National Building Code of Canada 2020 (NBC)

2025 Revisions and Errata Package

Selected replacement pages have been produced for the NBC.

Please print and insert in your copy of the Code.

Preface

The National Building Code of Canada 2020 (NBC), together with the National Plumbing Code of Canada 2020 (NPC), the National Fire Code of Canada 2020 (NFC) and the National Energy Code of Canada for Buildings 2020 (NECB), was developed by the Canadian Commission on Building and Fire Codes (CCBFC) as an objective-based national model code that can be adopted by provincial and territorial governments.

In Canada, provincial and territorial governments have the authority to enact legislation that regulates building design and construction within their jurisdictions. This may involve the adoption of the NBC without change or with modifications to suit local needs, and the enactment of other laws and regulations regarding building design and construction, including requirements for professional involvement.

The NBC is a model code in the sense that it helps promote consistency among provincial and territorial building codes. Persons involved in the design or construction of a building should consult the provincial or territorial jurisdiction concerned to find out which building code is applicable.

This edition of the NBC succeeds the 2015 edition.

Development of the National Model Codes

GOVERNANCE CHANGE NOTE: The national code development system underwent a governance change in November 2022 to support efforts to harmonize construction codes in jurisdictions throughout Canada. The CCBFC, which had been in place since 1991, was dissolved and replaced by a new governance model in which the Canadian Board for Harmonized Construction Codes (CBHCC) is responsible for developing, approving and maintaining the National Model Codes based on the strategic priorities set by the Canadian Table for Harmonized Construction Codes Policy. The 2020 National Model Codes were developed by the CCBFC. In this section, references to the CCBFC are written in the past tense to reflect the change in governance.

The CCBFC, an independent committee established by the National Research Council of Canada (NRC), was responsible for the content of the 2020 editions of the National Model Codes. The CCBFC was made up of volunteers from across the country and from all facets of the Codes-user community. Members of the CCBFC and its standing committees included builders, engineers, skilled trade workers, architects, building owners, building operators, fire and building officials, manufacturers, and representatives of general interests.

The CCBFC was advised on scope, policy and technical issues pertaining to the Codes by the Provincial/Territorial Policy Advisory Committee on Codes (PTPACC), which was a committee of senior representatives from provincial/territorial ministries responsible for building, fire, plumbing and energy regulation in their jurisdictions. The PTPACC was created by the provinces and territories, with provision of guidance to the CCBFC as one of its main functions. Through the PTPACC, the provinces and territories were engaged in every phase of the Codes development process.

Codes Canada staff within the Construction Research Centre at the NRC provided technical and administrative support to the CCBFC and its standing committees, and coordinated the provision of evidence-based research to inform Codes development. The NRC publishes the National Model Codes and periodic revisions to the Codes to address pressing issues.

The broader Codes-user community makes significant contributions to the Codes development process by submitting requests for changes or additions to the Codes and by commenting on the proposed changes during the public reviews that precede each new edition.

The CCBFC took into consideration the advice received from the provinces and territories as well as Codes users' comments at each stage of Codes development. The scope and content of the National Model Codes are determined on a consensus basis, which involves the review of technical, policy and practical concerns and discussion of the implications of these concerns.

More information on the Codes development process is available on the CBHCC's website.

National Building Code of Canada 2020

The NBC sets out technical provisions for the design and construction of new buildings. It also applies to the alteration, change of use and demolition of existing buildings.

The NBC establishes requirements to address the following five objectives:

- safety
- health
- accessibility
- fire and structural protection of buildings
- environment

Code provisions do not necessarily address all the characteristics of buildings that might be considered to have a bearing on the Code's objectives. Through the extensive consensus process used to develop and maintain the National Model Codes (see the section entitled Development of the National Model Codes), the Codes-user community has decided which characteristics should be regulated through the NBC.

The provisions of the NBC can be considered as the minimum acceptable measures required to adequately achieve the above-listed objectives, as recommended by the CCBFC. Once they are adopted into law or regulation by an authority having jurisdiction, the provisions become minimum acceptable requirements representing the minimum level of performance required to achieve the objectives that is acceptable to the adopting authority.

The NBC is a model code which, when adopted or adapted by a province or territory, becomes a regulation. It is not a guideline on building design or construction. The design of a technically sound building depends upon many factors beyond compliance with building regulations. Such factors include the availability of knowledgeable practitioners who have received appropriate education, training and experience and who are familiar with the principles of good building practice and experience using reference manuals and technical guides.

The NBC does not list acceptable proprietary building products. It establishes the criteria that building materials, products and assemblies must meet. Some of these criteria are explicitly stated in the NBC while others are incorporated by reference to material or product standards published by standards development organizations. Only those portions of the standards related to the objectives of this Code are mandatory parts of the NBC.

Relationship between the NBC and the NFC

The NBC and NFC each contain provisions that relate to the safety of persons in buildings in the event of a fire and the protection of buildings from the effects of fire.(1) These two model codes are developed as complementary and coordinated documents to minimize the possibility of their containing conflicting provisions. It is expected that buildings comply with both the NBC and the NFC.

(1) The NFC also applies to other types of facilities besides buildings (e.g. tank farms and storage yards). Those applications are not discussed here.

The NBC covers the fire safety and fire protection features that are required to be incorporated in a building at the time of its original construction. Building codes typically no longer apply once a building is occupied, unless the building is undergoing alteration or change of use, or being demolished.

The NFC covers:

- the ongoing maintenance and use of the fire safety and fire protection features incorporated in buildings
- the conduct of activities that might cause fire hazards in and around buildings
- limitations on hazardous contents in and around buildings
- the establishment of fire safety plans
- fire safety at construction and demolition sites

In addition, the NFC contains provisions regarding fire safety and fire protection features that must be added to existing buildings when certain hazardous activities or processes are introduced into these buildings.

Some of the NFC's provisions are incorporated by reference in the NBC and, thus, may apply to original construction, alterations, or changes in use.

Relationship between the NBC and the NECB

The provisions in Section 9.36. of Division B of the NBC are tied to the environment objective. These provisions, which apply to housing and small buildings, have a similar scope to that of the NECB, except that they do not address lighting and electrical power systems. The NECB is referenced in NBC Section 9.36. as an acceptable solution.

Code Requirements

Most NBC requirements address at least one of the Code's five stated objectives (safety, health, accessibility, fire and structural protection of buildings, and environment).

In processing proposed changes or additions to any of the National Model Codes, many issues are considered, such as the following:

- Does the proposed requirement provide the minimum level of performance—and no more than the minimum—needed to achieve the Code's objectives?
- Will persons responsible for Code compliance be able to act on or implement the requirement using commonly accepted practices?
- Will enforcement agencies be able to enforce the requirement?
- Are the costs of implementing the requirement justifiable?
- Have the potential policy implications of the requirement been identified and addressed?
- Is there broad consensus on this requirement among Code users representing all facets of the design and construction industries as well as among provincial and territorial governments?

Guidelines for requesting changes to the NBC are available on the CBHCC's website.

Objective-Based Code Format

The NBC has been published in an objective-based code format since 2005.

As described in more detail in the section entitled Structure of the NBC, the Code comprises three Divisions:

- Division A, which defines the scope of the Code and contains the objectives, the functional statements and the conditions necessary to achieve compliance;
- Division B, which contains acceptable solutions (commonly referred to as “technical requirements”) deemed to satisfy the objectives and functional statements listed in Division A; and
- Division C, which contains administrative provisions.

These and other Code documents published by the NRC are made available in free electronic format on the NRC's website.

Commercial Reproduction

Contact Information

The CBHCC welcomes comments and suggestions for improvements to the NBC. Persons interested in requesting a change to an NBC provision should refer to the guidelines available on the CBHCC's website.

To submit comments or suggestions, please contact:
The Secretary
Canadian Board for Harmonized Construction Codes
1200 Montreal Road
Ottawa, Ontario K1A 0R6
E-mail: CBHCCSecretary-SecretaireCCHCC@nrc-cnrc.gc.ca

Relationship of the NBC to Standards Development and Conformity Assessment

The development of many provisions in the NBC and the assessment of conformity to those provisions are supported by several of the member organizations of Canada's National Standards System (NSS).

The NSS is a network of accredited organizations concerned with standards development, certification, testing and inspection that is established under the auspices of the Standards Council of Canada Act. Activities of the NSS are coordinated by the Standards Council of Canada (SCC), which accredits standards development organizations, certification bodies, testing and calibration laboratories, and inspection bodies, among others.

The SCC is a non-profit federal Crown corporation responsible for the coordination of voluntary standardization in Canada. It also coordinates Canadian participation in voluntary international standardization activities.

Canadian Standards

Many of the standards referenced in the NBC are published by standards development organizations accredited in Canada. As part of the accreditation requirements, these organizations adhere to the principle of consensus, which generally means substantial majority agreement of a committee comprising a balance of producer, user and general interest members, and the consideration of all negative comments. The standards development organizations also have formal procedures for the balloting and second-level review of standards prepared under their oversight.

The following organizations are accredited as standards development organizations in Canada:

- Air-Conditioning, Heating and Refrigeration Institute (AHRI)
- ASTM International
- Bureau de normalisation du Québec (BNQ)
- Canadian General Standards Board (CGSB)
- CSA Group
- International Association of Plumbing and Mechanical Officials (IAPMO)
- ULC Standards
- Underwriters' Laboratories Inc. (UL)

Tables 1.3.1.2. and D-1.1.2. of Division B list the standards referenced in the NBC. Standards proposed to be referenced in the NBC are reviewed to ensure that their content is compatible with the Code. Thereafter, referenced standards are reviewed as needed during each Code cycle. Standards development organizations are asked to provide information on any changes in the status of their standards referenced in the NBC—withdrawals, amendments, new editions, etc. This information is passed on to the CBHCC, its code development committees, and interested stakeholders, all of whom are given the opportunity to identify any problems associated with the changes. These bodies do not necessarily review in detail the revised standards; rather, the approach relies on the consensus process involved in the maintenance of the standards and on the extensive knowledge and experience of committee members, provincial or territorial staff, NRC staff, and consulted stakeholders to identify changes in the standards that might create problems in the Code.

Canadian Commission on Building and Fire Codes and Standing Committees

Canadian Commission on Building and Fire Codes

D. Crawford *(Chair)*
R. Arsenault
K. Block
A. Borooah
R. Brooks
J. Chauvin
M. Cianchetti
T. Cochren
V. de Passillé
R. Dulmage
C. Fillingham
S. Garcia
K. Gloge
C. Gray
H. Griffin
K. Griffiths
T. Harper
L. Holmen
C. Joseph[1]
K. Lee
B. Lorne
D. MacKinnon
M. McSweeney
G. Morinville
S. Ottens
R. Richard
T. Ross
R. Rymell
B. Sim
S. Stinson
D. Sullivan
A. Tabet
P. Thorkelsson
M. Tovey
C. Tye
E. Whalen
G. Yoshida

Codes Canada staff who provided assistance to the Commission

M. Dumoulin
G. Gosselin
A. Gribbon
P. Jago
A. Laroche
F. Lohmann
P. Rizcallah
R. Tremblay

Standing Committee on Earthquake Design

J. Sherstobitoff *(Chair)*
P. Adebar
M. Allen
T. Allen
D. Carson
H. Dutrisac
L. Finn
J. Humar
J. Hutchinson
R. Jonkman
E. Kisilewicz
G. Krsmanovic
R. Mayfield
J.B.-W. McFadden
R. McGrath
A. Metten
D. Mitchell
J. Montgomery
B. Neville
T. Onur
C. Sewell
R. Tremblay
C. Ventura
A. Wong
T. Yang

Codes Canada staff who provided assistance to the Committee

J. Singh

Standing Committee on Energy Efficiency in Buildings[2]

A. Pride *(Chair)*
D. Bailey
D. Bartel
N. Brisson
A. Cameron
R. Cardinal
J. Comtois
L. Dalgleish
B. Darrell
F. Genest
H. Hayne
C. Kahramanoglu
M. Kelly
T. Lau
N. Lessard
Rd. Marshall
Rt. Marshall
A. Pape-Salmon
J. Pockar
M. Roy
T. Ryce
P. Sectakof
M. Slivar
A. Syed

Codes Canada staff who provided assistance to the Committee

E. Girgis
M. Mihailovic
P. Tardif
R. Ullah
M. Zeghal

Standing Committee on Energy Efficiency[3]

A. Pride *(Chair)*
P. Andres
D. Bailey
R. Bortolussi
J. Comtois
S. Crowell
L. Dalgleish
B. Deeks
S. Dueck
L. Hasan
T. Imhoff
S. Kemp
D. Krauel
C. Kuruluk
T. Lau
N. Lessard
W. Leung
J. Mantyla
Rd. Marshall
Z. May
A. Oding
C. O'keefe
M. Peer
J. Pockar
D. Rambaruth
M. Roy
L. Wynder

Codes Canada staff who provided assistance to the Committee

Y. Carrier
S. Gibb
E. Girgis
R. Hassan
H. Martin
M. Nazim
R. Ullah
M. Zeghal

Standing Committee on Environmental Separation

D. Watts *(Chair)*
R. Baker
M. Ball
S. Ciarlo
M. Gumienny
D. Ionescu
R. Jutras
D. Kayll
T. Lee
D. MacDonald
R. MacMillan
Rd. Marshall
R. Rocheleau
B. Stamatopoulos
D. Stones
G. Sturgeon
J. Wade
J. Wells

Codes Canada staff who provided assistance to the Committee

R. Hassan
M. Zeghal

Standing Committee on Fire Protection

R. Brown *(Chair)*
K. Bailey
M. Bodnar
C. Campbell
R. Cheung
A. Crimi
G. Frater
P. Gautreau
L. Hamre
A. Harmsworth
R. Jacobs
F. Jeffers
J. Jeske
N. Khan
M. Kohli
M.-A. Langevin
H. Locke
R. McGrath
R. McPhee
R. Nielsen
A. Pelletier
B. Schultz
P. Shinkoda
E. Sopeju
J. Zorko

Codes Canada staff who provided assistance to the Committee

D. Esposito
M. Fortin
S. Hyde-Clarke
A. Laroche
G.-L. Porcari
B. Potvin
A. Robbins
S. Shalabi
S. Yu

Standing Committee on Hazardous Materials and Activities

A. MacLellan-Bonnell *(Chair)*
P. Chamberland
R. Croome
D. Edgecombe
T. Espejo
G. Fawcett
E. Fernandes
M. Gagné
P. Gauthier
K. Jess
M. Mailvaganam
M. Ng
P. Parent
M. Parker
S. Porter
P. Richards
W. Rodger
J. Selann
R. Stephenson
B. Trussler

Codes Canada staff who provided assistance to the Committee

D. Esposito
M. Fortin
S. Hyde-Clarke
A. Laroche
G.-L. Porcari
B. Potvin
A. Robbins
S. Shalabi
S. Yu

Revisions and Errata

Issued by the Canadian Board for Harmonized Construction Codes

The Change Summary table that follows describes revisions, errata and editorial modifications that apply to the National Building Code of Canada 2020:

- Revisions are changes that have been approved by the Canadian Board for Harmonized Construction Codes for publication between Code editions.
- Errata are corrections to existing text.
- Editorial updates are provided for information purposes only.
- Editorial changes are modifications that improve clarity.

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

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

Change Summary (Date: 2025-03) — National Building Code of Canada 2020

Division	Code Reference	Change	Description of Change
Volume 1			
Preface	n/a	editorial update	Preface was updated to reflect change in governance of national code development system
		erratum	"M. Allen" was added to the list of members of the Standing Committee on Earthquake Design
		erratum	"J. Wang" was deleted from the list of members of the Standing Committee on Earthquake Design
		erratum	"D. Kayll" was added to the list of members of the Standing Committee on Environmental Separation
A	A-1.1.1.1.(1)	editorial update	First paragraph of Note was updated to read "... it is intended that the NFC ..."
B	1.3.1.1.(1)	revision	Date stated in Sentence was revised to read "15 July 2022"
	Table 1.3.1.2.	revision	Document references were updated as applicable to reflect more recent editions published as of 15 July 2022
	1.3.2.1.	editorial update	List of abbreviations was updated to include "CBHCC"
		erratum	Website for Ontario Ministry of Municipal Affairs and Housing was corrected
	A-2.3.1.1.(1), A-2.3.4., A-2.3.4.1.(1)(b)	errata	Notes were corrected to read "... Commentary entitled Large Farm Buildings, Including Bins and Silos ..."
	3.2.3.6.(5)	erratum	Sentence was corrected to read "... less than 1.2 m from the property line, the centre line of a *public way*, or an imaginary line ..."
	3.2.4.18.(12)	erratum	Sentence was corrected to read "... in accordance with Clause (10)(b) …"
	3.2.7.10.(7)	editorial change	Sentence was revised to read "... that connect transponders to individual devices ..."
	3.3.6.6.(2)	erratum	The word "height" was italicized in the term "*building height*"
	3.6.4.3.(1)	erratum	Subclause (a)(iii) was corrected to read "... in accordance with Sentence 3.1.5.23.(2), ..."
	Table 3.8.3.1.	erratum	Entry for "Signage (3.8.3.9.)" was corrected to read "4.5 and 9.4.4"

Change Summary (Date: 2025-03) — National Building Code of Canada 2020 (Continued)

