) 9.33.5.2.(1)
<CSA	B140.12-03	Oil-Burning Equipment: Service Water Heaters for Domestic Hot Water, Space Heating, and Swimming Pools	Table 9.36.4.2.>
<CSA	CAN/CSA-B182.1-11	Plastic Drain and Sewer Pipe and Pipe Fittings	Table 5.10.1.1. 9.14.3.1.(1)>

Table 1.3.1.2.
Documents Referenced in the <Book I (General) of the British Columbia Building Code 2012>
Forming part of Sentence 1.3.1.2.(1)

Issuing Agency	Document Number[1]	Title of Document[2]	Code Reference
<CSA	CAN/CSA-B211-00	Energy Efficiency of Oil-Fired Storage Tank Water Heaters	Table 9.36.4.2.>
<CSA	B212-00	Energy Utilization Efficiencies of Oil-Fired Furnaces and Boilers	9.36.3.10.>
<CSA	CAN/CSA-B214-12	Installation Code for Hydronic Heating Systems	6.2.1.1.(1) 9.33.4.2.(1)>
<CSA	CAN/CSA-B355-09	Lifts for Persons with Physical Disabilities	3.8.3.10.(1)>
CSA	CAN/CSA-B365-01	Installation Code for Solid-Fuel-Burning Appliances and Equipment	6.2.1.4.(1) 6.2.1.4.(2) 9.22.10.2.(1) 9.31.6.2.(2) 9.33.5.2.(1) 9.33.5.2.(2) 9.33.5.3.(1)
<CSA	B415.1-10	Solid-Fuel-Burning Heating Appliances	Table 9.36.3.10.>
CSA	C22.1-09	Canadian Electrical Code, Part I	3.3.6.2.(4) 3.6.1.2.(1) 3.6.2.1.(6) 3.6.2.7.(1) 6.2.1.4.(1) 9.31.6.2.(2) 9.33.5.2.(1) 9.34.1.1.(1)
<CSA	C22.2 No. 0.3-09	Test Methods for Electrical Wires and Cables	3.1.4.3.(1) 3.1.4.3.(2) 3.1.5.18.(1) 3.1.5.18.(3) 9.34.1.5.(1)>
CSA	C22.2 No. 141-<10>	<Emergency Lighting Equipment>	3.2.7.4.(2) <3.4.5.1.(3) 9.9.11.3.(3) 9.9.12.3.(7)>
CSA	C22.2 No. 211.0-03	General Requirements and Methods of Testing for Nonmetallic Conduit	3.1.5.20.(1)
<CSA>	<CAN/CSA-C22.2 No. 262-04>	<Optical Fiber Cable and Communication Cable Raceway Systems>	<3.1.5.20.(1)>
<CSA	CAN/CSA-C191-04	Performance of Electric Storage Tank Water Heaters for Domestic Hot Water Service	Table 9.36.4.2.>
<CSA	CAN/CSA-C260-M90	Rating the Performance of Residential Mechanical Ventilating Equipment	9.32.3.5.(2) 9.32.3.5.(5) 9.32.3.6.(2)>
<CSA	CAN/CSA-C282-09	Emergency Electrical Power Supply for Buildings	3.2.7.5.(1)>
<CSA	CAN/CSA-C368.1-M90	Performance Standard for Room Air Conditioners	Table 9.36.3.10.>
<CSA	CAN/CSA-C439-09	Rating the Performance of Heat/Energy-Recovery Ventilators	9.36.3.8.(4) 9.36.3.9.(3)>
CSA	CAN/CSA-C448 Series-02	Design and Installation of Earth Energy Systems	9.33.5.2.(1)
<CSA	CAN/CSA-C656-05	Split-System and Single-Package Central Air Conditioners and Heat Pumps	Table 9.36.3.10.>

3.1.16. Fabrics

3.1.16.1. Fabric Canopies and Marquees

1) Fabrics used as part of an awning, canopy or marquee that is located within or attached to a *building* of any type of construction shall conform to CAN/ULC-S109, "Flame Tests of Flame-Resistant Fabrics and Films."

3.1.17. Occupant Load

3.1.17.1. Occupant Load Determination

1) The *occupant load* of a *floor area* or part of a *floor area* shall be based on

a) the number of seats in an *assembly occupancy* having fixed seats,

b) 2 persons per sleeping room in a *dwelling unit*, or

c) the number of persons for which the area is designed, but not less than that determined from Table 3.1.17.1. for *occupancies* other than those described in Clauses (a) and (b), unless it can be shown that the area will be occupied by fewer persons.

2) If a *floor area* or part thereof has been designed for an *occupant load* other than that determined from Table 3.1.17.1., a permanent sign indicating that *occupant load* shall be posted in a conspicuous location.

Table 3.1.17.1.
Occupant Load
Forming part of Article 3.1.17.1.

Type of Use of *Floor Area* or Part Thereof	Area per person, m^2
Assembly uses	
space with fixed seats	(1)
space with non-fixed seats	0.75
stages for theatrical performances	0.75
space with non-fixed seats and tables	0.95
standing space	0.40
stadia and grandstands	0.60
bowling alleys, pool and billiard rooms	9.30
classrooms	1.85
school shops and vocational rooms	9.30
reading or writing rooms or lounges	1.85
dining, beverage and cafeteria space	1.20
laboratories in schools	4.60
<*Care*, *treatment* or detention uses>	
<*suites*>	<(2)>
<*care*,> *treatment* and sleeping room areas	10.00
detention quarters	11.60
Residential uses	
dwelling units	(2)
dormitories	4.60
Business and personal services uses	
personal services shops	4.60
offices	9.30

Table 3.1.17.1.
Occupant Load
Forming part of Article 3.1.17.1.

Type of Use of *Floor Area* or Part Thereof	Area per person, m^2
Mercantile uses	
basements and *first storeys*	3.70
second *storeys* having a principal entrance from a pedestrian thoroughfare or a parking area	3.70
other *storeys*	5.60
Industrial uses	
manufacturing or process rooms	4.60
storage garages	46.00
storage spaces (warehouse)	28.00
aircraft hangars	46.00
Other uses	
cleaning and repair goods	4.60
kitchens	9.30
storage	46.00
public corridors intended for *occupancies* in addition to pedestrian travel	3.70(3)

Notes to Table 3.1.17.1.:
(1) See Clause 3.1.17.1.(1)(a).
(2) See Clause 3.1.17.1.(1)(b) <(apply values for *dwelling units* to *suites* of *care occupancy*).>
(3) See A-3.3. in Appendix A.

3) For the purposes of this Article, *mezzanines*, tiers and balconies shall be regarded as part of the *floor area*.

4) If a room or group of rooms is intended for different *occupancies* at different times, the value to be used from Table 3.1.17.1. shall be the value which gives the greatest number of persons for the *occupancies* concerned.

Section 3.2. Building Fire Safety

3.2.1. General

3.2.1.1. Exceptions in Determining Building Height

1) <A roof-top enclosure shall not be considered as a *storey* in calculating the *building height* if the roof-top enclosure is
a) provided for elevator machinery, a stairway or a *service room*, and
b) used for no purpose other than for service to the *building*.>

2) Space under tiers of seats in a *building* of the arena type shall not be considered as adding to the *building height* provided the space is used only for dressing rooms, concession stands and similar purposes incidental to the *major occupancy* of the *building*.

3) Except as required by Sentence (5), a *mezzanine* need not be considered as a *storey* in calculating the *building height*, provided
a) not less than 60% of the horizontal plane separating the *mezzanine* from the room or floor space in which it is located is open, and
b) except as permitted in Sentences (7) and 3.3.2.12.(3), the space above the *mezzanine* is used as a visually open area without *partitions* or subdividing walls higher than 1 070 mm above the *mezzanine* floor. (See Appendix A)

4) Except as required by Sentence (5), the space above a *mezzanine* need not be considered as a *storey* in calculating the *building height*, provided
a) the aggregate area of *mezzanines* that are not superimposed and do not meet the conditions of Sentence (3) does not exceed 10% of the *floor area* in which they are located, and
b) the area of a *mezzanine* in a *suite* does not exceed 10% of the area of that *suite* <(see Appendix A)>.

3.3.4.8. <Protection of Openable Windows

1) Except as provided in Sentence (2), openable windows in *suites* of *residential occupancy* shall be protected by

a) a *guard* with a minimum height of 1 070 mm constructed in accordance with Article 3.3.1.18., or

b) a mechanism capable of controlling the free swinging or sliding of the openable part of the window so as to limit any clear unobstructed opening to not more than 100 mm measured either vertically or horizontally where the other dimension is greater than 380 mm.

2) Windows need not be protected in accordance with Sentence (1) where

a) the only opening having greater dimensions than those allowed by Clause (1)(b) is located higher than 1 070 mm above the finished floor, or

b) the bottom edge of the openable portion of the window is located less than 1 800 mm above the floor or ground on the other side of the window.>

3.3.4.9. Resistance to Forced Entry

1) <*Dwelling units* shall conform to Article 9.7.2.1. and Subsection 9.7.5.>

3.3.5. Industrial Occupancy

3.3.5.1. Scope

1) This Subsection applies to *industrial occupancies*.

3.3.5.2. Fire Extinguishing Systems

1) In addition to other requirements in this Code for the installation of automatic fire extinguishing systems, an appropriate fire extinguishing system shall be installed in every *industrial occupancy floor area* to provide protection if required by

a) provincial regulations or municipal bylaws, or

b) the British Columbia Fire Code, in the absence of the regulations or bylaws referred to in Clause (a).

3.3.5.3. Basements

1) A *basement* shall not be used for the storage, manufacture or handling of volatile solids, liquids or gases that generate explosive air-vapour mixtures or for processes that involve explosive dusts.

2) Entrances and *exits* to a *basement* and to rooms containing *building* services shall be separate from the remainder of the *building* in a *building* in which

a) the storage, manufacture or handling of volatile materials can generate explosive air-vapour mixtures, or

b) processes occur that produce explosive dusts.

3) *Basements* and rooms referred to in Sentence (2) shall be separated from the remainder of the *building* with a vapour-tight separation.

3.3.5.4. Repair and Storage Garages

1) If access is provided from a *storage garage* to a stair tower or elevator serving *occupancies* above the level of the *storage garage*, the access shall be through a vestibule conforming to Sentence 3.3.5.7.(4).

2) Treads and landings in interior stairs that extend to the roof of a *storage garage* shall be designed to be free of accumulations of ice and snow.

3) A mechanical *storage garage* not more than 4 *storeys* in *building height*, in which no persons other than parking attendants are permitted above the *street* floor level, need not have a *fire separation* between the *exits* and the remainder of the *building*.

4) A garage shall be provided with natural or mechanical ventilation in conformance with the requirements of Subsection 6.2.2. to prevent excessive accumulation of carbon monoxide, exhaust fumes or flammable and toxic vapours.

5) The clear height in a *storage garage* shall be not less than 2 m.

6) A continuous curb not less than 150 mm high and a *guard* not less than 1 070 mm high shall be provided at every garage floor opening and around the perimeter of every floor where the exterior walls are omitted.

7) Except for *open-air storeys*, every *storey* of a *storage garage* or *repair garage* located below *grade* shall be *sprinklered*.

3.3.5.5. Repair Garage Separation

1) A *repair garage* and any ancillary spaces serving it, including waiting rooms, reception rooms, tool and parts storage areas and supervisory office space, shall be separated from other *occupancies* by a *fire separation* having a *fire-resistance rating* not less than 2 h.

3.3.5.6. Storage Garage Separation

1) Except as permitted by Sentences 3.3.4.2.(4) and (5), a *storage garage* shall be separated from other *occupancies* by a *fire separation* with a *fire-resistance rating* not less than 1.5 h.

3.3.5.7. Vestibules

1) <Except as provided in Sentence (2),> if access is provided through a *fire separation* between a *storage garage* and a Group A, Division 1 or Group B *occupancy*, the access shall be through a vestibule conforming to Sentence (4).

2) <If access is provided through a *fire separation* between a *storage garage* and a Group B, Division 3 *occupancy* with not more than 10 occupants, access need not be through a vestibule, provided the *fire separation* complies with Clauses 3.3.4.2.(5)(b) to (d).>

3) In a *building* more than 3 *storeys* in *building height*, access through a *fire separation* between a *storage garage* and a Group A, Division 2, 3 or 4, or a Group C *occupancy*, shall be through a vestibule conforming to Sentence (4).

4) If access is provided through a vestibule, as required by Sentences (1), (3) and 3.3.5.4.(1), the vestibule shall

a) be not less than 1.8 m long,

b) be ventilated

   i) naturally to outside air by a vent that has an unobstructed area of not less than 0.1 m^2 for each door that opens into the vestibule but not less than 0.4 m^2, or

   ii) mechanically at a rate of 14 m^3/h for each square metre of vestibule floor surface area, and

c) have openings between the vestibule and an adjoining *occupancy* provided with self-closing doors with no hold-open devices.

3.3.5.8. Dispensing of Fuel

1) Facilities for the dispensing of fuel having a *flash point* below 37.8°C shall not be installed above any space intended for *occupancy*.

2) Facilities for the dispensing of fuel having a *flash point* below 37.8°C shall not be installed in any *building*, except that this requirement does not apply to a canopy which is open on not less than 75% of its perimeter.

3.3.5.9. Multiple Tenant Self Storage Warehouses

1) Unless the *building* is *sprinklered* throughout, each individual tenancy in a multiple tenant self storage warehouse classified as an *industrial occupancy* shall be separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* not less than 45 min.

3.3.6. <Design of Hazardous Areas

3.3.6.1. Application

1) This Subsection applies to design and fire protection requirements for *buildings* or parts thereof used for the storage, handling, use and processing of *dangerous goods*, including *flammable liquids* and *combustible liquids*, in quantities in excess of those identified in Table 3.2.7.1. of Division B of the British Columbia Fire Code. (See Appendix A.)

3.3.6.2. Storage of Dangerous Goods

1) Solid and liquid Class 5 oxidizing substances shall be separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* of not less than 2 h.

2) Reactive substances shall be separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* of not less than 2 h. (See Appendix A.)

3) The design of *buildings* or parts thereof used for the storage of Class 1 *dangerous goods* shall conform to the "Explosives Act" and its Regulations, published by Natural Resources Canada.

4) Where wiring or electrical equipment is located in areas in which flammable gases or vapours, *combustible dusts* or *combustible fibres* are present in quantities sufficient to create a hazard, such wiring and electrical equipment shall conform to the Electrical Safety Regulation.

11) The clearance between a handrail and any surface behind it shall be not less than
a) 50 mm, or
b) 60 mm if the surface behind the handrail is rough or abrasive.

12) Handrails and their supports shall be designed and constructed to withstand the loading values obtained from the non-concurrent application of
a) a concentrated load not less than 0.9 kN applied at any point and in any direction for all handrails, and
b) a uniform load not less than 0.7 kN/m applied in any direction to handrails not located within *dwelling units*.

13) A ramp shall have handrails on both sides.

3.4.6.6. Guards

1) Every *exit* shall have a wall or a well-secured *guard* on each side.

2) Except as required by Sentence (4), the height of *guards* for *exit* stairs shall be not less than 920 mm measured vertically to the top of the *guard* from a line drawn through the outside edges of the stair nosings and 1 070 mm around landings.

3) The height of *guards* for *exit* ramps and their landings shall be not less than 1 070 mm measured vertically to the top of the *guard* from the ramp surface.

4) The height of *guards* for exterior stairs and landings more than 10 m above adjacent ground level shall be not less than 1 500 mm measured vertically to the top of the *guard* from the surface of the landing or from a line drawn through the outside edges of the stair nosings.

5) Unless it can be shown that the size of openings that exceed this limit does not present a hazard, there shall be no opening that permits the passage of a sphere whose diameter is more than 100 mm through a *guard* for an *exit*.

6) In a stairway, a window for which the distance measured vertically between the bottom of the window and a line drawn through the outside edges of the stair nosings is less than 900 mm, or a window that extends to less than 1 070 mm above the landing, shall
a) be protected by a *guard* that is
   i) located approximately 900 mm above a line drawn through the outside edges of the stair nosings, or
   ii) not less than 1 070 mm high measured to the top of the *guard* from the surface of the landing, or
b) be fixed in position and designed to resist the lateral design loads specified for *guards* and walls in Articles 4.1.5.14. and 4.1.5.16.

7) Unless it can be shown that the location and size of openings do not present a hazard, *guards* shall be designed so that no member, attachment or opening located between 140 mm and 900 mm above the level being protected by the *guard* facilitates climbing.

3.4.6.7. Ramp Slope

(See also <Article 3.8.3.3.>)

1) Except as required for aisles by Article 3.3.2.5., the maximum slope of a ramp shall be
a) 1 in 10 in any *assembly*, <*care*, *treatment*, *detention*> or *residential occupancy*,
b) 1 in 6 in rooms or *floor areas* classified as a *mercantile* or *industrial occupancy*,
c) 1 in 8 in any other *floor area*, and
d) 1 in 10 for an exterior ramp.

3.4.6.8. Treads and Risers

(See A-9.8.4. in Appendix A.)

1) Except as permitted for *dwelling units* and by Sentence 3.4.7.5.(1) for fire escapes, steps for stairs shall have a run of not less than 280 mm between successive steps.

2) Steps for stairs referred to in Sentence (1) shall
a) have a rise between successive treads not less than 125 mm and not more than 180 mm,
b) have a closed riser, and
c) <have
   i) a riser with a rakeback of not more than 38 mm, or
   ii) the underside of the nosing with an angle of not less than 60° from the horizontal.>

3) <Except in fire escape stairs and where an exterior stair adjoins a *walkway* as permitted in Sentence 3.4.6.3.(3), risers, measured as the vertical nosing-to-nosing distance, shall be of uniform height in any one flight, with a maximum tolerance of

a) 5 mm between adjacent treads or landings, and

b) 10 mm between the tallest and shortest risers in a flight.

4) Except in fire escape stairs, treads, measured as the horizontal nosing-to-nosing distance, shall have a uniform run with a maximum tolerance of

a) 5 mm between adjacent treads, and

b) 10 mm between the deepest and shallowest treads in a flight.

5) Treads and risers shall not differ significantly in run and rise in successive flights in any stair system.

6) Where angled treads are incorporated into a stair, the treads in all sets of angled treads within a flight shall turn in the same direction.

7) The slope of treads or landings shall not exceed 1 in 50.>

8) The top of the nosing of stair treads shall

a) except as permitted in Sentence (10), have either a radius or a bevel between 6 mm and 10 mm in horizontal dimension,

b) have no abrupt angles on the underside, and

c) not project more than 38 mm.

9) The front edge of stair treads in *exits* and public *access to exits* shall be at right angles to the direction of *exit* travel.

10) If resilient material is used to cover the <nosing> of a stair tread, the minimum <rounded or bevelled edge> required by Sentence (8) is permitted to be reduced to 3 mm.

11) <Stairs shall be provided with tactile warning strips conforming to Article 3.8.3.11. unless the stairs are

a) stairs within or serving *dwelling units*,

b) *exit* stairs not normally used for access purposes, or

c) fire escape stairs.>

3.4.6.9. Curved Stairs

1) Except as permitted by Sentence (2), tapered treads shall not be used in an *exit*.

2) A curved stair used as an *exit* shall have

a) a handrail on each side,

b) treads with a minimum run of 240 mm exclusive of nosings,

c) treads that conform to Article 3.4.6.8. where they are measured 230 mm away from the handrail at the narrow end of the tread, and

d) an inside radius that is not less than twice the stair width.

3.4.6.10. Horizontal Exits

1) The *floor area* on each side of a *horizontal exit* shall be sufficient to accommodate the occupants of both *floor areas*, allowing not less than 0.5 m^2 of clear floor space per person, except that 1.5 m^2 shall be provided for each person in a wheelchair and 2.5 m^2 for each bedridden patient.

2) If vestibules, enclosed balconies or bridges are used as parts of a *horizontal exit*, their clear width shall be not less than that of the *exit* doorways opening into them, except that handrails are not permitted to project into this clear width more than 100 mm.

3) In a *horizontal exit* where there is a difference in level between the connected *floor areas*, slopes not more than those specified for ramps in Article 3.4.6.7. are permitted to be used.

4) No stairs or steps shall be used in a *horizontal exit*.

5) If 2 doors are provided in a *horizontal exit* that comprises a part of the required number of *exits* from the *floor areas* on both sides of the *exit*

a) the doors shall be mounted adjacent to each other with the door on the right side in the direction of travel through the *horizontal exit* swinging in the direction of travel through the *horizontal exit*, and

b) signs shall be provided on each side of the *horizontal exit* to indicate the door that swings in the direction of travel from that side.

(See Appendix A.)

6) If a *horizontal exit* utilizes bridges between *buildings* or outside balconies, the bridges or balconies shall conform to Article 3.2.3.19.

3.4.6.11. Doors

1) The distance between a stair riser and the leading edge of a door during its swing shall be not less than 300 mm.

2) No *exit* door shall open directly onto a step except that, if there is danger of blockage from ice or snow, an *exit* door is permitted to open onto not more than one step which shall be not more than 150 mm high.

3) *Exit* doors shall be clearly identifiable. (See Appendix A.)

4) No door leaf in an *exit* doorway with more than one leaf shall be less than 610 mm wide.

3.4.6.12. Direction of Door Swing

1) Except for doors serving a single *dwelling unit* and except as permitted by Article 3.4.6.14., every *exit* door shall

a) open in the direction of *exit* travel, and

b) swing on its vertical axis.

3.4.6.13. Self-closing Devices

1) An *exit* door that is normally required to be kept closed

a) shall be provided with a self-closing mechanism, and

b) shall never be secured in an open position except as permitted by Sentence 3.1.8.12.(1).

3.4.6.14. Sliding Doors

1) Except as permitted by Sentence (2) an *exit* door leading directly to outdoors at ground level is permitted to be a sliding door provided it conforms to Sentence 3.3.1.12.(1).

2) An *exit* door serving a Group B, Division 1 *occupancy*, or an *impeded egress zone* in other *occupancies*, is permitted to be a sliding door that does not conform to Sentence 3.3.1.12.(1) provided it is designed to be released in conformance with Article 3.3.1.13.

3.4.6.15. Revolving Doors

1) Except as permitted by Sentence (3), a revolving door, if used, shall

a) be collapsible,

b) have hinged doors providing equivalent exiting capacity located adjacent to it,

c) be used as an *exit* from the ground floor level only,

d) not be used at the foot of any stairway, and

e) have all glass in door leaves and enclosure panels conforming to

i) CAN/CGSB-12.1-M, “Tempered or Laminated Safety Glass,” or

ii) CAN/CGSB-12.11-M, “Wired Safety Glass.”

2) Except as permitted by Sentence (3), a revolving door shall not be considered to have an exiting capacity for more than 45 persons.

3) An electrically powered revolving door is not required to conform to Sentences (1) and (2) provided

a) the door leaves will collapse and stop automatic rotation of the door system and not obstruct the doorway if a force not more than that specified in Sentence 3.4.6.16.(2) is applied at the centre of a door leaf,

b) the door leaves are capable of being opened from inside the *building* without requiring keys, special devices, or specialized knowledge of the door opening mechanism,

c) the allowable exiting capacity is based on the clear width of passage through the door enclosure when the doors are fully collapsed,

d) a permanent sign, whose centreline is between 1 000 mm and 1 500 mm above the floor, is placed on each face of each door leaf indicating the method for collapsing the door leaf in an emergency, and

e) glass used for door leaves and enclosure panels is safety glass conforming to

i) CAN/CGSB-12.1-M, “Tempered or Laminated Safety Glass,” or

ii) CAN/CGSB-12.11-M, “Wired Safety Glass.”

3.4.6.16. Door Release Hardware

1) Except for devices on doors serving a *contained use area* or an *impeded egress zone* designed to be remotely released in conformance with Article 3.3.1.13., and except as permitted by Sentence (4) and Article 3.4.6.17., locking, latching and other fastening devices on a principal entrance door to a *building* as well as on every *exit* door shall permit the door to be readily opened from the inside with not more than one releasing operation and without requiring keys, special devices or specialized knowledge of the door opening mechanism. (See Appendix A.)

2) If a door is equipped with a latching mechanism, a device that will release the latch and allow the door to swing wide open when a force of not more than 90 N is applied to the device in the direction of travel to the *exit* shall be installed on

a) every *exit* door from a *floor area* containing an *assembly occupancy* having an *occupant load* more than 100,

b) every door leading to an *exit* lobby from an *exit* stair shaft, and every exterior door leading from an *exit* stair shaft in a *building* having an *occupant load* more than 100, and

c) every *exit* door from a *floor area* containing a *high-hazard industrial occupancy*.

3) <Except as required by Clause 3.3.1.13.(10)(d), every *exit* door shall be designed and installed so that, when the latch is released, the door will open under a force of not more than 90 N, applied at the knob or other latch-releasing device.>

4) Electromagnetic locks that do not incorporate latches, pins or other similar devices to keep the door in the closed position are permitted to be installed on *exit* doors other than doors leading directly from a *high-hazard industrial occupancy*, provided

a) the *building* is equipped with a fire alarm system,

b) the locking device, and all similar devices in the *access to exit* leading to the *exit* door, release upon actuation of the fire *alarm signal*,

c) the locking device releases immediately upon loss of power controlling the electromagnetic locking mechanism and its associated auxiliary controls,

d) the locking device releases immediately upon actuation of a manually operated switch readily accessible only to authorized personnel,

e) a force of not more than 90 N applied to the door opening hardware initiates an irreversible process that will release the locking device within 15 s and not relock until the door has been opened,

f) upon release, the locking device must be reset manually by the actuation of the switch referred to in Clause (d), and

g) a legible sign is permanently mounted on the *exit* door to indicate that the locking device will release within 15 s of applying pressure to the door-opening hardware.

(See Appendix A.)

5) Door hardware for the operation of the doors referred to in this Section shall be installed at a height not more than 1 200 mm above the finished floor.

3.4.6.17. Security for Banks and Mercantile Floor Areas

1) If a *building* is *sprinklered* throughout, the requirements of Sentence 3.4.6.16.(1) are permitted to be waived for *exit* and egress doors complying with Sentences (2) to (9) that serve a *floor area* or part of a *floor area* used exclusively for

a) a bank, or

b) the sale of retail merchandise.

(See Appendix A.)

2) *Exit* and egress doors referred to in Sentence (1) shall be designed to prevent locking at any time that the part of the *floor area* that they serve is open to the public.