Division	Code Reference	Change	Description of Change
B (Continued)	4.1.5.8.(1)	erratum	Sentence was corrected to read "..., except for transfer slabs that support loads from upper floors for which *live load* reductions apply."
	4.1.6.16.(6)	erratum	Sentence was corrected by replacing "h" by "h_e"
	4.1.7.2.	erratum	Reference to Note was corrected to read "(See Note A-4.1.7.2.)"
	4.1.7.5.(9)	erratum	"(See Note A-4.1.7.5.(9) and 4.1.7.7.(2).)" was added after Sentence
	4.1.7.6.(11)	erratum	Sentence was corrected to read "... except that C_gC_p values for walls and roofs shall be as specified for low *buildings* in Sentences 4.1.7.6.(3) to (9)."
	4.1.7.7.(2)	erratum	Reference to Note was corrected to read "(See Note A-4.1.7.5.(9) and 4.1.7.7.(2).)"
	Figure 4.1.7.12.-A	erratum	x-axis was corrected
	Figure 4.1.7.12.-B	erratum	x-axis was corrected
	4.1.8.10.(1)	erratum	Sentence was corrected to read "Except as required by Clauses (2)(b) and (3)(b), ..."
	4.1.8.18.(16)	erratum	Sentence was corrected to read "S_{sed} = peak spectral acceleration in the period range ..."
	A-4.1.5.5., A-4.1.5.8., A-4.4.2.1.(1)	errata	Notes were corrected to read "... Commentary entitled Live Loads Due to Use and Occupancy ..."
	Figure A-4.1.6.16.(6)	erratum	Figure was corrected by replacing "h" by "h_e"
	A-4.1.7.2.(2)	erratum	Note designation was corrected to read "A-4.1.7.2."
	A-4.1.7.7.(2)	erratum	Note designation was corrected to read "A-4.1.7.5.(9) and 4.1.7.7.(2)"
	5.8.1.4.(5)	erratum	Clause (a) was corrected to read "... in accordance with Annex G of ISO 12354-1, ..."
	5.8.1.5.(5)	erratum	Clause (a) was corrected to read "... in accordance with Annex G of ISO 12354-1, ..."
	Table 5.9.1.1.	revision	Document references were updated as applicable to reflect more recent editions published as of 15 July 2022
	Table D-1.1.2.	revision	Document references were updated as applicable to reflect more recent editions published as of 15 July 2022
	D-1.7.1.(5)	erratum	Sentence was corrected to read "... from Tables D-2.3.4.-A to D-2.3.4.-D."
	Table D-2.3.4.-B	erratum	Superscript reference to Table Note (3) was added to entry "40" in fourth row, third column
C	A-2.3.1.	editorial update	Last paragraph of Note was updated to read "... on the CBHCC's website."
Volume 2			
B	9.7.3.1.(4)	erratum	Clause (b) was corrected by replacing "m^3h/m" by "$(m^3/h)/m$"
	Table 9.10.3.1.-B	erratum	First bullet in "Description" entry for assembly F4f was corrected to read "wood joists or wood I-joists spaced 600 mm o.c."
	9.13.2.2.(2)	erratum	Clause (b) was corrected to read "... in accordance with Procedure B (wet cup) ..."
	9.13.2.6.(1)	erratum	Subclause (c)(ii) was corrected to read "... complying with Clause 9.13.2.2.(2)(b)."
	Table 9.23.6.1.	erratum	"Anchor Bolt Diameter" entry in last row was corrected to read "15.9"
	9.25.4.2.(4)	erratum	Sentence was corrected to read "... with Clause 9.3, Outdoor weathering resistance and retained tensile elongation, and Clause 9.4, Oxidative induction time, of ..."
	9.27.1.1.(1)	erratum	Sentence was corrected to read "... fibre-cement shingles, planks or sheets, ... is installed as cladding ..."
	9.36.4.2.(1)	erratum	Reference to Note was corrected to read "(See Note A-9.36.4.2.(1).)"
	9.36.5.15.(7)	erratum	Clause (b) was corrected to read "... as a gas-fired warm-air *furnace* using single-phase electric current conforming to Table 9.36.3.10."
	Table 9.36.5.16.	erratum	"Input for Reference SWH Equipment" entry for SWH equipment "Not listed in Table 9.36.4.2." was corrected to read: "> 22 kW, modeled as conforming to Table 9.36.4.2."
	Table 9.36.8.8.	erratum	"Energy Conservation Points" entries were corrected, and "AL-6B" row was deleted
	A-9.8.8.1.(4)	erratum	Third paragraph of Note was corrected to read "Examples of mechanisms ..."
	A-9.23.4.2.	editorial update	Second last paragraph of Note was updated to read "... generated all of the Code's span tables ..."
	Table A-9.36.1.3.	erratum	Table was corrected to include "NBC 9.36.7. (Tiered Performance)" and "NBC 9.36.8. (Tiered Prescriptive)" as compliance options

Change Summary (Date: 2025-03) — National Building Code of Canada 2020 (Continued)

Division	Code Reference	Change	Description of Change
B (Continued)	A-9.36.4.2.(2)	erratum	Note designation was corrected to read “A-9.36.4.2.(1)”
Volumes 1 and 2			
Index	Letter G	erratum	"Guardrails": entry was added
		erratum	“Guards (devices)”: “3.3.5.4.” and “9.8.8.4.” were deleted from “loads”, and “as protection for vehicles, 4.1.5.15.” was deleted
	Letter V	erratum	“Vehicle guardrails”: “3.3.5.4.” was added
		erratum	“Visual disability”: entry was deleted

Notes to Part 1 Compliance

A-1.1.1.1.(1) Application to Existing Buildings. This Code is most often applied to existing or relocated buildings when an owner wishes to rehabilitate a building, change its use, or build an addition, or when an enforcement authority decrees that a building or class of buildings be altered for reasons of public safety. It is not intended that the NBC be used to enforce the retrospective application of new requirements to existing buildings or existing portions of relocated buildings, unless specifically required by local regulations or bylaws. For example, although the NFC could be interpreted to require the installation of fire alarm, standpipe and hose, and automatic sprinkler systems in an existing building for which there were no requirements at the time of construction, it is intended that the NFC not be applied in this manner to these buildings unless the authority having jurisdiction has determined that there is an inherent threat to occupant safety and has issued an order to eliminate the unsafe condition, or where substantial changes or additions are being made to an existing building or the occupancy has been changed. (See also Note A-1.1.1.1.(1) of Division A of the NFC.)

Relocated buildings that have been in use in another location for a number of years can be considered as existing buildings, in part, and the same analytical process can be applied as for existing buildings. It should be noted, however, that a change in occupancy may affect some requirements (e.g. loads and fire separations) and relocation to an area with different wind, snow or earthquake loads will require the application of current code requirements. Depending on the construction of the building and the changes in load, structural modifications may be required. Similarly, parts of a relocated or existing building that are reconstructed, such as foundations and basements, or parts being modified are required to be built to current codes.

Whatever the reason, Code application to existing or relocated buildings requires careful consideration of the level of safety needed for that building. This consideration involves an analytical process similar to that required to assess alternative design proposals for new construction. See Clause 1.2.1.1.(1)(b) for information on achieving compliance with the Code using alternative solutions.

In developing Code requirements for new buildings, consideration has been given to the cost they impose on a design in relation to the perceived benefits in terms of safety. The former is definable; the latter difficult to establish on a quantitative basis. In applying the Code requirements to an existing building, the benefits derived are the same as in new buildings. On the other hand, the increased cost of implementing in an existing building a design solution that would normally be intended for a new building may be prohibitive.

The successful application of Code requirements to existing construction becomes a matter of balancing the cost of implementing a requirement with the relative importance of that requirement to the overall Code objectives. The degree to which any particular requirement can be relaxed without affecting the intended level of safety of the Code requires considerable judgment on the part of both the designer and the authority having jurisdiction.

Further information on the application of Code requirements to existing or relocated buildings can be found in the following publications:

- "User's Guide – NBC 1995, Fire Protection, Occupant Safety and Accessibility (Part 3)"
- "Guidelines for Application of Part 3 of the National Building Code of Canada to Existing Buildings"
- Commentary entitled "Application of NBC Part 4 of Division B for the Structural Evaluation and Upgrading of Existing Buildings" of the "Structural Commentaries (User's Guide – NBC 2020: Part 4 of Division B)"
- "User's Guide – NBC 1995, Application of Part 9 to Existing Buildings"
- CBD 230, "Applying building codes to existing buildings"

These Notes are included for explanatory purposes only and do not form part of the requirements. The number that introduces each Note corresponds to the applicable requirement in this Part.

Section 1.2. Terms and Abbreviations

1.2.1. Definitions of Words and Phrases

1.2.1.1. Non-defined Terms

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

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

3) Where acceptable solutions are referred to in Division B, they shall be the provisions stated in Parts 2 to 9.

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 15 July 2022.

1.3.1.2. Applicable Editions

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

Table 1.3.1.2.
Documents Referenced in the National Building Code of Canada 2020[1][2]
Forming Part of Sentence 1.3.1.2.(1)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
AAMA	501-05	Methods of Test for Exterior Walls	A-5.9.3.
AAMA	501.1-05	Standard Test Method for Water Penetration of Windows, Curtain Walls and Doors Using Dynamic Pressure	A-5.9.3.
AAMA	501.2-09	Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems	A-5.9.3.

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
AAMA	501.4-09	Recommended Static Test Method for Evaluating Curtain Wall and Storefront Systems Subjected to Seismic and Wind-Induced Inter-Story Drifts	A-5.9.3.
AAMA	501.5-07	Test Method for Thermal Cycling of Exterior Walls	A-5.9.3. A-5.9.3.3.(1)
AAMA	501.6-09	Recommended Dynamic Test Method for Determining the Seismic Drift Causing Glass Fallout from a Wall System	A-4.1.8.18.(14) and (15) A-5.9.3.
ACGIH	28th Edition	Industrial Ventilation: A Manual of Recommended Practice for Design	2.4.2.5.(1) 6.2.1.1.(1) 6.3.2.14.(2) A-6.3.1.5.
ACI	355.2-19	Qualification of Post-Installed Mechanical Anchors in Concrete (ACI 355.2-19) and Commentary	4.1.8.18.(7)
ACI	355.4M-19	Qualification of Post-Installed Adhesive Anchors in Concrete (ACI 355.4M-19) and Commentary	4.1.8.18.(7)
AHRI	ANSI/AHRI 210/240-2008	Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment	Table 9.36.3.10.
AHRI	1060 (I-P/2013)	Performance Rating of Air-to-Air Exchangers for Energy Recovery Ventilation Equipment	9.36.3.8.(4)
AHRI	ANSI/AHRI 1500 (2015)	Performance Rating of Commercial Space Heating Boilers	Table 9.36.3.10.
AISI	S201-12	North American Standard for Cold-Formed Steel Framing - Product Data 2012 Edition	9.24.1.2.(1)
ANSI	A135.6-2012	Engineered Wood Siding	Table 5.9.1.1. 9.27.9.1.(1)
ANSI	A208.1-2016	Particleboard	9.23.15.2.(3) 9.29.9.1.(1) 9.30.2.2.(1)
ANSI/CSA	CSA/ANSI Z21.10.3:19/CSA 4.3:19	Gas-fired 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	CSA/ANSI Z21.47:21/CSA 2.3:21	Gas-fired central furnaces	Table 9.36.3.10.
ANSI/CSA	ANSI Z21.50:19/CSA 2.22:19	Vented decorative gas appliances	Table 9.36.3.10.
ANSI/CSA	CSA/ANSI Z21.56:19/CSA 4.7:19	Gas-fired pool heaters	Table 9.36.4.2.
ANSI/CSA	ANSI Z83.8-2016/CSA 2.6-2016	Gas unit heaters, gas packaged heaters, gas utility heaters and gas-fired duct furnaces	Table 9.36.3.10.
ANSI/APA	ANSI/APA PRG 320-2018	Standard for Performance-Rated Cross-Laminated Timber	3.1.6.3.(3)
ASCE	ASCE/SEI (7-10)	Minimum Design Loads for Buildings and Other Structures	A-4.1.8.18.(14) and (15) A-9.4.2.1. and 9.4.2.2.
ASCE	ASCE/SEI (8-02)	Specification for the Design of Cold-Formed Stainless Steel Structural Members	A-4.3.4.2.(1)
ASCE	ASCE/SEI (49-12)	Wind Tunnel Testing for Buildings and Other Structures	4.1.7.14.(1)
ASHRAE	1997	ASHRAE Handbook – Fundamentals	A-9.32.3.11.
ASHRAE	2011	ASHRAE Handbook – HVAC Applications	A-2.4.2.1.(1)
ASHRAE	2013	ASHRAE Handbook – Fundamentals	A-9.36.2.4.(1) Table A-9.36.2.4.(1)-D
ASHRAE	Guideline 12-2000	Minimizing the Risk of Legionellosis Associated with Building Water Systems	6.2.1.1.(1) 6.3.2.15.(9) 6.3.2.16.(1)

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
ASHRAE	ANSI/ASHRAE 62-2001	Ventilation for Acceptable Indoor Air Quality (except Addendum n)	A-9.25.5.2.
ASHRAE	ANSI/ASHRAE 62.1-2016	Ventilation for Acceptable Indoor Air Quality	6.3.1.1.(2) 6.3.1.1.(3) 6.3.2.2.(1)
ASHRAE	ANSI/ASHRAE 140-2011	Standard Method of Test for the Evaluation of Building Energy Analysis Computer Programs	9.36.5.4.(8)
ASHRAE	ANSI/ASHRAE 188-2015	Legionellosis: Risk Management for Building Water Systems	A-6.2.1.1.
ASME	B18.6.1-1981	Wood Screws (Inch Series)	Table 5.9.1.1. 9.23.3.1.(3) A-9.23.3.1.(3)
ASME/CSA	ASME A17.1-2016/CSA B44-16	Safety Code for Elevators and Escalators	3.2.6.7.(2) 3.5.2.1.(1) 3.5.2.1.(2) 3.5.2.1.(3) 3.5.4.1.(2) 3.5.4.2.(1) A-3.5.2.1.(1) Table 4.1.5.11. Table 4.1.8.18.
ASTM	A123/A123M-17	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products	Table 5.9.1.1. Table 9.20.16.1.
ASTM	A153/A153M-16a	Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware	Table 5.9.1.1. Table 9.20.16.1. 9.23.2.4.(2)
ASTM	A252/A252M-19	Standard Specification for Welded and Seamless Steel Pipe Piles	4.2.3.8.(1)
ASTM	A283/A283M-18	Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates	4.2.3.8.(1)
ASTM	A390-06	Standard Specification for Zinc-Coated (Galvanized) Steel Poultry Fence Fabric (Hexagonal and Straight Line)	Table 9.10.3.1.-B
ASTM	A653/A653M-20	Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process	Table 5.9.1.1. 9.3.3.2.(1) 9.23.2.4.(1)
ASTM	A792/A792M-21a	Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process	9.3.3.2.(1)
ASTM	A1008/A1008M-21a	Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable	4.2.3.8.(1)
ASTM	A1011/A1011M-18a	Standard Specification for 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	C4-04	Standard Specification for Clay Drain Tile and Perforated Clay Drain Tile	Table 5.9.1.1. 9.14.3.1.(1)
ASTM	C27-98	Standard Classification of Fireclay and High-Alumina Refractory Brick	9.21.3.4.(1)
ASTM	C73-17	Standard Specification for Calcium Silicate Brick (Sand-Lime Brick)	Table 5.9.1.1. 9.20.2.1.(1)
ASTM	C126-22	Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units	Table 5.9.1.1. 9.20.2.1.(1)

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
ASTM	C177-19	Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus	9.36.2.2.(1)
ASTM	C212-22	Standard Specification for Structural Clay Facing Tile	Table 5.9.1.1. 9.20.2.1.(1)
ASTM	C260/C260M-10a	Standard Specification for Air-Entraining Admixtures for Concrete	9.3.1.8.(1)
ASTM	C411-19	Standard Test Method for 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	C412M-19	Standard Specification for Concrete Drain Tile	Table 5.9.1.1. 9.14.3.1.(1)
ASTM	C444M-21	Standard Specification for Perforated Concrete Pipe	9.14.3.1.(1)
ASTM	C494/C494M-19	Standard Specification for Chemical Admixtures for Concrete	9.3.1.8.(1)
ASTM	C516-19	Standard Specification for Vermiculite Loose Fill Thermal Insulation	A-9.25.2.4.(5)
ASTM	C518-21	Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus	9.36.2.2.(1)
ASTM	C553-13	Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications	Table 5.9.1.1.
ASTM	C612-14	Standard Specification for Mineral Fiber Block and Board Thermal Insulation	Table 5.9.1.1.
ASTM	C700-18	Standard Specification for Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated	Table 5.9.1.1. 9.14.3.1.(1)
ASTM	C726-17	Standard Specification for Mineral Wool Roof Insulation Board	Table 5.9.1.1. 9.25.2.2.(1)
ASTM	C754-20	Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products	Table A-9.11.1.4.-A Table A-9.11.1.4.-B Table A-9.11.1.4.-C Table A-9.11.1.4.-D
ASTM	C834-17	Standard Specification for Latex Sealants	Table 5.9.1.1. 9.27.4.2.(2)
ASTM	C840-20	Standard Specification for Application and Finishing of Gypsum Board	3.1.6.6.(2) Table 5.9.1.1. 9.29.5.1.(3) A-9.29.5.1.(3)
ASTM	C920-18	Standard Specification for Elastomeric Joint Sealants	Table 5.9.1.1. 9.27.4.2.(2)
ASTM	C954-22	Standard Specification for 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	C991-16	Standard Specification for Flexible Fibrous Glass Insulation for Metal Buildings	Table 5.9.1.1.
ASTM	C1002-22	Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs	Table 5.9.1.1. 9.24.1.4.(1) 9.29.5.7.(1)

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
ASTM	C1055-20	Standard Guide for Heated System Surface Conditions that Produce Contact Burn Injuries	A-6.5.1.1.(3)
ASTM	C1177/C1177M-17	Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing	3.1.5.14.(6) 3.1.5.15.(4) Table 5.9.1.1. Table 9.23.17.2.-A A-9.27.14.2.(2)(a)
ASTM	C1178/C1178M-18	Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel	3.1.5.14.(6) 3.1.5.15.(4) Table 5.9.1.1. 9.29.5.2.(1)
ASTM	C1184-18e1	Standard Specification for Structural Silicone Sealants	Table 5.9.1.1. 9.27.4.2.(2)
ASTM	C1193-16	Standard Specification for Use of Joint Sealants	A-Table 5.9.1.1. A-9.27.4.2.(1)
ASTM	C1280-18	Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing	Table 5.9.1.1.
ASTM	C1299-03	Standard Guide for Use in Selection of Liquid-Applied Sealants	A-9.27.4.2.(1)
ASTM	C1311-22	Standard Specification for Solvent Release Sealants	Table 5.9.1.1. 9.27.4.2.(2)
ASTM	C1330-18	Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants	Table 5.9.1.1. 9.27.4.2.(3)
ASTM	C1363-19	Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus	A-5.9.4.1.(1) 9.36.2.2.(4)
ASTM	C1396/C1396M-17	Standard Specification for Gypsum Board	3.1.5.14.(6) 3.1.5.15.(4) 3.1.6.6.(2) 3.1.6.15.(1) Table 5.9.1.1. Table 9.23.17.2.-A 9.29.5.2.(1) Table 9.29.5.3.
ASTM	C1472-16	Standard Guide for Calculating Movement and Other Effects When Establishing Sealant Joint Width	A-Table 5.9.1.1. A-9.27.4.2.(1)
ASTM	C1658/C1658M-19e1	Standard Specification for Glass Mat Gypsum Panels	3.1.5.14.(6) Table 5.9.1.1.
ASTM	D323-20a	Standard Test Method for Vapor Pressure of Petroleum Products (Reid Method)	1.4.1.2.(1)[4]
ASTM	D1037-12	Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials	A-9.23.15.2.(4)
ASTM	D1143/D1143M-20	Standard Test Methods for Deep Foundation Elements Under Static Axial Compressive Load	A-4.2.7.2.(2)
ASTM	D1227/D1227M-13e1	Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing	Table 5.9.1.1. 9.13.2.2.(2) 9.13.3.2.(2)
ASTM	D1761-20	Standard Test Methods for Mechanical Fasteners in Wood and Wood-Based Materials	A-9.27.5.4.(2)
ASTM	D2178/D2178M-15a	Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing	Table 5.9.1.1.