3) A sign with the words "This door shall not be locked at any time that the public is present" in letters not less than 50 mm high shall be permanently affixed to both sides of doors referred to in Sentence (1).

4) *Exit* and egress facilities complying with Sentences (5) to (9) shall be incorporated for egress by persons other than the public from a *floor area* or a part of a *floor area* referred to in Sentence (1) during times when the public is neither present nor being admitted to the area that they serve.

5) In *exit* and egress facilities referred to in Sentence (4), at least one door at each *exit* and egress location shall

a) be operable in conformance with Sentence 3.4.6.16.(1), or

b) be equipped with locks conforming to Sentence 3.4.6.16.(4) that release immediately

i) if an *alert signal* or *alarm signal* is initiated in the fire alarm system, or

ii) the sprinkler system is actuated.

4.3.2. Plain and Reinforced Masonry

4.3.2.1. Design Basis for Plain and Reinforced Masonry

1) *Buildings* and their structural members made of plain and reinforced masonry shall conform to CSA S304.1, "Design of Masonry Structures."

4.3.3. Plain, Reinforced and Pre-stressed Concrete

4.3.3.1. Design Basis for Plain, Reinforced and Pre-stressed Concrete

1) *Buildings* and their structural members made of plain, reinforced and pre-stressed concrete shall conform to CAN/CSA-A23.3, "Design of Concrete Structures." (See Appendix A.)

4.3.4. Steel

4.3.4.1. Design Basis for Structural Steel

1) *Buildings* and their structural members made of structural steel shall conform to CSA S16, "Design of Steel Structures." (See Appendix A.)

4.3.4.2. Design Basis for Cold-Formed Steel

1) *Buildings* and their structural members made of cold-formed steel shall conform to CAN/CSA-S136, "North American Specification for the Design of Cold-Formed Steel Structural Members." (See Appendix A.)

4.3.4.3. Steel Building Systems

1) Steel *building* systems shall be manufactured by companies certified in accordance with the requirements of CAN/CSA-A660, "Certification of Manufacturers of Steel Building Systems."

4.3.5. Aluminum

4.3.5.1. Design Basis for Aluminum

1) *Buildings* and their structural members made of aluminum shall conform to <CAN/CSA-S157/S157.1, "Strength Design in Aluminum/Commentary on CSA S157-05, Strength Design in Aluminum,"> using the loads stipulated in Section 4.1., in accordance with limit states design in Subsection 4.1.3.

4.3.6. Glass

4.3.6.1. Design Basis for Glass

1) <Glass used in *buildings* shall be designed in conformance with

a) CAN/CGSB-12.20-M, "Structural Design of Glass for Buildings," or

b) ASTM E1300, "Standard Practice for Determining Load Resistance of Glass in Buildings.">

Section 4.4. Design Requirements for Special Structures

4.4.1. Air-Supported Structures

4.4.1.1. Design Basis for Air-Supported Structures

1) The structural design of *air-supported structures* shall conform to <CSA S367, "Air-, Cable-, and Frame-Supported Membrane Structures,"> using the loads stipulated in Section 4.1., in accordance with limit states design in Subsection 4.1.3.

4.4.2. Parking Structures

4.4.2.1. Design Basis for Parking Structures

1) Parking structures shall be designed in conformance with CSA S413, "Parking Structures."

Section 4.5. Objectives and Functional Statements

4.5.1. Objective<s> and Functional Statements

4.5.1.1. Attributions to Acceptable Solutions

1) For the purpose of compliance with this Code as required in Clause 1.2.1.1.(1)(b) of Division A, the objectives and functional statements attributed to the acceptable solutions in this Part shall be the objectives and functional statements listed in Table 4.5.1.1. (See A-1.1.2.1.(1) in Appendix A.)

Table 4.5.1.1.

Table 4.5.1.1. is located in Volume 2, Attribution Tables.

Table 5.10.1.1.
Standards Applicable to Environmental Separators and Assemblies Exposed to the Exterior
Forming part of Sentence 5.10.1.1.(1)

Issuing Agency	Document Number	Title of Document
ULC	CAN/ULC-S702	Mineral Fibre Thermal Insulation for Buildings
ULC	CAN/ULC-S703	Cellulose Fibre Insulation (CFI) for Buildings
ULC	CAN/ULC-S704	Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Faced
ULC	CAN/ULC-S705.1	Thermal Insulation – Spray-Applied Rigid Polyurethane Foam, Medium Density – Material - Specification
ULC	CAN/ULC-S705.2	Thermal Insulation – Spray-Applied Rigid Polyurethane Foam, Medium Density <— Application>
<ULC	CAN/ULC-S706	Standard for Wood Fibre Insulating Boards for Buildings>

Notes to Table 5.10.1.1.:
(1) See Appendix A.

5.10.2. <Windows, Doors, Skylights and Other Glazed Products

5.10.2.1. General

1) This Subsection applies to windows, doors, skylights, other glazed products and their components that separate
a) interior space from exterior space, or
b) environmentally dissimilar interior spaces.

2) For the purposes of this Subsection, the term "skylight" refers to unit skylights, roof windows and tubular daylighting devices.

3) Windows, doors, skylights, other glazed products and their components that are required to have a *fire-protection rating* need not conform to this Subsection. (See Appendix A.)

5.10.2.2. Design and Construction

(See Appendix A.)

1) Windows, doors, skylights and their components shall be designed and constructed in accordance with
a) Subsection 5.1.4., Section 5.3., Section 5.4. and Section 5.6., or
b) the following standards:
   i) AAMA/WDMA/CSA 101/I.S.2/A440, "NAFS – North American Fenestration Standard/Specification for Windows, Doors, and Skylights," and
   ii) except as permitted by Sentence (3), CSA A440SI, "Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440, NAFS – North American Fenestration Standard/Specification for Windows, Doors, and Skylights."

(See Appendix A.)

2) Other glazed products and their components shall be designed and constructed in accordance with Subsection 5.1.4., Section 5.3., Section 5.4. and Section 5.6. (See Appendix A.)

3) For the purposes of conformance with Subclause (1)(b)(ii), loads and procedures from Section 5.2. may be used instead of the loads and procedures set out in the standard. (See Appendix A.)

5.10.2.3. [Reserved.]>

5.10.2.4. Heat Transfer

1) <Windows, doors and skylights shall meet the heat transfer performance requirements stated in Section 5.3. (See A-5.3.1.2. in Appendix A.)>

2) Except as provided in Sentence (3), all metal-framed glazed assemblies separating interior *conditioned space* from interior unconditioned space or exterior space shall incorporate a thermal break to minimize condensation.

3) Metal-framed glazed assemblies need not comply with Sentence (2) where these assemblies are
a) storm windows or doors, or
b) windows or doors that are required to have a *fire-protection rating*.

(See Appendix A.)

Section 5.11. Objectives and Functional Statements

(See Appendix A and Part 10.)

5.11.1. Objectives and Functional Statements

5.11.1.1. Attributions to Acceptable Solutions

1) For the purpose of compliance with this Code as required in Clause 1.2.1.1.(1)(b) of Division A, the objectives and functional statements attributed to the acceptable solutions in this Part shall be the objectives and functional statements listed in Table 5.11.1.1. (See A-1.1.2.1.(1) in Appendix A.)

Table 5.11.1.1.

Table 5.11.1.1. is located in Volume 2, Attribution Tables.

Section 9.6. <Glass>

9.6.1. General

9.6.1.1. <Application

1) This Section applies to glass, and the protection of glass, in

a) doors, including closet doors and sidelights for doors,

b) windows,

c) skylights as defined in Sentence 9.7.1.1.(2),

d) shower or bathtub enclosures, and

e) glazed panels and partitions.

(See Appendix A.)>

9.6.1.2. <Material Standards for> Glass

1) Glass shall conform to

a) CAN/CGSB-12.1-M, "Tempered or Laminated Safety Glass,"

b) CAN/CGSB-12.2-M, "Flat, Clear Sheet Glass,"

c) CAN/CGSB-12.3-M, "Flat, Clear Float Glass,"

d) CAN/CGSB-12.4-M, "Heat Absorbing Glass,"

e) CAN/CGSB-12.8, "Insulating Glass Units,"

f) CAN/CGSB-12.10-M, "Glass, Light and Heat Reflecting,"

g) CAN/CGSB-12.11-M, "Wired Safety Glass," or

h) ASTM E 2190, "Insulating Glass Unit Performance and Evaluation."

2) Mirrored glass doors may be used only at the entrance to clothes closets and shall conform to the requirements of CAN/CGSB-82.6-M, "Doors, Mirrored Glass, Sliding or Folding, Wardrobe." (See Appendix A.)

9.6.1.3. <Structural Sufficiency of Glass

1) Except as permitted by Sentence (2), glass used in *buildings* shall be designed in conformance with

a) CAN/CGSB-12.20-M, "Structural Design of Glass for Buildings," or

b) ASTM E1300, "Standard Practice for Determining Load Resistance of Glass in Buildings."

2) Individual panes of glass conforming to Table 9.6.1.3. that are used in doors need not comply with Sentence (1).>

Table 9.6.1.3.
Glass Area for Doors
Forming part of Sentence 9.6.1.3.(2)

Glass Thickness, mm	Maximum Glass Area, $m^{2(1)}$						
	Type of Glass						
	Annealed	Annealed, Multiple-Glazed, Factory-Sealed Units	Laminated	Wired	Heat-Strengthened	Fully Tempered	Fully Tempered, Multiple-Glazed, Factory-Sealed
3	0.50	0.70	(2)	(2)	1.00	1.00	2.00
4	1.00	1.50	(2)	(2)	1.50	4.00	4.00
5	1.50	1.50	(2)	(2)	1.50	No limit	No limit
6	1.50	1.50	1.20	1.00	1.50	No limit	No limit

Notes to Table 9.6.1.3.:

(1) See Appendix A.

(2) Not generally available.

9.6.1.4. <Types of Glass and Protection of Glass

1) Glass sidelights greater than 500 mm wide that could be mistaken for doors, glass in storm doors and glass in sliding doors within or at every entrance to a *dwelling unit* and in public areas shall be

a) safety glass of the tempered or laminated type conforming to CAN/CGSB-12.1-M, "Tempered or Laminated Safety Glass," or

b) wired glass conforming to CAN/CGSB-12.11-M, "Wired Safety Glass."

2) Except as provided in Sentence (4), glass in entrance doors to *dwelling units* and in public areas, other than the entrance doors described in Sentence (1), shall be safety glass or wired glass of the type described in Sentence (1) where the glass area exceeds 0.5 m^2 and extends to less than 900 mm from the bottom of the door.

3) Except as provided in Sentence (4), transparent panels that could be mistaken as a *means of egress* shall be protected by barriers or railings.

4) Sliding glass *partitions* that separate a *public corridor* from an adjacent *occupancy* and that are open during normal working hours need not conform to Sentences (2), (3) and (5), except that such *partitions* shall be suitably marked to indicate their existence and position.

5) Except as provided in Sentence (4), every glass or transparent door accessible to the public shall be equipped with hardware, bars or other permanent fixtures designed so that the existence and position of such doors is readily apparent.

6) Glass other than safety glass shall not be used for a shower or bathtub enclosure.>

Section 9.7. Windows, <Doors> and Skylights

<(See Appendix A and A-9.7.4. in Appendix A.)>

9.7.1. General

9.7.1.1. Application

1) This Section applies to

a) windows, doors and skylights separating *conditioned space* from unconditioned space or the exterior, and

b) main entrance doors.

2) For the purpose of this Section, the term "skylight" refers to unit skylights, roof windows and tubular daylighting devices.

3) <For the purpose of this Section, the term "doors" includes glazing in doors and sidelights for doors but does not include vehicular access doors.>

9.7.2. <Required Windows, Doors and Skylights>

9.7.2.1. <Entrance Doors>

1) A door shall be provided at each entrance to a *dwelling unit*.

2) Main entrance doors to *dwelling units* shall be provided with

a) a door viewer or transparent glazing in the door, or

b) a sidelight.

9.7.2.2. <[Reserved].>

9.7.3. Performance of Windows, Doors and Skylights

9.7.3.1. <General

1) [Reserved.]

2) Skylights and their components shall be designed, constructed and installed so that they resist snow loads.>

9.7.3.2. Heat Transfer Performance

1) Windows, doors and skylights and their components described in Clause 9.7.1.1.(1)(a) shall be designed, constructed and installed to

a) minimize surface condensation on the warm side of the component (see Appendix A), and

b) ensure comfortable conditions for occupants.

2) Compliance with the heat transfer performance requirements described in Sentence (1) shall be demonstrated by
a) complying with the requirements in Article 9.7.3.3., or
b) design and construction conforming to Part 5.

9.7.3.3. Thermal Characteristics of Windows, Doors and Skylights

1) <Except as permitted in Sentence (2), metal frames, and metal sashes, of windows, doors and skylights shall incorporate a thermal break.

2) Windows and doors described in Sentence (1) do not require a thermal break where they
a) are installed as storm windows and doors, or
b) are required to have a *fire-protection rating*.>

3) Reserved.

4) Windows, doors and skylights with or without storm doors or sash that are installed in portions of *buildings* where the intended use of the interior space will result in high moisture generation shall be designed in conformance with Section 5.3. (See A-9.25.5.2. in Appendix A.)

9.7.4. <Design and Construction

(See Appendix A.)

9.7.4.1. General

1) Except as provided by Sentence (2), windows, doors, skylights and their components shall be designed and constructed in accordance with
a) Article 9.7.4.2., or
b) Part 5.

2) Windows, doors, skylights and their components that are required to have a *fire-protection rating* need not conform to this Subsection (See Appendix A.)

9.7.4.2. Standards

1) Except as permitted by Sentence (2) and Article 9.7.4.3., windows, doors, skylights and their components shall conform to
a) AAMA/WDMA/CSA 101/I.S.2/A440, "NAFS – North American Fenestration Standard/Specification for Windows, Doors, and Skylights" (Harmonized Standard), and
b) A440S1, "Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440, NAFS – North American Fenestration Standard/Specification for Windows, Doors, and Skylights."

(See Appendix A.)

2) A door designated as a "Limited Water" door in accordance with the standard referenced in Clause (1)(a) shall not be used unless the door
a) separates a *dwelling unit* from an unconditioned *storage garage* or a carport,
b) conforms to Clauses 3.3.1.13.(1)(a), (b) and (c) and Sentences 3.3.1.13.(5) and (10), or
c) is not required by Sentence 9.27.3.8.(3) to have flashing installed.

9.7.4.3. Performance Requirements

1) For the purposes of compliance with the standard referenced in Clause 9.7.4.2.(1)(b), windows, doors and their components in a *building* of no more than 10 m in height, measured from *grade*, may conform to the design pressure, performance grade and water resistance values in Table C-4 of Appendix C instead of the values calculated in the Canadian Supplement.

2) For *buildings* described in Sentence 1.3.3.3.(1) of Division A, where design pressure, performance grade and water resistance values are calculated in accordance with the standard referenced in Clause 9.7.4.2.(1)(b), the driving rain wind pressure (DRWP) values in Table A.1 of CSA A440S1, "Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440, NAFS – North American Fenestration Standard/Specification for Windows, Doors, and Skylights," shall be used. (See Appendix A.)>

9.7.5. <Resistance to Forced Entry>

9.7.5.1. <Resistance to Forced Entry for Sliding Doors

1) This Article applies to sliding doors serving *dwelling units*, other than exterior doors to garages and to other ancillary spaces.

2) Sliding doors shall not permit the removal of the sliding panel when in the locked position.

3) Exterior doors shall

a) have a pin type locking mechanism, with a minimum 9 mm throw into the frame, or an equivalent locking mechanism, operable from the interior without the use of keys, special devices or specialized knowledge of the locking mechanism, or

b) conform to at least Grade 10 in ASTM F842, "Standard Test Methods for Measuring the Forced Entry Resistance of Sliding Door Assemblies, Excluding Glazing Impact."**>**

9.7.5.2. <Resistance to Forced Entry for Swinging Doors>

1) Except **<**for exterior doors to garages and to other ancillary spaces, this Article**>** applies to

a) swinging entrance doors to *dwelling units*,

b) swinging doors between *dwelling units* and attached garages or other ancillary spaces, and

c) swinging doors that provide access directly or indirectly from a *storage garage* to a *dwelling unit*.

(See Appendix A.)

2) **<**Doors, frames and hardware that conform to AAMA 1304, "Voluntary Specification for Forced Entry Resistance of Side-Hinged Door Systems," are not required to conform to Sentences (3) to (7).

3) Wood doors described in Sentence (1) shall

a) be solid core or stile-and-rail type,

b) be not less than 45 mm thick, and

c) if of the stile-and-rail type, have a panel thickness of not less than 19 mm, with a total panel area not more than half of the door area.

4) Doors described in Sentence (1) shall be provided with

a) a deadbolt lock with a cylinder having no fewer than 5 pins, and

b) a bolt throw not less than 25 mm long, protected with a solid or hardened free-turning ring or bevelled cylinder housing.

(See Article 9.9.6.7.)

5) An inactive leaf in double doors used in locations specified in Sentence (1) shall be provided with heavy-duty bolts top and bottom having an engagement of not less than 15 mm.

6) Hinges for doors described in Sentence (1) shall be fastened

a) to wood doors with wood screws not less than 25 mm long and to wood frames with wood screws so that at least 2 screws per hinge penetrate not less than 30 mm into solid wood, or

b) to metal doors and metal frames with machine screws not smaller than No. 10 and not less than 10 mm long.

(See Appendix A.)**>**

7) Strikeplates for deadbolts described in Sentence (4) shall be fastened

a) to wood frames with wood screws that penetrate not less than 30 mm into solid wood, or

b) to metal frames with machine screws not smaller than No. 8 and not less than 10 mm long.

(See A-9.7.5.2.(6) in Appendix A.)

8) Except for storm or screen doors, doors described in Sentence (1) that swing outward shall be provided with hinges or pins so that the doors cannot be removed when they are in the closed position. (See Appendix A.)

9) Solid blocking shall be provided on both sides at the lock height between the jambs for doors described in Sentence (1) and the structural framing so that the jambs will resist spreading by force.

9.7.5.3. <Resistance to Forced Entry for Windows>

1) In *dwelling units*, windows, any part of which is located within 2 m of adjacent ground level, shall conform to the requirements for resistance to forced entry as described in <Clause 5.3.5 of AAMA/WDMA/CSA 101/I.S.2/A440, "NAFS – North American Fenestration Standard/Specification for Windows, Doors, and Skylights."> (See Appendix A.)

9.7.6. <Installation>

9.7.6.1. <Installation of Windows, Doors and Skylights

1) Except as provided by Sentence (2), the installation of manufactured and pre-assembled windows, doors and skylights and the field assembly of manufactured window and door combination units shall conform to the instructions, if any, provided by the manufacturer.

2) In case of conflict between the provisions of this Code and instructions referred to in Sentence (1), the provisions of this Code shall govern.>

9.7.6.2. <Sealants, Trim and Flashing>

1) The sealing compound used to seal the glass component of <an insulating glazing unit> to the sash component shall be compatible with the sealing compound used to edge seal the glass component.

2) <Flashing used to protect openings shall conform to Articles 9.27.3.7. and 9.27.3.8.>

3) <Sealants shall be applied> between window frames or trim and the exterior cladding or masonry in conformance with Subsection 9.27.4.

4) <All unfinished portions of the frame and other components of aluminum windows, doors or skylights in contact with the edges of masonry, concrete, stucco or plaster shall be protected with an alkali-resistant coating.>

Section 9.8. Stairs, Ramps, Handrails and Guards

9.8.1. Application

9.8.1.1. General

1) This Section applies to the design and construction of interior and exterior stairs, steps, ramps, handrails and *guards*.

9.8.1.2. <Stairs, Ramps, Landings, Handrails and Guards in Garages

1) Where stairs, ramps, landings, handrails or *guards* are installed in garages that serve a single *dwelling unit*, the garage shall be considered to be part of the *dwelling unit* and the requirements for stairs, ramps, landings, handrails and *guards* within *dwelling units* shall apply.>

9.8.1.3. Exit Stairs, Ramps and Landings

1) Where a stair, ramp or landing forms part of an *exit*, the appropriate requirements in Sections 9.9. and 9.10. shall also apply.

9.8.1.4. Escalators and Moving Walkways

1) Escalators and moving *walkways* shall conform to the appropriate requirements in Part 3.

9.8.2. Stair Dimensions

9.8.2.1. Stair Width

1) <Except as provided in Sentence (2),> required *exit* stairs and public stairs <serving *buildings* of *residential occupancy*> shall have a width of not less than 900 mm.

2) <*Exit* stairs serving a single *dwelling unit* shall have a width of not less than 860 mm.

3) Required *exit* stairs and public stairs serving *buildings* of other than *residential occupancy* shall have a width of not less than the greater of

a) 900 mm, or

b) 8 mm per person based on the *occupant load* limits specified in Table 3.1.17.1.>

4) At least one stair between each floor level within a *dwelling unit*, and exterior stairs serving a single *dwelling unit* except required *exit* stairs, shall have a width of not less than 860 mm.

9.8.2.2. Height over Stairs

1) The clear height over stairs shall be measured vertically<, over the clear width of the stair, from a straight line tangent to the tread and landing nosings to the lowest point above. (See A-3.4.3.4. in Appendix A.)>

2) <Except as permitted by Sentences (3) and (4), the clear height over stairs shall not be less than 2 050 mm.

3) The clear height over stairs serving a single *dwelling unit* shall not be less than 1 950 mm.

4) Reserved.>

9.8.3. Stair Configurations

9.8.3.1. Straight and Curved Runs in Stairs

1) Except as provided in Sentence (2), stairs shall consist of
a) straight-run flights, or
b) curved flights.

2) Stairs within *dwelling units* shall consist of
a) straight-run flights,
b) curved flights, or
c) straight runs with winders.

3) Only one set of winders described in Sentence (2) shall be permitted between floor levels.

9.8.3.2. Minimum Number of Risers

1) Except for stairs within a *dwelling unit*, at least 3 risers shall be provided in interior flights.

9.8.3.3. Maximum Height of Stairs

1) The vertical height of any flight of stairs shall not exceed 3.7 m.

Table 9.10.2.1.
Occupancy Classifications
Forming part of Sentence 9.10.2.1.(1)

Group	Division	Description of *Major Occupancies*(1)
C	—	*Residential occupancies*
D	—	*Business and personal services occupancies*
E	—	*Mercantile occupancies*
F	2	*Medium-hazard industrial occupancies*
F	3	*Low-hazard industrial occupancies* (Does not include *storage garages* serving individual dwelling units)

Notes to Table 9.10.2.1.:
(1) See A-3.1.2.1.(1) in Appendix A.

9.10.2.2. Custodial, Convalescent and Residential Care Homes

1) Children's custodial homes and convalescent homes for ambulatory occupants living as a single housekeeping unit in a *dwelling unit* with sleeping accommodation for not more than 10 persons are permitted to be classified as <Group C, *residential occupancies*.>

2) A care facility accepted for residential use pursuant to provincial legislation is permitted to be classified as a *residential occupancy* provided

a) the occupants live <as a single housekeeping unit in a *dwelling unit*> with sleeping accommodation for not more than 10 persons,

b) interconnected *smoke alarms* are installed in each sleeping room in addition to the requirements of Article 9.10.19.2.,

c) emergency lighting is provided in conformance with <Article 9.9.12.3.>, and

d) the *building* is *sprinklered* throughout.

9.10.2.3. Group A, Division 2, Low Occupant Load

1) This Part may apply to a Group A , Division 2 <*assembly occupancy* that is permitted by Article 3.1.2.6. to be classified as Group D, *business and personal services occupancy*, provided the *building* in which the *assembly occupancy* is located complies with Sentence 1.3.3.1.(1).>

9.10.2.4. Major Occupancies above Other Major Occupancies

1) Except as permitted in Article 9.10.2.5., in any *building* containing more than one *major occupancy* in which one *major occupancy* is located entirely above another, the requirements of Article 9.10.8.1. for each portion of the *building* containing a *major occupancy* shall be applied to that portion as if the entire *building* was of that *major occupancy*.

9.10.2.5. Buildings Containing More Than One Major Occupancy

1) In a *building* containing more than one *major occupancy*, where the aggregate area of all *major occupancies* in a particular group or division does not exceed 10% of the *floor area* on the *storey* on which they are located, they need not be considered as *major occupancies* for the purposes of Articles 9.10.8.1. and 9.10.2.4. provided they are not classified as Group F, Division 2 *occupancies*.

9.10.3. Ratings

9.10.3.1. Fire-Resistance and Fire-Protection Ratings

1) Where a *fire-resistance rating* or a *fire-protection rating* is required in this Section for an element of a *building*, such rating shall be determined in conformance with the test methods described in Part 3, A-9.10.3.1. in Appendix A, or Appendix D.

9.10.3.2. Flame-Spread Ratings

1) Where a *flame-spread rating* is required in this Section for an element of a *building*, such rating shall be determined in accordance with the test methods described in Part 3, or in accordance with Appendix D.

2) Unless the *flame-spread rating* is referred to herein as a "surface *flame-spread rating*," it shall apply to any surface of the element being considered that would be exposed by cutting through it as well as to the exposed surface of the element.

9.10.3.3. Fire Exposure

1) Floor, roof and ceiling assemblies shall be rated for exposure to fire on the underside.

2) Exterior walls shall be rated for exposure to fire from inside the *building*, except that such walls need not comply with the temperature rise limitations required by the standard tests referred to in Article 9.10.3.1. if such walls have a *limiting distance* of not less than 1.2 m, and due allowance is made for the effects of heat radiation in accordance with the requirements in Part 3.

3) Interior vertical *fire separations* required to have *fire-resistance ratings* shall be rated for exposure to fire on each side.

9.10.3.4. Suspended Membrane Ceilings

1) Where a ceiling construction has a suspended membrane ceiling with lay-in panels or tiles which contribute to the required *fire-resistance rating*, hold down clips or other means shall be provided to prevent the lifting of such panels or tiles in the event of a fire.

9.10.4. Building Size Determination

9.10.4.1. Mezzanines not Considered as Storeys

1) Except as required by Sentences (2) and 9.10.4.2.(1), the space above a *mezzanine* is permitted to be excluded from the calculation of *building height*, provided

a) the aggregate area of *mezzanines* that are not superimposed does not exceed 10% of the *floor area* of the *building* in which they are located, and

b) the area of *mezzanine* in a *suite* does not exceed 10% of the area of that *suite* on the *storey* on which it is located.