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
ASTM	D2898-10	Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing	3.1.4.8.(3) 3.1.5.5.(3) 3.1.5.24.(1) 3.1.6.9.(6) 3.2.3.7.(4) 9.10.14.5.(3) 9.10.15.5.(3)
ASTM	D3019/D3019M-17	Standard Specification for Lap Cement Used with Asphalt Roll Roofing, Non-Fibered, and Fibered	Table 5.9.1.1. 9.13.3.2.(2) Table 9.26.2.1.-B
ASTM	D3679-21	Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Siding	9.27.12.1.(1)
ASTM	D4477-22	Standard Specification for Rigid (Unplasticized) Poly(Vinyl Chloride) (PVC) Soffit	9.27.12.1.(3)
ASTM	D4479/D4479M-07	Standard Specification for Asphalt Roof Coatings – Asbestos-Free	Table 5.9.1.1. 9.13.2.2.(2) 9.13.3.2.(2) Table 9.26.2.1.-B
ASTM	D4637/D4637M-15	Standard Specification for EPDM Sheet Used In Single-Ply Roof Membrane	Table 5.9.1.1. 9.13.3.2.(2) Table 9.26.2.1.-B
ASTM	D4811/D4811M-16	Standard Specification for Nonvulcanized (Uncured) Rubber Sheet Used as Roof Flashing	Table 5.9.1.1. 9.13.3.2.(2) Table 9.26.2.1.-B
ASTM	D5456-21e1	Standard Specification for Evaluation of Structural Composite Lumber Products	3.1.11.7.(5)
ASTM	D6878/D6878M-21	Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing	Table 5.9.1.1. 9.13.3.2.(2) Table 9.26.2.1.-B
ASTM	D7254-21	Standard Specification for Polypropylene (PP) Siding	9.27.13.1.(1)
ASTM	D7793-21	Standard Specification for Insulated Vinyl Siding	9.27.12.1.(2)
ASTM	D8052/D8052M-17	Standard Test Method for Quantification of Air Leakage in Low-Sloped Membrane Roof Assemblies	A-5.4.1.2.(1)
ASTM	E90-09	Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements	5.8.1.2.(1) 5.8.1.4.(1) 9.11.1.2.(1)
ASTM	E96/E96M-22	Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials	5.5.1.2.(3) 9.13.2.2.(2) 9.25.4.2.(1) 9.25.4.2.(2) 9.25.5.1.(1) 9.30.1.2.(1)
ASTM	E283/E283M-19	Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen	5.9.3.4.(2) A-5.9.3.4.(2)
ASTM	E330/E330M-14	Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference	A-5.9.3.2.(1)
ASTM	E331-00	Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference	5.9.3.5.(2) A-5.9.3.5.(2)

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
ASTM	E336-20	Standard Test Method for Measurement of Airborne Sound Attenuation between Rooms in Buildings	5.8.1.2.(2) 5.8.1.4.(7) 9.11.1.2.(2) A-9.11.
ASTM	E413-22	Classification for Rating Sound Insulation	A-1.4.1.2.(1)[4] 5.8.1.2.(1) 5.8.1.2.(2) 5.8.1.4.(7) 5.8.1.5.(3) 9.11.1.2.(1) 9.11.1.2.(2)
ASTM	E492-09e1	Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine	A-9.11.
ASTM	E547-00	Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference	5.9.3.5.(2) A-5.9.3.5.(2)
ASTM	E597-95	Practice for Determining a Single Number Rating of Airborne Sound Insulation for Use in Multi-Unit Building Specifications	A-9.11.
ASTM	E736/E736M-19	Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members	Table 9.10.3.1.-B
ASTM	E783-02	Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors	A-5.4.1.2.(2) A-5.9.2.3.(1) A-5.9.3.4.(2)
ASTM	E1007-21	Standard Test Method for Field Measurement of Tapping Machine Impact Sound Transmission Through Floor-Ceiling Assemblies and Associated Support Structures	A-9.11.
ASTM	E1105-15	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-5.9.2.3.(1) A-5.9.3.5.(2)
ASTM	E1186-17	Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems	A-5.4.1.2.(2)
ASTM	E1300-16	Standard Practice for Determining Load Resistance of Glass in Buildings	4.3.6.1.(1) 9.6.1.3.(1)
ASTM	E2190-19	Standard Specification for Insulating Glass Unit Performance and Evaluation	Table 5.9.1.1. 9.6.1.2.(1)
ASTM	E2307-20	Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-storey Test Apparatus	3.1.8.3.(4) A-3.1.8.3.(2) 9.10.9.2.(4)
ASTM	E2357-18	Standard Test Method for Determining Air Leakage Rate of Air Barrier Assemblies	A-5.4.1.1.(3) 9.36.2.9.(1) A-9.36.2.9.(1)
ASTM	F476-14	Standard Test Methods for Security of Swinging Door Assemblies	9.7.5.2.(2) A-9.7.5.2.(2)
ASTM	F1667/F1667M-21a	Standard Specification for Driven Fasteners: Nails, Spikes, and Staples	9.23.3.1.(1) 9.26.2.3.(1) 9.29.5.6.(1)
ASTM	F2090-21	Standard Specification for Window Fall Prevention Devices With Emergency Escape (Egress) Release Mechanisms	A-9.8.8.1.(4)

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
ASTM	G115-10	Standard Guide for Measuring and Reporting Friction Coefficients	4.1.8.18.(18)
BNQ	BNQ 3624-115/2016	Polyethylene (PE) Pipe and Fittings for Soil and Foundation Drainage	Table 5.9.1.1. 9.14.3.1.(1)
CCBFC	NRCC 35951	Guidelines for Application of Part 3 of the National Building Code of Canada to Existing Buildings	A-1.1.1.1.(1)[4]
CCBFC	NRCC 38730	Model National Energy Code of Canada for Houses 1997	A-9.36.3.10.(1) A-9.36.4.2.(1)
CCBFC	NRCC 38732	National Farm Building Code of Canada 1995	1.1.1.1.(3)[4] A-5.1.2.1.(1)
CCBFC	NRCC 40383	User's Guide – NBC 1995, Fire Protection, Occupant Safety and Accessibility (Part 3)	A-1.1.1.1.(1)[4]
CCBFC	NRCC 43963	User's Guide – NBC 1995, Application of Part 9 to Existing Buildings	A-1.1.1.1.(1)[4]
CCBFC	NRCC 56190	National Building Code of Canada 2015	A-4.1.8.4.(3) Appendix C
CCBFC	NRCC-CONST-56438E	National Energy Code of Canada for Buildings 2020	A-2.1.1.2.(6)[4] A-2.2.1.1.(1)[4] A-3.2.1.1.(1)[4] A-5.4.1. A-2.2.8.1.(1)[5] 9.36.1.3.(1) 9.36.1.3.(5) 9.36.3.1.(2) Table 9.36.3.10. 9.36.4.1.(2) 9.36.8.9.(2) 9.36.8.10.(2) A-9.36.1.3. A-9.36.2.4.(1) A-9.36.3.10.(1) A-9.36.4.2.(1) A-9.36.5.2.
CCBFC	NRCC-CONST-56437E	National Fire Code of Canada 2020	1.4.1.2.(1) [4] A-1.1.1.1.(1)[4] 2.1.1.2.(4)[4] A-2.2.1.1.(1)[4] A-3.2.1.1.(1)[4] 1.1.4.1.(1) 2.2.4.3.(1) 2.2.6.11.(1) 2.2.8.1.(1) 2.2.8.1.(4) 2.2.8.7.(1) 2.4.2.3.(4) A-2.2.8.4.(1) 3.1.13.1.(1) 3.2.3.21.(1) 3.2.5.16.(1) 3.3.1.2.(1) 3.3.1.10.(1) 3.3.2.3.(1) 3.3.2.16.(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)

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
		National Fire Code of Canada 2020 (continued)	3.3.6.4.(1) 3.3.6.4.(2) 3.3.6.6.(1) 3.7.3.1.(1) A-3.1.2.3.(1) A-3.2.4.6.(2) A-3.2.6. A-3.2.7.8.(3) A-3.3. A-3.3.1.7.(1) A-3.3.3.1.(1) A-3.3.6.1.(1) A-3.9.3.1.(1) 6.3.4.2.(3) 6.3.4.3.(1) 6.3.4.4.(1) 6.9.1.2.(1) 8.1.1.1.(3) 8.1.1.3.(1) 9.10.20.4.(1) 9.10.21.8.(1) A-9.10.2.2.
CCBFC	NRCC-CONST-56436E	National Plumbing Code of Canada 2020	2.1.1.2.(4)[4] A-2.2.1.1.(1)[4] A-3.2.1.1.(1)[4] A-4.1.6.4.(3) 5.6.2.2.(2) 6.3.2.15.(8) 6.3.2.15.(10) 6.3.2.16.(6) 7.1.2.1.(1) 9.31.6.2.(1) 9.36.3.11.(2) 9.36.4.3.(2) A-9.36.5.8.(5) Appendix C
CCBFC	NRCC-CONST-56529E	Structural Commentaries (User's Guide – NBC 2020: Part 4 of Division B)	A-1.1.1.1.(1)[4] A-2.3.1.1.(1) A-2.3.4. A-2.3.4.1.(1)(b) A-4.1.1.3.(1) A-4.1.1.3.(2) A-4.1.2.1. A-4.1.2.1.(1) A-Table 4.1.2.1. A-4.1.3. A-4.1.3.2.(2) A-4.1.3.2.(4) A-4.1.3.2.(5) A-4.1.3.3.(2) A-4.1.3.4.(1) A-Table 4.1.3.4. A-4.1.3.5.(1) A-4.1.3.5.(3) A-4.1.3.6.(1) A-4.1.3.6.(2) A-4.1.3.6.(3) A-4.1.3.6.(4) A-4.1.5.5. A-4.1.5.8. A-4.1.5.17.

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
		Structural Commentaries (User's Guide – NBC 2020: Part 4 of Division B) (continued)	A-4.1.6.1.(1) A-4.1.6.2. A-4.1.6.3.(2) A-4.1.6.4.(1) A-4.1.6.16. A-4.1.7.2. A-4.1.7.3.(5)(c) A-4.1.7.3.(10) A-4.1.7.5.(9) and 4.1.7.7.(2) A-4.1.7.9.(1) A-4.1.7.13. A-4.1.8.2.(1) A-4.1.8.3.(4) A-4.1.8.3.(6) A-4.1.8.3.(7)(b) and (c) A-4.1.8.3.(8) A-4.1.8.4.(2) and (3) A-4.1.8.4.(3) A-Table 4.1.8.5.-A A-Table 4.1.8.6. A-4.1.8.7.(1) A-4.1.8.9.(4) A-4.1.8.9.(5) A-4.1.8.10.(5) and (6) A-4.1.8.10.(7) A-4.1.8.10.(9) A-4.1.8.10.(10)(a) A-4.1.8.11.(3) A-4.1.8.12.(1)(a) A-4.1.8.12.(1)(b) A-4.1.8.12.(3) A-4.1.8.12.(4)(a) A-4.1.8.13.(4) A-4.1.8.15.(1) A-4.1.8.15.(3) A-4.1.8.15.(4) A-4.1.8.15.(5) A-4.1.8.15.(6) A-4.1.8.15.(7) A-4.1.8.15.(8) A-4.1.8.16.(1) A-4.1.8.16.(4) A-4.1.8.16.(6)(a) A-4.1.8.16.(7) A-4.1.8.16.(8)(a) A-4.1.8.16.(10) A-4.1.8.17.(1) A-4.1.8.18. A-4.1.8.18.(7)(e) A-4.1.8.18.(13) and 4.4.3.1.(1) A-4.1.8.18.(14) and (15) A-4.1.8.18.(16) A-4.1.8.19.(3)(a) A-4.1.8.19.(4) and 4.1.8.21.(5) A-4.1.8.21.(4)(a) A-4.2.4.1.(3) A-4.2.4.1.(5) A-4.2.5.1.(1) A-4.2.6.1.(1)

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
		Structural Commentaries (User's Guide – NBC 2020: Part 4 of Division B) (continued)	A-4.2.7.2.(1) A-4.3.6.1.(1) A-4.4.2.1.(1) A-5.1.4.2. A-5.2.2.2.(4) Table C-3
CGSB	CAN/CGSB-1.501-M89	Method for Permeance of Coated Wallboard	5.5.1.2.(2) 9.25.4.2.(7)
CGSB	CAN/CGSB-7.2-94	Adjustable Steel Columns	9.17.3.4.(1) A-9.17.3.4.
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)
CGSB	CAN/CGSB-11.3-M87	Hardboard	Table 5.9.1.1. 9.29.7.1.(1) 9.30.2.2.(1)
CGSB	CAN/CGSB-12.1-2022	Safety Glazing	3.3.1.20.(3) 3.3.2.17.(1) 3.3.2.17.(2) 3.4.6.15.(1) 3.4.6.15.(3) 3.7.2.4.(1) Table 5.9.1.1. 9.6.1.2.(1) 9.6.1.4.(1) 9.6.1.4.(6) 9.8.8.7.(1)
CGSB	CAN/CGSB-12.2-M91	Flat, Clear Sheet Glass	Table 5.9.1.1. 9.6.1.2.(1)
CGSB	CAN/CGSB-12.3-M91	Flat, Clear Float Glass	Table 5.9.1.1. 9.6.1.2.(1)
CGSB	CAN/CGSB-12.4-M91	Heat Absorbing Glass	Table 5.9.1.1. 9.6.1.2.(1)
CGSB	CAN/CGSB-12.8-2017	Insulating glass units	Table 5.9.1.1. 9.6.1.2.(1)
CGSB	CAN/CGSB-12.9-M91	Spandrel glass	Table 5.9.1.1. 9.6.1.2.(1)
CGSB	CAN/CGSB-12.10-M76	Glass, Light and Heat Reflecting	9.6.1.2.(1)
CGSB	CAN/CGSB-12.11-M90	Wired Safety Glass	3.3.1.20.(3) 3.4.6.15.(1) 3.4.6.15.(3) 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) A-9.6.1.3.(2)
CGSB	CAN/CGSB-19.22-M89	Mildew-Resistant Sealing Compound for Tubs and Tiles	9.29.10.5.(1)
CGSB	37-GP-9Ma-1983	Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing	Table 5.9.1.1. 9.13.3.2.(2) Table 9.26.2.1.-A
CGSB	CAN/CGSB-37.50-M89	Hot-Applied, Rubberized Asphalt for Roofing and Waterproofing	Table 5.9.1.1. 9.13.3.2.(2) Table 9.26.2.1.-B

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
CGSB	CAN/CGSB-37.51-M90	Application for Hot-Applied Rubberized Asphalt for Roofing and Waterproofing	9.26.15.1.(1)
CGSB	CAN/CGSB-37.54-95	Polyvinyl Chloride Roofing and Waterproofing Membrane	Table 5.9.1.1. 9.13.3.2.(2) Table 9.26.2.1.-B
CGSB	37-GP-55M-1979	Application of Sheet Applied Flexible Polyvinyl Chloride Roofing Membrane	9.26.16.1.(1)
CGSB	37-GP-56M-1985	Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing	9.13.3.2.(2) Table 9.26.2.1.-B
CGSB	CAN/CGSB-37.58-M86	Membrane, Elastomeric, Cold-Applied Liquid, for Non-Exposed Use in Roofing and Waterproofing	Table 5.9.1.1. 9.13.3.2.(2) Table 9.26.2.1.-B
CGSB	CAN/CGSB-41.24-95	Rigid Vinyl Siding, Soffits and Fascia	Table 5.9.1.1.
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 5.9.1.1. 9.20.13.9.(1) Table 9.26.2.1.-A 9.27.3.2.(1)
CGSB	CAN/CGSB-51.33-M89	Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction	Table 5.9.1.1. 9.25.4.2.(5) A-9.25.4.2.(6)
CGSB	CAN/CGSB-51.34-2022	Polyethylene sheet for use in building construction – Material specification	Table 5.9.1.1. 9.13.2.2.(2) 9.18.6.2.(1) 9.25.3.2.(2) 9.25.3.6.(1) 9.25.4.2.(4)
CGSB	CAN/CGSB-51.71-2005	Depressurization Test	9.32.3.8.(7)
CGSB	CAN/CGSB-71.26-M88	Adhesive for Field-Gluing Plywood to Lumber Framing for Floor Systems	A-9.23.4.2.(2) Table A-9.23.4.2.(2)-C
CGSB	CAN/CGSB-82.6-M86	Doors, Mirrored Glass, Sliding or Folding, Wardrobe	9.6.1.2.(2) A-9.6.1.2.(2)
CGSB	CAN/CGSB-93.1-M85	Sheet, Aluminum Alloy, Prefinished, Residential	Table 5.9.1.1. 9.27.11.1.(3) A-9.27.11.1.(2) and (3)
CGSB	CAN/CGSB-93.2-M91	Prefinished Aluminum Siding, Soffits, and Fascia, for Residential Use	3.2.3.6.(5) Table 5.9.1.1. 9.10.14.5.(8) 9.10.14.5.(12) 9.10.15.5.(7) 9.10.15.5.(11) 9.27.11.1.(2) A-9.27.11.1.(2) and (3)
CGSB	CAN/CGSB-149.10-2019	Determination of the airtightness of building envelopes by the fan depressurization method	9.36.6.3.(1) 9.36.6.3.(2)
CISC/ICCA	2018	Crane-Supporting Steel Structures: Design Guide (Third Edition)	A-4.1.3.2.(2)
CMHC	1988	Air Permeance of Building Materials	Table A-9.25.5.1.(1)
CMHC	1993	Testing of Fresh Air Mixing Devices	A-9.32.3.4.
CSA	6.19-17	Residential carbon monoxide alarming devices	6.9.3.1.(2) 9.32.3.9.(2) 9.32.3.9.(3)

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
CSA	A23.1:19	Concrete materials and methods of concrete construction	2.3.2.5.(5) 4.2.3.6.(1) 4.2.3.9.(1) Table 5.9.1.1. 9.3.1.1.(1) 9.3.1.1.(4) 9.3.1.3.(1) 9.3.1.4.(1)
CSA	A23.3:19	Design of concrete structures	Table 4.1.8.9. 4.1.8.18.(7) 4.3.3.1.(1) A-4.1.3.2.(4) A-4.1.8.16.(1) A-4.1.8.16.(4) A-4.3.3.1.(1)
CSA	A23.4-16	Precast concrete – Materials and construction	A-4.3.3.1.(1)
CSA	CAN/CSA-A82:14	Fired masonry brick made from clay or shale	Table 5.9.1.1. 9.20.2.1.(1)
CSA	CAN/CSA-A82.27-M91	Gypsum Board	3.1.5.14.(6) 3.1.5.15.(4) 3.1.6.6.(2) 3.1.6.15.(1)
CSA	A82.30-M1980	Interior Furring, Lathing and Gypsum Plastering	9.29.4.1.(1)
CSA	A82.31-M1980	Gypsum Board Application	3.2.3.6.(5) 9.10.9.2.(5) 9.10.12.4.(3) 9.10.14.5.(8) 9.10.14.5.(12) 9.10.15.5.(7) 9.10.15.5.(11) 9.29.5.1.(2) Table 9.10.3.1.-A
CSA	CAN3-A93-M82	Natural Airflow Ventilators for Buildings	Table 5.9.1.1. 9.19.1.2.(5)
CSA	CAN/CSA-A123.2-03	Asphalt-Coated Roofing Sheets	Table 5.9.1.1. 9.13.3.2.(2) Table 9.26.2.1.-B
CSA	A123.3-05	Asphalt Saturated Organic Roofing Felt	Table 5.9.1.1. Table 9.26.2.1.-B
CSA	CAN/CSA-A123.4-04	Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems	Table 5.9.1.1. 9.13.2.2.(2) 9.13.3.2.(2) Table 9.26.2.1.-B
CSA	A123.5:16	Asphalt shingles made from glass felt and surfaced with mineral granules	Table 5.9.1.1. Table 9.26.2.1.-B
CSA	CAN/CSA-A123.16:04	Asphalt-coated glass-base sheets	Table 5.9.1.1. Table 9.26.2.1.-B
CSA	A123.17-05	Asphalt Glass Felt Used in Roofing and Waterproofing	Table 5.9.1.1. 9.13.3.2.(2) Table 9.26.2.1.-B
CSA	CAN/CSA-A123.21:20	Standard test method for the dynamic wind uplift resistance of membrane-roofing systems	5.2.2.2.(4) A-5.2.2.2.(4)
CSA	A123.22-08	Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection	Table 9.26.2.1.-B

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
CSA	A123.23-15	Product specification for polymer-modified bitumen sheet, prefabricated and reinforced	Table 5.9.1.1. Table 9.26.2.1.-B
CSA	A123.51-14	Asphalt shingle application on roof slopes 1:6 and steeper	Table 5.9.1.1. 9.26.1.3.(1)
CSA	A165.1-14	Concrete block masonry units	Table 5.9.1.1. 9.15.2.2.(1) 9.17.5.1.(1) 9.20.2.1.(1) 9.20.2.6.(1) Table A-9.11.1.4.-A Table A-9.11.1.4.-C
CSA	A165.2-14	Concrete Brick Masonry Units	Table 5.9.1.1. 9.20.2.1.(1)
CSA	A165.3-14	Prefaced concrete masonry units	Table 5.9.1.1. 9.20.2.1.(1)
CSA	CAN/CSA-A179-14	Mortar and Grout for Unit Masonry	Table 5.9.1.1. 9.15.2.2.(3) 9.20.3.1.(1)
CSA	CAN/CSA-A220 Series-06	Concrete Roof Tiles	Table 5.9.1.1. Table 9.26.2.1.-B 9.26.17.1.(1)
CSA	A277-16	Procedure for certification of prefabricated buildings, modules, and panels	A-1.1.1.1.(2)[4]
CSA	CAN/CSA-A324-M88	Clay Flue Liners	9.21.3.3.(1)
CSA	CAN/CSA-A370:14	Connectors for masonry	A-9.21.4.5.(2)
CSA	CAN/CSA-A371-14	Masonry Construction for Buildings	Table 5.9.1.1. 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/A440-17	North American Fenestration Standard/Specification for windows, doors, and skylights	5.9.2.2.(1) A-5.3.1.2. A-5.9.2.3.(1) A-5.9.3.1.(1) Table 9.7.3.3. 9.7.4.1.(1) 9.7.4.2.(1) 9.7.5.1.(1) 9.7.5.3.(1) 9.36.2.9.(3) A-9.7.4.2.(1)
CSA	A440S1:19	Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440-17, North American Fenestration Standard/Specification for windows, doors, and skylights	5.9.2.2.(1) 5.9.3.5.(3) A-5.9.2.2. A-5.9.3.5.(3) 9.7.4.2.(1) 9.36.2.9.(3) A-9.7.4.2.(1)
CSA	A440.2:19/A440.3:19	Fenestration energy performance/User guide to CSA A440.2:19, Fenestration energy performance	Table 9.7.3.3. 9.36.2.2.(3) A-Table 9.36.2.7.-A

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
CSA	A440.2:19	Fenestration energy performance	A-5.3.1.2. A-5.9.3.3.(1) Table 9.36.8.6. A-9.7.4.2.(1)
CSA	A440.3:19	User guide to CSA A440.2:19, Fenestration energy performance	A-5.3.1.2.
CSA	A440.4:19	Window, door, and skylight installation	A-5.9.2.3.(1) 9.7.6.1.(1) A-9.7.4.2.(1)
CSA	A660-10	Certification of manufacturers of steel building systems	4.3.4.3.(1)
CSA	A3001-18	Cementitious Materials for Use in Concrete	Table 5.9.1.1. 9.3.1.2.(1) 9.28.2.1.(1)
CSA	B51:19	Boiler, pressure vessel, and pressure piping code	6.2.1.5.(1) 9.31.6.2.(2) 9.33.5.2.(1)
CSA	B52:18	Mechanical refrigeration code	6.2.1.5.(1) 9.33.5.2.(1)
CSA	B55.1:15	Test method for measuring efficiency and pressure loss of drain water heat recovery units	9.36.5.12.(2)
CSA	CAN/CSA-B72:20	Installation Code for Lightning Protection Systems	3.6.1.3.(1)
CSA	B111-1974	Wire Nails, Spikes and Staples	9.23.3.1.(1) 9.26.2.3.(1) 9.29.5.6.(1) A-Table 9.23.3.5.-B
CSA	B139 Series:19	Installation code for oil-burning equipment	6.2.1.5.(1) 9.31.6.2.(2) 9.33.5.2.(1)
CSA	B140.4:04	Oil-Fired Warm Air Furnaces	Table 9.36.3.10.
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	B149.1:20	Natural gas and propane installation code	2.4.2.2.(2) 6.2.1.5.(1) 9.10.22.1.(1) 9.31.6.2.(2) 9.33.5.2.(1) A-9.10.22.
CSA	ANSI/CSA-B149.6-15	Code for digester gas, landfill gas, and biogas generation and utilization	2.2.8.1.(3)
CSA	CAN/CSA-B182.1:21	Plastic drain and sewer pipe and pipe fittings	Table 5.9.1.1. 9.14.3.1.(1)
CSA	CAN/CSA-B211-00	Energy Efficiency of Oil-Fired Storage Tank Water Heaters	Table 9.36.4.2.
CSA	B214:21	Installation code for hydronic heating systems	6.2.1.1.(1) 9.33.4.2.(1) A-9.36.3.4.(1)
CSA	B355:19	Platform lifts and stair lifts for barrier-free access	3.8.3.7.(1)

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
CSA	B365-17	Installation code for solid-fuel-burning appliances and equipment	6.2.1.5.(1) 9.22.10.2.(1) 9.31.6.2.(2) 9.33.5.3.(1) A-9.33.1.1.(2) A-9.33.5.3.
CSA	B415.1:22	Performance testing of solid-biofuel-burning heating appliances	Table 9.36.3.10.
CSA	B651-18	Accessible design for the built environment	3.3.1.19.(1) 3.8.3.1.(1) Table 3.8.3.1. 3.8.3.3.(1) 3.8.3.9.(1) 3.8.3.9.(2) A-3.8.3.1.(1)
CSA	C22.1:21	Canadian Electrical Code, Part I (25th edition), Safety Standard for Electrical Installations	2.2.1.15.(1) 3.3.6.2.(4) 3.6.1.2.(1) 3.6.2.1.(6) 3.6.2.7.(1) A-3.1.4.3.(1)(b)(i) A-3.2.4.20.(9)(a) A-3.3.6.2.(4) 6.2.1.5.(1) 9.31.6.2.(2) 9.33.5.2.(1) 9.34.1.1.(1) A-9.10.22. A-9.34.2. A-9.35.2.2.(1)
CSA	C22.2 No. 0.3-09	Test methods for electrical wires and cables	3.1.4.3.(1) 3.1.4.3.(3) 3.1.5.21.(1) 3.1.5.21.(3) 9.34.1.5.(1)
CSA	C22.2 No. 113-10	Fans and Ventilators	9.32.3.10.(7)
CSA	C22.2 No. 141:15	Emergency lighting equipment	3.2.7.4.(2) 3.4.5.1.(3) 9.9.11.3.(3) 9.9.12.3.(7)
CSA	CAN/CSA-C22.2 No. 150-16	Microwave ovens	A-9.10.22.
CSA	C22.2 No. 211.0-03	General Requirements and Methods of Testing for Nonmetallic Conduit	3.1.5.23.(1)
CSA	CAN/CSA-C22.2 No. 262-04	Optical Fiber Cable and Communication Cable Raceway Systems	3.1.5.23.(1)
CSA	CAN/CSA-C191-13	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	9.32.3.10.(1) 9.32.3.10.(2) Table 9.32.3.10.-B
CSA	C282-15	Emergency electrical power supply for buildings	3.2.7.5.(1)
CSA	C368.1:14	Energy performance of room air conditioners	Table 9.36.3.10.

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
CSA	CAN/CSA-C439-18	Laboratory methods of test for rating the performance of heat/energy-recovery ventilators	9.32.3.10.(4) 9.32.3.10.(5) 9.36.3.8.(4) 9.36.3.9.(3) A-9.36.3.9.(3)
CSA	ANSI/CSA/IGSHPA C448 SERIES-16	Design and installation of ground source heat pump systems for commercial and residential buildings	9.33.5.2.(1)
CSA	C656-14	Performance standard for split-system and single-package air conditioners and heat pumps	Table 9.36.3.10.
CSA	CAN/CSA-C745-20	Energy efficiency of electric storage tank water heaters and heat pump water heaters	Table 9.36.4.2. Table 9.36.8.10.
CSA	CAN/CSA-C746-17	Energy performance rating for large and single packaged vertical air conditioners and heat pumps	Table 9.36.3.10.
CSA	C748-13	Performance of direct-expansion (DX) ground-source heat pumps	Table 9.36.3.10.
CSA	CAN/CSA-C749:15	Energy performance of dehumidifiers	Table 9.36.3.10.
CSA	CAN/CSA-C828:19	Performance requirements for line voltage thermostats used with individual room electric space heating devices	9.36.3.6.(3)
CSA	CAN/CSA-C13256-1-01	Water-Source Heat Pumps - Testing and Rating for Performance - Part 1: Water-to-Air and Brine-to-Air Heat Pumps (Adopted ISO 13256-1:1998, first edition, 1998-08-15, with Canadian Deviations)	Table 9.36.3.10.
CSA	CAN/CSA-C13256-2-01	Water-Source Heat Pumps - Testing and Rating for Performance - Part 2: Water-to-Water and Brine-to-Water Heat Pumps (Adopted ISO 13256-2:1998, first edition, 1998-08-15, with Canadian Deviations)	Table 9.36.3.10.
CSA	F280-12	Determining the required capacity of residential space heating and cooling appliances	9.33.5.1.(1) A-9.36.3.2.(1) A-9.36.5.15.(5)
CSA	CAN/CSA-F326-M91	Residential Mechanical Ventilation Systems	9.32.3.1.(1) A-9.32.3.1.(1) A-9.32.3.5. A-9.32.3.7. A-9.32.3.8. A-9.33.6.13.
CSA	G30.18:21	Carbon steel bars for concrete reinforcement	9.3.1.1.(4)
CSA	G40.21-13	Structural quality steel	4.2.3.8.(1) Table 5.9.1.1. 9.23.4.3.(2)
CSA	CAN/CSA-G401-14	Corrugated steel pipe products	Table 5.9.1.1. 9.14.3.1.(1)
CSA	CAN/CSA-O80 Series:21	Wood preservation	3.1.4.5.(1) 4.2.3.2.(1) Table 5.9.1.1.
CSA	CAN/CSA-O80.0:21	General requirements for wood preservation	4.2.3.2.(2)
CSA	CAN/CSA-O80.1:21	Specification of treated wood	4.2.3.2.(1) 9.3.2.9.(5)
CSA	CAN/CSA-O80.2:21	Processing and treatment	4.2.3.2.(1)
CSA	CAN/CSA-O80.3:21	Preservative formulations	4.2.3.2.(1)

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
CSA	O86:19	Engineering design in wood	Table 4.1.8.9. 4.3.1.1.(1) A-5.1.4.1.(6)(b) and (c) A-9.15.2.4.(1) A-9.23.4.2.
CSA	O112.9:21	Evaluation of adhesives for structural wood products (exterior exposure)	Table 9.10.3.1.-B
CSA	O112.10-08	Evaluation of Adhesives for Structural Wood Products (Limited Moisture Exposure)	Table 9.10.3.1.-B
CSA	O118.1-08	Western Red Cedar Shakes and Shingles	Table 5.9.1.1. Table 9.26.2.1.-B 9.27.7.1.(1)
CSA	O118.2-08	Eastern White Cedar Shingles	Table 5.9.1.1. Table 9.26.2.1.-B 9.27.7.1.(1)
CSA	O121-17	Douglas fir plywood	Table 5.9.1.1. 9.23.15.2.(1) 9.23.16.2.(1) Table 9.23.17.2.-A 9.27.8.1.(1) 9.30.2.2.(1) Table 9.23.12.3.-A Table 9.23.12.3.-B Table 9.23.12.3.-C
CSA	CAN/CSA-O122-16	Structural glued-laminated timber	Table 9.23.4.2.-K Table 9.23.12.3.-D
CSA	CAN/CSA-O132.2 Series-90	Wood Flush Doors	9.7.4.3.(4)
CSA	O141:05	Softwood Lumber	Table 5.9.1.1. 9.3.2.6.(1) A-9.3.2.1.(1)
CSA	O151-17	Canadian softwood plywood	Table 5.9.1.1. 9.23.15.2.(1) 9.23.16.2.(1) Table 9.23.17.2.-A 9.27.8.1.(1) 9.30.2.2.(1) Table 9.23.12.3.-A Table 9.23.12.3.-B Table 9.23.12.3.-C
CSA	O153:19	Poplar plywood	Table 5.9.1.1. 9.23.15.2.(1) 9.23.16.2.(1) Table 9.23.17.2.-A 9.27.8.1.(1) 9.30.2.2.(1)
CSA	O177-06	Qualification Code for Manufacturers of Structural Glued-Laminated Timber	4.3.1.2.(1) Table 9.23.4.2.-K Table 9.23.12.3.-D

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
CSA	O325:21	Construction sheathing	Table 5.9.1.1. Table 9.23.13.6. 9.23.15.2.(1) 9.23.15.4.(2) 9.23.16.2.(1) 9.23.16.3.(2) 9.29.9.1.(2) 9.29.9.2.(5) Table 9.23.12.3.-A Table 9.23.12.3.-B Table 9.23.12.3.-C
CSA	O437.0-93	OSB and Waferboard	Table 5.9.1.1. 9.23.15.2.(1) 9.23.15.4.(2) 9.23.16.2.(1) 9.23.16.3.(2) Table 9.23.17.2.-A 9.27.10.1.(1) 9.29.9.1.(2) 9.30.2.2.(1) Table 9.23.12.3.-A Table 9.23.12.3.-B Table 9.23.12.3.-C A-9.23.15.4.(2)
CSA	CAN/CSA-P.2-13	Testing method for measuring the annual fuel utilization efficiency of residential gas-fired or oil-fired furnaces and boilers	Table 9.36.3.10.
CSA	CAN/CSA-P.3-15	Testing method for measuring energy consumption and determining efficiencies of gas-fired and fuel oil-fired water heaters	Table 9.36.4.2. Table 9.36.8.10.
CSA	CAN/CSA-P.4.1:21	Testing method for measuring fireplace efficiency	Table 9.36.3.10.
CSA	P.6-09	Test method for measuring thermal efficiency of gas-fired pool heaters	Table 9.36.4.2.
CSA	CAN/CSA-P.8-09	Thermal efficiencies of industrial and commercial gas-fired package furnaces	Table 9.36.3.10.
CSA	CAN/CSA-P.9-11	Test method for determining the performance of combined space and water heating systems (combos)	9.36.3.10.(3) Table 9.36.3.10. Table 9.36.4.2. Table 9.36.5.15.-C
CSA	P.10-07	Performance of Integrated Mechanical Systems for Residential Heating and Ventilation	9.36.3.9.(2) Table 9.36.3.10. Table 9.36.4.2. Table 9.36.5.15.-C
CSA	CAN/CSA-P.11-07	Testing Method for Measuring Efficiency and Energy Consumption of Gas-Fired Unit Heaters	Table 9.36.3.10.
CSA	S6:19	Canadian Highway Bridge Design Code	A-Table 4.1.5.3. A-Table 4.1.5.9.
CSA	S16:19	Design of steel structures	Table 4.1.8.9. 4.3.4.1.(1) A-4.1.5.11. A-Table 4.1.8.9. A-4.3.4.1.(1)
CSA	CAN/CSA-S37-18	Antennas, towers, and antenna-supporting structures	4.1.6.15.(1) 4.1.7.11.(1)
CSA	S136-16	North American specification for the design of cold-formed steel structural members (using the Appendix B provisions applicable to Canada)	4.1.8.1.(5) Table 4.1.8.9. 4.3.4.2.(1)

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
CSA	S157-17/S157.1-17	Strength design in aluminum/Commentary on CSA S157-17, Strength design in aluminum	4.3.5.1.(1)
CSA	S269.1-16	Falsework and formwork	4.1.1.3.(4) A-9.15.1.1.(1)(c) and 9.20.1.1.(1)(b)
CSA	S269.2-16	Access scaffolding for construction purposes	4.1.1.3.(4)
CSA	CAN/CSA-S269.3-M92	Concrete Formwork	4.1.1.3.(4)
CSA	S304-14	Design of masonry structures	Table 4.1.8.9. 4.3.2.1.(1) A-5.1.4.1.(6)(b) and (c)
CSA	S367-12	Air-, cable-, and frame-supported membrane structures	4.4.1.1.(1)
CSA	S406-16	Specification of permanent wood foundations for housing and small buildings	9.15.2.4.(1) 9.16.5.1.(1) A-9.15.2.4.(1)
CSA	S413:21	Parking structures	4.4.2.1.(1) A-4.4.2.1.(1)
CSA	S478:19	Durability in buildings	A-5.1.4.2.
CSA	S832:14	Seismic risk reduction of operational and functional components (OFCs) of buildings	A-Table 4.1.8.18.
CSA	Z32-15	Electrical safety and essential electrical systems in health care facilities	3.2.7.3.(4) 3.2.7.6.(1) A-3.2.7.6.(1)
CSA	Z240 MH Series-16	Manufactured homes	A-1.1.1.1.(2)[4]
CSA	Z240.2.1-16	Structural requirements for manufactured homes	A-1.1.1.1.(2)[4] 9.12.2.2.(6) 9.15.1.3.(1)
CSA	Z240.10.1:19	Site preparation, foundation, and installation of buildings	A-1.1.1.1.(2)[4] 9.15.1.3.(1) 9.23.6.3.(1)
CSA	CAN/CSA-Z317.2-15	Special requirements for heating, ventilation, and air-conditioning (HVAC) systems in health care facilities	6.2.1.1.(1) 6.3.2.15.(6)
CSA	CAN/CSA-Z662-15	Oil and gas pipeline systems	3.2.3.22.(1)
CSA	Z7396.1-17	Medical gas pipeline systems – Part 1: Pipelines for medical gases, medical vacuum, medical support gases, and anaesthetic gas scavenging systems	3.7.3.1.(1)
CSSBI	23M-2016	Standard for Residential Steel Cladding	9.27.11.1.(1) A-9.27.11.1.(1)
CWC	1997	Introduction to Wood Building Technology	A-9.27.3.8.(4)
CWC	2000	Wood Reference Handbook	A-9.27.3.8.(4)
CWC	2009	The Span Book	A-9.23.4.2.
CWC	2014	Engineering Guide for Wood Frame Construction	9.4.1.1.(1) 9.23.13.1.(2) 9.23.13.2.(2) 9.23.13.3.(2) A-9.4.1.1. A-9.23.13.1.
DIN	EN 303-5:2012	Heating boilers – Part 5: Heating boilers for solid fuels, manually and automatically stoked, nominal heat output of up to 500 kW – Terminology, requirements, testing and marking; German version EN 303-5:2012	Table 9.36.3.10.