2) Except as provided in Sentence 9.10.4.2.(1), a *mezzanine* need not be considered as a *storey* in calculating the *building height* provided

a) not less than 60% of the horizontal plane separating the *mezzanine* from the room or floor space in which it is located is open, and

b) except from within enclosures described in Sentence (3), the space above the *mezzanine* is used as an open area without partitions or subdividing walls higher than 1 070 mm above the *mezzanine* floor.

(See Appendix Note A-3.2.1.1.(3).)

3) The space above a *mezzanine* conforming to Sentence (2) is permitted to include an enclosed space whose area does not exceed 10% of the open area of the room in which the *mezzanine* is located, provided the enclosed space does not obstruct visual communication between the open space above the *mezzanine* and the room in which it is located.

4) For the purpose of determining *occupant load*, the areas of *mezzanines* that are not considered as *storeys* shall be added to the *floor area* of the *storey* on which they are located. (See Appendix A.)

5) Platforms and catwalks intended solely for periodic inspection and maintenance need not be considered as floor assemblies or *mezzanines* for the purpose of calculating *building height*, provided

a) they are not used for storage, and

b) they are constructed with *noncombustible* materials, unless the *building* is permitted to be of *combustible construction*.

9.10.4.2. More Than One Level of Mezzanine

1) Each level of *mezzanine* that is partly or wholly superimposed above the first level of *mezzanine* shall be considered as a *storey* in calculating the *building height*.

9.10.4.3. Basement Storage Garages

1) Where a *basement* is used primarily as a *storage garage*, the *basement* is permitted to be considered as a separate *building* for the purposes of this Section provided the floor above the *basement* and the exterior walls of the *basement* above the adjoining ground level are constructed as *fire separations* of masonry or concrete having a *fire-resistance rating* of not less than 2 h, except as permitted by Sentences 3.2.1.2.(2) and (3).

9.10.4.4. <Roof-Top Enclosures

1) A roof-top enclosure shall not be considered as a *storey* in calculating the *building height* if the roof-top enclosure is

a) provided for elevator machinery, a stairway or a *service room*, and

b) used for no purpose other than for service to the *building*.>

Table 9.32.2.2.
Natural Ventilation Area
Forming part of Sentence 9.32.2.2.(1)

Location		Minimum Unobstructed Area
Within a *dwelling unit*	Bathrooms or water-closet rooms	0.09 m^2
	Unfinished *basement* space	0.2% of the *floor area*
	Dining rooms, living rooms, bedrooms, kitchens, combined rooms, dens, recreation rooms and all other finished rooms	0.28 m^2 per room or combination room
Other than within a *dwelling unit*	Bathrooms or water-closet rooms	0.09 m^2 per water closet
	Sleeping areas	0.14 m^2 per occupant
	Laundry rooms, kitchens, recreation rooms	4% of the *floor area*
	Corridors, storage rooms and other similar public rooms or spaces	2% of the *floor area*
	Unfinished *basement* space not used on a shared basis	0.2% of the *floor area*

2) Where a vestibule opens directly off a living or dining room within a *dwelling unit*, ventilation to the outdoors for such rooms may be through the vestibule.

3) Openings for natural ventilation other than windows shall provide protection from the weather and insects.

4) Screening shall be of corrosion-resistant material.

9.32.2.3. Reserved

9.32.3 <Heating-Season (Mechanical) Ventilation

(See Appendix A.)

9.32.3.1. Required Ventilation

1) Every *dwelling unit* that is supplied with electrical power shall be provided with a mechanical ventilation system that conforms to

a) CAN/CSA-F326-M, "Residential Mechanical Ventilation Systems," or

b) this Subsection.

9.32.3.2. Design and Installation

1) Aspects of a mechanical ventilation system not specifically addressed in this Subsection shall be designed, constructed and installed in accordance with good practice such as that described in the ASHRAE Handbook and standards, the HRAI Digest, the HRAI Residential Mechanical Ventilation Manual, the TECA Ventilation Guidelines, the Hydronics Institute Manuals and the SMACNA manuals.

2) Exhaust fans and supply fans shall be installed in accordance with this Subsection and the manufacturer's instructions.

3) The mechanical components of a mechanical ventilation system shall be installed so as to be accessible for inspection, maintenance, repair, and cleaning.

9.32.3.3. Mechanical Ventilation System Components

1) A mechanical ventilation system shall include

a) a principal ventilation system that

i) provides supply air in accordance with Article 9.32.3.4., and

ii) includes an exhaust fan that conforms with Article 9.32.3.5.,

b) the kitchen and bathroom exhaust fans that are required by Article 9.32.3.6., and

c) if the *building* includes a heated crawl space, the components that are required by Article 9.32.3.7.

9.32.3.4. Principal Ventilation System Supply Air

(See Appendix A.)

1) Except as provided in Sentence (6), a principal ventilation system shall mechanically provide supply air in accordance with Sentence (2), (3), (4) or (5).

2) Where the principal ventilation system is a ducted forced-air heating system, the ducted forced-air heating system shall

a) provide supply air through the ducting to

i) each bedroom, and

ii) each floor level without a bedroom,

b) <draw supply air from an outdoor inlet that is connected to the cabinet containing the furnace air circulating fan required by Clause (d) by ducting that measures, from that cabinet to the point at which the ducting intersects the return air plenum,

i) between 3 m and 4.5 m in length, or

ii) if a flow control device is used, not more than 4.5 m in length.>

c) draw supply air through ducting that is

i) rigid ducting with an equivalent diameter of at least 100 mm, or

ii) flexible ducting with an equivalent diameter of at least 125 mm, and

d) have a furnace air circulating fan set to run continuously.

3) Where the principal ventilation system is a ducted forced-air heating system used in combination with a heat-recovery ventilator,

a) <the ducted forced-air heating system shall conform to Clauses (2)(a), (c) and (d),>

b) the heat-recovery ventilator shall draw supply air from an outdoor inlet into the return air *plenum* of the ducted forced-air heating system, and

c) the heat-recovery ventilator shall draw exhaust air, through dedicated ducting,

i) from one or more indoor inlets, at least one of which is located at least 2 m above the floor of the uppermost floor level, and

ii) at the capacity rating of the heat-recovery ventilator, which shall be no less than the air-flow rate specified in Table 9.32.3.5.

4) Where the principal ventilation system is a heat-recovery ventilator, the heat-recovery ventilator shall

a) provide supply air through dedicated ducting to

i) each bedroom, and

ii) each floor level without a bedroom, and

b) draw exhaust air, through dedicated ducting,

i) from one or more indoor inlets, at least one of which is located at least 2 m above the floor of the uppermost floor level, and

ii) at the capacity rating of the heat-recovery ventilator, which shall be no less than the air-flow rate specified in Table 9.32.3.5.

5) Where the principal ventilation system is a ducted central-recirculation ventilation system, the ducted central-recirculation ventilation system shall

a) draw supply air from an outdoor inlet connected upstream of the fan, and

b) draw air from

i) each bedroom and deliver it to a common area, or

ii) a common area and deliver it to each bedroom.

6) <A principal ventilation system need not conform to Sentence (1) if the principal ventilation system

a) services a *dwelling unit* that

i) is located where the January design temperature, on a 2.5% basis determined in conformance with Article 1.1.3.1., is greater than –20°C,

ii) has only 1 *storey* and a *floor area* of less than 168 m^2 within the *building* envelope (see Appendix A), and

iii) does not have a ducted forced-air heating system, and

b) provides supply air passively from outdoors through dedicated inlets that

i) are located in each bedroom and at least one common area,

ii) are located at least 1 800 mm above the floor, and

iii) have an unobstructed vent area of not less than 25 cm^2.>

9.32.3.5. Principal Ventilation System Exhaust Fan

1) A principal ventilation system exhaust fan shall
a) run continuously, and
b) provide at least the air-flow rate specified in Table 9.32.3.5.

Table 9.32.3.5.
Principal Ventilation System Exhaust Fan Minimum Air-flow Rate
Forming part of Sentence 9.32.3.5.(1)

Floor Area, m^2	Minimum Air-flow Rate, L/s				
	Number of Bedrooms				
	0–1	2–3	4–5	6–7	>7
< 140	14	21	28	35	42
140–280	21	28	35	42	49
281–420	28	35	42	49	56
421–560	35	42	49	56	64
561–700	42	49	56	64	71
> 700	49	56	64	71	78

2) For the purposes of Sentence (1), the capacity rating of the principal ventilation system exhaust fan shall be determined, based on air-flow performance at 50 pa of external static pressure, in accordance with
a) HVI Publication 916, "Airflow Test Procedure," or
b) CAN/CSA-C260-M, "Rating the Performance of Residential Mechanical Ventilating Equipment."

3) The principal ventilation system exhaust fan shall be
a) designed to run continuously, and
b) controlled by a dedicated switch that
   i) has 2 settings, on and off,
   ii) is located where it will be accessible for the purposes of servicing the exhaust fan but not likely to be turned off inadvertently, and
   iii) is clearly marked "PRINCIPAL VENTILATION EXHAUST FAN."

4) If the principal ventilation system exhaust fan is designed to run at multiple air-flow rates,
a) the air-flow rate of the fan shall be controlled by a switch other than the switch described in Clause (3)(b), and
b) the lowest air-flow rate shall not be less than the air-flow rate specified in Table 9.32.3.5.

5) The sound rating of the principal ventilation system exhaust fan shall not exceed 1.0 sone when running continuously at the air-flow rate specified in Table 9.32.3.5. as determined in accordance with
a) HVI Publication 915, "Loudness Testing and Rating Procedure," or
b) CAN/CSA-C260-M, "Rating the Performance of Residential Mechanical Ventilating Equipment."

9.32.3.6. Kitchen and Bathroom Exhaust Fans

1) An exhaust fan that provides at least the air-flow rate specified in Table 9.32.3.6. shall be installed in
a) every kitchen, and
b) every bathroom or water-closet room, unless the bathroom or water-closet room is served by the principal ventilation system exhaust fan that complies with Article 9.32.3.5.

2) For the purposes of Sentence (1), the capacity rating of the exhaust fan shall be determined, based on air-flow performance at 50 pa of external static pressure, in accordance with
a) HVI Publication 916, "Airflow Test Procedure," or
b) CAN/CSA-C260-M, "Rating the Performance of Residential Mechanical Ventilating Equipment."

Table 9.32.3.6.
Kitchen/Bathroom Exhaust Fan Minimum Air-flow Rate
Forming part of Sentence 9.32.3.6.(1)

Room	Minimum Exhaust Fan Air-flow Rate, L/s	
	Intermittent	Continuous
Kitchen	47	N/A
Bathroom	23	9

9.32.3.7. Heated Crawl Space Ventilation

1) <Where a crawl space is heated by a ducted forced-air heating system that does not draw air from the crawl space to the furnace through the return air plenum, the crawl space shall be connected to the floor space above the crawl space by at least one air-transfer grille.

2) Where a crawl space is heated other than by a ducted forced-air heating system, the crawl space shall
a) be connected to
   i) the floor space above the crawl space by at least one air-transfer grille, and
   ii) the principal ventilation system by a supply air outlet or an exhaust air inlet,
b) be connected to the floor space above the crawl space by at least 2 air-transfer grilles, or
c) be connected to
   i) the floor space above the crawl space by at least one air-transfer grille, and
   ii) the outdoors by a dedicated exhaust fan that complies with Sentence (4).

3) An air-transfer grille required by Sentence (1) or (2) shall have an unobstructed vent area of the greater of
a) 25 cm^2, and
b) 0.83 cm^2 for every m^2 of crawl space area.>

4) Where a dedicated exhaust fan is installed in accordance with Subclause (2)(c)(ii), the dedicated exhaust fan shall
a) provide an air-flow rate of at least 23 L/s, and
b) be controlled by
   i) a humidity control device, or
   ii) an adjustable time control device that is capable of providing not less than 8 total hours of ventilation per 24 hour period.

5) Where a crawl space is divided into 2 or more compartments, each heated compartment shall conform to Sentence (1) or (2).

9.32.3.8. Air Ducts

1) *Exhaust ducts* shall discharge to the outdoors.

2) *Exhaust ducts* that are downstream of an exhaust fan shall have no connections to other fans or ducts.

3) *Exhaust ducts*, and *supply ducts* that conduct heated or cooled air, shall
a) be sized in accordance with the requirements of the manufacturer of the fans to which they are connected, and
b) have an equivalent diameter not less than that specified by Table 9.32.3.8.(3).

Table 9.32.3.8.(3)
Maximum Equivalent Duct Length(1), m
Forming part of Sentence 9.32.3.8.(3)

Flexible Duct						
Equivalent Diameter, mm (Cross Section Area for Rectangular Ducts, cm^2)	Fan Capacity, L/s					
	25	40	50	60	70	80
125 (123)	32	15	—	—	—	—
150 (177)	46	40	28	18	13	—
175 (240)	46	46	46	46	46	24
200 (314)	46	46	46	46	46	46

Table 9.32.3.8.(3)
Maximum Equivalent Duct Length(1), m
Forming part of Sentence 9.32.3.8.(3)

Rigid Duct						
Equivalent Diameter, mm (Cross Section Area for Rectangular Ducts, cm^2)	Fan Capacity, L/s					
	25	40	50	60	70	80
100 (79)	32	15	—	—	—	—
125 (123)	46	40	28	18	13	—
150 (177)	46	46	46	42	34	24
175 (240)	46	46	46	46	46	46

Notes to Table 9.32.3.8.(3):
(1) The equivalent length of a duct is the length of the duct plus 10 m for the exterior hood and 3 m for each 90° elbow.

4) Where an *exhaust duct* passes through or is located adjacent to a space that is not *conditioned space*, the duct shall conform to Article 9.36.3.2., except that in no case shall such a duct be insulated to less than RSI 0.75.

5) Where a principal ventilation system *supply duct* passes through or is located adjacent to a *conditioned space*, the duct shall be

a) insulated to not less than RSI 0.75, and

b) provided with an effective vapour barrier.

6) Where a kitchen exhaust fan grille is installed within 1.2 m horizontally of a *cooktop*, the exhaust fan duct shall

a) be constructed of a material that is noncombustible, corrosion-resistant, and cleanable, and

b) be equipped with a grease filter at the intake end.

7) <Except for a supply air system described in Sentence 9.32.3.4.(2) or (3), all joints in *exhaust ducts*, and in *supply ducts* that conduct conditioned air, shall be sealed against air leakage with

a) sealants or gaskets made from liquids, mastics or heat-applied materials,

b) mastic with embedded fabric,

c) foil-faced butyl tape, or

d) aluminum foil tape.>

8) *Supply ducts* for a mechanical ventilation system shall not be used to provide combustion or dilution air to fuel-burning appliances.

9.32.3.9. Outdoor Inlets and Outlets

1) Outdoor air inlets and exhaust outlets shall be shielded from the weather, birds and rodents by using hoods incorporating a screen of corrosion-resistant material with openings of 6 to 12 mm.

9.32.3.10. Interior Distribution

1) Interior doors shall be undercut by a minimum of 12 mm above the finished floor or the rooms shall be provided with an air-transfer grille with an unobstructed vent area that is not less than 100 cm^2.>

9.32.4. Additional Protection Against Depressurization

9.32.4.1. Protection Requirements

1) <Additional make-up air for the actual *appliance* exhaust rate shall be provided for any *appliance* that discharges air to the exterior at an installed rate exceeding 0.5 air change per hour when it is located within a *dwelling unit* that contains a vented *appliance* that is subject to back drafting (Naturally Aspirating Fuel-Fired Vented Appliance). (See Appendix A.)>

2) <Where additional make-up air is required for appliances described in Sentence (1), it shall be provided by a supply fan rated to deliver outdoor air at the rate of the installed exhaust appliance.>

3) The supply fan as required in <Sentence (2)> shall be interconnected with the exhaust fan for which make-up air is required.

4) The outdoor air required by Sentence (3) shall be
a) tempered to at least 1°C before being introduced to a normally unoccupied area of the *dwelling unit*, or
b) tempered to at least 12°C before being introduced to occupied areas either by passive transfer grille or directly from outside.

9.32.4.2. Carbon Monoxide Alarms

(See Appendix A.)

1) This Article applies to every *building* that contains a *residential occupancy* and that also contains
a) a fuel-burning *appliance*, or
b) a *storage garage*.

2) Carbon monoxide (CO) alarms required by this Article shall
a) conform to CAN/CSA-6.19, "Residential Carbon Monoxide Alarming Devices,"
b) be equipped with an integral alarm that satisfies the audibility requirements of CAN/CSA-6.19, "Residential Carbon Monoxide Alarming Devices,"
c) have no disconnect switch between the overcurrent device and the CO alarm, where the CO alarm is powered by the *dwelling unit's* electrical system, and
d) be mechanically fixed at a height recommended by the <manufacturer's instructions>.

3) <Where a room contains a solid-fuel-burning *appliance*,> a CO alarm conforming to CAN/CSA-6.19, "Residential Carbon Monoxide Alarming Devices," shall be mechanically fixed
a) <at a height recommended by the manufacturer's instructions where those instructions specifically mention solid-fuel-burning *appliances*, or>
b) <in the absence of specific instructions related to solid-fuel-burning *appliances*, on or near the ceiling.>

4) Where a fuel-burning *appliance* is installed in a *suite* of *residential occupancy*, a CO alarm shall be installed
a) inside each bedroom, or
b) outside each bedroom, within 5 m of each bedroom door, measured following corridors and doorways.

5) Where a fuel-burning *appliance* is installed in a *service room* that is not in a *suite* of *residential occupancy*, a CO alarm shall be installed
a) in the *service room*, and
b) for every *suite* of *residential occupancy* that shares a wall or floor/ceiling assembly with that *service room*, either
   i) inside each bedroom, or
   ii) outside each bedroom, within 5 m of each bedroom door, measured following corridors and doorways.

6) For each *suite* of *residential occupancy* that shares a wall or floor/ceiling assembly with a *storage garage* or that is adjacent to an attic or crawl space to which the *storage garage* is also adjacent, a CO alarm shall be installed
a) inside each bedroom, or
b) outside each bedroom, within 5 m of each bedroom door, measured following corridors and doorways.

Section 9.33. Heating and Air-conditioning

9.33.1. General

9.33.1.1. Application

1) <This Section applies to the design and installation of heating systems, including requirements for combustion air and air-conditioning systems serving only one *dwelling unit*.>

2) The design and installation of heating systems, including requirements for combustion air, and air-conditioning systems other than those <described in Sentence (1)> shall conform to Part 6. (See Appendix A and Subsection 9.10.10.)

3) <Systems used for heating and air-conditioning shall conform to the energy efficiency requirements in Section 9.36.>

9.36.2.5. Continuity of Insulation

1) Except as provided in Sentences (2) to (9) and in Sentence 9.36.2.4.(3) regarding balcony and canopy slabs, and except for clearances around components required for fire safety reasons, interior *building* components that meet *building* envelope components and major structural members that partly penetrate the *building* envelope shall not break the continuity of the insulation and shall not decrease the effective thermal resistance at their projected area to less than that required in Articles 9.36.2.6. and 9.36.2.8. (See Appendix A.)

2) Where an interior wall, *foundation* wall, *firewall*, *party wall* or structural element penetrates an exterior wall or insulated roof or ceiling and breaks the continuity of the plane of insulation, the penetrating element shall be insulated

a) on both of its sides, inward or outward from the *building* envelope, for a distance equal to 4 times its uninsulated thickness to an effective thermal resistance not less than that required for exterior walls as stated in Table 9.36.2.6.A. or 9.36.2.6.B.,

b) within the plane of insulation of the penetrated element to an effective thermal resistance not less than 60% of that required for the penetrated element, or

c) within itself to an effective thermal resistance not less than that required for the penetrated element.

(See Appendix A.)

3) Where a masonry fireplace or flue penetrates an exterior wall and breaks the continuity of the plane of insulation, it shall be insulated within the plane of insulation of the wall or within itself to an effective thermal resistance not less than 55% of that required for the exterior wall as stated in Table 9.36.2.6.A. or 9.36.2.6.B. (See Appendix A.)

4) Where an ornamentation or appendage penetrates an exterior wall and breaks the continuity of the plane of insulation, the penetrating element shall be insulated

a) on both of its sides, inward or outward from the *building* envelope, for a distance equal to 4 times the insulated thickness of the exterior wall to an effective thermal resistance not less than that required for the wall as stated in Table 9.36.2.6.A. or 9.36.2.6.B.,

b) within the plane of insulation of the wall to an effective thermal resistance not less than 55% of that required for the exterior wall, or

c) within the penetrating element to an effective thermal resistance not less than that required for the exterior wall.

5) Except as provided in Sentences (8) and (9), where two planes of insulation are separated by a *building* envelope assembly and cannot be physically joined, one of the planes of insulation shall be extended for a distance equal to at least 4 times the thickness of the assembly separating the two planes. (See Appendix A.)

6) <Except as permitted by Article 9.36.2.11., where mechanical, plumbing or electrical system components, such as pipes, ducts, conduits, cabinets, chases, panels or recessed heaters, are placed within and parallel to a wall assembly required to be insulated, the effective thermal resistance of that wall at the projected area of the system component shall be not less than that required by Tables 9.36.2.6.A., 9.36.2.6.B., 9.36.2.8.A. and 9.36.2.8.B. (See Appendix A.)>

7) Except as permitted by Article 9.36.2.11., where mechanical ducts, plumbing pipes, conduits for electrical services or communication cables are placed within the insulated portion of a floor or ceiling assembly, the effective thermal resistance of the assembly at the projected area of the ducts, pipes, conduits or cables shall be not less than 2.78 (m^2·K)/W.

8) Joints and junctions between walls and other *building* envelope components shall be insulated in a manner that provides an effective thermal resistance that is no less than the lower of the minimum values required for the respective adjoining components. (See Appendix A.)

9) Sentence (1) does not apply where the continuity of the insulation is interrupted

a) between the insulation in the *foundation* wall and that of the floor slab,

b) by an integral perimeter footing of a slab-on-grade (see Sentences 9.25.2.3.(5) and 9.36.2.8.(8)), or

c) at the horizontal portion of a *foundation* wall that supports masonry veneer and is insulated on the exterior.

9.36.2.6. Thermal Characteristics of Above-ground Opaque Building Assemblies

1) Except as provided in Sentences (2) and 9.36.2.8.(3) and Articles 9.36.2.5. and 9.36.2.11., the effective thermal resistance of above-ground opaque *building* assemblies or portions thereof shall be not less than that shown for the applicable <heating degree-day> category in

a) Table 9.36.2.6.A., where the ventilation system does not include heat-recovery equipment, or

b) Table 9.36.2.6.B., where the ventilation system includes heat-recovery equipment conforming to Article 9.36.3.9.

(See Appendix A.)

Table 9.36.2.6.A.
Effective Thermal Resistance of Above-ground Opaque Assemblies in Buildings without a Heat-Recovery Ventilator
Forming part of Sentence 9.36.2.6.(1)

Above-ground Opaque *Building* Assembly	Heating Degree-Days of *Building* Location,(1) in Celsius Degree-Days					
	Zone 4 < 3000	Zone 5 3000 to 3999	Zone 6 4000 to 4999	Zone 7A 5000 to 5999	Zone 7B 6000 to 6999	Zone 8 ≥ 7000
	Minimum Effective Thermal Resistance (RSI), $(m^2 \cdot K)/W$					
Ceilings below attics	6.91	8.67	8.67	10.43	10.43	10.43
Cathedral ceilings and flat roofs	4.67	4.67	4.67	5.02	5.02	5.02
Walls(2)	2.78	3.08	3.08	3.08	3.85	3.85
Floors over unheated spaces	4.67	4.67	4.67	5.02	5.02	5.02

Notes to Table 9.36.2.6.A.:
(1) See Article 1.1.3.1.
(2) See Sentence 9.36.2.8.(3) for requirements concerning the above-ground portion of *foundation* walls.

Table 9.36.2.6.B.
Effective Thermal Resistance of Above-ground Opaque Assemblies in Buildings with a Heat-Recovery Ventilator
Forming part of Sentence 9.36.2.6.(1)

Above-ground Opaque *Building* Assembly	Heating Degree-Days of *Building* Location,(1) in Celsius Degree-Days					
	Zone 4 < 3000	Zone 5 3000 to 3999	Zone 6 4000 to 4999	Zone 7A 5000 to 5999	Zone 7B 6000 to 6999	Zone 8 ≥ 7000
	Minimum Effective Thermal Resistance (RSI), $(m^2 \cdot K)/W$					
Ceilings below attics	6.91	6.91	8.67	8.67	10.43	10.43
Cathedral ceilings and flat roofs	4.67	4.67	4.67	5.02	5.02	5.02
Walls(2)	2.78	2.97	2.97	2.97	3.08	3.08
Floors over unheated spaces	4.67	4.67	4.67	5.02	5.02	5.02

Notes to Table 9.36.2.6.B.:
(1) See Article 1.1.3.1.
(2) See Sentence 9.36.2.8.(3) for requirements concerning the above-ground portion of *foundation* walls.

2) The effective thermal resistance of *rim joists* shall be not less than that required for above-ground walls in Table 9.36.2.6.A. or 9.36.2.6.B., as applicable.

3) A reduction in the effective thermal resistance of ceiling assemblies in attics under sloped roofs is permitted for a length no greater than 1 200 mm but only to the extent imposed by the roof slope and minimum venting clearance, provided the nominal thermal resistance of the insulation directly above the exterior wall is not less than 3.52 $(m^2 \cdot K)/W$. (See Appendix A.)

4) Except for tubular daylighting devices, the minimum effective thermal resistance values for walls stated in Tables 9.36.2.6.A. and 9.36.2.6.B. shall also apply to shafts for skylights.

9.36.2.7. Thermal Characteristics of Fenestration, Doors and Skylights

1) Except as provided in Sentences (2) to (8) and Article 9.36.2.11., fenestration and doors shall have an overall thermal transmittance (U-value) not greater than the values listed in Table 9.36.2.7.A. for the applicable <heating degree-day> category. (See Appendix A.)

Table 9.36.2.7.A.
Required Thermal Characteristics of Fenestration and Doors
Forming Part of Sentence 9.36.2.7.(1)

Components	Thermal Characteristics(1)	Heating Degree-Days of *Building* Location,(2) in Celsius Degree-Days					
		Zone 4 < 3000	Zone 5 3000 to 3999	Zone 6 4000 to 4999	Zone 7A 5000 to 5999	Zone 7B 6000 to 6999	Zone 8 ≥ 7000
Fenestration(3) and doors	Max. U-value, W/(m²·K)	1.80	1.80	1.60	1.60	1.40	1.40

Notes to Table 9.36.2.7.A.:
(1) See Appendix A.
(2) See Article 1.1.3.1.
(3) Except skylights (see Sentence (2)) and glass block assemblies (see Sentence (4)).