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
DOE	10 CFR, Part 430-2011	Energy, Energy Conservation Program for Consumer Products	Table 9.36.4.2.
DOE	10 CFR, Part 431-2011	Energy, Energy Efficiency Program for Certain Commercial and Industrial Equipment	Table 9.36.3.10. Table 9.36.4.2.
ECC	2013	EIFS Practice Manual	A-5.9.4.1.(1) A-9.27.14.1.(1)
EPA	40 CFR, Part 60-2008	Protection of Environment, Standards of Performance for New Stationary Sources	Table 9.36.3.10.
EPA	625/R-92/016 (1994)	Radon Prevention in the Design and Construction of Schools and Other Large Buildings	A-5.4.1.1. 6.2.1.1.(1)
FEMA	450-1-2003	NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures	A-4.1.8.18.(14) and (15)
FEMA	P-750-2009	NEHRP Recommended Seismic Provisions for New Buildings and Other Structures	A-4.1.8.18.(14) and (15)
FLL	2008	Guidelines for the Planning, Construction and Maintenance of Green Roofing	A-5.6.1.2.(2)
FPI	Project 43-10C-024 (1988)	Deflection Serviceability Criteria for Residential Floors	A-9.23.4.2.(2)
HC	2004	Fungal Contamination in Public Buildings: Health Effects and Investigation Methods	A-5.5.1.1.
HC	2007	Radon: A Guide for Canadian Homeowners	A-5.4.1.1. A-6.2.1.1. A-9.13.4.3.
HC	2008	Guide for Radon Measurements in Public Buildings (Schools, Hospitals, Care Facilities, Detention Centres)	A-5.4.1.1. A-6.2.1.1.
HC	2008	Guide for Radon Measurements in Residential Dwellings (Homes)	A-9.13.4.3.
HC	H46-2/90-156E	Exposure Guidelines for Residential Indoor Air Quality	A-6.3.1.5. A-9.25.5.2.
HC	R.S.C. 1985, c. H-3	Hazardous Products Act	A-1.4.1.2.(1)[4] A-9.25.2.2.(2)
HC	WHMIS 1988	Workplace Hazardous Materials Information System (WHMIS)	A-1.4.1.2.(1)[4] A-3.3.1.2.(1)
HC	SOR/2015-17	Hazardous Products Regulations	1.4.1.2.(1)[4] A-3.3.1.2.(1)
HPVA	ANSI/HPVA HP-1-2009	American National Standard for Hardwood and Decorative Plywood	Table 5.9.1.1. 9.27.8.1.(1) 9.30.2.2.(1)
HRAI	2017 Edition	HRAI Digest	6.2.1.1.(1) 9.32.2.3.(4) 9.32.3.2.(1) 9.33.4.1.(1) A-9.36.3.2.(1) A-9.36.3.2.(2) A-9.36.3.4.(1)
HVI	HVI Publication 911	Certified Home Ventilating Products Directory	A-9.36.3.9.(3)
HVI	HVI Publication 916-2015	Airflow Test Procedure	9.32.3.10.(1)
HVI	HVI Publication 915-2016	Loudness Testing and Rating Procedure	9.32.3.10.(2) Table 9.32.3.10.-B
ICC	400-2012	Standard on the Design and Construction of Log Structures	9.36.2.2.(5) A-9.36.2.2.(5)

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
IEC	60268-16:2020	Sound system equipment - Part 16: Objective rating of speech intelligibility by speech transmission index	A-3.2.4.22.(1)(b)
ISO	3864-1:2011	Graphical symbols – Safety colours and safety signs – Part 1: Design principles for safety signs and safety markings	3.4.5.1.(2) 9.9.11.3.(2)
ISO	7010:2011	Graphical symbols – Safety colours and safety signs – Registered safety signs	3.4.5.1.(2) A-3.4.5.1.(2)(c) 9.9.11.3.(2)
ISO	7240-19:2007	Fire detection and alarm systems – Part 19: Design, installation, commissioning and service of sound systems for emergency purposes	A-3.2.4.22.(1)(b)
ISO	7731:2003	Ergonomics – Danger signals for public and work areas – Auditory danger signals	A-3.2.4.22.(1)(b)
ISO	8201:1987	Acoustics – Audible emergency evacuation signal	3.2.4.18.(2) A-3.2.4.18.(2)
ISO	10848-1:2006	Acoustics – Laboratory measurement of the flanking transmission of airborne and impact sound between adjoining rooms – Part 1: Frame document	5.8.1.4.(2) 5.8.1.4.(3) 5.8.1.5.(2) 5.8.1.5.(3)
ISO	12354-1:2017	Building acoustics - Estimation of acoustic performance of buildings from the performance of elements - Part 1: Airborne sound insulation between rooms	5.8.1.4.(1) 5.8.1.4.(2) 5.8.1.4.(4) 5.8.1.4.(5) 5.8.1.4.(6) 5.8.1.5.(1) 5.8.1.5.(2) 5.8.1.5.(5) 5.8.1.5.(6)
NEMA	SB 50:2008	Emergency Communications Audio Intelligibility Applications Guide	A-3.2.4.22.(1)(b)
NFPA	2008	Fire Protection Handbook, Twentieth Edition	A-3.2.2.2.(1) A-3.6.2.7.(5)
NFPA	2010 Edition	Fire Protection Guide to Hazardous Materials	A-6.9.1.2.(1)
NFPA	13-2019[6]	Standard for the Installation of Sprinkler Systems	3.1.9.1.(4) 3.2.4.8.(2) 3.2.4.15.(1) 3.2.5.12.(1) 3.2.5.12.(9) 3.2.8.2.(5) 3.2.8.3.(2) 3.3.2.14.(3) A-3.1.11.5.(3) and (4) A-3.2.4.9.(3)(f) A-3.2.5.12.(1) A-3.2.5.12.(6) A-3.2.5.13.(1) A-3.2.8.2.(3) 9.10.9.9.(4)
NFPA	13D-2016	Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes	3.2.4.1.(2) 3.2.5.12.(3) 3.2.7.9.(4) A-3.2.5.12.(2) A-3.2.5.12.(6) A-3.2.5.13.(1) 9.10.2.2.(2) 9.10.18.2.(3)

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
NFPA	13R-2019[7]	Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies	3.2.5.12.(2) A-3.2.5.12.(2) A-3.2.5.12.(6) A-3.2.5.13.(1)
NFPA	14-2013	Standard for the Installation of Standpipe and Hose Systems	3.2.5.9.(1) 3.2.5.10.(1)
NFPA	20-2016	Standard for the Installation of Stationary Pumps for Fire Protection	3.2.4.9.(4) 3.2.5.18.(1) A-3.2.4.9.(3)(f)
NFPA	30-2018	Flammable and Combustible Liquids Code	A-6.9.1.2.(1)
NFPA	30A-2021	Code for Motor Fuel Dispensing Facilities and Repair Garages	A-6.9.1.2.(1)
NFPA	32-2016	Standard for Drycleaning Facilities	A-6.9.1.2.(1)
NFPA	33-2018	Standard for Spray Application Using Flammable or Combustible Materials	A-6.9.1.2.(1)
NFPA	34-2018	Standard for Dipping, Coating, and Printing Processes Using Flammable or Combustible Liquids	A-6.9.1.2.(1)
NFPA	35-2021	Standard for the Manufacture of Organic Coatings	A-6.9.1.2.(1)
NFPA	36-2021	Standard for Solvent Extraction Plants	A-6.9.1.2.(1)
NFPA	40-2019	Standard for the Storage and Handling of Cellulose Nitrate Film	A-6.9.1.2.(1)
NFPA	51-2018	Standard for the Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes	A-6.9.1.2.(1)
NFPA	51A-2012	Standard for Acetylene Cylinder Charging Plants	A-6.9.1.2.(1)
NFPA	55-2020	Compressed Gases and Cryogenic Fluids Code	A-6.9.1.2.(1)
NFPA	61-2017	Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities	A-6.9.1.2.(1)
NFPA	68-2013	Standard on Explosion Protection by Deflagration Venting	3.3.6.4.(2) A-3.6.2.7.(5) A-6.9.1.2.(1)
NFPA	69-2014	Standard on Explosion Prevention Systems	A-3.6.2.7.(5) A-6.9.1.2.(1)
NFPA	72-2019	National Fire Alarm and Signaling Code	A-3.2.4.22.(1)(b)
NFPA	80-2013	Standard for Fire Doors and Other Opening Protectives	3.1.8.5.(2) 3.1.8.12.(2) 3.1.8.16.(1) 3.1.9.1.(5) A-3.1.8.1.(2) A-3.2.8.2.(3) 9.10.9.9.(5) 9.10.13.1.(1)
NFPA	80A-2012	Recommended Practice for Protection of Buildings from Exterior Fire Exposures	A-3
NFPA	82-2014	Standard on Incinerators and Waste and Linen Handling Systems and Equipment	6.2.2.1.(1) 9.10.10.5.(2)
NFPA	85-2019	Boiler and Combustion Systems Hazards Code	A-6.9.1.2.(1)
NFPA	86-2019	Standard for Ovens and Furnaces	A-6.9.1.2.(1)
NFPA	88A-2019	Standard for Parking Structures	A-6.9.1.2.(1)
NFPA	91-2015	Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Particulate Solids	6.3.4.3.(1) A-6.9.1.2.(1)

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
NFPA	96-2021	Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations	3.2.4.8.(2) 3.6.3.5.(1) A-3.3.1.2.(2) A-3.6.3.5. 6.3.1.6.(1) A-6.9.1.2.(1) A-9.10.1.4.(1)
NFPA	101-2021	Life Safety Code	3.3.2.1.(2) 3.3.2.1.(3) A-3.3.2.1.(2)
NFPA	105-2013	Standard for Smoke Door Assemblies and Other Opening Protectives	3.1.8.5.(3) 3.1.8.5.(7)
NFPA	204-2018	Standard for Smoke and Heat Venting	A-6.9.1.2.(1)
NFPA	211-2019	Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances	6.3.3.2.(2) 6.3.3.3.(1)
NFPA	303-2021	Fire Protection Standard for Marinas and Boatyards	A-6.9.1.2.(1)
NFPA	307-2021	Standard for the Construction and Fire Protection of Marine Terminals, Piers, and Wharves	A-6.9.1.2.(1)
NFPA	409-2016	Standard on Aircraft Hangars	A-6.9.1.2.(1)
NFPA	415-2016	Standard on Airport Terminal Buildings, Fueling Ramp Drainage, and Loading Walkways	A-6.9.1.2.(1)
NFPA	484-2019	Standard for Combustible Metals	A-6.9.1.2.(1)
NFPA	654-2017	Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids	A-6.9.1.2.(1)
NFPA	655-2017	Standard for Prevention of Sulfur Fires and Explosions	A-6.9.1.2.(1)
NFPA	664-2017	Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities	A-6.9.1.2.(1)
NFPA	1710-2010	Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments	A-3.2.3.1.(8)
NFRC	100-2010	Procedure for Determining Fenestration Product U-factors	9.36.2.2.(3)
NFRC	200-2010	Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence	9.36.2.2.(3)
NLGA	2017	Standard Grading Rules for Canadian Lumber	9.3.2.1.(1) A-9.3.2.1.(1) Table A-9.3.2.1.(1)-A A-Table 9.3.2.1. A-9.3.2.8.(1) A-9.23.10.4.(1)
NLGA	SPS-1-2017	Fingerjoined Structural Lumber	Table 9.10.3.1.-A A-9.23.10.4.(1)
NLGA	SPS-3-2017	Fingerjoined “Vertical Stud Use Only” Lumber	Table 9.10.3.1.-A A-9.23.10.4.(1)
NRC	1988	Performance and acceptability of wood floors – Forintek studies	A-9.23.4.2.(2)
NRC	2005	A Guide for the Wind Design of Mechanically Attached Flexible Membrane Roofs	A-5.2.2.2.(4)

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
NRC	17808-2005	Performance Guidelines for Basement Envelope Systems and Materials: Final Research Report	A-9.25.5.1.
NRC	BPN 54-85	The difference between a vapour barrier and an air barrier	A-9.25.1.1.(2)
NRC	CBD 222	Airtight houses and carbon monoxide poisoning	A-9.33.1.1.(2)
NRC	CBD 230	Applying building codes to existing buildings	A-1.1.1.1.(1)[4]
NRC	CBD 231	Moisture problems in houses	A-9.25.3.1.(1)
NRC	CRBCPI-Y2-R19	Guideline on Design for Durability of Building Envelopes	A-5.1.4.2. A-5.4.1.1.(3)
NRC	NRCC 49677-2007	Best Practice Guide on Fire Stops and Fire Blocks and their Impact on Sound Transmission	A-9.11.
NRC	RR-331-2017	Guide to Calculating Airborne Sound Transmission in Buildings	A-5.8.1.4. A-5.8.1.4.(4)(b)
NRCA	3rd Edition, 2017	The NRCA Vegetative Roof Systems Manual	A-5.6.1.2.(2)
NRCan	R.S.C. 1985, c. E-17	Explosives Act	3.3.6.2.(3)
NRCan	SOR/2016-311	Energy Efficiency Regulations, 2016	Table 9.36.4.2.
NYCDH	2008	Guidelines on Assessment and Remediation of Fungi in Indoor Environments	A-5.5.1.1.
OMMAH	2012	2012 Building Code Compendium, Volume 2, Supplementary Standard SB-7, Guards for Housing and Small Buildings	A-9.8.8.2.
SMACNA	ANSI/SMACNA 006-2006	HVAC Duct Construction Standards – Metal and Flexible	9.33.6.5.(2) A-9.36.3.2.(2)
SPRI	ANSI/GRHC/SPRI VR-1-2018	Procedure for Investigating Resistance to Root or Rhizome Penetration on Vegetative Roofs	5.6.1.2.(2)
SPRI	ANSI/SPRI WD-1-2014	Wind Design Standard Practice for Roofing Assemblies	A-5.2.2.2.(4)
TC	SOR/96-433	Canadian Aviation Regulations – Part III	4.1.5.13.(1)
TC	SOR/2001-286	Transportation of Dangerous Goods Regulations (TDGR)	1.4.1.2.(1)[4] A-1.4.1.2.(1)[4] A-3.3.1.2.(1)
TIAC	2013	Mechanical Insulation Best Practices Guide	A-6.3.2.5.
TPIC	2019	Truss Design Procedures and Specifications for Light Metal Plate Connected Wood Trusses	9.23.14.11.(1)
TWC	1993	Details of Air Barrier Systems for Houses	Table A-9.25.5.1.(1)
UL	ANSI/CAN/UL/ULC 300:2022	Fire Testing of Fire Extinguishing Systems for Protection of Commercial Cooking Equipment	6.9.1.3.(1)
UL	ANSI/UL 1784-2015	Standard for Air Leakage Tests of Door Assemblies and Other Opening Protectives	3.1.8.4.(4)
ULC	CAN/ULC-S101-14	Standard Method of Fire Endurance Tests of Building Construction and Materials	2.2.1.8.(4) 2.2.1.10.(1) 3.1.5.7.(2) 3.1.5.14.(5) 3.1.5.14.(6) 3.1.5.15.(3) 3.1.5.15.(4) 3.1.7.1.(1) 3.1.11.7.(1) 3.2.3.8.(1) A-3.1.5.14.(5)(d) 9.10.16.3.(1) Table 9.10.3.1.-B

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
ULC	CAN/ULC-S102:2018	Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies	3.1.5.24.(1) 3.1.12.1.(1) Table 5.9.1.1. Table 9.23.17.2.-A 9.29.5.2.(1)
ULC	CAN/ULC-S102.2:2018	Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies	3.1.12.1.(2) 3.1.13.4.(1) 9.27.12.1.(4) 9.27.13.1.(2)
ULC	CAN/ULC-S102.3:2018	Standard Method of Fire Test of Light Diffusers and Lenses	3.1.13.4.(1)
ULC	CAN/ULC-S102.4:2017	Standard Method of Test for Fire and Smoke Characteristics of Electrical Wiring, Cables and Non-Metallic Raceways	3.1.4.3.(2) 3.1.5.21.(2) 3.1.5.23.(2)
ULC	CAN/ULC-S104-15	Standard Method for Fire Tests of Door Assemblies	3.1.8.4.(1) 3.2.6.5.(3)
ULC	CAN/ULC-S105:2016	Standard Specification for Fire Door Frames Meeting the Performance Required by CAN/ULC-S104	9.10.13.6.(1)
ULC	CAN/ULC-S106-15	Standard Method for Fire Tests of Window and Glass Block Assemblies	3.1.8.4.(1)
ULC	CAN/ULC-S107:2019	Standard Methods of Fire Tests of Roof Coverings	3.1.15.1.(1)
ULC	CAN/ULC-S109-14	Standard Method for Flame Tests of Flame-Resistant Fabrics and Films	2.2.1.14.(1) 3.1.16.1.(1) 3.1.18.5.(1) 3.6.5.2.(2) 3.6.5.3.(1) 9.33.6.3.(1)
ULC	CAN/ULC-S110-13	Standard Methods of Test for Air Ducts	3.6.5.1.(2) 3.6.5.1.(5) 9.33.6.2.(2) 9.33.6.2.(4)
ULC	CAN/ULC-S111-13	Standard Method of Fire Tests for Air Filter Units	6.3.2.13.(1) 9.33.6.14.(1)
ULC	CAN/ULC-S112-10	Standard Method of Fire Test of Fire Damper Assemblies	3.1.8.4.(1) A-3.2.6.6.(1)
ULC	CAN/ULC-S112.1-10	Standard for Leakage Rated Dampers for Use in Smoke Control Systems	3.1.8.4.(3) 6.3.2.7.(3)
ULC	CAN/ULC-S112.2-07	Standard Method of Fire Test of Ceiling Firestop Flap Assemblies	3.6.4.3.(2) 9.10.13.14.(1)
ULC	CAN/ULC-S113:2016	Standard Specification for Wood Core Doors Meeting the Performance Required by CAN/ULC-S104 for Twenty Minute Fire Rated Closure Assemblies	9.10.13.2.(1) A-9.10.9.3.(2) A-9.10.13.2.(1)
ULC	CAN/ULC-S114:2018	Standard Method of Test for Determination of Non-Combustibility in Building Materials	1.4.1.2.(1)[4]

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
ULC	CAN/ULC-S115:2018	Standard Method of Fire Tests of Firestop Systems	3.1.5.19.(3) 3.1.8.3.(3) 3.1.9.1.(1) 3.1.9.1.(2) 3.1.9.1.(3) 3.1.9.1.(6) 3.1.9.1.(7) 3.1.9.3.(1) 3.1.9.3.(2) 3.1.9.3.(4) 3.1.9.4.(4) 3.1.9.4.(7) A-3.1.8.3.(2) A-3.1.11.7.(7) 9.10.9.2.(3) 9.10.9.6.(1) 9.10.9.6.(2) 9.10.9.8.(1) 9.10.9.8.(6)
ULC	CAN/ULC-S124-06	Standard Method of Test for the Evaluation of Protective Coverings for Foamed Plastic	3.1.5.15.(2) A-3.1.5.14.(5)(d)
ULC	CAN/ULC-S126-14	Standard Method of Test for Fire Spread Under Roof-Deck Assemblies	3.1.14.1.(1) 3.1.14.2.(1)
ULC	CAN/ULC-S134-13	Standard Method of Fire Test of Exterior Wall Assemblies	3.1.5.5.(1) 9.10.14.5.(2) 9.10.15.5.(2) 9.10.15.5.(3)
ULC	ULC-S135-04	Standard Test Method for the Determination of Combustibility Parameters of Building Materials Using an Oxygen Consumption Calorimeter (Cone Calorimeter)	3.1.5.1.(2)
ULC	CAN/ULC-S138-06	Standard Method of Test for Fire Growth of Insulated Building Panels in a Full-Scale Room Configuration	3.1.5.7.(1) 3.1.5.7.(3)
ULC	CAN/ULC-S139:2017	Standard for Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables	3.2.6.5.(6) 3.2.7.10.(2) 3.2.7.10.(3)
ULC	CAN/ULC-S143-14	Standard Method of Fire Tests for Non-Metallic Electrical and Optical Fibre Cable Raceway Systems	3.1.5.23.(1)
ULC	CAN/ULC-S144-12	Standard Method of Fire Resistance Test – Grease Duct Assemblies	3.6.3.5.(2) A-3.6.3.5.
ULC	CAN/ULC-S146-19	Standard Method of Test for the Evaluation of Encapsulation Materials and Assemblies of Materials for the Protection of Structural Timber Elements	3.1.6.5.(1)
ULC	ULC-S332-93	Standard for Burglary Resisting Glazing Material	A-9.7.5.2.(1)
ULC	ULC-S505-74	Standard for Fusible Links for Fire Protection Services	3.1.8.10.(2)