2) Skylights shall have an overall thermal transmittance not greater than the values listed in Table 9.36.2.7.B for the applicable <heating degree-day> category. (See Appendix A.)

Table 9.36.2.7.B
Overall Thermal Transmittance of Skylights
Forming part of Sentence 9.36.2.7.(2)

Component	Heating Degree-Days of *Building* Location,(1) in Celsius Degree-Days					
	Zone 4 < 3000	Zone 5 3000 to 3999	Zone 6 4000 to 4999	Zone 7A 5000 to 5999	Zone 7B 6000 to 6999	Zone 8 ≥ 7000
	Maximum Overall Thermal Transmittance, W/(m²·K)					
Skylights	2.90	2.90	2.70	2.70	2.40	2.40

Notes to Table 9.36.2.7.B:
(1) See Article 1.1.3.1.

3) Except for site-assembled or site-glazed factory-made fenestration products, curtain wall construction, and site-built windows and glazed doors that are tested in accordance with Sentence 9.36.2.2.(3), site-built windows and glazed doors need not comply with Sentence (1), provided they are constructed in accordance with one of the options presented in Table 9.36.2.7.C for the applicable climate zone. (See Appendix A.)

Table 9.36.2.7.C
Compliance Options for Site-built Windows and Glazed Portion of Doors
Forming part of Sentence 9.36.2.7.(3)

Component	Description of Component	Compliance Options							
		Climate Zones 4 and 5			Climate Zones 6 and 7A			Climate Zones 7B and 8	
		≤ 3999 HDD			4000 to 5999 HDD			≥ 6000 HDD	
		1	2	3	1	2	3	1	2
Frame	non-metallic	✓	✓	—	✓	✓	—	✓	✓
	thermally broken metallic	—	—	✓	—	—	✓	—	—
Glazing	double	—	✓	—	—	—	—	—	—
	triple	✓	—	✓	✓	✓	✓	✓	✓
	argon-filled	—	✓	—	✓	—	✓	—	✓
Low-e coating	none		—	—	—	—	—	—	—
	number of panes with ≤ 0.10	—	≥ 1	—	—	—	—	≥ 2	—
	number of panes with ≤ 0.20	—	—	2	≥ 1	2	≥ 2	—	≥ 2
Spacer	size, mm	12.7	—	12.7	≥ 12.7	12.7	≥ 12.7	≥ 12.7	≥ 12.7
	non-metallic	—	✓	—	—	—	—	—	—

4) Glass block assemblies separating *conditioned space* from unconditioned space or the exterior shall have
a) an overall thermal transmittance of not more than 2.9 W/(m²·K), and
b) a total aggregate area of not more than 1.85 m².

5) <[Reserved.]>

6) Storm windows and doors need not comply with Sentence (1).

7) Vehicular access doors separating a *conditioned space* from an unconditioned space or the exterior shall have a nominal thermal resistance of not less than 1.1 (m^2·K)/W.

8) Access hatches separating a *conditioned space* from an unconditioned space shall be insulated to a nominal thermal resistance of not less than 2.6 (m^2·K)/W.

<9) A door separating a *conditioned space* from an unconditioned space or the exterior is not required to conform to Sentence (1) if,

a) in the case of a *building* in a location with a heating degree-day value of less than or equal to 3999, the door is one of not more than three nonconforming doors, each of which has an overall thermal transmittance not greater than 2.10 W/m^2·K,

b) in the case of a *building* in a location with a heating degree-day value of at least 4000 and not greater than 5999, the door is one of not more than two nonconforming doors, each of which has an overall thermal transmittance not greater than 2.10 W/m^2·K,

c) in the case of a *building* in a location with a heating degree-day value of greater than or equal to 6000, the door is one of not more than two nonconforming doors, each of which has an overall thermal transmittance not greater than 2.00 W/m^2·K, or

d) in any case, the door is the only nonconforming door and has an overall thermal transmittance not greater than 2.60 W/m^2·K.

10) A *building* described in Clause (9)(a) or (b) is permitted to have an additional nonconforming door with an overall thermal transmittance not greater than 2.10 W/m^2·K if the effective thermal resistance of the ceilings of the *building* is at least 0.88 m^2·K/W greater than the relevant value shown in Table 9.36.2.6.A. or Table 9.36.2.6.B., as applicable.>

9.36.2.8. Thermal Characteristics of Building Assemblies Below-Grade or in Contact with the Ground

1) Except as provided in Sentence (2) and Article 9.36.2.5., the effective thermal resistance of *building* assemblies that are below-*grade* or in contact with the ground shall be not less than that shown for the applicable <heating degree-day> category in

a) Table 9.36.2.8.A., where the ventilation system does not include heat-recovery equipment, or

b) Table 9.36.2.8.B., where the ventilation system includes heat-recovery equipment conforming to Article 9.36.3.9.

(See Appendix A.)

Table 9.36.2.8.A.
Effective Thermal Resistance of Assemblies Below-Grade or in Contact with the Ground in Buildings without a Heat-Recovery Ventilator
Forming part of Sentences 9.36.2.8.(1) to (9)

Building Assembly Below-*Grade* or in Contact with the Ground[1]	Heating Degree-Days of *Building* Location,[2] in Celsius Degree-Days					
	Zone 4 < 3000	Zone 5 3000 to 3999	Zone 6 4000 to 4999	Zone 7A 5000 to 5999	Zone 7B 6000 to 6999	Zone 8 ≥ 7000
	Minimum Effective Thermal Resistance (RSI), (m^2·K)/W					
Foundation walls	1.99	2.98	2.98	3.46	3.46	3.97
Unheated floors[3] below frost line[4][5]	uninsulated	uninsulated	uninsulated	uninsulated	uninsulated	uninsulated
above frost line[5]	<1.96>	1.96	1.96	1.96	1.96	1.96
Heated and unheated floors on permafrost	n/a	n/a	n/a	n/a	4.44	4.44
Heated floors[6]	2.32	2.32	2.32	2.84	2.84	2.84
Slabs-on-grade with an integral footing[6]	<1.96>	1.96	1.96	3.72	3.72	4.59

Notes to Table 9.36.2.8.A.:

(1) See Appendix A.
(2) See Article 1.1.3.1.
(3) Does not apply to below-grade floors over heated crawl spaces.
(4) Typically applies to floors-on-ground in full-height *basements*.
(5) Refers to undisturbed frost line before house is constructed.
(6) See Sentence 9.25.2.3.(5) for requirement on placement of insulation. The design of slabs-on-grade with an integral footing is addressed in Part 4 (see Article 9.16.1.2.).

Table 9.36.2.8.B.
Effective Thermal Resistance of Assemblies Below-Grade or in Contact with the Ground in Buildings with a Heat-Recovery Ventilator
Forming part of Sentences 9.36.2.8.(1) to (9)

Building Assembly Below-*Grade* or in Contact with the Ground[1]	Heating Degree-Days of *Building* Location,[2] in Celsius Degree-Days					
	Zone 4 < 3000	Zone 5 3000 to 3999	Zone 6 4000 to 4999	Zone 7A 5000 to 5999	Zone 7B 6000 to 6999	Zone 8 ≥ 7000
	Minimum Effective Thermal Resistance (RSI), (m^2·K)/W					
Foundation walls	1.99	2.98	2.98	2.98	2.98	2.98
Unheated floors[3] below frost line[4][5]	uninsulated	uninsulated	uninsulated	uninsulated	uninsulated	uninsulated
above frost line[5]	<1.96>	1.96	1.96	1.96	1.96	1.96
Heated and unheated floors on permafrost	n/a	n/a	n/a	n/a	4.44	4.44
Heated floors[6]	2.32	2.32	2.32	2.84	2.84	2.84
Slabs-on-grade with an integral footing[6]	<1.96>	1.96	1.96	2.84	2.84	3.72

Notes to Table 9.36.2.8.B.:
(1) See Appendix A.
(2) See Article 1.1.3.1.
(3) Does not apply to below-grade floors over heated crawl spaces.
(4) Typically applies to floors-on-ground in full-height *basements*.
(5) Refers to undisturbed frost line before house is constructed.
(6) See Sentence 9.25.2.3.(5) for requirement on placement of insulation. The design of slabs-on-grade with an integral footing is addressed in Part 4 (see Article 9.16.1.2.).

2) Where an entire floor assembly falls into two of the categories listed in Tables 9.36.2.8.A. and 9.36.2.8.B., the more stringent value shall apply. (See Appendix A.)

3) Where the top of a section of *foundation* wall is on average less than 600 mm above the adjoining ground level, the above-ground portion of that section of wall shall be insulated to the effective thermal resistance required in Table 9.36.2.8.A. or 9.36.2.8.B.

4) Unheated floors-on-ground that are above the frost line and have no embedded heating pipes, cables or ducts shall be insulated to the effective thermal resistance required in Table 9.36.2.8.A. or 9.36.2.8.B.

a) on the exterior of the *foundation* wall down to the footing, or

b) on the interior of the *foundation* wall and, as applicable,

i) beneath the slab for a distance not less than 1.2 m horizontally or vertically down from its perimeter with a thermal break along the edge of the slab that meets at least 50% of the required thermal resistance,

ii) on top of the slab for a distance not less than 1.2 m horizontally from its perimeter, or

iii) within the wooden sleepers below the floor for a distance not less than 1.2 m horizontally from its perimeter.

(See Appendix A.)

5) Except as provided in Sentence (6), floors-on-ground with embedded heating ducts, cables or pipes shall be insulated to the effective thermal resistance required in Table 9.36.2.8.A. or 9.36.2.8.B. under their full bottom surface including the edges.

6) Where only a portion of a floor-on-ground has embedded heating ducts, cables or pipes, that heated portion shall be insulated to the effective thermal resistance required in Table 9.36.2.8.A. or 9.36.2.8.B. under its full bottom surface to 1.2 m beyond its perimeter including exterior edges if applicable.

7) In addition to the requirements stated in Sentences (5) and (6), heated floors-on-ground shall be insulated to the effective thermal resistance required in Table 9.36.2.8.A. or 9.36.2.8.B. vertically

a) around their perimeter, or

b) on the outside of the *foundation* wall, extending down to the level of the bottom of the floor.

8) Floors on permafrost shall be insulated to the effective thermal resistance required in Table 9.36.2.8.A. or 9.36.2.8.B. under the entire slab and around all edges, and under the integral perimeter footing.

9) Slabs-on-grade with an integral perimeter footing shall

a) be insulated to the effective thermal resistance required in Table 9.36.2.8.A. or 9.36.2.8.B. under the entire slab and around all edges, but not under the integral perimeter footing, and

b) be constructed with skirt insulation having the same effective thermal resistance as the insulation installed under the slab.

(See Appendix A.) (See also Sentences 9.25.2.3.(5) and 9.36.2.5.(8).)

10) Junctions between below-*grade* assemblies shall be protected from the ingress of *soil* gas in conformance with Subsection 9.25.3.

9.36.2.9. Airtightness

1) The leakage of air into and out of *conditioned spaces* shall be controlled by constructing

a) a continuous *air barrier system* in accordance with Sentences (2) to (6), Subsection 9.25.3. and Article 9.36.2.10.,

b) a continuous *air barrier system* in accordance with Sentences (2) to (6) and Subsection 9.25.3. and a *building* assembly having an air leakage rate not greater than 0.20 L/(s·m^2) (Type A4) when tested in accordance with CAN/ULC-S742, "Air Barrier Assemblies – Specification," at a pressure differential of 75 Pa, or

c) a continuous *air barrier system* in accordance with Sentences (2) to (6) and Subsection 9.25.3. and a *building* assembly having an air leakage rate not greater than 0.20 L/(s·m^2) when tested in accordance with ASTM E 2357, "Determining Air Leakage of Air Barrier Assemblies."

(See Appendix A.)

2) An *air barrier system* installed to meet the requirements of Sentence (1) shall be continuous

a) across construction, control and expansion joints,

b) across junctions between different *building* materials and assemblies, and

c) around penetrations through all *building* assemblies.

3) Windows, doors and skylights and their components shall comply with the minimum air leakage requirements stated in

a) AAMA/WDMA/CSA 101/I.S.2/A440, "NAFS – North American Fenestration Standard/Specification for Windows, Doors, and Skylights" (Harmonized Standard), and

b) CSA A440S1, "Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440, NAFS – North American Fenestration Standard/Specification for Windows, Doors, and Skylights" (Canadian Supplement).

4) Vehicular access doors that separate heated garages from unconditioned spaces or the exterior shall be weatherstripped around their perimeter to prevent air leakage.

5) Fireplaces shall be equipped with doors, enclosures or devices to restrict air movement through the *chimney* when the fireplace is not in use. (See Appendix A.)

6) Where the airtight material used in the *air barrier system* is installed toward the exterior of the *building* envelope, its location and properties shall conform to Subsection 9.25.5. (See Appendix A.)

9.36.2.10. Construction of Air Barrier Details

1) Materials intended to provide the principal resistance to air leakage shall conform to CAN/ULC-S741, "Air Barrier Materials - Specification." (See A-9.25.5.1.(1) in Appendix A for air leakage characteristics and water vapour permeance values for a number of common materials.)

2) Materials referred to in Sentence (1) shall be

a) compatible with adjoining materials, and

b) free of holes and cracks.

(See A-9.36.2.10.(5)(b) in Appendix A.)

3) Where the *air barrier system* consists of rigid panel-type material, all joints shall be sealed. (See A-9.36.2.10.(5)(b) in Appendix A.)

4) Where the *air barrier system* consists of timber logs, all joints shall be sealed to resist airflow through gaps between logs that have shifted due to in-service conditions such as shrinkage and settling.

9.37.2.10. Travel Limit to Exits or Egress Doors

1) In a *building* that contains a *secondary suite*, the travel limit from a floor level in a *dwelling unit* to an *exit* or egress door may exceed 1 *storey* provided the floor level within the *dwelling unit* is served by an operable window conforming to Article 9.9.10.1.

9.37.2.11. Shared Egress Facilities

1) Except as provided in Article 9.9.7.3., where an egress door from a *dwelling unit* opens onto a *public corridor* or exterior passageway, it shall be possible from the location where the egress door opens onto the *public corridor* or exterior passageway to go in opposite directions to 2 separate *exits* unless the *dwelling unit* is served by a second and separate *means of egress* or an opening window conforming to Article 9.9.10.1.

2) Each *dwelling unit* shall be provided with a second and separate *means of egress* or an opening window conforming to Article 9.9.10.1. where the egress door from either *dwelling unit* opens onto

a) an *exit* stairway that serves both *suites*,

b) a *public corridor* serving both *suites* and served by a single *exit* stairway,

c) an exterior passageway serving both *suites* and served by a single *exit* stairway, or

d) a balcony serving both *suites* and served by a single *exit* stairway.

9.37.2.12. Exit Signs

1) *Exit* signs are not required within a *building* that contains a *secondary suite*.

9.37.2.13. Structural Fire Resistance

1) Table 9.10.8.1., Fire-Resistance Ratings for Structural Members and Assemblies, does not apply to a *building* that contains a *secondary suite*.

9.37.2.14. Combustible Drain, Waste and Vent Piping

(See Appendix A.)

1) *Combustible* drain, waste and vent piping is permitted to be located within or penetrate a *fire separation* required to have a *fire-resistance rating* provided

a) except for the permitted penetration in Clause (b), the *combustible* piping is located within an assembly protected by a membrane of a minimum 12.7 mm gypsum board,

b) the permitted penetration through the gypsum board membrane is limited in size to the diameter of the penetrating pipe, and

c) the *combustible* piping does not penetrate the gypsum board protection membrane on the underside of a horizontal *fire separation*.

2) *Combustible* drain, waste and vent piping enclosed in an assembly or protected as described in Sentence (1) is permitted on both sides of a *fire separation*.

(See Appendix A.)

9.37.2.15. Separation of Residential Suites

1) *Dwelling units* in a *building* that contains a *secondary suite* shall be separated from each other by

a) a *fire separation* conforming to Article 9.10.9.14.,

b) a *fire separation* having a *fire-resistance rating* of not less than 30 min. where the *dwelling units* are equipped with *smoke alarms* conforming to Article 9.37.2.19., or

c) a *fire separation* having no required *fire-resistance rating* where the *building* is *sprinklered*.

<(See Appendix A and Appendix Note A-9.37.2.17. of Appendix A.)>

9.37.2.16. Separation of Public Corridors

1) A *public corridor* serving a *building* that contains a *secondary suite* shall be separated from the *suites* by

a) a *fire separation* conforming to Article 9.10.9.15.,

b) a *fire separation* having a *fire-resistance rating* of not less than 30 <min> where the *dwelling units* are equipped with *smoke alarms* conforming to Article 9.37.2.19., or

c) a *fire separation* having no required *fire resistance rating* where the *building* is *sprinklered*.

(See Appendix A.)

9.37.2.17. <Air Ducts and Fire Dampers
(See Appendix A.)

1) Except as provided in Sentences (2) and (3) and notwithstanding Sentences 9.32.1.1.(1) and 9.33.1.1.(1), Sections 9.32 and 9.33 apply to *buildings* that contain *secondary suites*.

2) Where a heating or ventilation duct system serves more than one *suite*, the system shall be designed and installed to prevent the circulation of smoke upon a signal from a duct-type *smoke detector*.

3) Ducts penetrating *fire separations* need not be equipped with *fire dampers* in conformance with Article 3.1.8.9. provided they are *noncombustible* with all openings in the duct system serving only one *fire compartment*.

9.37.2.18. Spatial Separation

1) Notwithstanding Sentence 9.10.15.1.(1), Subsection 9.10.15. applies to *buildings* that contain *secondary suites*.>

9.37.2.19. Smoke Alarms
<(See Appendix A.)>

1) Except as permitted by Sentence (3), an additional *smoke alarm* of photo-electric type conforming to CAN/ULC-S531, "Standard for Smoke Alarms," shall be installed in each *suite*.

2) *Smoke alarms* required in Sentence (1) shall be wired so that the activation of the additional alarm in one *suite* will cause the additional alarm in the other *suite* to sound.

3) An additional interconnected *smoke alarm* is not required to be installed in each *suite* provided

a) <the *fire separations* required in Articles 9.37.2.15. and 9.37.2.16. have a *fire-resistance rating* of 45 min or greater, or>

b) the *building* is *sprinklered*.

9.37.2.20. Sound Control

1) The assemblies separating the residential *suites* need not comply with the sound control requirements of Subsection 9.11.2. (See Appendix A.)

9.37.2.21. Attic Space Access

1) An attic space access hatchway not less than 0.32 m^2 in an area with no dimension less than <500 mm> may serve both *suites* in a *building* that contains a *secondary suite*.

9.37.2.22. Garages and Carports

1) Section 9.35. is applicable to garages and carports serving a *building* that contains a *secondary suite*.

Section 9.38. Objectives and Functional Statements

9.38.1. Objectives and Functional Statements

9.38.1.1. Attributions to Acceptable Solutions

1) For the purpose of compliance with this Code as required in Clause 1.2.1.1.(1)(b) of Division A, the objectives and functional statements attributed to the acceptable solutions in this Part shall be the objectives and functional statements listed in Table 9.38.1.1. (See A-1.1.2.1.(1) in Appendix A.)

Table 9.38.1.1.

Table 9.38.1.1. is located in Volume 2, Attribution Tables.

<A-Table 5.10.1.1. Selection and Installation of Sealants Analysis of many sealant joint failures indicates that the majority of failures can be attributed to improper joint preparation and deficient installation of the sealant and various joint components. The following ASTM guidelines describe several aspects that should be considered when applying sealants in unprotected environments to achieve a durable application:

- ASTM C 1193, "Use of Joint Sealants,"
- ASTM C 1299, "Selection of Liquid-Applied Sealants,"
- ASTM C 1472, "Calculating Movement and Other Effects When Establishing Sealant Joint Width."

The sealant manufacturer's literature should always be consulted for recommended procedures and materials.**>**

A-5.10.2.1.(3) Airtightness and Watertightness of Wired Glass Windows Fixed wired glass assemblies are sometimes permitted as closures in vertical fire separations. The airtightness and watertightness requirements are waived for these windows when used in such an application, in recognition of the fact that the availability of assemblies that meet both the requirements of the window standards and the requirements for fire resistance may be limited. However, control of air and water leakage should not be ignored: measures should be taken to attempt to comply with applicable requirements.

<A-5.10.2.2. Windows, Doors, Skylights and Other Glazed Products

Design Values

CSA A440S1 requires that the individual performance levels achieved by the product for structural resistance, water penetration resistance and air leakage resistance be reported on the product's performance label.

Storm Doors and Windows

Where storm doors and storm windows are not incorporated in a rated window or door assembly, they should be designed and constructed to comply with the applicable requirements of Part 5 regarding such properties as appropriate air leakage and structural loads.

Forced Entry Test

Even though the performance label on rated windows, doors and skylights does not explicitly indicate that the product has passed the forced entry resistance test, products are required to pass this test in order to be rated.**>**

Installation and Field Testing of Windows, Doors, Skylights and Other Glazed Products

Windows, doors, skylights, other glazed products and their components require installation details that are appropriately designed and constructed to provide acceptable overall performance of a building envelope assembly. Proper design of installation details provides the information necessary to integrate the window, door or skylight's structure, air barrier, vapour barrier and water barrier functions into the overall design of the building envelope assembly for these functions. Proper construction of these details is necessary to achieve an appropriate level of long term performance. Further guidance on installation detailing for windows, doors, skylights and other glazed products and their components can be found in CSA A440.4, "Window, Door and Skylight Installation."

Field testing of installed windows, doors and skylights during construction can be an invaluable tool for verifying acceptable levels of performance for the installed system. Although not required by this Code, field testing early in the envelope construction phase is considered favourable such that discontinuities in the system can be readily identified and corrections made before construction of the entire assembly is completed. Additional field testing during the construction phases can also be used to monitor installation consistency. Further guidance on methods and guidelines for the field testing of windows, doors and skylights can be found in CSA A440.4, "Window, Door and Skylight Installation, Annex D – Field Testing of Window and Door Installations." While this document does list previously identified industry performance data values, it is important to note that the user should utilize current specific performance requirements for a project as governed by the values developed in the referenced standard AAMA/WDMA/CSA101/I.S.2/A440, "NAFS – North American Fenestration Standard/Specification for Windows, Doors, and Skylights."

Field test procedures should be in accordance with referenced test standards, such as ASTM E783, "Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors" and ASTM E1105, "Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference."**>**

<A-5.10.2.2.(1) Two Compliance Paths It is intended that any fenestration product that conforms to this Part may choose to comply with either Clause (a) or Clause (b) of Sentence 5.10.2.2.(1). Even if a product is in scope of the standards referenced via Clause (b) (NAFS and the Canadian Supplement to NAFS), the compliance path in Clause (a) may be used. However, it is not intended that the compliance path in Clause (b) be used where fenestration products are not within the scope of the referenced standards.

A-5.10.2.2.(2) Other Glazed Products Glazed products such as curtain walls or sloped glazing that are not typically considered windows but are installed as part of a separation described in Sentence 5.10.2.1.(1) are not within the scope of the referenced standards and therefore must conform to Subsection 5.1.4. and Sections 5.3., 5.4. and 5.6.

A-5.10.2.2.(4) Loads and Procedures For windows within the scope of the "Canadian Supplement" referred to in Sentence 5.10.2.2.(1), structural and wind loads are included and may be calculated in accordance with that standard. As an alternative, structural and wind loads from Section 5.2. may be used to select fenestration products that are appropriate for the point of installation. Values derived from the referenced standard, which uses a simplified calculation method, are typically higher than those derived from calculations done in conformance with Section 5.2.>

A-5.10.2.4.(3) Heat Transfer through Fire-Rated Glazed Assemblies Thermal bridging through fire-rated glazed assemblies should not be ignored; measures should be taken to minimize condensation consistent with the intent of Sentence 5.10.2.4.(2).

A-6.2.1.1. <Good Engineering Practice>

Building Pressurization

New buildings tend to be considerably more airtight than older ones. Consequently, these buildings may have a reduced pressurization requirement compared to the normal requirement in order to limit drafts and provide a reasonable level of comfort.

The humidification and relative pressurization of buildings and individual spaces in buildings can be significant factors in compromising the on-going performance of the building envelope and other environmental separators.

In new construction, HVAC designers should take this issue into consideration and confer with those responsible for the design of the environmental separators so as to limit stress where these building elements are not intended to resist or accommodate such loads. In existing buildings, the ability of the environmental separators to resist or accommodate increases in pressure differential or moisture loading should be considered before changes are made to the HVAC system.

<Radon Control

Measures may be necessary to reduce the radon concentration to a level below the guideline specified by Health Canada.

Further information on reducing the indoor concentration of radon can be found in the following Health Canada publications:

- "Guide for Radon Measurements in Public Buildings (Schools, Hospitals, Care Facilities, Detention Centres)," and
- "Radon: A Guide for Canadian Homeowners" (CMHC/HC).>

A-6.2.1.3. Structural Movement This Article is intended to remind designers and installers of mechanical systems of one aspect of the "good engineering practice" referred to in Article 6.2.1.1.

In determining how to accommodate structural movement, there are two important principles to bear in mind:

- The prime concern of the NBC is the safety of people in and around the building, as opposed to protection of the mechanical systems and equipment.
- The nature of the accommodation will vary with the type of movement being considered, taking into account particularly how often the movement is likely to be encountered over the life of the building.

For example, a gas line supported on columns that also support a crane must be installed in such a way that the movement of the columns, which occurs many times daily, does not cause the lines to break, thus creating a hazard. Even if the gas line installation could somehow be designed to break in a non-hazardous manner, it would hardly be recognized as good engineering practice if movement that occurs so frequently could disrupt the operation of the mechanical system.

On the other hand, earthquakes occur far less frequently and it would not be surprising to have a non-critical mechanical system fail as a result of an earthquake. However, even in this situation, the failure must occur in a manner that does not create a hazard to building occupants. For example, heavy mechanical equipment should be properly anchored so that it does not topple on building occupants during an earthquake. The design of the anchors should take into account accelerations consistent with the seismic data given in Appendix C for the location of the building. Part 4 provides guidance on the calculation of the loads such equipment would exert on the building structure during an earthquake; these same loads can be used in designing the anchors.

Some mechanical equipment can be an important component of post-disaster life safety systems. In these cases, the measures needed to accommodate the movements caused by an earthquake become even more critical since failure of the equipment would not be acceptable.

Clearly, complying with this requirement will, in most cases, necessitate close coordination between the mechanical designer and the structural designer.

A-6.2.1.8.(1) Installation General Ducts or pipes without dampers or valves are generally not considered to constitute "equipment" and are therefore not subject to this requirement.

A-6.2.2.3.(2) Ventilation of Storage Garages Storage garages are ventilated to protect occupants from exposure to carbon monoxide and other vehicular exhaust fumes. In certain cases, such as small two- or three-bay storage garages that are used for occasional vehicle storage, and where occupants are not present, carbon monoxide or nitrogen dioxide monitoring devices may be omitted if the ventilation system is interlocked with a local light switch or other controls to ensure continuous system operation whenever the area is occupied. In any event, the ventilation system capacity must be designed to limit the concentrations of carbon monoxide or nitrogen dioxide at or below the prescribed values.

A-6.2.2.5.(3) Minimizing Growth of Micro-organisms Sources for microbial growth causing hypersensitivity, pneumonitis and humidifier fever include drain pans, spray-water air-washers, contaminated filters, poorly maintained cooling coils, water incursion into ductwork, cafeteria dishwasher drainage leaks, high humidity and stagnant water. Some of the control measures are as follows:

a) Drain pans should be pitched toward the drain outlet and the outlet bottom should be flush with the drain pan bottom, otherwise there will be standing water in the pan, exposed to the supply air passing through the cooling section of the air-handling unit.

b) Access into air-handling equipment should be provided for maintenance of filters, cooling coils and condensate drain pans located below the cooling coils. Access doors should be large and easy to open to facilitate thorough and regular maintenance. Hinged access doors are preferable to bolted access panels.

c) If moisture is added to commercial building ventilation air (such as in hospital operating rooms and dedicated computer rooms) to maintain humidity levels in a designated range (for example, 40% to 50% relative humidity), humidifiers that inject steam or water vapour into central air-handling units or main supply ducts are normally used. Injection nozzles should not be located in air-handling unit plenums or ductwork that is insulated with internal fibrous lining. If the lining becomes wet, conditions conducive to microbial growth will result.

The above only addresses built-in features of an HVAC system that can help to minimize growth of micro-organisms. Even more important than the built-in features is a program of regular maintenance and cleaning of those portions of the system where such growth is likely to occur.

A-6.2.2.6.(1) NFPA Publications Pertaining to the Heating, Ventilating and Air-Conditioning of Spaces Containing Hazardous Gases, Dusts or Liquids

NFPA 30, "Flammable and Combustible Liquids Code"

NFPA 30A, "Motor Fuel Dispensing Facilities and Repair Garages"

NFPA 32, "Drycleaning Plants"

NFPA 33, "Spray Application Using Flammable or Combustible Materials"

NFPA 34, "Dipping and Coating Processes Using Flammable or Combustible Liquids"

NFPA 35, "Manufacture of Organic Coatings"

NFPA 36, "Solvent Extraction Plants"

NFPA 40, "Storage and Handling of Cellulose Nitrate Film"

NFPA 51, "Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes"

NFPA 51A, "Acetylene Cylinder Charging Plants"

<NFPA 55, "Compressed Gases and Cryogenic Fluids Code">

continues on page 621

A-9.5.1.2. Combination Rooms If a room draws natural light and natural ventilation from another area, the opening between the two areas must be large enough to effectively provide sufficient light and air. This is why a minimum opening of 3 m^2 is required, or the equivalent of a set of double doors. The effectiveness of the transfer of light and air also depends on the size of the transfer opening in relation to the size of the dependent room; in measuring the area of the wall separating the two areas, the whole wall on the side of the dependent room should be considered, not taking into account offsets that may be in the surface of the wall.

The opening does not necessarily have to be in the form of a doorway; it may be an opening at eye level. However, if the dependent area is a bedroom, provision must be made for the escape window required by Article 9.9.10.1. to fulfill its safety function. This is why a direct passage is required between the bedroom and the other area; the equivalent of at least a doorway is therefore required for direct passage between the two areas.

<A-9.5.5.3. Doorways to Rooms with a Bathtub, Shower or Water Closet If the minimum 860 mm hallway serves more than one room with identical facilities, only one of the rooms is required to have a door not less than 760 mm wide.

If a number of rooms have different facilities, for example, one room has a shower, lavatory and water closet, and another room has a lavatory and water closet, the room with the shower, lavatory and water closet must have the minimum 760 mm wide door. Where multiple rooms provide the same or similar facilities, one of these rooms must comply with the requirement to have at least one bathtub or shower, one lavatory and one water closet. Where the fixtures are located in two separate rooms served by the same hallway, the requirement for the minimum doorway width would apply to both rooms.

If the minimum 860 mm hallway does not serve any room containing a bathtub, shower and water closet, additional fixtures do not need to be installed.**>**

<A-9.6.1.1.(1) Application. The scope of this Section includes glass installed on the interior or on the exterior of a building.**>**

A-9.6.1.2.(2) Mirrored Glass Doors CAN/CGSB-82.6-M covers mirrored glass doors for use on reach-in closets. It specifies that such doors are not to be used for walk-in closets.

A-Table 9.6.1.3. Glass in Doors Maximum areas in Table 9.6.1.3. for other than fully tempered glazing are cut off at 1.50 m^2, as this would be the practical limit after which safety glass would be required by Sentence 9.6.1.4.(2).

<A-9.7. Windows, Doors and Skylights. This section applies only to windows, doors and skylights as defined in the scope of the standards referenced in Article 9.7.4.2. Other glazed products, such as site-built windows, curtain walls or sloped glazing, are required to conform to Part 5.

It is also permitted for fenestration products within the scope of the NAFS standard to conform to Part 5. This option is typically used for windows and doors that are impractical to subject to the testing requirements of NAFS due to their size or for custom configurations.**>**

<A-9.7.3.2.(1)(a) Minimizing Condensation The total prevention of condensation on the surfaces of fenestration products is difficult to achieve and, depending on the design and construction of the window or door, may not be absolutely necessary. Clause 9.7.3.2.(1)(a) therefore requires that condensation be minimized, which means that the amount of moisture that condenses on the inside surface of a window, door or skylight, and the frequency at which this occurs, must be limited. The occurrence of such condensation must be sufficiently rare, the accumulation of any water must be sufficiently small, and drying must be sufficiently rapid to prevent the deterioration of moisture-susceptible materials and the growth of fungi.

<A-9.7.4. Design and Construction. Garage doors, sloped glazing, curtain walls, storefronts, commercial entrance systems, site-built or site-glazed products, revolving doors, interior windows and doors, storm windows, storm doors, sunrooms and commercial steel doors are not in the scope of NAFS.

All windows, doors and skylights installed to separate conditioned space from unconditioned space or the exterior must also conform to Section 9.36.**>**

A-9.7.4.2.(1) Standards Referenced for Windows, Doors and Skylights

<General

Doors between an unconditioned garage and a dwelling unit are considered to be in scope of the standard referenced in this Sentence. Although the standard refers to windows in “exterior building envelopes”, a note to the definition of “building envelope” clarifies that for the purpose of application of the standard, in some cases a building envelope may consist of 2 separate walls (such as a wall between garage and dwelling unit as well as the exterior wall of the garage itself).

A door leading to the exterior from an unconditioned garage is also within scope of the referenced standard, as it is also part of the exterior building envelope. However, because the scope of the BC Building Code takes precedence, these doors are not required to conform to “NAFS”. This Subsection of the Code does not apply to a door separating two unconditioned spaces.**>**

Canadian Requirements in the Harmonized Standard

In addition to referencing the Canadian Supplement, CSA A440S1, "Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440, NAFS – North American Fenestration Standard/Specification for Windows, Doors, and Skylights," the Harmonized Standard, AAMA/WDMA/CSA 101/I.S.2/A440, "NAFS – North American Fenestration Standard/Specification for Windows, Doors, and Skylights," contains some Canada-specific test criteria.

Standards Referenced for Excluded Products

Clause 1.1, General, of the Harmonized Standard defines the limits to the application of the standard with respect to various types of fenestration products. A list of exceptions to the application statement identifies a number of standards that apply to excluded products. Compliance with those standards is not required by the Code; the references are provided for information purposes only.

Label Indicating Performance and Compliance with Standard

The Canadian Supplement requires that a product's performance ratings be indicated on a label according to the designation requirements in the Harmonized Standard and that the label include

- design pressure, where applicable,
- negative design pressure, where applicable,
- water penetration test pressure, and
- the Canadian air infiltration and exfiltration levels.

It should be noted that, for a product to carry a label in Canada, it must meet all of the applicable requirements of both the Harmonized Standard and the Canadian Supplement, including the forced entry requirements.

Water Penetration Resistance

<For the various performance grades listed in the Harmonized Standard, the corresponding water penetration resistance test pressures are a percentage of the design pressure. For R class products, water penetration resistance test pressures are 15% of design pressure. In Canada, driving rain wind pressures (DRWP) have been determined for the locations listed in Appendix C of the Code. These are listed in the Canadian Supplement. The DRWP given in the Canadian Supplement must be used for all products covered in the scope of the Harmonized Standard when used in buildings within the scope of Part 9.

To achieve equivalent levels of water penetration resistance for all locations, the Canadian Supplement includes a provision for calculating specified DRWP at the building site considering building exposure. Specified DRWP values are, in some cases, greater than 15% of design pressure and, in other cases, less than 15% of design pressure. For a fenestration product to comply with the Code, it must be able to resist the structural and water penetration loads at the building site. Reliance on a percentage of design pressure for water penetration resistance in the selection of an acceptable fenestration product will not always be adequate. Design pressure values are reported on a secondary designator, which is required by the Canadian Supplement to be affixed to the window.

As an alternative to the above noted provision in the Canadian Supplement for calculating specified DRWP, the Water Resistance values listed in Table C-4 of Appendix C may be used.>

Uniform Load Structural Test

<The Harmonized Standard specifies that fenestration products be tested at 150% of design pressure for wind (specified wind load) and that skylights and roof windows be tested at 200% of design pressure for snow (specified snow load). With the change in the NBC 2005 to a 1-in-50 return period for wind load, a factor of 1.4 rather than 1.5 is now applied for wind. The NBC has traditionally applied a factor of 1.5 rather than 2.0 for snow. Incorporating these lower load factors into the Code requirements for fenestration would better reflect acceptable minimum performance levels; however, this has not been done in order to avoid adding complexity to the Code, to recognize the benefits of Canada-US harmonization, and to recognize that differentiation of products that meet the Canadian versus the US requirements would add complexity for manufacturers, designers, specifiers and regulatory officials.

The required design pressure and Performance Grade (PG) rating of doors and windows has been listed for each of the geographic locations found in the Code in Table C-4. These may be used as an alternative to the specified wind load calculations in the Canadian Supplement.>

Condensation Resistance

The Harmonized Standard identifies three test procedures that can be used to determine the condensation resistance of windows and doors. Only the physical test procedure given in CSA A440.2 can be used to establish Temperature Index (I) values. Computer simulation tools can also be used to estimate the relative condensation resistance of windows, but these methods employ different expressions of performance known as Condensation Resistance Factors (CR). I and CR values are not interchangeable.

Where removable multiple glazing panels (RMGP) are installed on the inside of a window, care should be taken to hermetically seal the RMGP against the leakage of moisture-laden air from the interior into the cavity on the exterior of the RMGP because the moisture transported by the air could lead to significant condensation on the interior surface of the outside glazing.

Basement Windows

Clause 8.4.2, Basement Windows, of the Harmonized Standard refers to products that are intended to meet Code requirements for ventilation and emergency egress. The minimum test size of 800 mm x 360 mm (total area of 0.288 m^2) specified in the standard will not provide the minimum openable area required by the Code for bedrooms (i.e. 0.35 m^2 with no dimension less than 380 mm) and the means to provide minimum open area identified in the standard is inconsistent with the requirements of the Code (see Subsection 9.9.10. for bedroom windows). The minimum test size specified in the standard will also not provide the minimum ventilation area of 0.28 m^2 required for non-heating-season natural ventilation (see Article 9.32.2.2.).

<A-9.7.4.3.(2) Performance Requirements. If the option of calculating design pressure performance grade and water resistance values using the Canadian Supplement is chosen, the DRWP values in Table A.1 of that standard must be used for all buildings within the scope of Part 9 of the BC Building Code. This requirement applies whether the windows, doors and skylights are designed to conform to Article 9.7.4.2. or to Part 5.**>**

A-9.7.5.2.(1) Forced Entry Via Glazing in Doors and Sidelights There is no mandatory requirement that special glass be used in doors or sidelights, primarily because of cost. It is, however, a common method of forced entry to break glass in doors and sidelights to gain access to door hardware and unlock the door from the inside. Although insulated glass provides increased resistance over single glazing, the highest resistance is provided by laminated glass. Tempered glass, while stronger against static loads, is prone to shattering under high, concentrated impact loads.

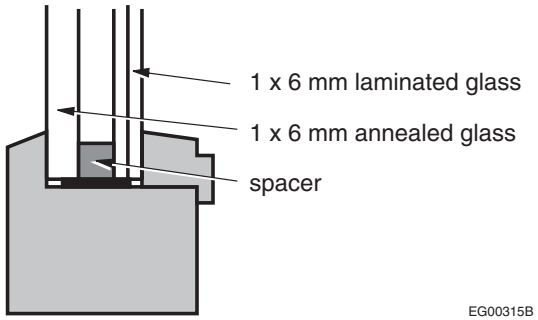

Figure A-9.7.5.2.(1)
Combined laminated/annealed glazing

Laminated glass is more expensive than annealed glass and must be used in greater thicknesses. Figure A-9.7.5.2.(1) shows an insulated sidelight made of one pane of laminated glass and one pane of annealed glass. This method reduces the cost premium that would result if both panes were laminated.

Consideration should be given to using laminated glazing in doors and accompanying sidelights regulated by Article 9.6.1.3., in windows located within 900 mm of locks in such doors, and in basement windows.

Underwriters' Laboratories of Canada have produced ULC-S332, "Burglary Resisting Glazing Material," which provides a test procedure to evaluate the resistance of glazing to attacks by thieves. While it is principally intended for plate glass show windows, it may be of value for residential purposes.

A-9.7.5.2.(6) Door Fasteners The purpose of the requirement for 30 mm screw penetration into solid wood is to prevent the door from being dislodged from the jamb due to impact forces. It is not the intent to prohibit other types of hinges or strikeplates that are specially designed to provide equal or greater protection.

A-9.7.5.2.(8) Hinged Doors Methods of satisfying this Sentence include either using non-removable pin hinges or modifying standard hinges by screw fastening a metal pin in a screw hole in one half of the top and bottom hinges. When the door is closed, the projecting portion of the pin engages in the corresponding screw hole in the other half of the hinge and then, even if the hinge pin is taken out, the door cannot be removed.

A-9.7.5.3.(1) Resistance of Windows to Forced Entry Although this Sentence only applies to windows within 2 m of adjacent ground level, certain house and site features, such as balconies or canopy roofs, allow for easy access to windows at higher elevations. Consideration should be given to specifying break-in resistant windows in such locations.

This Sentence does not apply to windows that do not serve the interior of the dwelling unit, such as windows to garages, sun rooms or greenhouses, provided connections between these spaces and the dwelling unit are secure.

One method that is often used to improve the resistance of windows to forced entry is the installation of metal "security bars." However, while many such installations are effective in increasing resistance to forced entry, they may also reduce or eliminate the usefulness of the window as an exit in case of fire or other emergency that prevents use of the normal building exits. Indeed, unless such devices are easily openable from the inside, their installation in some cases would contravene the requirements of Article 9.9.10.1., which requires every bedroom that does not have an exterior door to have at least one window that is large enough and easy enough to open that it can be used as an exit in case of emergency. Thus an acceptable security bar system should be easy to open from the inside while still providing increased resistance to entry from the outside.

A-9.8.4. Step Dimensions The Code distinguishes three principal types of stair treads and uses the following terminology to describe them: rectangular treads are found in straight-run flights; angled treads are found in curved flights; winders are a special type of angled tread described in Appendix Note A-9.8.4.5. See Figure A-9.8.4.-A.

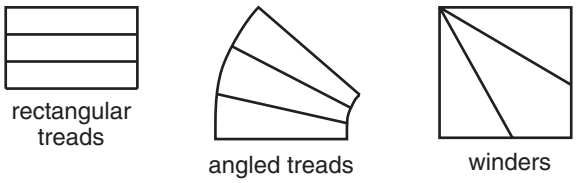

Figure A-9.8.4.-A
Types of treads

<Articles 9.8.4.1. to 9.8.4.6. specify various dimensional limits for steps. Figure A-9.8.4.-B illustrates the elements of a step and how these are to be measured.

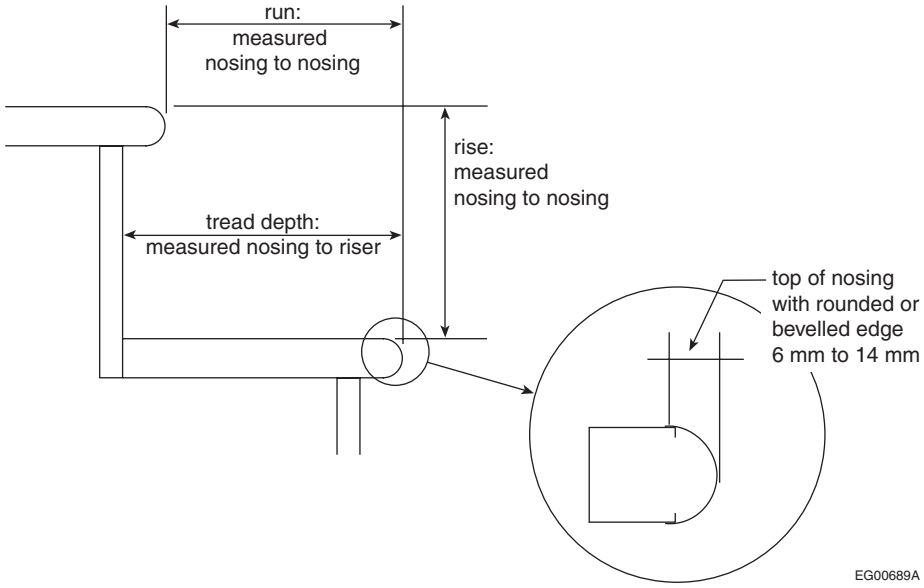

Figure A-9.8.4.-B
Elements of steps and their measurement>

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Self-flashing sills are sills that

- slope toward the exterior where the sills have an upward facing surface that extends beyond the jambs,
- where installed over a masonry sill, extend not less than 25 mm beyond the inner face of that sill,
- incorporate a drip positioned not less than 5 mm outward from the outer face of the cladding below or not less than 15 mm beyond the inner edge of a masonry sill, and
- terminate at the jambs or, where the face of the jambs is not at least flush with the face of the cladding and the sills extend beyond the jambs, incorporate end dams sufficiently high to protect against overflow in wind-driven rain conditions. A wind pressure of 10 Pa can raise water 1 mm. Thus, for example, if a window is exposed to a driving rain wind pressure of 200 Pa, end dams should be at least 20 mm high.

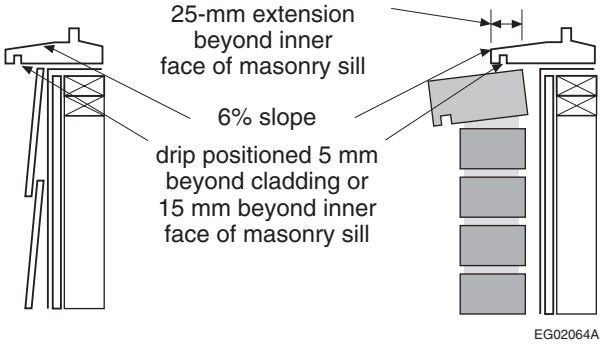

Figure A-9.27.3.8.(5)
Examples of configurations of self-flashing sills

<A-9.27.4.2.(1) Selection and Installation of Sealants Analysis of many sealant joint failures indicates that the majority of failures can be attributed to improper joint preparation and deficient installation of the sealant and various joint components. The following ASTM guidelines describe several aspects that should be considered when applying sealants in unprotected environments to achieve a durable application:

- ASTM C 1193, "Use of Joint Sealants,"
- ASTM C 1299, "Selection of Liquid-Applied Sealants,"
- ASTM C 1472, "Calculating Movement and Other Effects When Establishing Sealant Joint Width."

The sealant manufacturer's literature should always be consulted for recommended procedures and materials.>

A-9.27.9.2.(3) Grooves in Hardboard Cladding Grooves deeper than that specified may be used in thicker cladding providing they do not reduce the thickness to less than the required thickness minus 1.5 mm. Thus for type 1 or 2 cladding, grooves must not reduce the thickness to less than 4.5 mm or 6 mm depending on method of support, or to less than 7.5 mm for type 5 material.

A-9.27.10.2.(2) Thickness of Grade O-2 OSB In using Table 9.27.8.2. to determine the thickness of Grade O-2 OSB cladding, substitute "face orientation" for "face grain" in the column headings.

A-9.27.11.1.(3) and (4) Material Standards for Aluminum Cladding Compliance with Sentence 9.27.11.1.(3) and CAN/CGSB-93.2-M, "Prefinished Aluminum Siding, Soffits, and Fascia, for Residential Use," is required for aluminum siding that is installed in horizontal or vertical strips. Compliance with Sentence 9.27.11.1.(4) and CAN/CGSB-93.1-M, "Sheet, Aluminum Alloy, Prefinished, Residential," is required for aluminum cladding that is installed in large sheets.

A-Table 9.28.4.3. Stucco Lath Paper-backed welded wire lath may also be used on horizontal surfaces provided its characteristics are suitable for such application.

A-9.30.1.2.(1) Water Resistance In some areas of buildings, water and other substances may frequently be splashed or spilled onto the floor. It is preferable, in such areas, that the finish flooring be a type that will not absorb moisture or permit it to pass through; otherwise, both the flooring itself and the subfloor beneath it may deteriorate. Also, particularly in food preparation areas and bathrooms, unsanitary conditions may be created by the absorbed moisture. Where absorbent or permeable flooring materials are used in these areas, they should be installed in such a way that they can be conveniently removed periodically for cleaning or replacement, i.e., they should not be glued or nailed down. Also, if the subfloor is a type that is susceptible to moisture damage (this includes virtually all of the wood-based subfloor materials used in wood-frame construction), it should be protected by an impermeable membrane placed between the finish flooring and the subfloor. The minimum degree of impermeability required by Sentence 9.30.1.2.(1) would be provided by such materials as polyethylene, aluminum foil, and most single-ply roofing membranes (EPDM, PVC).

A-9.31.6.2.(3) Securement of Service Water Heaters

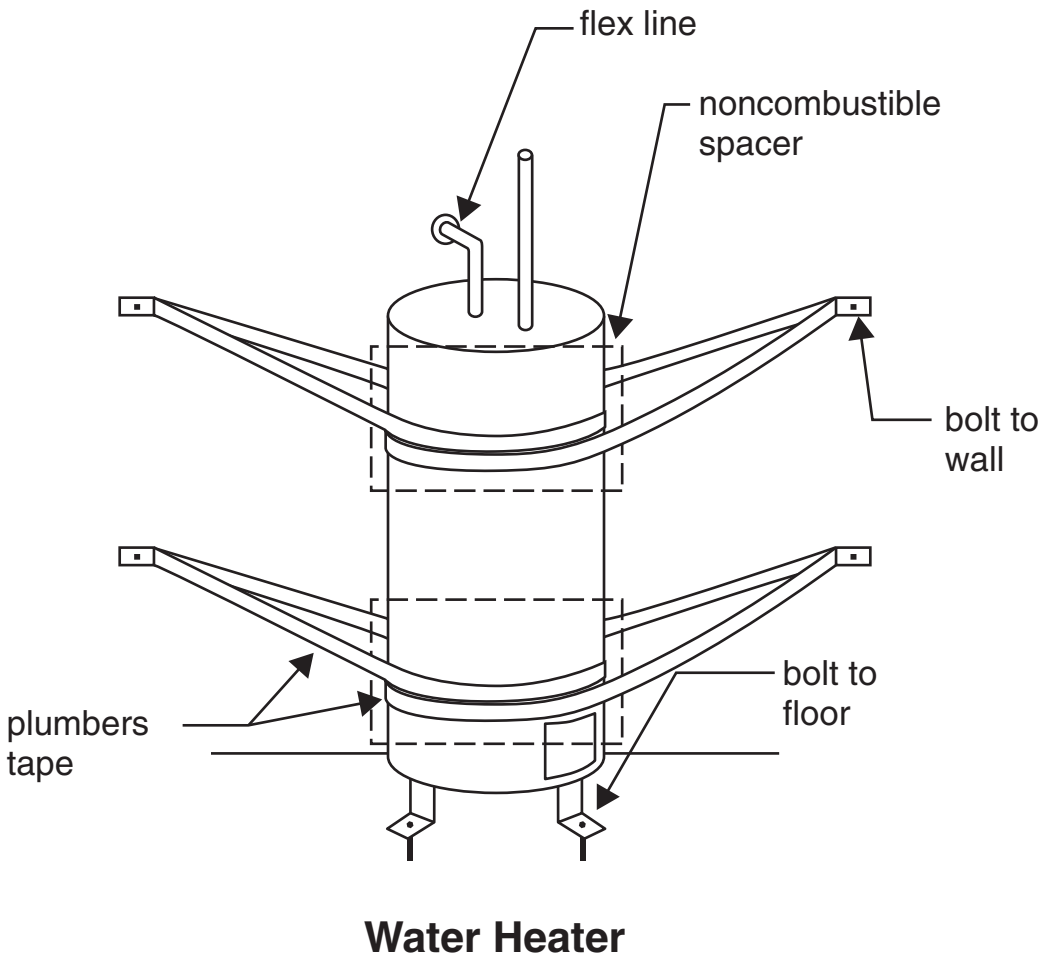

Figure A-9.31.6.2.(3)
Securement of service water heater

Seismic bracing of hot water tank

"Guidelines for Earthquake Bracing of Residential Water Heaters" is available from the California Office of the State Architect and provides more detail and alternate methods of bracing hot water tanks to resist earthquakes.