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
ULC	CAN/ULC-S524:2019	Standard for Installation of Fire Alarm Systems	3.1.8.11.(3) 3.1.8.14.(3) 3.2.4.5.(1) 3.2.4.20.(7) 3.2.4.20.(8) 3.2.4.20.(10) 3.2.4.20.(15) A-3.2.4.7.(4) A-3.2.4.18.(9) and (10) A-3.2.4.19.(1)(g) A-3.2.4.20.(10) 9.10.19.4.(3) 9.10.19.6.(2)
ULC	CAN/ULC-S526-2016	Visible Signaling Devices for Fire Alarm and Signaling Systems, Including Accessories	A-3.2.4.19.(3)
ULC	CAN/ULC-S531:2019	Standard for Smoke Alarms	3.2.4.20.(2) 9.10.19.1.(1)
ULC	CAN/ULC-S537:2019	Standard for Verification of Fire Alarm Systems	3.2.4.5.(2)
ULC	CAN/ULC-S540-13	Standard for Residential Fire and Life Safety Warning Systems: Installation, Inspection, Testing and Maintenance	3.2.4.21.(1) 9.10.2.2.(3) 9.10.2.2.(4) 9.10.19.8.(1)
ULC	CAN/ULC-S553-14	Standard for the Installation of Smoke Alarms	3.2.4.20.(13) 9.10.19.3.(2)
ULC	CAN/ULC-S561:2022	Standard for Installation and Services for Fire Signal Receiving Centres and Systems	3.2.4.7.(4) A-3.2.4.7.(4)
ULC	CAN/ULC-S572:2017	Standard for Photoluminescent and Self-Luminous Exit Signs and Path Marking Systems	3.4.5.1.(3) 3.4.5.1.(4) A-3.4.5.1.(4) 9.9.11.3.(3) 9.9.11.3.(4)
ULC	CAN/ULC-S610:2018	Standard for Factory-Built Fireplace Systems	9.22.8.1.(1)
ULC	CAN/ULC 628:2022	Standard for Fireplace Inserts and Hearth-Mounted Stoves	9.22.10.1.(1)
ULC	CAN/ULC 629:2022	Standard for 650°C Factory-Built Chimneys	9.33.10.2.(1)
ULC	CAN/ULC-S639:2018	Standard for Steel Liner Assemblies for Solid-Fuel Burning Masonry Fireplaces	9.22.2.3.(1)
ULC	CAN/ULC-S701.1:2022	Standard for Thermal Insulation, Polystyrene Boards	Table 5.9.1.1. Table 9.23.17.2.-A 9.25.2.2.(1) Table A-9.36.2.4.(1)-D
ULC	CAN/ULC-S702.1:2021	Standard for Mineral Fibre Thermal Insulation for Buildings, Part 1: Material Specification	3.1.6.3.(4) Table 5.9.1.1. A-5.9.1.1.(1) 9.10.9.8.(3) Table 9.23.17.2.-A 9.25.2.2.(1) Table A-9.36.2.4.(1)-D
ULC	CAN/ULC-S703-09	Standard for Cellulose Fibre Insulation (CFI) for Buildings	Table 5.9.1.1. 9.25.2.2.(1) Table A-9.36.2.4.(1)-D
ULC	CAN/ULC-S704.1:2017	Standard for Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Faced	Table 5.9.1.1. Table 9.23.17.2.-A 9.25.2.2.(1) Table A-9.36.2.4.(1)-D

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number(3)	Title of Document	Code Reference
ULC	CAN/ULC-S705.1-18	Standard for Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density – Material Specification	Table 5.9.1.1. 9.25.2.2.(1) Table A-9.36.2.4.(1)-D
ULC	CAN/ULC-S705.2:2020	Standard for Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density – Application	Table 5.9.1.1. 9.25.2.5.(1)
ULC	CAN/ULC-S706.1:2020	Standard for Insulating Wood Fibre Boards for Buildings	Table 5.9.1.1. 9.23.16.7.(3) Table 9.23.17.2.-A 9.25.2.2.(1) 9.29.8.1.(1)
ULC	CAN/ULC-S710.1:2019	Standard for Bead-Applied One Component Polyurethane Air Sealant Foam, Part 1: Material Specification	Table 5.9.1.1. 9.36.2.10.(6)
ULC	CAN/ULC-S711.1:2019	Standard for Bead-Applied Two Component Polyurethane Air Sealant Foam, Part 1: Material Specification	Table 5.9.1.1. 9.36.2.10.(6)
ULC	CAN/ULC-S712.1:2021	Standard for Thermal Insulation – Light Density, Open Cell Spray Applied Semi-Rigid Polyurethane Foam – Material Specification	Table A-9.36.2.4.(1)-D
ULC	CAN/ULC-S716.1:2019	Standard for Exterior Insulation and Finish Systems (EIFS) – Materials and Systems	5.9.4.1.(1) A-5.9.4.1.(1) 9.27.14.1.(1) 9.27.14.2.(1) A-9.27.14.2.(2)(a)
ULC	CAN/ULC-S716.2:2019	Standard for Exterior Insulation and Finish Systems (EIFS) – Installation of EIFS Components and Water Resistive Barrier	A-5.9.4.1.(1) 9.27.14.3.(1)
ULC	CAN/ULC-S716.3:2019	Standard for Exterior Insulation and Finish Systems (EIFS) – Design Application	A-5.9.4.1.(1) 9.27.14.3.(1)
ULC	CAN/ULC-S717.1:2017	Standard for Flat Wall Insulating Concrete Form (ICF) Units – Material Properties	Table 5.9.1.1. 9.15.4.1.(1)
ULC	CAN/ULC-S741-08	Standard for Air Barrier Materials – Specification	5.4.1.2.(2) 9.36.2.10.(1)
ULC	CAN/ULC-S742:2020	Standard for Air Barrier Assemblies – Specification	5.4.1.2.(1) 5.4.1.2.(2) A-5.4.1.1.(3) A-5.4.1.2.(1) A-5.4.1.2.(2) A-5.4.1.2.(4) 9.36.2.9.(1) A-9.36.2.9.(1) A-9.36.2.10.(5)(b)
ULC	CAN/ULC-S770-15	Standard Test Method for Determination of Long-Term Thermal Resistance of Closed-Cell Thermal Insulating Foams	Table A-9.36.2.4.(1)-D
ULC	CAN/ULC-S1001-11	Standard for Integrated Systems Testing of Fire Protection and Life Safety Systems	3.2.9.1.(1) A-3.2.9.1.(1) 9.10.1.2.(1)
ULC	ULC/ORD-C199P-02	Combustible Piping for Sprinkler Systems	3.2.5.13.(2) 3.2.5.13.(5)
ULC	ULC/ORD-C1254.6-95	Fire Testing of Restaurant Cooking Area Fire Extinguishing System Units	6.9.1.3.(1)
U.S. Congress		National Appliance Energy Conservation Act of 1987	Table 9.36.4.2. Table 9.36.5.16.

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number[3]	Title of Document	Code Reference
WCLIB	No. 17 (2004)	Grading Rules for West Coast Lumber	A-Table 9.3.2.1.
WWPA	2021	Western Lumber Grading Rules	A-Table 9.3.2.1.

Notes to Table 1.3.1.2.:

(1) While every effort was made to ensure the accuracy of the information in this Table, the NRC is not responsible for the accuracy, timeliness or reliability of the content presented therein. For all purposes of interpreting and applying the referenced standards, Code users should refer to the most recent official versions of the referenced editions.

(2) See Table D-1.1.2. of Appendix D for the list of standards referenced therein.

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

(4) Code reference is in Division A.

(5) Code reference is in Division C.

(6) Subsection 9.3.15, Sprinkler-Protected Glazing, does not apply in the context of Division B.

(7) Subsection 6.5.3, Sprinkler-Protected Glazing, does not apply in the context of Division B.

1.3.2. Organizations

1.3.2.1. Abbreviations of Proper Names

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

AAMA ..... Fenestration and Glazing Industry Alliance (formerly American Architectural Manufacturers Association) (www.fgiaonline.org)

ACGIH ..... American Conference of Governmental Industrial Hygienists (www.acgih.org)

ACI ..... American Concrete Institute (www.concrete.org)

AHRI ..... Air-Conditioning, Heating and Refrigeration Institute (www.ahrinet.org)

AISI ..... American Iron and Steel Institute (www.steel.org)

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

APA ..... APA — The Engineered Wood Association (www.apawood.org)

ASCE ..... American Society of Civil Engineers (www.asce.org)

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

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

ASTM ..... ASTM International (www.astm.org)

BNQ ..... Bureau de normalisation du Québec (www.bnq.qc.ca/en)

CAN ..... National Standard of Canada designation (www.scc.ca) (The number or name following the CAN designation represents the agency under whose auspices the standard is issued.)
CAN3 designates CSA

CBHCC ..... Canadian Board for Harmonized Construction Codes (cbhcc-cchcc.ca)

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

CCME ..... Canadian Council of Ministers of the Environment (www.ccme.ca)

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

CHC ..... Canadian Hydronics Council (www.chchydro.com)

CISC ..... Canadian Institute of Steel Construction (www.cisc-icca.ca)

CMHC ..... Canada Mortgage and Housing Corporation (www.cmhc.ca)

CRCA ..... Canadian Roofing Contractors' Association (www.roofingcanada.com)

CSA	CSA Group (www.csagroup.org)
CSSBI	Canadian Sheet Steel Building Institute (www.cssbi.ca)
CWC	Canadian Wood Council (www.cwc.ca)
DOE	U.S. Department of Energy (www.energy.gov)
EC	Environment and Climate Change Canada (www.ec.gc.ca)
ECC	EIFS Council of Canada (www.eifscouncil.org)
EPA	Environmental Protection Agency (U.S.) (www.epa.gov)
FEMA	Federal Emergency Management Agency (U.S.) (www.fema.gov)
FLL	German Landscape Research, Development and Construction Society (shop.fll.de/en)
FPI	FPInnovations – Wood Products (formerly FCC – Forintek Canada Corporation) (www.fpinnovations.ca)
GRHC	Green Roofs for Healthy Cities (www.greenroofs.org)
HC	Health Canada (www.hc-sc.gc.ca)
HPVA	Decorative Hardwoods Association (formerly Hardwood Plywood & Veneer Association) (www.decorativehardwoods.org)
HRAI	Heating, Refrigeration and Air Conditioning Institute of Canada (www.hrai.ca)
HVI	Home Ventilating Institute (www.hvi.org)
ICC	International Code Council (www.iccsafe.org)
IEC	International Electrotechnical Commission (www.iec.ch)
ISO	International Organization for Standardization (www.iso.org)
NBC	National Building Code of Canada 2020
NCMA	National Concrete Masonry Association (www.ncma.org)
NECB	National Energy Code of Canada for Buildings 2020
NEMA	National Electrical Manufacturers Association (www.nema.org)
NFC	National Fire Code of Canada 2020
NFPA	National Fire Protection Association (www.nfpa.org)
NFRC	National Fenestration Rating Council (www.nfrc.org)
NLGA	National Lumber Grades Authority (www.nlga.org)
NPC	National Plumbing Code of Canada 2020
NRC	National Research Council of Canada (nrc.canada.ca)
NRCA	National Roofing Contractors Association (www.nrca.net)
NRCan	Natural Resources Canada (www.nrcan.gc.ca)
NYCDH	New York City Department of Health and Mental Hygiene (www.nyc.gov/health)
OMMAH	Ontario Ministry of Municipal Affairs and Housing (www.ontario.ca/page/ministry-municipal-affairs-housing)
SEI	Structural Engineering Institute (www.asce.org/structural-engineering/structural-engineering)
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association (www.smacna.org)
SPRI	Single Ply Roofing Industry (www.spri.org)
TC	Transport Canada (tc.canada.ca)
TIAC	Thermal Insulation Association of Canada (www.tiac.ca)
TPIC	Truss Plate Institute of Canada (www.tpic.ca)

A-2.2.1.1.(2) Non-agricultural Major Occupancies. It is intended that portions of farm buildings that contain permitted major occupancies other than agricultural major occupancies be subject to the requirements of Part 3. Unless specifically referenced in Part 2, the requirements of Part 3 are not intended to be applied to portions of farm buildings meeting the criteria for the application of Part 2 (see Articles 1.3.3.5. and 1.3.3.6. of Division A).

A-2.2.1.5. Environmental Conditions. The materials used in the construction of fire separations and closures in farm buildings should be selected to minimize deterioration caused by exposure to corrosive or humid environmental conditions.

A-2.2.1.8.(1) Concealed Spaces Used as Supply Air Plenums. Sentence 2.2.1.8.(1) is not intended to prohibit a concealed attic or roof space from being used as a supply air plenum for the distribution of air through a porous ceiling or ceiling inlets to the space below.

A-2.2.1.15.(2) Damage to Electrical Wiring. The protection required by Sentence 2.2.1.15.(2) is intended to prevent rodents from damaging electrical wiring that is installed in a concealed space, such as a space within an assembly, an attic space, or a service space.

A-2.2.7.1.(1) Exiting from Floor Areas. The intent of Sentence 2.2.7.1.(1) is that each floor level be served by its own exits. This approach to providing exits is consistent with that in Part 3.

A-2.2.7.2. Overhead Doors and Sliding Doors. Overhead doors and sliding doors are not permitted to be used as exits from farm buildings with human occupants because such doors could delay their egress.

A-2.2.8.2.(3) Ventilation of Below-Floor Storage Areas for Liquid Manure. Where a farm building housing livestock with a below-floor storage area for liquid manure is provided with a ventilation system in accordance with Article 2.2.8.3., the requirements of Sentences 2.2.8.2.(1) and (2) are considered to be satisfied with respect to the fire and explosion hazard posed by manure gases. Should other hazardous substances or conditions be present in the farm building, the requirements of Sentences 2.2.8.2.(1) and (2) must be applied with respect to those substances or conditions.

A-2.2.8.3. Below-Floor Storage Areas for Liquid Manure. The following are examples of manure-handling equipment and systems that are not considered to be below-floor storage areas for liquid manure:

- gutters, pumps and pump chambers designed to be emptied or flushed every few days
- shallow gutters
- gutters scraped with an alley scraper or stable cleaner
- gutters equipped with a belt manure removal system
- normally empty transfer gutters and pipes

A-2.2.8.4.(1) Welding and Cutting. The room referred to in Sentence 2.2.8.4.(1) is a space where significant and regular welding and cutting operations are routinely performed, such as a welding shop supporting the farm operation. Sentence 2.2.8.4.(1) is not intended to apply to occasional welding and cutting operations, such as those carried out during repairs of farm machinery.

Refer to Section 5.2. of Division B of the NFC for requirements relating to hot works, including cutting, welding, soldering, brazing, grinding and adhesive bonding.

A-2.2.8.6. Liquids Capable of Releasing Hazardous Gases or Vapours. Examples of liquids that are capable of releasing hazardous gases or vapours include liquid manure, wash water from a milking facility, and waste water in a septic system.

A-2.3.1.1.(1) Design of Bins and Silos. Information on the design of bins and silos can be found in the Commentary entitled Large Farm Buildings, Including Bins and Silos in the "Structural Commentaries (User's Guide – NBC 2020: Part 4 of Division B)."

A-2.3.2.3.(1) Bulk Densities of Agricultural Products. The bulk densities, ϱ, of agricultural products listed in Table A-2.3.2.3.(1) can be used to determine the specific weight, γ, of the products as follows:

$$\gamma = \frac{\rho g}{1\,000}$$

A-2.3.2.5.(4)(a) Lateral Earth Pressure on Walls of Liquid Manure Storage Tanks. The lateral earth pressure referred to in Clause 2.3.2.5.(4)(a) should be based on the equivalent fluid density of the earth surrounding the liquid manure storage tank. Equivalent fluid densities for different types of soil are listed in Table A-2.3.2.5.(4)(a).

Table A-2.3.2.5.(4)(a)
Equivalent Fluid Densities for Soil

Type of Soil	Equivalent Fluid Density, kN/m^3
Clean sand and gravel, well-drained	4.7
Sand and gravel with fines, restricted permeability	5.7
Stiff residual silts and clays	7.0
Soft silts and clays, poorly drained	16.0

A-2.3.2.5.(6) Design of Liquid Manure Storage Tanks to Minimize Leakage. In designing walls and bases of liquid manure storage tanks to minimize leakage of liquid manure, all factors that may influence the formation of cracks should be taken into account, including thermal effects, concrete shrinkage, structural movement, and material choice and installation. The control of crack formation to minimize leakage is particularly important for reinforced concrete structures to prevent corrosion of the reinforcing steel.

A-2.3.3.1.(1) Reduced Snow Loads for Unobstructed Slippery Roofs. Research has shown that sloped roofs covered with pre-painted steel have reduced snow loads relative to roofs covered with asphalt shingles. Sentence 2.3.3.1.(1) allows a reduction of the slope factor, C_s, for unobstructed slippery roofs of farm buildings where the roof slope, α, is greater than 15° but not greater than 60°. Figure A-2.3.3.1.(1) shows the C_s versus α curve calculated in accordance with Sentence 2.3.3.1.(1).

Before using the reduced slope factor, the designer should carefully examine the proposed roof configuration to ensure that snow will freely slide off the roof. The reduced slope factor does not apply to sloped roofs terminating at grade, at a roof valley, or at another roof of lower slope because the snow may pile up or not slide freely at the transition in slope. The reduced slope factor also does not apply to roofs with obstructions, such as chimneys, silos or ice guards.

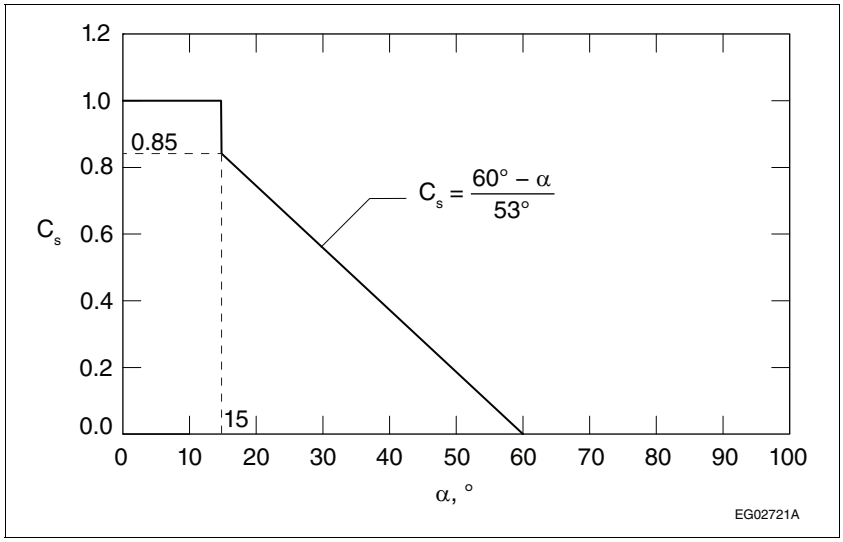


Figure A-2.3.3.1.(1)
Curve for slope factor, C_s, versus roof slope, α, for unobstructed slippery roofs of farm buildings

A-2.3.4. Seismic Design of Above-Ground Liquid Manure Storage Tanks. Information on the seismic design of above-ground liquid manure storage tanks can be found in the Commentary entitled Large Farm Buildings, Including Bins and Silos in the "Structural Commentaries (User's Guide – NBC 2020: Part 4 of Division B)."