<A-9.32.3. Heating-Season (Mechanical) Ventilation While ventilation strategies can have a significant impact on energy performance, ventilation is primarily a health and safety issue. Inadequate ventilation can lead to mold, high concentrations of CO_2, and other indoor air pollutants, which can lead to adverse health outcomes. Previous editions of the British Columbia Building Code relied on ventilation through the building envelope in combination with a principal exhaust fan. However, with the increased attention on the continuity of the air barrier system in buildings, builders can no longer rely on uncontrolled ventilation through the building envelope. In most buildings, mechanical systems will be required to provide adequate ventilation for occupants.

As described in Article 9.32.3.3., every dwelling unit must include a principal ventilation system. A principal ventilation system is the combination of an exhaust fan and a supply fan (or passive supply in some instances: see Sentence 9.32.3.4.(6)).

The principal ventilation system exhaust fan is separate from the requirements for a fan in every bathroom and kitchen. While a bathroom fan may be used to satisfy both the requirements for the principal ventilation exhaust fan and the requirements for a bathroom fan, the requirements for each must be met. If the fan provides this combined function of the principal ventilation exhaust fan and the bathroom fan, it will also need to have controls that conform to Sentences 9.32.3.5.(3) and (4). Unlike other bathroom fans, the principal ventilation exhaust fan is required to run continuously and should not have a control switch in a location where it may be turned off inadvertently.**>**

A-9.32.3.4. Principal Ventilation System Supply Air

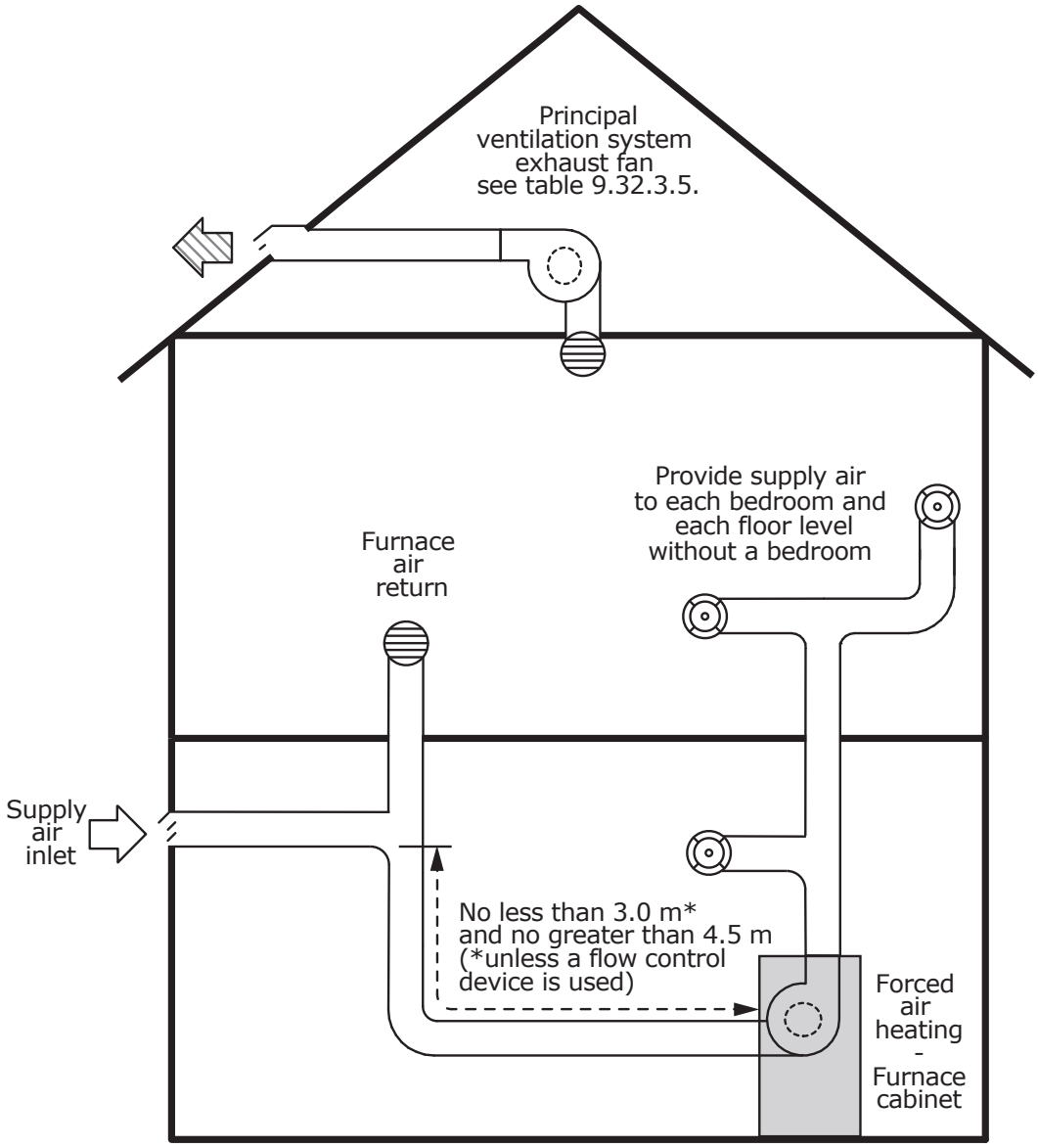

Figure A-9.32.3.4.(2)
Forced-Air Heating System Supply Air Distribution

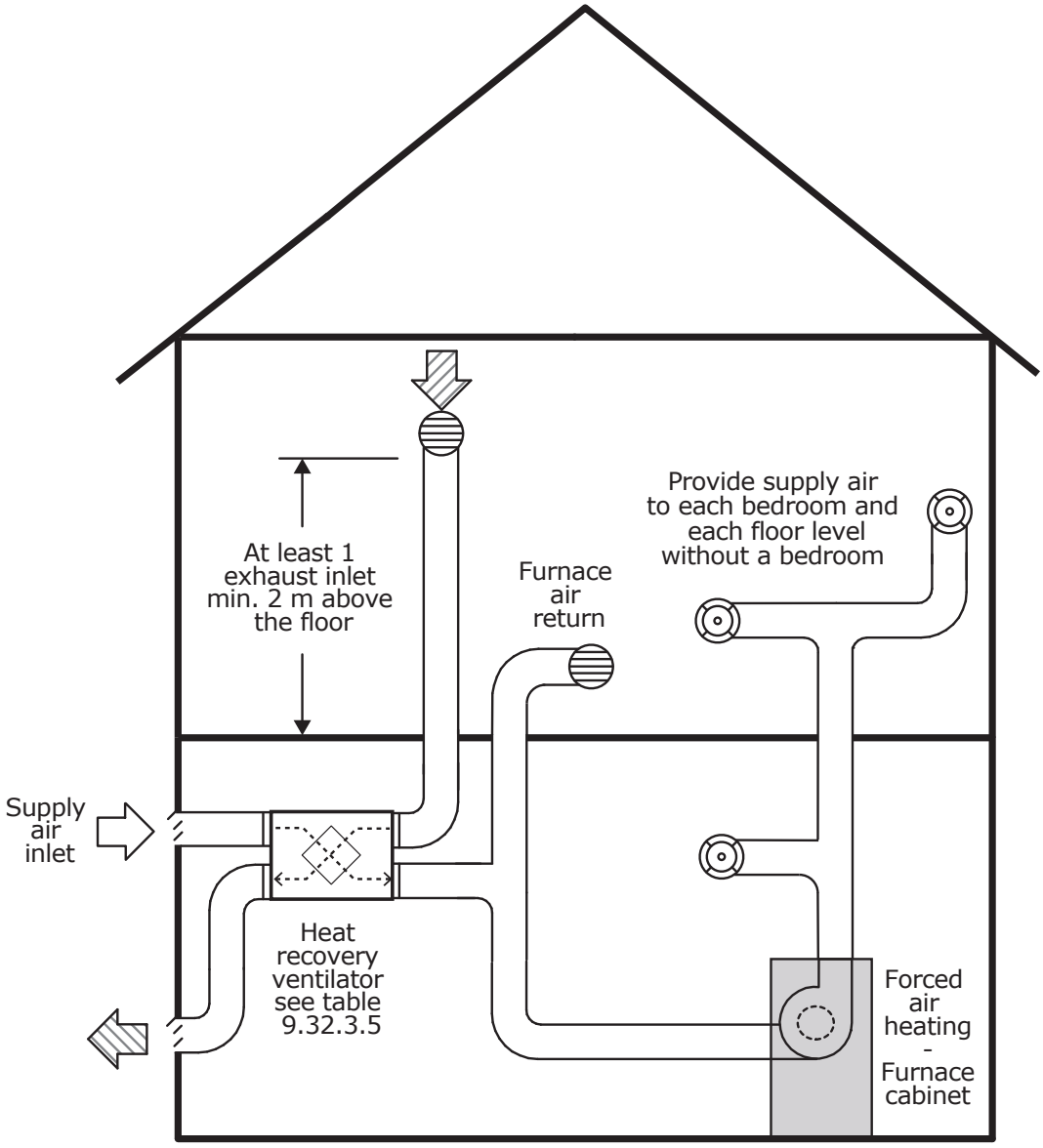

Figure A-9.32.3.4.(3)
Forced-Air Heating System with Heat Recovery Ventilator Supply Air Distribution

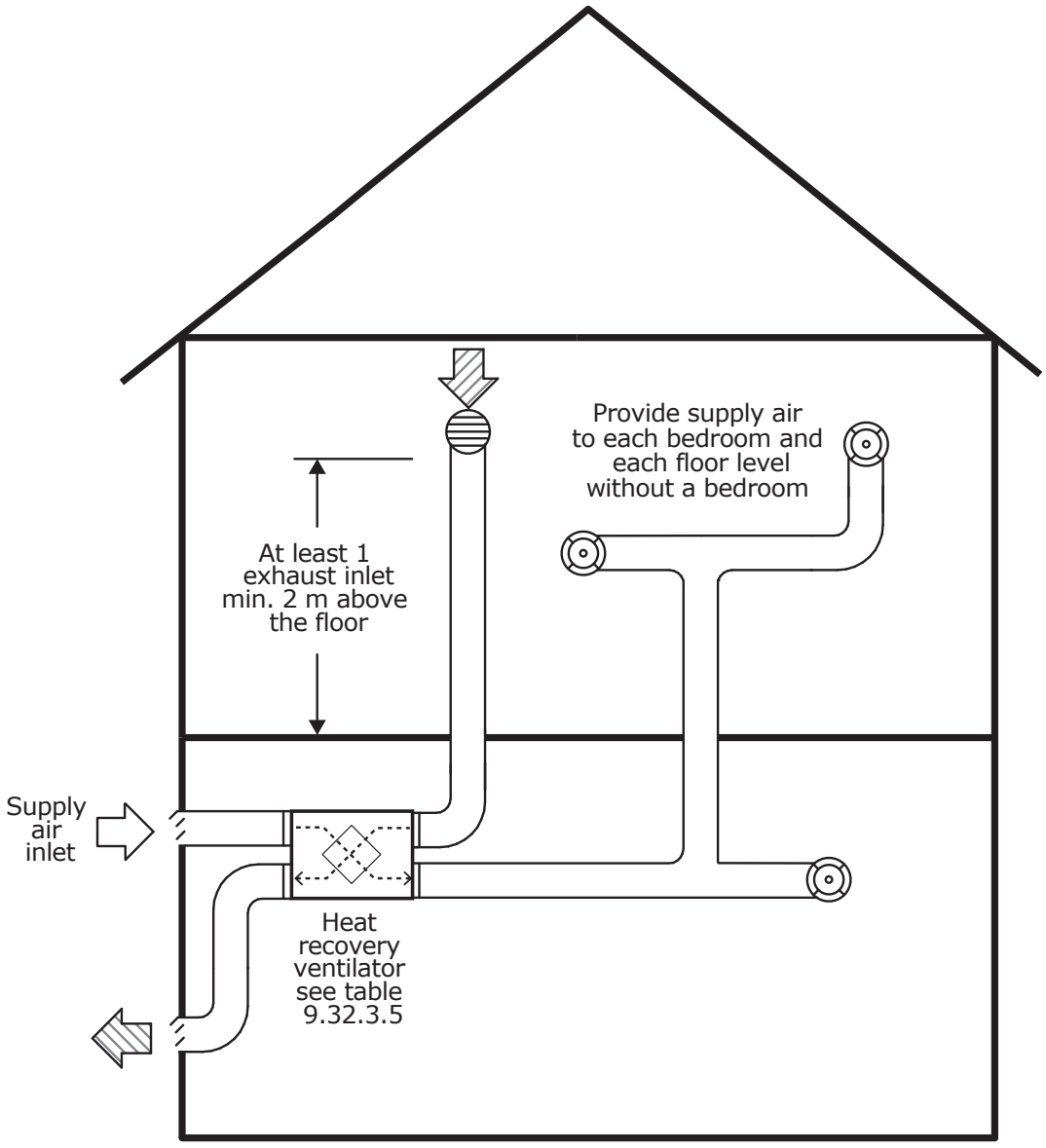

Figure A-9.32.3.4.(4)
Heat Recovery Ventilator Supply Air Distribution

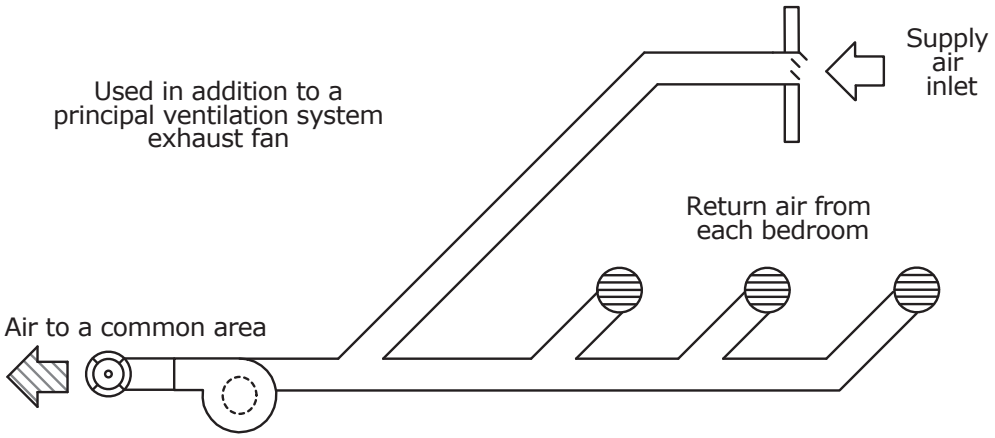

Figure A-9.32.3.4.(5)(b)(i)
Central Recirculation System Supply Air Distribution

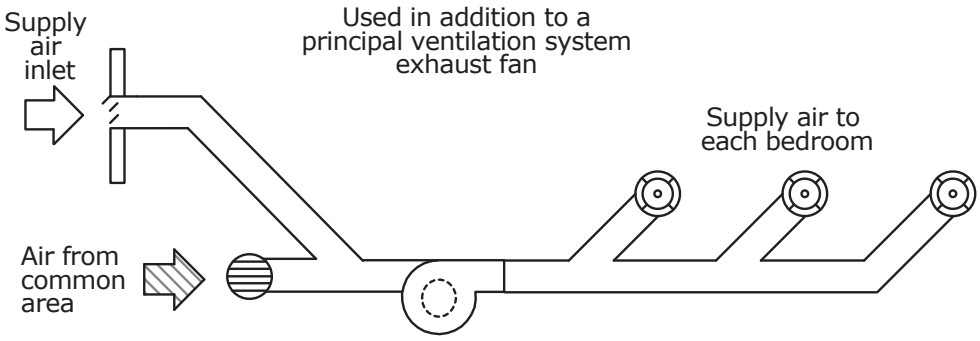

Figure A-9.32.3.4.(5)(b)(ii)
Central Recirculation System Supply Air Distribution

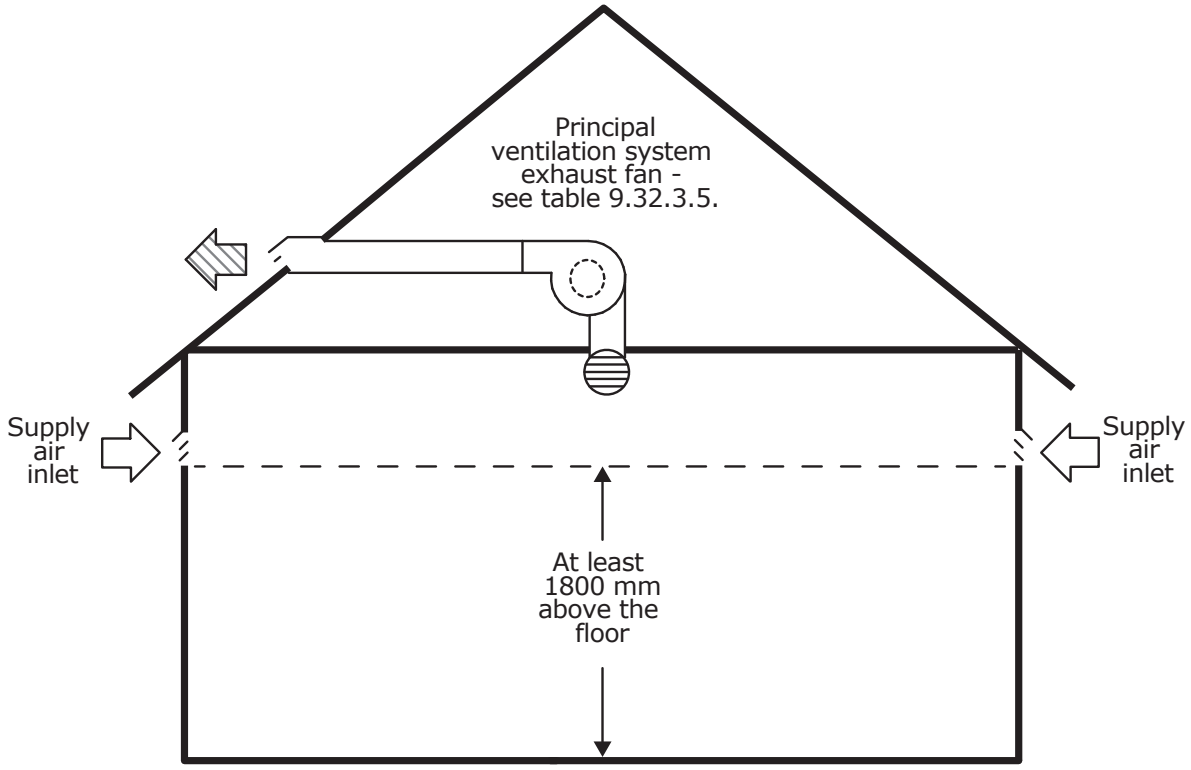

Figure A-9.32.3.4.(6)
Passive Supply Air Distribution

<A-9.32.3.4.(6)(a)(ii) Floor Area Calculation for Passive Supply Air Distribution The floor area to be calculated for Subclause 9.32.3.4.(6)(a)(ii) does not include sun porches, enclosed verandas, vestibules, attached garages, or other spaces that are outside the building envelope and do not require ventilation supply air.**>**

<A-9.32.3.8.(1)(a) Deleted>

<A-9.32.4.1.(1) Naturally Aspirating Fuel-Fired Vented Appliance (NAFFVA). NAFFVA, typically appliances with draft hoods, are subject to back drafting when a negative pressure condition occurs in the dwelling. The following tables describe the conditions under which Sentence 9.32.4.1.(1) applies:

Table A-9.32.4.1.(1)A.
Vent Safety — Natural Gas and Propane

Fuel Type	Natural Gas and Propane			
Vent Type	Power Vent(3)	Direct Vent(3)	Thermal Buoyancy Chimney(2)	
Appliance Type	Furnace Boiler HWT Fireplace	HWT Fireplace Heater	Mid-Efficient F/A Furnace or Boiler(5)	Drafthood Boiler HWT(4)
Special Conditions				Located in Air-Barriered Room(1)
Classification	Non-NAFFVA		NAFFVA	Non-NAFFVA
9.32.4.1.(1) Applies	No		Yes	No

Notes to Table A-9.32.4.1.(1)A.:

(1) Mechanical room must be air-barriered from remainder of house with no access from within house. Room must be lined with panel products with sealed joints and all pipe and wire penetrations sealed. Effectively, the room must be finished before equipment is installed and holes drilled for pipes and wires. This option is not available for forced air furnaces as it is not possible to effectively seal the ducts.

(2) Thermal buoyancy chimneys must be within the heated envelope of the house to provide acceptable venting performance.

(3) Any power vented appliance with pressurized vent (1 pipe) or sealed combustion (2 pipe) or direct vent appliance (fireplace, heater or HWT) are non-NAFFVA.

(4) Mid-efficient (draft induced) appliances are considered NAFFVA with the exception of a boiler or HWT located in an air-barriered room.

(5) This category applies only to
   a) mid-efficient forced air furnaces equipped with induced draft fans and exhaust proving switch, and
   b) boilers equipped with induced draft fans and exhaust proving switch.

Table A-9.32.4.1.(1)B.
Vent Safety — Oil and Solid Fuel

Fuel Type	Oil			Solid		
Vent Type	Thermal Buoyancy Chimney(2)		Direct Vent	Thermal Buoyancy Chimney(2)		Any
Appliance Type	Boiler HWT(4)	F/A Furnace Boiler HWT(3), (4)	F/A Furnace Boiler HWT	Boiler	F/A Furnace Boiler HWT Fireplace Heat Stove	Outside Boiler
Special Conditions	Located in Air-Barriered Room(1)			Located in Air-Barriered Room(1)		
Classification	Non-NAFFVA	NAFFVA	Non-NAFFVA	Non-NAFFVA	NAFFVA(5)	N/A
9.32.4.1.(1) Applies	No	Yes	No	No	Yes(5)	No

Notes to Table A-9.32.4.1.(1)B.:

(1) Mechanical room must be air-barriered from remainder of house with no access from within house. Room must be lined with panel products with sealed joints and all pipe and wire penetrations sealed. Effectively, the room must be finished before equipment is installed and holes drilled for pipes and wires. This option is not available for forced air furnaces as it is not possible to effectively seal the ducts.

(2) Thermal buoyancy chimneys must be within the heated envelope of the house to provide acceptable venting performance.

(3) Oil-fired HWT, boilers and furnaces equipped with blocked vent switches.

(4) Sealed combustion kits can be added to oil-fired appliances but they switch to interior combustion air if intake is blocked and rely on barometrically dampered thermal buoyancy chimneys so they are considered NAFFVA.

(5) Wood-burning appliances certified for use in mobile homes and installed to mobile home installation standards are considered non-NAFFVA and Sentence 9.32.4.1.(1) does not apply to them.**>**

A-9.32.4.2. Carbon Monoxide Alarms Carbon monoxide (CO) is a colourless, odourless gas that can build up to lethal concentrations in an enclosed space without the occupants being aware of it. Thus, where an enclosed space incorporates or is near a potential source of CO, it is prudent to provide some means of detecting its presence.

Dwelling units have two common potential sources of CO:

- fuel-fired space- or water-heating equipment within the dwelling unit or in adjacent spaces within the building, and
- attached storage garages.

Most fuel-fired heating appliances do not normally produce CO and, even if they do, it is normally conveyed outside the building by the appliance's venting system. Nevertheless, appliances can malfunction and venting systems can fail. Therefore, the provision of appropriately placed CO alarms can improve safety in the dwelling unit is a relatively low-cost back-up safety measure.

Similarly, although Article 9.10.9.16. requires that the walls and floor/ceiling assemblies separating attached garages from dwelling units incorporate an air barrier system, there have been several instances of CO from garages being drawn into houses, which indicates that a fully gas-tight barrier is difficult to achieve. When the attached storage garage is located at or below the elevation of the living space, winter season stack action will generate a continuous pressure between the garage and the dwelling unit. This pressure is capable of transferring potentially contaminated air into the house. The use of exhaust fans in the dwelling unit may further increase this risk.

A-9.33.5.3. Design, Construction and Installation Standard for Solid-Fuel-Burning Appliances CAN/CSA-B365 is essentially an installation standard, and covers such issues as accessibility, air for combustion and ventilation, chimney and venting, mounting and floor protection, wall and ceiling clearances, installation of ducts, pipes, thimbles and manifolds, and control and safety devices. But the standard also includes a requirement that solid-fuel-burning appliances and equipment satisfy the requirements of one of a series of standards, depending on the appliance or equipment, therefore also making it a design and construction standard. It is required that cooktops and ovens as well as stoves, central furnaces and other space heaters be designed and built in conformity with the relevant referenced standard.

A-9.33.6.13. Return Air System It is a common practice to introduce outdoor air to the house by means of an outdoor air duct connected to the return air plenum of a forced air furnace. This is an effective method and is a component of one method of satisfying the mechanical ventilation requirements of Subsection 9.32.3. However, some caution is required. If the proportion of cold outside to warm return air is too high, the resulting mixed air temperature could lead to excessive condensation in the furnace heat exchanger and possible premature failure of the heat exchanger. CAN/CSA-F326-M, "Residential Mechanical Ventilation Systems," requires that this mixed air temperature not be below 15.5°C when the outdoor temperature is at the January 2.5% value. It is also important that the outdoor air and the return air mix thoroughly before reaching the heat exchanger. Appendix Note A-9.32.3. provides some guidance on this.

A-9.33.10.2.(1) Factory-Built Chimneys Under the provisions of Article 1.2.1.1. of Division A, certain solid-fuel-burning appliances may be connected to factory-built chimneys other than those specified in Sentence 9.33.10.2.(1) if tests show that the use of such a chimney will provide an equivalent level of safety.

A-9.34.2. Lighting Outlets The <British Columbia Electrical Safety Regulation> contains requirements relating to lighting that are similar to those in the British Columbia Building Code. The Electrical <Safety Regulation> requirements, however, apply only to residential occupancies, whereas many of the requirements in the <Code> apply to all Part 9 buildings. Code users must therefore be careful to ensure that all applicable provisions of the <British Columbia Building Code> are followed, irrespective of the limitations in the Electrical <Safety Regulation>.

<A-9.35.2.2.(1) Garage Floor Sources of ignition, such as electrical wiring and appliances, can set off an explosion if exposed to gases or vapours such as those that can be released in garages. This provision applies where the frequency and concentration of such releases are low. Where the garage can accommodate more than 3 vehicles, and where wiring is installed within 50 mm of the garage floor, the British Columbia Electrical Safety Regulation, pursuant to the Safety Standards Act should be consulted as it specifies more stringent criteria for wiring.