A-2.3.4.1.(1)(b) SFRSs for Farm Buildings in Seismic Category SC2. Information on SFRSs with $R_dR_o \geq 3.0$ for farm buildings in Seismic Category SC2 can be found in the Commentary entitled Large Farm Buildings, Including Bins and Silos in the "Structural Commentaries (User's Guide – NBC 2020: Part 4 of Division B)."

A-2.4.2.1.(1) Required Ventilation. Guidance on ventilation in farm animal housing and indoor plant agriculture facilities can be found in the chapter entitled Environmental Controls for Animals and Plants in the "ASHRAE Handbook – HVAC Applications."

A-2.4.2.3. Controlled-Atmosphere Storage Areas. Controlled-atmosphere storage areas are typically used to preserve fruits and vegetables, and are not intended to contain hazardous gases.

A-2.4.2.4.(3) Gas Hazards in Enclosed Horizontal Silos. In enclosed horizontal silos, gases produced by tractors during loading and unloading operations and by silage fermentation present a hazard. Providing openings at both roof or eave level and floor level in horizontal silos promotes airflow to remove these gases, most of which are heavier than air.

A-2.4.2.4.(3)(b) Openings at Floor Level in Enclosed Horizontal Silos. The requirement of Clause 2.4.2.4.(3)(b) can be met by providing a single opening at floor level, which may also serve as a tractor access opening.

A-2.4.2.5. Below-Floor Storage of Liquid Manure. The ventilation requirements of Article 2.4.2.5. are intended to address the specific hazards due to manure gases in farm buildings housing livestock with below-floor storage of liquid manure. Where these requirements are met, it is not necessary to apply the provisions of Articles 6.3.1.5. and 6.9.1.2. with respect to manure gases. However, where the farm building contains other hazardous substances (air contaminants or hazardous gases, dusts or liquids), the provisions of Articles 6.3.1.5. and 6.9.1.2. must be applied with respect to those substances.

A-2.4.2.5.(1) Minimum Ventilation Rate. The minimum ventilation rate required by Sentence 2.4.2.5.(1) is intended to limit the concentrations of flammable gases and toxic gases produced by the decomposition of liquid manure. Higher ventilation rates may be necessary to promote farm animal health and production. Where requested by the authority having jurisdiction, compliance with Clauses 2.4.2.5.(1)(a) and (b) can be demonstrated through periodic in situ monitoring of gas concentrations or through calculation of gas concentrations using a reliable method (such as that described in the following publication: Massé, D.I., Croteau, F., Patni, N.K. and Masse, L. Methane Emissions from Dairy Cow and Swine Manure Slurries Stored at 10°C and 15°C. Canadian Biosystems Engineering, Vol. 45, pp. 6.1–6.6, 2003).

3.2.3.3. Wall Enclosing Attic or Roof Space

1) An exterior wall enclosing an *attic or roof space* and located above an *exposing building face*, shall be constructed in conformance with the requirements for the *exposing building face*.

3.2.3.4. Party Wall

1) A *party wall* shall be constructed as a *firewall*. (See Note A-3.2.3.4.(1).)

3.2.3.5. Wall with Limiting Distance Less Than 1.2 m

1) Openings in a wall that has a *limiting distance* less than 1.2 m shall be protected by *closures* whose *fire-protection rating* is in conformance with the *fire-resistance rating* required for the wall.

2) Wired glass or glass block shall not be used for a *closure* referred to in Sentence (1).

3.2.3.6. Combustible Projections

1) Except for a *building* containing one or two *dwelling units* only, *combustible* projections on the exterior of a wall that could expose an adjacent *building* to fire spread and are more than 1 m above ground level, including balconies, platforms, canopies and stairs, shall not be permitted within

a) 1.2 m of a property line or the centre line of a *public way*, or
b) 2.4 m of a *combustible* projection on another *building* on the same property.

2) Except as provided in Sentence (4), where the *exposing building face* has a *limiting distance* of not more than 0.45 m, projecting roof soffits shall not be constructed above the *exposing building face*. (See Note A-3.2.3.6.(2).)

3) Except as provided in Sentence (4), where the *exposing building face* has a *limiting distance* of more than 0.45 m, the face of roof soffits shall not project to less than 0.45 m from the property line. (See Note A-3.2.3.6.(2).)

4) The face of a roof soffit is permitted to project to the property line, where it faces a *public way*. (See Note A-9.10.14.5.(11) and 9.10.15.5.(10).)

5) Where roof soffits project to less than 1.2 m from the property line, the centre line of a *public way*, or an imaginary line between two *buildings* or *fire compartments* on the same property, they shall

a) have no openings, and
b) be protected by
   i) not less than 0.38 mm thick sheet steel,
   ii) unvented aluminum conforming to CAN/CGSB-93.2-M, "Prefinished Aluminum Siding, Soffits, and Fascia, for Residential Use,"
   iii) not less than 12.7 mm thick gypsum soffit board or gypsum ceiling board installed according to CSA A82.31-M, "Gypsum Board Application,"
   iv) not less than 11 mm thick plywood,
   v) not less than 12.5 mm thick OSB or waferboard, or
   vi) not less than 11 mm thick lumber.

6) For *buildings* of *combustible construction*, materials installed to provide the required protection of soffits may be covered with a *combustible* or *noncombustible* finish material.

3.2.3.7. Construction of Exposing Building Face

1) Except as provided in Sentences (3) and (4), and Articles 3.2.3.10. and 3.2.3.11., the *fire-resistance rating*, construction and cladding for *exposing building faces* of *buildings* or *fire compartments* of Group A, B, C, D or Group F, Division 3 *occupancy* classification shall comply with Table 3.2.3.7.

2) If audible signal devices with voice reproduction capabilities are intended for paging and similar voice message use, other than during a fire emergency, they shall be installed so that *alert signals* and *alarm signals* take priority over all other signals.

3) Audible signal devices forming part of a fire alarm or voice communication system shall not be used for playing music or background noise.

3.2.4.18. Audibility of Alarm Systems

(See Note A-3.2.4.18.)

1) Audible signal devices forming part of a fire alarm system shall be installed in a *building* so that

a) *alarm signals* are clearly audible throughout the *floor area*, and
b) *alert signals* are clearly audible in continuously staffed locations, and where there are no continuously staffed locations, throughout the *floor area*.

(See Note A-3.2.4.18.(1).)

2) The sound pattern of an *alarm signal* shall conform to the temporal pattern defined in Clause 4.2 of ISO 8201, "Acoustics – Audible emergency evacuation signal." (See Note A-3.2.4.18.(2).)

3) The sound patterns of *alert signals* shall be significantly different from the temporal patterns of *alarm signals*. (See Note A-3.2.4.18.(3).)

4) The fire *alarm signal* sound pressure level shall be not more than 110 dBA in any normally occupied area. (See Note A-3.2.4.18.(4).)

5) The sound pressure level in a sleeping room from a fire alarm audible signal device shall be not less than 75 dBA in a *building* of *residential* or *care occupancy* when any intervening doors between the device and the sleeping room are closed. (See Note A-3.2.4.18.(5).)

6) Audible signal devices in sleeping rooms in a *building* of *residential* or *care occupancy* shall emit a low frequency signal. (See Note A-3.2.4.18.(6).)

7) Except as required by Sentence (5), the sound pressure level from a fire alarm system's audible signal device within a *floor area* shall be not less than 10 dBA above the ambient noise level and not less than 65 dBA when any intervening doors between the device and the rest of the *floor area* are closed.

8) Except as permitted by Sentence (12), audible signal devices located within a *dwelling unit* shall include a means for them to be manually silenced for a period of not more than 10 min, after which time the devices shall restore themselves to normal operation. (See Note A-3.2.4.18.(8).)

9) Audible signal devices within a *dwelling unit* or a *suite* of *residential* or *care occupancy* shall be connected to the fire alarm system

a) in a manner such that a single open circuit at one device will not impair the operation of other audible signal devices on that same circuit that serve the other *dwelling units* or *suites* of *residential* or *care occupancy*, or
b) on separate signal circuits that are not connected to the devices in any other *dwelling unit*, *public corridor* or *suite* of *residential* or *care occupancy*.

(See Note A-3.2.4.18.(9) and (10).)

10) In a *building* or part thereof classified as a *residential* or *care occupancy*,

a) separate circuits shall be provided for audible signal devices on each *floor area*, and
b) audible signal devices within *dwelling units* or *suites* of *residential* or *care occupancy* shall be wired on separate signal circuits from those not within *dwelling units* or *suites* of *residential* or *care occupancy*.

(See Note A-3.2.4.18.(9) and (10).)

11) Audible signal devices shall be installed in a *service space* referred to in Sentence 3.2.1.1.(8) and shall be connected to the fire alarm system.

12) Audible signal devices within *dwelling units* that are wired on separate signal circuits in accordance with Clause (10)(b) need not include a means for manual signal

silencing as required by Sentence (8), provided the fire alarm system includes a provision for an automatic signal silence within *dwelling units*, where

a) the automatic signal silence cannot occur within the first 60 s of operation or within the zone of initiation,
b) a subsequent alarm elsewhere in the *building* will reactuate the silenced audible signal devices within *dwelling units*,
c) after a period of not more than 10 min, the silenced audible signal devices will be restored to continuous audible signal if the alarm is not acknowledged, and
d) the voice communication systems referred to in Articles 3.2.4.22. and 3.2.4.23. have a provision to override the automatic signal silence to allow the transmission of voice messages through silenced audible signal device circuits that serve the *dwelling units*.

(See Note A-3.2.4.18.(8).)

13) If a 2-stage fire alarm system has been installed with an automatic signal silence as described in Sentence (12), the system shall be designed so that any silenced audible signal devices serving *dwelling units* are reactuated whenever an *alarm signal* is required to be transmitted as part of the second stage. (See Note A-3.2.4.18.(8).)

3.2.4.19. Visible Signals

1) Where a fire alarm system is installed, visible signal devices shall be provided in addition to *alarm signal* devices

a) in *buildings* or portions thereof intended for use primarily by persons with a hearing impairment,
b) in *assembly occupancies* in which music and other sounds associated with performances could exceed 100 dBA,
c) in any *floor area* in which the ambient noise level is more than 87 dBA,
d) in any *floor area* in which the occupants
   i) use ear protection devices,
   ii) are located in an audiometric booth, or
   iii) are located in sound-insulating enclosures,
e) in *public corridors* serving a Group B, C, D or E *major occupancy*,
f) in corridors used by the public serving a Group A *major occupancy*,
g) in not less than 10% of the *suites* of *residential occupancy* in a hotel or motel (see Note A-3.2.4.19.(1)(g)), and
h) in washrooms, except those located within
   i) *suites* of *residential occupancy*,
   ii) *suites* of *care occupancy*, or
   iii) patients' sleeping rooms.

2) Visible signal devices are permitted to be installed in lieu of audible signal devices in the compartments referred to in Article 3.3.3.6.

3) Visible signal devices required by Sentence (1) shall be installed so that the signal from at least one device is visible throughout the *floor area* or portion thereof in which they are installed. (See Note A-3.2.4.19.(3).)

3.2.4.20. Smoke Alarms

1) Except as provided in Article 3.2.4.21., *smoke alarms* shall be installed in accordance with this Article.

2) Except as required by Sentence (5) and permitted by Sentence (10), *smoke alarms* conforming to CAN/ULC-S531, "Standard for Smoke Alarms," shall be installed in each *dwelling unit* and, except for *care*, *treatment* or *detention occupancies* required to have a fire alarm system, in each sleeping room not within a *dwelling unit* or *suite* of *care occupancy*.

3) At least one *smoke alarm* shall be installed on each *storey* of a *dwelling unit* or *suite* of *care occupancy*.

3.2.7.10. Protection of Electrical Conductors

1) The protection of electrical and emergency conductors referred to in Clauses (a) to (c) shall conform to the requirements stated in Sentences (2) to (11):

a) electrical conductors located within *buildings* identified in Article 3.2.6.1. serving
   i) fire alarms,
   ii) emergency lighting, or
   iii) emergency equipment within the scope of Articles 3.2.6.2. to 3.2.6.8.,
b) emergency conductors serving fire pumps required to be installed under Article 3.2.5.18., and
c) electrical conductors serving mechanical systems serving
   i) areas of refuge identified in Clause 3.3.3.6.(1)(b), or
   ii) *contained use areas* identified in Clauses 3.3.3.7.(4)(a) and (b).

2) Except as otherwise required by Sentence (3) and permitted by this Article, electrical conductors that are used in conjunction with systems identified in Sentence (1) shall

a) conform to CAN/ULC-S139, "Standard for Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables," including the hose stream application, to provide a circuit integrity rating of not less than 1 h (see Note A-3.2.7.10.(2)(a) and (3)(a)) (see also Clause 3.2.6.5.(6)(b)), or
b) be located in a *service space* that is separated from the remainder of the *building* by a *fire separation* that has a *fire-resistance rating* not less than 1 h.

3) Electrical conductors identified in Clause (1)(c) shall

a) conform to CAN/ULC-S139, "Standard for Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables," including the hose stream application, to provide a circuit integrity rating of not less than 2 h (see Note A-3.2.7.10.(2)(a) and (3)(a)), or
b) be located in a *service space* that is separated from the remainder of the *building* by a *fire separation* that has a *fire-resistance rating* not less than 2 h.

4) The *service spaces* referred to in Clauses (2)(b) and (3)(b) shall not contain any *combustible* materials other than the conductors being protected.

5) Except as stated in Sentences (7) and (9), the electrical conductors referred to in Sentence (1) are those that extend from the source of emergency power to

a) the equipment served, or
b) the distribution equipment supplying power to the equipment served, if both are in the same room (see Note A-3.2.7.10.(5)(b)).

6) If a fire alarm transponder or annunciator in one *fire compartment* is connected to a central processing unit or another transponder or annunciator located in a different *fire compartment*, the electrical conductors connecting them shall be protected in accordance with Sentence (2).

7) Fire alarm system branch circuits within a *storey* that connect transponders to individual devices need not conform to Sentence (2). (See Note A-3.2.7.10.(7).)

8) Except as permitted in Sentence (9), if a distribution panel supplies power to emergency lighting, the power supply conductors leading up to the distribution panel shall be protected in accordance with Sentence (2).

9) Conductors leading from a distribution panel referred to in Sentence (8) to emergency lighting units in the same *storey* need not conform to Sentence (2).

10) Distribution panels serving emergency lighting units located on other *storeys* shall be installed in a *service room* separated from the *floor area* by a *fire separation* having a *fire-resistance rating* of at least 1 h.

11) Conductors leading from a distribution panel to emergency lighting units located on other *storeys* shall be protected in accordance with Sentence (2) between the distribution panel and the *floor area* where the emergency lighting units are located.

3.3.6.3. Indoor Storage of Anhydrous Ammonia and Flammable, Toxic and Oxidizing Gases

1) Where required by the NFC, cylinders of *dangerous goods* classified as flammable gases stored indoors shall be located in a room

a) that is separated from the remainder of the *building* by a gas-tight *fire separation* having a *fire-resistance rating* of at least 2 h,
b) that is located on an exterior wall of the *building*,
c) that can be entered from the exterior, and
d) whose *closures* leading to the interior of the *building* are
   i) equipped with self-closing devices that keep the *closures* closed when not in use, and
   ii) constructed so as to prevent the migration of gases from the room into other parts of the *building*.

2) Where required by the NFC, cylinders of anhydrous ammonia or *dangerous goods* classified as toxic or oxidizing gases stored indoors shall be located in a room

a) that is separated from the remainder of the *building* by a gas-tight *fire separation* having a *fire-resistance rating* of at least 1 h,
b) that is located on an exterior wall of the *building*,
c) that can be entered from the exterior, and
d) whose *closures* leading to the interior of the *building* are
   i) equipped with self-closing devices that keep the *closures* closed when not in use, and
   ii) constructed so as to prevent the migration of gases from the room into other parts of the *building*.

3.3.6.4. Storage and Dispensing Rooms for Flammable Liquids and Combustible Liquids

1) *Fire separations* for rooms where *flammable liquids* and *combustible liquids* are stored are required to be constructed with a *fire-resistance rating* in conformance with Subsection 4.2.9. of Division B of the NFC.

2) Where Class IA or IB liquids specified in Subsection 4.1.2. of Division B of the NFC are dispensed within a storage room, the room shall be designed to prevent critical structural and mechanical damage from an internal explosion in conformance with good engineering practice such as that described in NFPA 68, "Standard on Explosion Protection by Deflagration Venting." (See Note A-3.3.6.4.(2).)

3.3.6.5. Tire Storage

1) A tire storage area designed to contain more than 375 m^3 of rubber tires 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 Note A-3.3.6.5.(1).)

3.3.6.6. Ammonium Nitrate Storage

1) Where Article 3.2.9.1. of Division B of the NFC applies due to the quantity and nature of the stored product, and as stipulated in Sentences (2) to (6), *buildings* used for the storage of ammonium nitrate shall be classified as *medium-hazard industrial occupancies* (Group F, Division 2).

2) *Buildings* intended for the storage of ammonium nitrate shall be not more than one *storey* in *building height*.

3) *Buildings* intended for the storage of ammonium nitrate shall not

a) have *basements* or crawl spaces, or
b) contain open floor drains, tunnels, elevator pits or other pockets that might trap molten ammonium nitrate.

4) *Buildings* intended for the storage of ammonium nitrate shall have not less than 0.007 m^2 of vent area for each square metre of storage area, unless mechanical ventilation is provided.

3.6.3.5. Grease Duct Enclosures

(See Note A-3.6.3.5.)

1) Except as provided in Sentence (2), *fire separations* enclosing grease ducts for commercial cooking operations shall conform to NFPA 96, "Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations."

2) The *fire-resistance rating* of field-applied and factory-built grease duct enclosure assemblies shall be determined in conformance with CAN/ULC-S144, "Standard Method of Fire Resistance Test – Grease Duct Assemblies."

3.6.4. Horizontal Service Spaces and Service Facilities

3.6.4.1. Scope

1) This Subsection applies to *horizontal service spaces* and service facilities, including ceiling spaces, duct spaces, crawl spaces and *attic or roof spaces*.

3.6.4.2. Fire Separations for Horizontal Service Spaces

1) Except as provided in Article 3.6.3.5., a *horizontal service space* that penetrates a required vertical *fire separation* shall be separated from the remainder of the *building* it serves in conformance with Sentence (2).

2) If a *horizontal service space* or other concealed space is located above a required vertical *fire separation* other than a vertical shaft, this space need not be divided at the *fire separation* as required by Article 3.1.8.3. provided the construction between this space and the space below is a *fire separation* with a *fire-resistance rating* equivalent to that required for the vertical *fire separation*, except that the *fire-resistance rating* is permitted to be not less than 30 min if the vertical *fire separation* is not required to have a *fire-resistance rating* more than 45 min. (See Note A-3.6.4.2.(2).)