The capacity of the garage is based on standard-size passenger vehicles such as cars, mini-vans and sport utility vehicles, and half-ton trucks. In a typical configuration, the capacity of the garage is defined by the width of the garage doors—generally single or double width—which correlates to the number of parking bays.

In many constructions, floor areas adjacent to the garage are either above the garage floor level or separated from it by a foundation wall. Where the foundation wall is cast-in-place concrete and rises at least 50 mm above the garage floor, it can serve as the airtight curb. Where the foundation wall is block or preserved wood, extra measures may be needed to provide airtightness. In many instances, the construction will be required to be airtight to conform with Sentence 9.25.3.1.(1), and in any case, must comply with Sentences 9.10.9.16.(4) and (5).

Where the space adjacent to the garage is at the same level as the garage, a 50 mm curb or partition is not needed if the wall complies with Sentences 9.10.9.16.(4) and (5), and there is no connecting door. Where there is a connecting door, if the garage floor is not sloped towards the exterior, it must be raised at least 50 mm off the floor or be installed so it closes against the curb. This requirement does not preclude the installation of a ramp leading from the garage floor up to the door.

In some instances, access to the basement is via a stair from the garage. In such cases, a curb must be installed at the edge of the stair well and must be sealed to the foundation wall, curb or partition between the garage and adjacent spaces.

See Figure A-9.35.2.2.(1).

Table A-9.36.2.4.(1)D.
Thermal Resistance Values of Common Building Materials(1)

Air Films	Thickness of Material	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ per mm	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ for thickness listed
Exterior:			
ceiling, floors and walls wind 6.7 m/s (winter)	—	—	0.03
Interior:			
ceiling (heat flow up)	—	—	0.11
floor (heat flow down)	—	—	0.16
walls (heat flow horizontal)	—	—	0.12
Air Cavities(2)(3)	Thickness of Air Space	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ per mm	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ for thickness listed
Ceiling (heat flow up) faced with non-reflective material(4)	13 mm	—	0.15
	20 mm	—	0.15
	40 mm	—	0.16
	90 mm	—	0.16
Floors (heat flow down) faced with non-reflective material(4)	13 mm	—	0.16
	20 mm	—	0.18
	40 mm	—	0.20
	90 mm	—	0.22
<Walls (heat flow horizontal) faced with non-reflective material(4)	9.5 mm	—	0.15
	13 mm	—	0.16
	20 mm	—	0.18
	40 mm	—	0.18
	90 mm	—	0.18>
Cladding Materials	Thickness of Material	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ per mm	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ for thickness listed
Brick:			
fired clay (2400 kg/m^2)	100 mm	0.0007	0.07
concrete: sand and gravel, or stone (2400 kg/m^2)	100 mm	0.0004	0.04
Cement/lime, mortar, and stucco	—	0.0009	—
Wood shingles:			
400 mm, 190 mm exposure	—	—	0.15
400 mm, 300 mm exposure (double exposure)	—	—	0.21
insulating backer board	8 mm	—	0.25
Siding:			
Metal or vinyl siding over sheathing:			
hollow-backed	—	—	0.11
insulating-board-backed	9.5 mm nominal	—	0.32
foiled-backed	9.5 mm nominal	—	0.52

Table A-9.36.2.4.(1)D.
Thermal Resistance Values of Common Building Materials(1)

Cladding Materials	Thickness of Material	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ per mm	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ for thickness listed
Wood:			
bevel, 200 mm, lapped	13 mm	—	0.14
bevel, 250 mm, lapped	20 mm	—	0.18
drop, 200 mm	20 mm	—	0.14
hardboard	11 mm	—	0.12
plywood, lapped	9.5 mm	—	0.10
Stone:			
quartzitic and sandstone (2240 kg/m^3)	—	0.0003	—
calcitic, dolomitic, limestone, marble, and granite (2240 kg/m^3)	—	0.0004	—
Fibre-cement: single-faced, cellulose fibre-reinforced cement	6.35 mm	0.003	0.023
	8 mm	0.003	0.026
Roofing Materials(5)	Thickness of Material	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ per mm	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ for thickness listed
Asphalt roll roofing	—	—	0.03
Asphalt/tar	—	0.0014	—
Built-up roofing	10 mm	—	0.06
Crushed stone	—	0.0006	—
Metal deck	—	—	negligible
Shingle:			
asphalt	—	—	0.08
wood	—	—	0.17
Slate	13 mm	—	0.01
Sheathing Materials	Thickness of Material	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ per mm	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ for thickness listed
Gypsum sheathing	12.7 mm	0.0063	0.08
Insulating fibreboard	—	0.016	—
Particleboard:			
low density (593 kg/m^3)	—	0.0098	—
medium density (800 kg/m^3)	—	0.0077	—
high density (993 kg/m^3)	—	0.0059	—
Plywood – generic softwood	9.5 mm	0.0087	0.083
	11 mm		0.096
	12.5 mm		0.109
	15.5 mm		0.135
	18.5 mm		0.161
Plywood – Douglas fir	9.5 mm	0.0111	0.105
	11 mm		0.122
	12.5 mm		0.139
	15.5 mm		0.172
	18.5 mm		0.205

Table A-9.36.2.4.(1)D.
Thermal Resistance Values of Common Building Materials(1)

Sheathing Materials	Thickness of Material	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ per mm	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ for thickness listed
Sheet materials:			
permeable felt	—	—	0.011
seal, 2 layers of mopped (0.73 kg/m^3)	—	—	0.210
seal, plastic film	—	—	negligible
Waferboard (705 kg/m^3)	—	0.0095	—
Oriented strandboard (OSB)	9.5 mm	0.0098	0.093
	11 mm		0.108
Insulation Materials(6)	Thickness of Material	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ per mm	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ for thickness listed
Blanket and batt: rock or glass mineral fibre (CAN/ULC-S702)			
R12	89/92 mm	—	2.11
R14	89/92 mm	—	2.46
R19(7) (R20 compressed)	140 mm	—	3.34
R20	152 mm	—	3.52
R22	140/152 mm	—	3.87
R22.5	152 mm	—	3.96
R24	140/152 mm	—	4.23
R28	178/216 mm	—	4.93
R31	241 mm	—	5.46
R35	267 mm	—	6.16
R40	279/300 mm	—	7.04
Boards and slabs:			
Roof board	—	0.018	—
Building board or ceiling tile, lay-in panel	—	0.016	—
Polyisocyanurate/polyurethane-faced sheathing: Types 1, 2 and 3 (CAN/ULC-S704)			
permeably faced	25 mm	0.03818	0.97
	50 mm	0.0360	1.80
impermeably faced	25 mm	0.03937	1.00
	50 mm	0.0374	1.87
Expanded polystyrene (CAN/ULC-S701)(8)			
Type 1	25 mm	0.026	0.65
Type 2	25 mm	0.028	0.71
Type 3	25 mm	0.030	0.76
Extruded polystyrene: Types 2, 3 and 4 (CAN/ULC-S701)	25 mm	0.035	0.88
	50 mm	0.0336	1.68
Semi-rigid glass fibre wall/roof insulation (48 kg/m^3)	25 mm	0.0298	0.757
Semi-rigid rock wool wall insulation (56 kg/m^3)	25 mm	0.0277	0.704

Table A-9.36.2.4.(1)D.
Thermal Resistance Values of Common Building Materials(1)

Insulation Materials(6)	Thickness of Material	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ per mm	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ for thickness listed
Loose-fill insulation			
Cellulose (CAN/ULC-S703)	—	0.025	—
Glass fibre loose fill insulation for attics (CAN/ULC-S702)	112 to 565 mm	0.01875	—
Glass fibre loose fill insulation for walls (CAN/ULC-S702)	89 mm	0.02865	2.55
	140 mm	0.0289	4.05
	152 mm	0.030	4.23
Perlite	—	0.019	—
Vermiculite	—	0.015	—
Spray-applied insulation			
Sprayed polyurethane foam			
medium density (CAN/ULC-S705.1)	25 mm	0.036	0.90
	50 mm	0.036	1.80
light density (CAN/ULC-S712.1)	25 mm	0.026	0.65
Sprayed cellulosic fibre (CAN/ULC-S703)	settled thickness	0.024	—
Spray-applied glass-fibre insulation (CAN/ULC-S702)			
density: 16 kg/m^3	89 mm	0.025	2.30
	140 mm	0.025	3.53
density: 28.8 kg/m^3	89 mm	0.029	2.64
	140 mm	0.029	4.06
Structural Materials	Thickness of Material	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ per mm	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ for thickness listed
Concrete			
Low-density aggregate			
expanded shale, clay, slate or slags, cinders (1600 kg/m^3)	—	0.0013	—
perlite, vermiculite, and polystyrene bead (480 kg/m^3)	—	0.0063	—
Normal-density aggregate			
sand and gravel or stone aggregate (2400 kg/m^3)	—	0.0004	—
Hardwood(9)(10)			
Ash	—	0.0063	—
Birch	—	0.0055	—
Maple	—	0.0063	—
Oak	—	0.0056	—
Softwood(9)(10)			
Amabilis fir	—	0.0080	—
California redwood	—	0.0089	—
Douglas fir-larch	—	0.0069	—

Table A-9.36.2.4.(1)D.
Thermal Resistance Values of Common Building Materials(1)

Structural Materials	Thickness of Material	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ per mm	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ for thickness listed
Eastern white cedar	—	0.0099	—
Eastern white pine	—	0.0092	—
Hemlock-fir	—	0.0084	—
Lodgepole pine	—	0.0082	—
Red pine	—	0.0077	—
Western hemlock	—	0.0074	—
Western red cedar	—	0.0102	—
White spruce	—	0.0097	—
Yellow cyprus-cedar	—	0.0077	—
Wood, structural framing, spruce-pine-fir(11)	—	0.0085	—
Steel, galvanized sheet, 0.14% carbon content	—	0.0000161	—
Concrete Blocks	Thickness of Material	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ per mm	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ for thickness listed
Limestone aggregate with 2 cores			
cores filled with perlite	190 mm	—	0.37
	290 mm	—	0.65
Light-weight units (expanded shale, clay, slate or slag aggregate) with 2 or 3 cores			
no insulation in cores	90 mm	—	0.24
	140 mm	—	0.30
	190 mm	—	0.32
	240 mm	—	0.33
	290 mm	—	0.41
cores filled with perlite	140 mm	—	0.74
	190 mm	—	0.99
	290 mm	—	1.35
cores filled with vermiculite	140 mm	—	0.58
	190 mm	—	0.81
	240 mm	—	0.98
	290 mm	—	1.06
cores filled with molded EPS beads	190 mm	—	0.85
molded EPS inserts in cores	190 mm	—	0.62
Medium-weight units (combination of normal- and low-mass aggregate) with 2 or 3 cores			
no insulation in cores	190 mm	—	0.26
cores filled with molded EPS beads	190 mm	—	0.56
molded EPS inserts in cores	190 mm	—	0.47
cores filled with perlite	190 mm	—	0.53
cores filled with vermiculite	190 mm	—	0.58

Table A-9.36.2.4.(1)D.
Thermal Resistance Values of Common Building Materials(1)

Concrete Blocks	Thickness of Material	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ per mm	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ for thickness listed
Normal-weight units (sand and gravel aggregate) with 2 or 3 cores			
no insulation in cores	90 mm	—	0.17
	140 mm	—	0.19
	190 mm	—	0.21
	240 mm	—	0.24
	290 mm	—	0.26
cores filled with perlite	190 mm	—	0.35
cores filled with vermiculite	140 mm	—	0.40
	190 mm	—	0.51
	240 mm	—	0.61
	290 mm	—	0.69
Hollow Clay Bricks	Thickness of Material	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ per mm	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ for thickness listed
Multi-cored without insulation in cores	90 mm	—	0.27
Rectangular 2-core			
no insulation in cores	140 mm	—	0.39
	190 mm	—	0.41
	290 mm	—	0.47
cores filled with vermiculite	140 mm	—	0.65
	190 mm	—	0.86
	290 mm	—	1.29
Rectangular 3-core			
no insulation in cores	90 mm	—	0.35
	140 mm	—	0.38
	190 mm	—	0.41
	240 mm	—	0.43
	290 mm	—	0.45
cores filled with vermiculite	140 mm	—	0.68
	190 mm	—	0.86
	240 mm	—	1.06
	290 mm		1.19
Interior Finish Materials(12)	Thickness of Material	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ per mm	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ for thickness listed
Gypsum board	—	0.0061	—
Hardboard – medium-density (800 kg/m^3)	—	0.0095	—
Interior finish (plank, tile) board	—	0.0198	—
Particleboard			
low-density (590 kg/m^3)	—	0.0098	—
medium-density (800 kg/m^3)	—	0.0074	—
high-density (1 000 kg/m)	—	0.0059	—
underlay	15.9 mm	—	0.140

Table A-9.36.2.4.(1)D.
Thermal Resistance Values of Common Building Materials(1)

Interior Finish Materials(12)	Thickness of Material	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ per mm	Thermal Resistance (RSI), $(m^2 \cdot K)/W$ for thickness listed
Plywood	—	0.0087	—
Flooring material			
Carpet and fibrous pad	—	—	0.370
Carpet and rubber pad	—	—	0.220
Cork tile	3.2 mm	—	0.049
Hardwood flooring	19 mm	—	0.120
Terrazzo	25 mm	—	0.014
Tile (linoleum, vinyl, rubber)	—	—	0.009
Tile (ceramic)	9.5 mm	—	0.005
Wood subfloor	19 mm	—	0.170
Plastering			
Cement plaster: sand aggregate	—	0.0014	—
Gypsum plaster			
low-density aggregate	—	0.0044	—
sand aggregate	—	0.0012	—

Notes to Table A-9.36.2.4.(1)D.:

(1) The thermal resistance values given in Table A-9.36.2.4.(1)D. are generic values for the materials listed or minimum acceptable values taken from the standards listed. Values published by manufacturers for their proprietary materials may differ slightly but are permitted to be used, provided they were obtained in accordance with the test methods referenced in Article 9.36.2.2. For materials not listed in the Table or where the listed value does not reflect the thickness of the product, the thermal resistance value has to be calculated by dividing the material's thickness, in m, by its conductivity, in W/(m·K), which can be found in the manufacturer's literature.

(2) <RSI values can be interpolated for air cavity sizes that fall between 9.5 and 90 mm, and they can be moderately extrapolated for air cavities measuring more than 90 mm. However, air cavities measuring less than 9.5 mm cannot be included in the calculation of effective thermal resistance of the assembly.>

(3) Where strapping is installed, use the RSI value for an air layer of equivalent thickness.

(4) Reflective insulation material may contribute a thermal property value depending on its location and installation within an assembly. Where a value is obtained through evaluation carried out in accordance with Clause 9.36.2.2.(4)(b), it may be included in the calculation of the thermal resistance or transmittance of the specific assembly.

(5) <Materials installed towards the exterior of a vented air space in a roof assembly cannot be included in the calculation of effective thermal resistance of the assembly.>

(6) All types of cellular foam plastic insulation manufactured to be able to retain a blowing agent, other than air, for a period longer than 180 days shall be tested for long-term thermal resistance (LTTR) in accordance with CAN/ULC-S770, "Determination of Long-Term Thermal Resistance of Closed-Cell Thermal Insulating Foams." This LTTR value shall be input as the design thermal resistance value for the purpose of energy calculations in Section 9.36. Product standards contain a baseline LTTR for a thickness of 50 mm, from which the LTTR for other thicknesses can be calculated.

(7) An RSI 3.52 (R20) batt compressed into a 140 mm cavity has a thermal resistance value of 3.34 (R19); if installed uncompressed in a 152 mm cavity (e.g. in a metal stud assembly), it will retain its full thermal resistance value of 3.52 $(m^2 \cdot K)/W$.

(8) Expanded polystyrene insulation is not manufactured to be able to retain a blowing agent; it is therefore not necessary to test its LTTR. See (9).

(9) The thermal resistance values for wood species are based on a moisture content (MC) of 12%. In Canada, equilibrium moisture content for wood in buildings ranges from 8-14%. The difference between the thermal properties of wood species with 12% MC and those with 14% MC is negligible.

(10) For wood species not listed in the Table, the RSI value of a wood species of equal or greater density (or specific gravity (relative density)) can be used since the thermal resistance of wood is directly related to its density (higher density wood has a lower thermal resistance).

(11) 0.0085 is considered a common value for structural softwood (see also ASHRAE 2009, "ASHRAE Handbook – Fundamentals").

(12) Materials installed towards the interior of a conditioned air space cannot be included in the calculation of effective thermal resistance of the assembly.

A-9.36.2.4.(3) Calculating Thermal Resistance of Major Structural Penetrations Projecting slabs contribute a large area to the 2% exclusion so calculation and analysis of the heat loss through the area they penetrate should be carried out; where construction features only occasional penetrations by beams or joists, the heat loss is less critical to the overall energy performance of a building. Although the 2% exemption is based on gross wall area, it applies to penetrations through any building envelope assembly.

A-9.36.2.4.(4) Credit for Unheated Spaces Protecting the Building Envelope The reduction in RSI afforded by Sentence 9.36.2.4.(4) is intended to provide a simple credit under the prescriptive path for any unheated space that protects a component of the building envelope. The credited value is conservative because it cannot take into account the construction of the enclosure surrounding the unheated space, which may or may not comply with the Code; as such, too many variables, such as its size or airtightness, may negate any higher credit that could be allowed.

There may be simulation tools that can be used under the performance path to provide a better assessment of the effect of an indirectly heated space; these tools may be used to calculate the credit more accurately when an unheated space is designed to provide signifi cantly better protection than the worst-case situation assumed here. Vented spaces, such as attic and roof spaces or crawl spaces, are considered as exterior spaces; the RSI-value credit allowed in Sentence 9.36.2.4.(4) can therefore not be applied in the calculation of the effective thermal resistance of assemblies separating conditioned spaces from vented spaces.

A-9.36.2.5.(1) Continuity of Insulation Sentence 9.36.2.5.(1) is intended to apply to building components such as partitions, chimneys, fi replaces, and columns and beams that are embedded along exterior walls, but not to stud framing and ends of joists. Studs and joists in frame construction are not considered to break the continuity of the insulation because the method for calculating the effective thermal resistance of such assemblies, which is described in Appendix Note A-9.36.2.4.(1), takes their presence into consideration.

The rest of Article 9.36.2.5. contains exceptions to Sentence (1): Sentences (2) to (8) introduce relaxations for various construction details while Sentence (9) allows a complete exemption to the requirements in Sentence (1) for three specifi c construction details. Balcony and canopy slabs are also exempt from the requirements in Sentence (1) because their presence is permitted to be disregarded when calculating the overall effective thermal resistance of walls they penetrate.

A-9.36.2.5.(2) Thermal Bridging Sentence 9.36.2.5.(2) aims to minimize thermal bridging within the building envelope, which occurs when building elements conduct more heat than the insulated portion of the building envelope, which can lead to signifi cant heat loss through the thermal bridge. The most typical case to which Clause 9.36.2.5.(2)(a) applies is that of a fi rewall that must completely penetrate the building envelope (see Figure A-9.36.2.5.(2)-A). Figures A-9.36.2.5.(2)-B and A-9.36.2.5.(2)-C illustrate the insulation options presented in Clauses 9.36.2.5.(2)(b) and (c).

U-values and Energy Ratings (ER) for manufactured windows, glazed doors and skylights are obtained through testing in accordance with the standards referenced in Sentence 9.36.2.2.(3). The U-value and/or ER number for a proprietary product that has been tested can be found in the manufacturer's literature or on a label affixed to the product.

A-Table 9.36.2.7.A. Thermal Characteristics of Windows and Doors Energy Ratings, also known as ER numbers, are based on CSA A440.2/A440.3CSA A440.2/A440.3, "Fenestration Energy Performance/User Guide to CSA A440.2-09, Fenestration Energy Performance."

They are derived from a formula that measures the overall performance of windows or doors based on solar heat gain, heat loss and air leakage through frames, spacers and glass. The ER formula produces a single unitless ER number between 0 and 50 for each of the specified sample sizes found in CSA A440.2/A440.3 (the number only applies to the product at the sample size and not to a particular proprietary window or door). The higher the ER number, the more energy-efficient the product. Note that the ER formula does not apply to sloped glazing so skylights do not have an ER value.

The maximum U-values specified in Table 9.36.2.7.A. are based on the following assumptions:

- that of moderate solar gain for each window and glazed door,
- that houses have a mix of picture and sash windows, each of which performs differently from an energy-efficiency perspective, and
- that fenestration area to gross wall area ratios typically vary between 8% and 25%.

<A-9.36.2.7.(3) Site-built Windows. Site-built windows are often installed in custom-built homes or in unique configurations for which manufactured units are not available. Article 9.7.4.1. requires windows, doors and skylights to conform to either the standards referenced in Article 9.7.4.2. or to Part 5. Regardless of the compliance path chosen, the requirements of Section 9.36. and the remainder of Section 9.7. must also be met. Windows, doors and skylights and other glazed products that comply with Part 5 and are installed in a Part 9 building may use the site-built provisions of Sentence 9.36.2.7.(3) rather than complying with the requirements in Sentence 9.36.2.7.(1).**>**

A-9.36.2.8.(1) Nominal Insulation Values for Walls Below-Grade or in Contact with the Ground Tables A-9.36.2.8.(1)A., A-9.36.2.8.(1)B. and A-9.36.2.8.(1)C. are provided to help Code users assess the compliance of walls that are below-grade or in contact with the ground with Table 9.36.2.8.A. or 9.36.2.8.B. Table A-9.36.2.8.(1)A. presents the minimum nominal thermal resistance to be made up in a given wall assembly for it to achieve the applicable RSI value required by Table 9.36.2.8.A. or 9.36.2.8.B. The amount of additional materials needed to meet the prescribed RSI value can then be estimated using the thermal resistance values listed in Table A-9.36.2.4.(1)D. for the rest of the building materials in the assembly, any finishing materials, sheathing or insulation, if applicable, and the interior air film. For example, an RSI value of 0.20 (m^2·K)/W needed to achieve the minimum RSI for a given assembly could be made up by installing 12.7 mm gypsum board, which has an RSI value of 0.0775 (m^2·K)/W, and by taking into account the air film coefficient on the interior side of the wall, which is 0.12 (m^2·K)/W.

Note that the wall assemblies described in Table A-9.36.2.8.(1)A. do not necessarily address other structural or building envelope requirements (see Section 9.25.).

Table A-9.36.2.8.(1)A.
Minimum Nominal Thermal Resistance (RSI) to be Made up by Insulation, Sheathing or Other Materials and Air Films in Wall Assemblies Below-Grade or in Contact with the Ground

Description of Framing or Material	Size and Spacing of Wood Framing	Thermal Resistance of Insulated Assembly			Minimum Effective Thermal Resistance Required by Article 9.36.2.8. for Wall Assemblies Below-Grade or in Contact with the Ground, (m^2·K)/W			
		Nominal, (m^2·K)/W (ft^2·°F·h/Btu)		Effective (m^2·K)/W	1.99	2.98	3.46	3.97
		Insulation in Framing Cavity	Continuous Materials	Entire Assembly	Minimum Nominal Thermal Resistance,(1) in (m^2·K)/W, to be Made up by Insulation, Sheathing(2) or Other Materials and Air Film Coefficients			
200 mm cast-in-place concrete	38 × 89 mm, 610 mm o.c.	2.11 (R12)	None	1.79	0.20	1.19	1.67	2.18
			1.41 (R8)	3.20	—	—	0.26	0.77
		2.46 (R14)	1.76 (R10)	3.75	—	—	—	0.22
	38 × 140 mm, 610 mm o.c.	3.34 (R19)3)	None	2.78	—	0.20	0.68	1.19
		4.23 (R24)	None	3.26	—	—	0.20	0.71
	None	n/a	1.76 (R10)	1.84	0.15	1.14	1.62	2.13
			2.64 (R15)	2.72	—	0.26	0.74	1.25
			3.52 (R20)(3)	3.60	—	—	—	0.37

Table A-9.36.2.8.(1)A.
Minimum Nominal Thermal Resistance (RSI) to be Made up by Insulation, Sheathing or Other Materials and Air Films in Wall Assemblies Below-Grade or in Contact with the Ground

Description of Framing or Material	Size and Spacing of Wood Framing	Thermal Resistance of Insulated Assembly			Minimum Effective Thermal Resistance Required by Article 9.36.2.8. for Wall Assemblies Below-Grade or in Contact with the Ground, (m^2·K)/W			
		Nominal, (m^2·K)/W (ft^2·°F·h/Btu)		Effective (m^2·K)/W	1.99	2.98	3.46	3.97
		Insulation in Framing Cavity	Continuous Materials	Entire Assembly	Minimum Nominal Thermal Resistance,[1] in (m^2·K)/W, to be Made up by Insulation, Sheathing[2] or Other Materials and Air Film Coefficients			
190 mm concrete block masonry: normal-weight, no insulation in cores	38 × 89 mm, 610 mm o.c.	2.11 (R12)	None	1.92	0.07	1.06	1.54	2.05
			1.41 (R8)	3.33	—	—	0.13	0.64
			2.11 (R12)	4.03	—	—	—	—
	38 × 140 mm, 610 mm o.c.	3.34 (R19)[3]	None	2.91	—	0.07	0.55	1.06
		4.23 (R24)	None	3.39	—	—	0.07	0.58
	None	n/a	1.76 (R10)	1.97	0.02	1.01	1.49	2.00
			2.64 (R15)	2.85	—	0.13	0.61	1.12
			3.52 (R20)[3]	3.73	—	—	—	0.24
190 mm concrete block masonry: light-weight, no insulation in cores	38 × 89 mm, 610 mm o.c.	2.11 (R12)	None	2.03	—	0.95	1.43	1.94
			1.41 (R8)	3.44	—	—	0.02	0.53
			2.11 (R12)	4.14	—	—	—	—
	38 × 140 mm, 610 mm o.c.	3.34 (R19)[3]	None	3.02	—	—	0.44	0.95
		4.23 (R24)	None	3.50	—	—	—	0.47
	None	n/a	1.76 (R10)	2.08	—	0.90	1.38	1.89
			2.64 (R15)	2.96	—	0.02	0.50	1.01
			3.52 (R20)	3.84	—	—	—	0.13
Insulating concrete form (ICF):[4] 150 mm concrete	n/a	n/a	3.52 (R20)[3]	3.58	—	—	—	0.39
			3.73 (R21.2)	3.79	—	—	—	0.18
Pressure-treated wood frame	38 × 140 mm, 203 mm o.c.	3.34 (R19)[3]	None	2.33	—	0.65	1.13	1.64
		4.23 (R24)	None	2.62	—	0.36	0.84	1.35
	38 × 186 mm, 203 mm o.c.	4.93 (R28)	None	2.81	—	0.17	0.65	1.16
	38 × 235 mm, 203 mm o.c.	5.28 (R31)	None	3.86	—	—	—	0.11
	38 × 140 mm, 406 mm o.c.	3.34 (R19)[3]	None	2.59	—	0.39	0.87	1.38
		4.23 (R24)	None	3.00	—	—	0.46	0.97
	38 × 186 mm, 406 mm o.c.	4.93 (R28)	None	3.85	—	—	—	0.12
	38 × 235 mm, 406 mm o.c.	5.28 (R31)	None	4.11	—	—	—	—

Table C-3
Locations in British Columbia Requiring Radon Rough-Ins (see Article 9.13.4.2.)(1)
Forming part of Appendix C

Location	Radon Area 1 or 2
Victoria Region	
Victoria (Gonzales Hts)	2
Victoria (Mt. Tolmie)	2
Victoria	2
Whistler	2
White Rock	2
Williams Lake	1
Youbou	2

Notes to Table C-3:

(1) Testing has demonstrated that specific areas of the province are at an elevated risk of the presence of indoor radon levels exceeding Health Canada guidelines. These areas are identified as area 1 in Table C-3. Locations identified as area 2 are not known to have an elevated risk.

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Table C-4
Required Performance of Windows and Doors in Part 9 Buildings
Forming Part of Appendix C

Location	Climatic Data		Specified Loads			NAFS		
	1/5 DRWP	1/50 HWP	DRWP	Wind Load		Required Fenestration Performance		
	Pa	kPa	Pa	Pa	(psf)	DP	PG	Water Resist.
100 Mile House	60	0.35	60	709	14.80	720	15	140
Abbotsford	160	0.44	160	891	18.61	960	20	180
Agassiz	160	0.47	160	952	19.88	960	20	180
Alberni	220	0.32	220	648	13.53	720	15	220
Ashcroft	80	0.38	80	770	16.07	960	20	150
Bamfield	280	0.50	280	1013	21.15	1200	25	290
Beatton River	80	0.30	80	608	12.69	720	15	140
Bella Bella	350	0.50	350	1013	21.15	1200	25	360
Bella Coola	350	0.39	350	790	16.49	960	20	360
Burns Lake	100	0.39	100	790	16.49	960	20	150
Cache Creek	80	0.39	80	790	16.49	960	20	150
Campbell River	260	0.52	260	1053	21.99	1200	25	260
Carmi	60	0.38	60	770	16.07	960	20	150
Castlegar	60	0.34	60	689	14.38	720	15	140
Chetwynd	60	0.40	60	810	16.92	960	20	150
Chilliwack	160	0.47	160	952	19.88	960	20	180
Comox	260	0.52	260	1053	21.99	1200	25	260
Courtenay	260	0.52	260	1053	21.99	1200	25	260

Table C-4
Required Performance of Windows and Doors in Part 9 Buildings
Forming Part of Appendix C

Location	Climatic Data		Specified Loads			NAFS		
	1/5 DRWP	1/50 HWP	DRWP	Wind Load		Required Fenestration Performance		
	Pa	kPa	Pa	Pa	(psf)	DP	PG	Water Resist.
Cranbrook	100	0.33	100	668	13.96	720	15	140
Crescent Valley	80	0.33	80	668	13.96	720	15	140
Crofton	160	0.40	160	810	16.92	960	20	180
Dawson Creek	100	0.40	100	810	16.92	960	20	150
Dease Lake	380	0.30	380	608	12.69	720	15	400
Dog Creek	100	0.35	100	709	14.80	720	15	140
Duncan	180	0.39	180	790	16.49	960	20	180
Elko	100	0.40	100	810	16.92	960	20	150
Fernie	100	0.40	100	810	16.92	960	20	150
Fort Nelson	80	0.30	80	608	12.69	720	15	140
Fort St. John	100	0.39	100	790	16.49	960	20	150
Glacier	80	0.32	80	648	13.53	720	15	140
Gold River	250	0.32	250	648	13.53	720	15	260
Golden	100	0.35	100	709	14.80	720	15	140
Grand Forks	80	0.40	80	810	16.92	960	20	150
Greenwood	80	0.40	80	810	16.92	960	20	150
Hope	140	0.63	140	1276	26.64	1440	30	220
Jordan River	250	0.55	250	1114	23.26	1200	25	260
Kamloops	80	0.40	80	810	16.92	960	20	150
Kaslo	80	0.31	80	628	13.11	720	15	140
Kelowna	80	0.40	80	810	16.92	960	20	150
Kimberley	100	0.33	100	668	13.96	720	15	140
Kitimat Plant	220	0.48	220	972	20.30	1200	25	220
Kitimat Townsite	220	0.48	220	972	20.30	1200	25	220
Ladysmith	180	0.40	180	810	16.92	960	20	180
Langford	220	0.40	220	810	16.92	960	20	220
Lillooet	100	0.44	100	891	18.61	960	20	150
Lytton	80	0.43	80	871	18.19	960	20	150
Mackenzie	60	0.32	60	648	13.53	720	15	140
Masset	400	0.61	400	1235	25.80	1440	30	400
McBride	60	0.35	60	709	14.80	720	15	140
McLeod Lake	60	0.32	60	648	13.53	720	15	140
Merritt	80	0.44	80	891	18.61	960	20	150
Mission City	160	0.43	160	871	18.19	960	20	180

Table C-4
Required Performance of Windows and Doors in Part 9 Buildings
Forming Part of Appendix C

Location	Climatic Data		Specified Loads			NAFS		
	1/5 DRWP	1/50 HWP	DRWP	Wind Load		Required Fenestration Performance		
	Pa	kPa	Pa	Pa	(psf)	DP	PG	Water Resist.
Montrose	60	0.35	60	709	14.80	720	15	140
Nakusp	60	0.33	60	668	13.96	720	15	140
Nanaimo	200	0.50	200	1013	21.15	1200	25	220
Nelson	60	0.33	60	668	13.96	720	15	140
Ocean Falls	350	0.59	350	1195	24.95	1200	25	360
Osoyoos	60	0.40	60	810	16.92	960	20	150
Parksville	200	0.50	200	1013	21.15	1200	25	220
Penticton	60	0.45	60	911	19.03	960	20	150
Port Alberni	240	0.32	240	648	13.53	720	15	260
Port Alice	220	0.32	220	648	13.53	720	15	220
Port Hardy	220	0.52	220	1053	21.99	1200	25	220
Port McNeill	260	0.52	260	1053	21.99	1200	25	260
Port Renfrew	270	0.52	270	1053	21.99	1200	25	290
Powell River	220	0.51	220	1033	21.57	1200	25	220
Prince George	80	0.37	80	749	15.65	960	20	150
Prince Rupert	240	0.54	240	1094	22.84	1200	25	260
Princeton	80	0.36	80	729	15.23	960	20	150
Qualicum Beach	200	0.53	200	1073	22.42	1200	25	220
Queen Charlotte City	360	0.61	360	1235	25.80	1440	30	360
Quesnel	80	0.31	80	628	13.11	720	15	140
Revelstoke	80	0.32	80	648	13.53	720	15	140
Salmon Arm	80	0.39	80	790	16.49	960	20	150
Sandspit	500	0.78	500	1580	32.99	1680	35	510
Sechelt	160	0.48	160	972	20.30	1200	25	180
Sidney	160	0.42	160	851	17.76	960	20	180
Smith River	40	0.30	40	608	12.69	720	15	140
Smithers	120	0.40	120	810	16.92	960	20	150
Sooke	220	0.48	220	972	20.30	1200	25	220
Squamish	160	0.50	160	1013	21.15	1200	25	180
Stewart	180	0.36	180	729	15.23	960	20	180
Tahsis	300	0.34	300	689	14.38	720	15	330
Taylor	100	0.40	100	810	16.92	960	20	150
Terrace	200	0.36	200	729	15.23	960	20	220
Tofino	300	0.68	300	1377	28.76	1440	30	330

Table C-4
Required Performance of Windows and Doors in Part 9 Buildings
Forming Part of Appendix C

Location	Climatic Data		Specified Loads			NAFS		
	1/5 DRWP	1/50 HWP	DRWP	Wind Load		Required Fenestration Performance		
	Pa	kPa	Pa	Pa	(psf)	DP	PG	Water Resist.
Trail	60	0.35	60	709	14.80	720	15	140
Ucluelet	280	0.68	280	1377	28.76	1440	30	290
Vancouver Region								
Vancouver – Burnaby (Simon Fraser Univ.)	160	0.47	160	952	19.88	960	20	180
Vancouver – Cloverdale	160	0.44	160	891	18.61	960	20	180
Vancouver – Haney	160	0.44	160	891	18.61	960	20	180
Vancouver – Ladner	160	0.46	160	932	19.45	960	20	180
Vancouver – Langley	160	0.44	160	891	18.61	960	20	180
Vancouver – New Westminster	160	0.44	160	891	18.61	960	20	180
Vancouver – North Vancouver	160	0.45	160	911	19.03	960	20	180
Vancouver – Richmond	160	0.45	160	911	19.03	960	20	180
Vancouver – Surrey (88 Ave. & 156 St.)	160	0.44	160	891	18.61	960	20	180
West Vancouver	160	0.48	160	972	20.30	1200	25	180
Vernon	80	0.40	80	810	16.92	960	20	150
Victoria Region								
Victoria (Gonzales Hts)	220	0.57	220	1154	24.11	1200	25	220
Victoria (Mt Tolmie)	220	0.63	220	1276	26.64	1440	30	220
Victoria	220	0.57	220	1154	24.11	1200	25	220
Whistler	160	0.32	160	648	13.53	720	15	180
White Rock	160	0.44	160	891	18.61	960	20	180
Williams Lake	80	0.35	80	709	14.80	720	15	140
Youbou	200	0.32	200	648	13.53	720	15	220

Notes to Table C-4
Table C-4 may not be used for skylights (see Sentence 9.7.4.3.(1)). >

Table 9.38.1.1.
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 9
Forming part of Sentence 9.38.1.1.(1)

Acceptable Solutions	Functional Statements and Objectives[1]
9.34.1.1. Standard for Electrical Installations	
(1)	[F32-OS3.3]
	[F01-OS1.1]
	[F01-OP1.1]
9.34.1.3. Location of Equipment in Public Areas	
(1)	[F10-OS3.1] [F32-OS3.3]
9.34.1.4. Recessed Lighting Fixtures	
(1)	[F01-OS1.1]
9.34.1.5. Wiring and Cables	
(1)	[F02-OS1.2]
	[F02-OP1.2]
9.34.2.1. Lighting of Entrances	
(1)	[F30-OS3.1]
	[F34-OS4.2]
9.34.2.2. Outlets in Dwelling Units	
(1)	[F30-OS3.1]
(2)	[F30-OS3.1]
9.34.2.3. Stairways	
(1)	[F30-OS3.1]
(2)	[F30-OS3.1]
9.34.2.4. Basements	
(1)	[F30-OS3.1]
(2)	[F30-OS3.1]
9.34.2.5. Storage Rooms	
(1)	[F30-OS3.1]
9.34.2.6. Garages and Carports	
(1)	[F30-OS3.1]
(2)	[F30-OS3.1]
(3)	[F30-OS3.1]
9.34.2.7. Public and Service Areas	
(1)	[F30-OS3.1]
(2)	[F30-OS3.1]
(3)	[F30-OS3.1]
9.35.2.2. Garage Floor	
(1)	[F40-OS1.1]

Table 9.38.1.1.
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 9
Forming part of Sentence 9.38.1.1.(1)

Acceptable Solutions	Functional Statements and Objectives[1]
9.35.3.2. Protection from Damage due to Soil Movement	
(1)	[F21-OS2.3]
	[F21-OH1.1,OH1.2,OH1.3]
	[F21-OP2.3,OP2.4]
	[F21-OH4] Applies to floors and elements that support floors.
	[F21-OS3.1] Applies to floors and elements that support floors.
(2)	[F21-OS2.3]
	[F21-OH1.1,OH1.2,OH1.3]
	[F21-OP2.3,OP2.4]
	[F21-OH4] Applies to floors and elements that support floors.
	[F21-OS3.1] Applies to floors and elements that support floors.
9.35.3.4. Column Piers	
(1)	[F80-OS2.3]
	[F80-OP2.3]
(2)	[F20-OS2.1,OS2.2]
	[F20-OP2.1,OP2.2]
9.35.4.2. Columns	
(1)	[F20-OS2.1]
	[F20-OP2.1]
9.35.4.3. Anchorage	
(1)	[F22-OS2.4,OS2.5]
	[F22-OP2.4,OP2.5]
<9.36.2.2. Determination of Thermal Characteristics of Materials, Components and Assemblies	
(1)	[F92-OE1.1]
(2)	[F92-OE1.1]
(3)	[F92-OE1.1]
(4)	[F92-OE1.1]
9.36.2.4. Calculation of Effective Thermal Resistance of Assemblies	
(1)	[F92-OE1.1]
(3)	[F92-OE1.1]
9.36.2.5. Continuity of Insulation	
(1)	[F92-OE1.1]
(2)	[F92-OE1.1]
(4)	[F92-OE1.1]
(5)	[F92-OE1.1]
(6)	[F92-OE1.1]
(7)	[F92-OE1.1]
(8)	[F92-OE1.1]

Table 9.38.1.1.
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 9
Forming part of Sentence 9.38.1.1.(1)

Acceptable Solutions	Functional Statements and Objectives[1]
9.36.2.6. Thermal Characteristics of Above-ground Opaque Building Assemblies	
(1)	[F92-OE1.1]
(2)	[F92-OE1.1]
(3)	[F92-OE1.1]
(4)	[F92-OE1.1]
9.36.2.7. Thermal Characteristics of Fenestration, Doors and Skylights	
(1)	[F92-OE1.1]
(2)	[F92-OE1.1]
(3)	[F92-OE1.1]
(4)	[F92-OE1.1]
(5)	[F92-OE1.1]
(7)	[F92-OE1.1]
(8)	[F92-OE1.1]
9.36.2.8. Thermal Characteristics of Building Assemblies Below-Grade or in Contact with the Ground	
(1)	[F92-OE1.1]
(2)	[F92-OE1.1]
(3)	[F92-OE1.1]
(4)	[F92-OE1.1]
(5)	[F92-OE1.1]
(6)	[F92-OE1.1]
(7)	[F92-OE1.1]
(8)	[F92-OE1.1]
(9)	[F92-OE1.1]
9.36.2.9. Airtightness	
(1)	[F90-OE1.1]
(2)	[F90-OE1.1]
(3)	[F90-OE1.1]
(4)	[F90-OE1.1]
(5)	[F90-OE1.1]
(6)	[F90-OE1.1]
9.36.2.10. Construction of Air Barrier Details	
(1)	[F90-OE1.1]
(2)	[F90-OE1.1]
(3)	[F90-OE1.1]
(4)	[F90-OE1.1]
(5)	[F90-OE1.1]
(6)	[F90-OE1.1]
(17)	[F90-OE1.1]

Table 9.38.1.1.
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 9
Forming part of Sentence 9.38.1.1.(1)

Acceptable Solutions	Functional Statements and Objectives[1]
9.36.2.11. Trade-off Options for Above-ground Building Envelope Components and Assemblies	
(2)	[F92-OE1.1]
(3)	[F92-OE1.1]
(4)	[F92-OE1.1]
(5)	[F92-OE1.1]
(6)	[F92-OE1.1]
(7)	[F92-OE1.1]
(8)	[F92-OE1.1]
9.36.3.2. Equipment and Ducts	
(1)	[F95-OE1.1]
(3)	[F91,F93-OE1.1]
(4)	[F91,F93-OE1.1]
(5)	[F91,F93-OE1.1]
9.36.3.3. Air Intake and Outlet Dampers	
(1)	[F91,F95-OE1.1]
(2)	[F91,F95-OE1.1]
9.36.3.4. Piping for Heating and Cooling Systems	
(2)	[F93-OE1.1]
9.36.3.5. Equipment for Heating and Air-conditioning Systems	
(1)	[F98-OE1.1]
9.36.3.6. Temperature Controls	
(1)	[F92-OE1.1]
(2)	[F95,F98-OE1.1]
(3)	[F95-OE1.1]
(4)	[F95-OE1.1]
(5)	[F95-OE1.1]
(6)	[F95-OE1.1]
(7)	[F95-OE1.1]
9.36.3.7. Humidification	
(1)	[F95-OE1.1]
9.36.3.8. Heat Recovery from Dehumidification in Spaces with an Indoor Pool or Hot Tub	
(1)	[F95,F100-OE1.1]
(3)	[F95-OE1.1]
(4)	[F98,F100-OE1.1]
(5)	[F98,F100-OE1.1]
9.36.3.9. Heat Recovery from Ventilation Systems	
(2)	[F95,F100-OE1.1]
(3)	[F95,F100-OE1.1]
(4)	[F95,F98,F100-OE1.1]

Table 9.38.1.1.
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 9
Forming part of Sentence 9.38.1.1.(1)

Acceptable Solutions	Functional Statements and Objectives[1]
9.36.3.10. Equipment Efficiency	
(1)	[F95,F98,F99-OE1.1]
9.36.3.11. Solar Thermal Systems	
(1)	[F95,F98,F99-OE1.1]
(3)	[F93,F96-OE1.1]
9.36.4.2. Equipment Efficiency	
(1)	[F96,F98-OE1.1]
(2)	[F93,F96-OE1.1]
(3)	[F98-OE1.1]
9.36.4.3. Solar Domestic Hot Water Systems	
(1)	[F96,F98-OE1.1]
(3)	[F93,F96-OE1.1]
9.36.4.4. Piping	
(1)	[F93,F96-OE1.1]
(2)	[F93,F96-OE1.1]
(3)	[F93,F96-OE1.1]
9.36.4.5. Controls	
(1)	[F96-OE1.1]
9.36.4.6. Indoor Swimming Pool Equipment Controls	
(1)	[F96-OE1.1]
(2)	[F96-OE1.1]
9.36.5.3. Compliance	
(1)	[F99-OE1.1]
(2)	[F92,F93,F95,F96,F98,F99,F100-OE1.1]
(3)	[F92,F93,F95,F96,F98,F99,F100-OE1.1]
(4)	[F92,F93,F95,F96,F98,F99,F100-OE1.1]
(5)	[F92,F93,F95,F96,F98,F99,F100-OE1.1]
(6)	[F99-OE1.1]
9.36.5.4. Calculation Methods	
(1)	[F99-OE1.1]
(3)	[F99-OE1.1]
(4)	[F99-OE1.1]
(5)	[F95,F99-OE1.1]
(6)	[F95,F99-OE1.1]
(7)	[F95,F99-OE1.1]
(8)	[F99-OE1.1]
(9)	[F99-OE1.1]
(10)	[F90,F99-OE1.1]
(11)	[F90,F99-OE1.1]

Table 9.38.1.1.
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 9
Forming part of Sentence 9.38.1.1.(1)

Acceptable Solutions	Functional Statements and Objectives[1]
9.36.5.5. Climatic Data	
(1)	[F99-OE1.1]
(2)	[F99-OE1.1]
(3)	[F99-OE1.1]
9.36.5.6. Building Envelope Calculations	
(1)	[F92,F99-OE1.1]
(2)	[F92,F99-OE1.1]
(3)	[F92,F99-OE1.1]
(4)	[F92,F99-OE1.1]
(5)	[F92,F99-OE1.1]
(6)	[F92,F99-OE1.1]
(7)	[F92,F93,F95,F96,F99-OE1.1]
(8)	[F92,F99-OE1.1]
(9)	[F92,F99-OE1.1]
(10)	[F92,F99-OE1.1]
(11)	[F92,F99-OE1.1]
9.36.5.7. HVAC System Calculations	
(1)	[F95,F99-OE1.1]
(2)	[F95,F99-OE1.1]
(3)	[F95,F99-OE1.1]
(4)	[F95,F99-OE1.1]
(5)	[F95,F99-OE1.1]
(6)	[F95,F99-OE1.1]
(7)	[F95,F99-OE1.1]
(8)	[F95,F99-OE1.1]
(9)	[F95,F99-OE1.1]
9.36.5.8. Service Water Heating System Calculations	
(1)	[F96,F99-OE1.1]
(2)	[F96,F99-OE1.1]
(3)	[F96,F99-OE1.1]
(4)	[F96,F99-OE1.1]
(5)	[F96,F99-OE1.1]
(6)	[F96,F99-OE1.1]
9.36.5.9. General Requirements for Modeling the Proposed House	
(1)	[F99-OE1.1]
9.36.5.10. Modeling Building Envelope of Proposed House	
(1)	[F92,F95,F99-OE1.1]
(4)	[F92,F95,F99-OE1.1]
(5)	[F92,F95,F99-OE1.1]

Table 9.38.1.1.
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 9
Forming part of Sentence 9.38.1.1.(1)

Acceptable Solutions	Functional Statements and Objectives[1]
(6)	[F92,F95,F99-OE1.1]
(7)	[F92,F95,F99-OE1.1]
(9)	[F90,F91,F92,F95,F99-OE1.1]
(10)	[F90,F99-OE1.1]
(11)	[F90,F99-OE1.1]
(12)	[F90,F99-OE1.1]
(13)	[F90,F99-OE1.1]
9.36.5.11. Modeling HVAC System of Proposed House	
(1)	[F95,F99-OE1.1]
(2)	[F95,F99-OE1.1]
(3)	[F92,F95,F99-OE1.1]
(4)	[F95,F99,F100-OE1.1]
(5)	[F95,F99-OE1.1]
(6)	[F95,F99-OE1.1]
(7)	[F99-OE1.1]
(8)	[F95,F99-OE1.1]
(9)	[F95,F99-OE1.1]
(10)	[F95,F99,F100-OE1.1]
(11)	[F95,F99-OE1.1]
(12)	[F95,F99,F100-OE1.1]
(13)	[F95,F99-OE1.1]
(14)	[F95,F99,F100-OE1.1]
(15)	[F95,F99-OE1.1]
(16)	[F95,F99-OE1.1]
(17)	[F95,F99-OE1.1]
(18)	[F95,F99-OE1.1]
(19)	[F95,F99-OE1.1]
(20)	[F95,F99-OE1.1]
9.36.5.12. Modeling Service Water Heating System of Proposed House	
(1)	[F96,F99-OE1.1]
(2)	[F99-OE1.1]
9.36.5.13. General Requirements for Modeling the Reference House	
(1)	[F99-OE1.1]
(2)	[F99-OE1.1]
9.36.5.14. Modeling Building Envelope of Reference House	
(1)	[F92,F95,F99-OE1.1]
(2)	[F90,F91,F92,F95,F99-OE1.1]
(3)	[F92,F95,F99-OE1.1]
(4)	[F92,F95,F99-OE1.1]

Table 9.38.1.1.
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 9
Forming part of Sentence 9.38.1.1.(1)

Acceptable Solutions	Functional Statements and Objectives[1]
(5)	[F92,F99-OE1.1]
(6)	[F92,F95,F99-OE1.1]
(7)	[F92,F99-OE1.1]
(8)	[F92,F99-OE1.1]
(9)	[F92,F95,F99-OE1.1]
(10)	[F92,F99-OE1.1]
9.36.5.15. Modeling HVAC System of Reference House	
(1)	[F95,F99-OE1.1]
(2)	[F95,F99-OE1.1]
(3)	[F95,F99,F100-OE1.1]
(4)	[F95,F99-OE1.1]
(5)	[F95,F99-OE1.1]
(6)	[F95,F99-OE1.1]
(7)	[F95,F99-OE1.1]
(8)	[F95,F99,F100-OE1.1]
(9)	[F95,F99-OE1.1]
(10)	[F95,F99-OE1.1]
(11)	[F95,F99-OE1.1]
(12)	[F95,F99,F100-OE1.1]
(13)	[F95,F99,F100-OE1.1]
(14)	[F95,F99-OE1.1]
(15)	[F95,F99-OE1.1]
(16)	[F95,F99-OE1.1]
9.36.5.16. Modeling Service Water Heating System of Reference House	
(1)	[F95,F99-OE1.1]
(2)	[F95,F99-OE1.1]
(3)	[F95,F99-OE1.1]>
9.37. Secondary Suites	
<9.37.2.1.>	[F30-OS3.1] [F10-OS3.7]
<9.37.2.2.>	[F20-OS4.1]
<9.37.2.3.>	[F30-OS3.1] [F10-OS3.7]
<9.37.2.4.>	[F30-OS3.1] [F10-OS3.7]
<9.37.2.5.>	[F30-OS3.1] [F10-OS3.7]
<9.37.2.6.>	[F30-OS3.1] [F10-OS3.7]
<9.37.2.7.>	[F03-OP1.2]
	[F05-OS1.5] [F03-OS1.2]
<9.37.2.8.>	[F05-OS1.5]

Table 9.38.1.1.
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 9
Forming part of Sentence 9.38.1.1.(1)

Acceptable Solutions	Functional Statements and Objectives(1)
<9.37.2.9.>	[F30-OS3.1] [F10-OS3.7]
<9.37.2.10.>	[F10-OS3.7]
<9.37.2.11.>	[F10-OS3.7]
<9.37.2.12.>	[F10-OS3.7]
<9.37.2.14.>	[F03-OP1.2] [F04-OP1.3]
	[F03-OS1.2] [F04-OS1.3]
<9.37.2.15.>	[F03-OP1.2] [F04-OP1.3]
	[F03-OS1.2] [F04-OS1.3]
<9.37.2.16.>	[F03-OP1.2]
<9.37.2.17.>	[F03,F06-OP1.2]
	[F03,F06-OS1.5] [F03-OS1.2]
<9.37.2.18.>	[F03-OP1.2]
	[F03-OS1.2]
<9.37.2.19.>	[F02,F03-OP3.1]
<9.37.2.20.>	[F81,F11-OS1.5]
<9.37.2.21.>	[F56-OH3.1]
<9.37.2.22.>	[F82-OH1.1, OH1.2, OH1.3]
	[F82-OS2.3]

Notes to Table 9.38.1.1.:
(1) See Parts 2 and 3 of Division A.