3.6.4.3. Plenum Requirements

1) A concealed space used as a *plenum* within a floor assembly or within a roof assembly need not conform to Sentence 3.1.5.18.(1) and Article 3.6.5.1., provided

a) all materials within the concealed space have a *flame-spread rating* not more than 25 and a smoke developed classification not more than 50, except for
   i) tubing for pneumatic controls,
   ii) optical fibre cables and electrical wires and cables with *combustible* insulation, jackets or sheathes that are used for the transmission of voice, sound or data and conform to Sentences 3.1.4.3.(2) and 3.1.5.21.(2),
   iii) totally enclosed non-metallic raceways with an FT6 rating, when tested in accordance with Sentence 3.1.5.23.(2), in *buildings* required to be of *noncombustible construction* or in *buildings* or parts of *buildings* permitted to be of *encapsulated mass timber construction*, and
   iv) totally enclosed non-metallic raceways with an FT4 rating, when tested in accordance with Clause 3.1.5.23.(1)(a), in *buildings* permitted to be of *combustible construction*, and
b) the supports for the ceiling membrane are of *noncombustible* material having a melting point not below 760°C.

2) If a concealed space referred to in Sentence (1) is used as a return-air *plenum* and incorporates a ceiling membrane that forms part of the required *fire-resistance rating* of the assembly, every opening through the membrane shall be protected by a *fire stop flap* that

a) stops the flow of air into the concealed space in the event of a fire,
b) is supported in a manner that will maintain the integrity of the ceiling membrane for the duration of time required to provide the required *fire-resistance rating*,

b) *barrier-free* washrooms,
c) *barrier-free* showers,
d) *barrier-free* elevators,
e) *barrier-free* parking spaces, and
f) assistive listening systems or adaptive technologies.

2) Where a washroom is not designed to accommodate persons with physical disabilities in a *storey* to which a *barrier-free* path of travel is required, signs providing visual and tactile information in accordance with Subsection 3.8.3. shall be installed to indicate the location of *barrier-free* facilities.

3) Except for doors that serve *service spaces* or are located within a *suite*, signs installed at or near doors shall provide the same information in both visual and tactile forms in accordance with Subsection 3.8.3.

4) Directional signs shall provide visual information in accordance with Subsection 3.8.3. (See Note A-3.8.2.10.(4).)

3.8.2.11. Counters

1) Where a service counter is provided, at least one section of it shall comply with Subsection 3.8.3. (See Note A-3.8.2.11.(1).) (See also Note A-3.8.2.3.)

3.8.2.12. Telephones

1) In each location where one or more public telephones are installed, at least one telephone shall comply with Subsection 3.8.3.

3.8.3. Design

3.8.3.1. Design Standards

1) *Buildings* or parts thereof and facilities that are required to be *barrier-free* shall be designed in accordance with
a) this Subsection, or
b) the provisions of CSA B651, "Accessible design for the built environment," listed in Table 3.8.3.1., in their entirety.
(See Note A-3.8.3.1.(1).)

Table 3.8.3.1.
Barrier-free Design Provisions
Forming Part of Sentence 3.8.3.1.(1)

Barrier-free Application (Code References)	Applicable CSA B651 Provisions
Interior accessible routes (3.8.3.2.)	4.3 and 5.1
Exterior accessible routes (3.8.3.3.)	8.2.1 to 8.2.5 and 8.2.7
Passenger pickup areas (3.8.3.4.)	9.3
Ramps (3.8.3.5.)	5.3 and 5.5
Doors and doorways (3.8.3.6.)	5.2
Passenger-elevating devices (3.8.3.7.)	5.6.2
Operating controls (3.8.3.8.)	4.2
Signage (3.8.3.9.)	4.5 and 9.4.4
Drinking fountains (3.8.3.10.)	6.1
Washroom facilities (3.8.3.12. to 3.8.3.16.)	6.2 and 6.3
Bathing facilities (3.8.3.17. and 3.8.3.18.)	6.5
Communication (3.8.3.19. and 3.8.3.21.)	6.6
Counters (3.8.3.20. and 3.8.3.21.)	6.7.1
Spaces in seating areas (3.8.3.22.)	6.7.3

4.1.5.5. Loads on Exterior Areas

(See Note A-4.1.5.5.)

1) Exterior areas accessible to vehicular traffic shall be designed for their intended use, including the weight of firefighting equipment, but not for less than the snow and rain loads prescribed in Subsection 4.1.6.

2) Except as provided in Sentences (3) and (4), roofs shall be designed for either the uniform *live loads* specified in Table 4.1.5.3., the concentrated *live loads* listed in Table 4.1.5.9., or the snow and rain loads prescribed in Subsection 4.1.6., whichever produces the most critical effect.

3) Exterior areas accessible to pedestrian traffic, but not vehicular traffic, shall be designed for their intended use, but not for less than the greater of

a) the *live load* prescribed for assembly areas in Table 4.1.5.3., or
b) the snow and rain loads prescribed in Subsection 4.1.6.

4) Roof parking decks and exterior areas accessible to vehicular traffic shall be designed

a) for the appropriate load combination listed in Sentence 4.1.3.2.(2) with a *live load*, L, consisting of either a uniformly distributed *live load* as specified in Table 4.1.5.3. or a concentrated *live load* as listed in Table 4.1.5.9., whichever produces the most critical effect, and a companion snow load, S, as prescribed in Subsection 4.1.6., but with the companion-load factor reduced to 0.2, and
b) such that the load combination in Clause (a) is not less than the snow and rain loads prescribed in Subsection 4.1.6. with the *live load* taken as zero.

5) Roof parking decks that are used for the long-term storage of vehicles shall be designed for the appropriate load combination listed in Sentence 4.1.3.2.(2) with a *live load*, L, consisting of either a uniformly distributed *live load* as specified in Table 4.1.5.3. or a concentrated *live load* as listed in Table 4.1.5.9., whichever produces the most critical effect, and a snow load, S, as prescribed in Subsection 4.1.6.

4.1.5.6. Loads for Dining Areas

1) The minimum specified *live load* listed in Table 4.1.5.3. for dining areas may be reduced to 2.4 kPa for areas in *buildings* that are being converted to dining areas, provided that the *floor area* does not exceed 100 m^2 and the dining area will not be used for other assembly purposes, including dancing.

4.1.5.7. More Than One Occupancy

1) Where an area of floor or roof is intended for 2 or more *occupancies* at different times, the value to be used from Table 4.1.5.3. shall be the greatest value for any of the *occupancies* concerned.

4.1.5.8. Variation with Tributary Area

(See Note A-4.1.5.8.)

1) One- and two-way floor slabs shall have no reduction for tributary area applied to *live load*, except for transfer slabs that support loads from upper floors for which *live load* reductions apply.

2) An area used for *assembly occupancies* designed for a *live load* of less than 4.8 kPa and roofs designed for the minimum loading specified in Table 4.1.5.3. shall have no reduction for tributary area.

3) Where a structural member supports a tributary area of a floor or a roof, or a combination thereof, that is greater than 80 m^2 and either used for *assembly occupancies* designed for a *live load* of 4.8 kPa or more, or used for storage, manufacturing, retail stores, garages or as a footbridge, the specified *live load* due to use and *occupancy* is the load specified in Article 4.1.5.3. multiplied by

$$0.5 + \sqrt{20/\mathrm{A}}$$

ii) S shall be taken as 0.0 on the panels, and
iii) S for all roof areas shall be taken as the sum of S on the panels, as derived from Subclause (a)(i) and shifted by a distance of w_p downslope onto the roof, where w_p is the panel width along the roof slope, and S on the roof areas, as derived from Subclauses (a)(ii) to (a)(iv)

(see Note A-4.1.6.16.(5)(b)).

6) For flat roofs with Tilted solar panels, the snow loads, S, shall be determined in accordance with the requirements for roofs without solar panels, except that

a) C_a shall be taken as 0.0 for the panels,
b) C_a shall be taken as 1.0 for roof areas beyond a distance of $5(h_e - C_bC_wS_s/\gamma)$ from the lowest edge of the panels, where h_e is the height of the highest edge of the panels above the roof surface,
c) except as provided in Clauses (d) and (e), for roof areas within a distance of $5(h_e - C_bC_wS_s/\gamma)$ from the lowest edge of the panels, C_a shall be taken as
   i) 1.25 for $(h_g - C_bC_wS_s/\gamma) \le 0.3$ m, where h_g is the gap height between the lowest edge of the panels and the roof surface,
   ii) $1.294 - 0.1471(h_g - C_bC_wS_s/\gamma)$ for $0.3 < (h_g - C_bC_wS_s/\gamma) \le 2.0$ m, and
   iii) 1.0 for $(h_g - C_bC_wS_s/\gamma) > 2.0$ m

(see Note A-4.1.6.16.(6)(c)),

d) except as provided in Clause (e), C_a shall be taken as 2.0 for roof areas within a distance of w_{ph} beyond the lowest edge of the panels, where w_{ph} is the horizontal projection of the panel width, w_p, along the sloped panel edges, and
e) where the panels, panel supports or back plates obstruct snow from sliding under the panels, the load of the increased volume of snow in the gaps between the panels shall be considered to be uniformly distributed.

(See Note A-4.1.6.16.(6).)

4.1.7. Wind Load

4.1.7.1. Specified Wind Load

1) The specified wind loads for a *building* and its components shall be determined using the Static, Dynamic or Wind Tunnel Procedure as stated in Sentences (2) to (5).

2) For the design of *buildings* that are not dynamically sensitive, as defined in Sentence 4.1.7.2.(1), one of the following procedures shall be used to determine the specified wind loads:

a) the Static Procedure described in Article 4.1.7.3.,
b) the Dynamic Procedure described in Article 4.1.7.8., or
c) the Wind Tunnel Procedure described in Article 4.1.7.14.

3) For the design of *buildings* that are dynamically sensitive, as defined in Sentence 4.1.7.2.(2), one of the following procedures shall be used to determine the specified wind loads:

a) the Dynamic Procedure described in Article 4.1.7.8., or
b) the Wind Tunnel Procedure described in Article 4.1.7.14.

4) For the design of *buildings* that may be subject to wake buffeting or channelling effects from nearby *buildings*, or that are very dynamically sensitive, as defined in Sentence 4.1.7.2.(3), the Wind Tunnel Procedure described in Article 4.1.7.14., shall be used to determine the specified wind loads.

5) For the design of cladding and secondary structural members, one of the following procedures shall be used to determine the specified wind loads:

a) the Static Procedure described in Article 4.1.7.3., or
b) the Wind Tunnel Procedure described in Article 4.1.7.14.

6) Computational fluid dynamics shall not be used to determine the specified wind loads for a *building* and its components. (See Note A-4.1.7.1.(6).)

4.1.7.2. Classification of Buildings

(See Note A-4.1.7.2.)

1) Except as provided in Sentences (2) and (3), a *building* is permitted to be classified as not dynamically sensitive.

2) A *building* shall be classified as dynamically sensitive if
a) its lowest natural frequency is less than 1 Hz and greater than 0.25 Hz,
b) its height is greater than 60 m, or
c) its height is greater than 4 times its minimum effective width, where the effective width, w, of a *building* shall be taken as

$$w = \frac{\sum h_i w_i}{\sum h_i}$$

where the summations are over the height of the *building* for a given wind direction, h_i is the height above *grade* to level i, and w_i is the width normal to the wind direction at height h_i; the minimum effective width is the lowest value of the effective width considering all wind directions.

3) A *building* shall be classified as very dynamically sensitive if
a) its lowest natural frequency is less than or equal to 0.25 Hz, or
b) it contains a human occupancy, and its height is more than 6 times its minimum effective width as defined in Clause (2)(c).

4.1.7.3. Static Procedure

1) The specified external pressure or suction due to wind on part or all of a surface of a *building* shall be calculated as follows:

$$p = I_W q C_e C_t C_g C_p$$

where
p = specified external pressure acting statically and in a direction normal to the surface, considered positive when the pressure acts towards the surface and negative when it acts away from the surface,
I_W = importance factor for wind load, as provided in Table 4.1.7.3.,
q = reference velocity pressure, as provided in Sentence (4),
C_e = exposure factor, as provided in Sentences (5) and (7),
C_t = topographic factor, as provided in Article 4.1.7.4.,
C_g = gust effect factor, as provided in Sentence (8), and
C_p = external pressure coefficient, as provided in Articles 4.1.7.5. and 4.1.7.6.

Table 4.1.7.3.
Importance Factor for Wind Load, I_W
Forming Part of Sentences 4.1.7.3.(1) and 4.1.7.8.(4)

Importance Category	Importance Factor, I_W	
	ULS	SLS
Low	0.8	0.75
Normal	1	0.75
High	1.15	0.75
Post-disaster	1.25	0.75

2) The net wind load for the *building* as a whole shall be the algebraic difference of the loads on the windward and leeward surfaces, and in some cases, may be calculated as the sum of the products of the external pressures or suctions and the areas of the surfaces over which they are averaged as provided in Sentence (1).

4) For the design of the cladding and of secondary structural elements supporting the cladding, the value of C_p shall be established as follows, where W and D are the widths of the *building*:

a) on walls, C_p shall be taken as ±0.9, except that within a distance equal to the larger of 0.1D and 0.1W from a *building* corner, the negative value of C_p shall be taken as –1.2,
b) on walls where vertical ribs deeper than 1 m are placed on the facade, C_p shall be taken as ±0.9, except that, within a distance equal to the larger of 0.2D and 0.2W from a *building* corner, the negative value of C_p shall be taken as –1.4, and
c) on roofs, C_p shall be taken as –1.0, except that
   i) within a distance equal to the larger of 0.1D and 0.1W from a roof edge, C_p shall be taken as –1.5,
   ii) in a zone that is within a distance equal to the larger of 0.2W and 0.2D from a roof corner, C_p shall be taken as –2.3 but is permitted to be taken as –2.0 for roofs with perimeter parapets that are higher than 1 m, and
   iii) on lower levels of flat stepped roofs, positive pressure coefficients established for the walls of the steps apply for a distance b (see Figure 4.1.7.6.-D for the definition of b).

(See Note A-4.1.7.5.(4).)

5) Except as provided in Sentence (6), for the design of balcony *guards*, the internal pressure coefficient, C_{pi}, shall be taken as zero and the value of C_p shall be taken as ±0.9, except that, within a distance equal to the larger of 0.1W and 0.1D from a *building* corner, C_p shall be taken as ±1.2.

6) Where the top of the balcony *guard* is 2.0 m or less below the roof surface, the values of C_p shall be taken as equal to those determined for parapets in Sentences (7) and (8).

7) To determine the contribution from parapets to the wind loads on the main structural system, the values of C_p shall be taken as

a) on the outer faces, equal to those on the walls below,
b) on the inner face of the windward parapet, equal to that on the upwind edge of a roof surface at the level of the top of the parapet, and
c) on the inner faces of the other parapets, zero.

8) For the structural design of parapets themselves, the values of C_p shall be taken as equal to those specified in Sentence (7), except that the value of C_p on the inner face of the leeward parapet shall be taken as equal to that on the outer face of the windward parapet.

9) For the design of cladding on parapets, the values of C_p shall be taken as

a) on the outer vertical surfaces, equal to those on the cladding on the walls below, and
b) on the inner and top surfaces, equal to those on the cladding of a roof surface at the level of the top of the parapet.

(See Note A-4.1.7.5.(9) and 4.1.7.7.(2).)

4.1.7.6. External Pressure Coefficients for Low Buildings

1) For the design of *buildings* with a height, H, that is both less than or equal to 20 m and less than the smaller plan dimension, the values of the product of the pressure coefficient and gust factor, C_gC_p, provided in Sentences (2) to (9) are permitted to be used.

2) For the design of the main structural system of the *building*, which is affected by wind pressures on more than one surface as shown in Figure 4.1.7.6.-A, the values of C_gC_p are provided in Table 4.1.7.6.

(6) For B/H > 5 in Load Case A, the negative coefficients listed for surfaces 2 and 2E in Table 4.1.7.6. should only be applied on an area whose width is 2.5H measured from the windward eave. The pressures on the remainder of the windward roof should be reduced to the pressures for the leeward roof.

Table 4.1.7.6.
External Peak Values of C_gC_p in Figure 4.1.7.6.-A
Forming Part of Sentence 4.1.7.6.(2)

Load Case	Roof Slope	External Peak Values of C_gC_p[1][2]											
		Building Surfaces											
		1	1E	2	2E	3	3E	4	4E	5	5E	6	6E
A	0° to 5°	0.75	1.15	–1.3	–2.0	–0.7	–1.0	–0.55	–0.8	–	–	–	–
	20°	1.0	1.5	–1.3	–2.0	–0.9	–1.3	–0.8	–1.2	–	–	–	–
	30° to 45°	1.05	1.3	0.4	0.5	–0.8	–1.0	–0.7	–0.9	–	–	–	–
	90°	1.05	1.3	1.05	1.3	–0.7	–0.9	–0.7	–0.9	–	–	–	–
B	0° to 90°	–0.85	–0.9	–1.3	–2.0	–0.7	–1.0	–0.85	–0.9	0.75	1.15	–0.55	–0.8

Notes to Table 4.1.7.6.:

(1) For values of roof slope not shown, the coefficient C_gC_p can be interpolated linearly.

(2) Positive coefficients denote forces toward the surface, whereas negative coefficients denote forces away from the surface.

3) For the design of individual walls and wall cladding, the values of C_gC_p are provided in Figure 4.1.7.6.-B.

4) For the design of roofs with a slope less than or equal to 7°, the values of C_gC_p are provided in Figure 4.1.7.6.-C.

5) For the design of flat roofs with steps in elevation, the values of C_gC_p are provided in Figure 4.1.7.6.-D.

6) For the design of gabled or hipped, single-ridge roofs with a slope greater than 7°, the values of C_gC_p are provided in Figure 4.1.7.6.-E.

7) For the design of gabled, multi-ridge roofs, the values of C_gC_p are provided in
a) Figure 4.1.7.6.-C for roofs with a slope less than or equal to 10°, and
b) Figure 4.1.7.6.-F for roofs with a slope greater than 10°.

8) For monosloped roofs, the values of C_gC_p are provided in
a) Figure 4.1.7.6.-C for roofs with a slope less than or equal to 3°, and
b) Figure 4.1.7.6.-G for roofs with a slope greater than 3° and less than or equal to 30°.

9) For sawtooth roofs, the values of C_gC_p are provided in
a) Figure 4.1.7.6.-C for roofs with a slope less than or equal to 10°, and
b) Figure 4.1.7.6.-H for roofs with a slope greater than 10°.

10) The wind loads on balcony *guards* on low *buildings* shall be as specified in Sentences 4.1.7.5.(5) and (6).

11) The wind loads on parapets on low *buildings* shall be as specified in Sentences 4.1.7.5.(7) to (9) except that C_gC_p values for walls and roofs shall be as specified for low *buildings* in Sentences 4.1.7.6.(3) to (9).

2) The internal pressure coefficient, C_{pi}, for cladding on parapets shall be –0.70 to +0.70. (See Note A-4.1.7.5.(9) and 4.1.7.7.(2).)

4.1.7.8. Dynamic Procedure

1) For the application of the Dynamic Procedure, the provisions of Article 4.1.7.3. shall be followed, except that the exposure factor, C_e, shall be as prescribed in Sentences (2) and (3), and the gust effect factor, C_g, shall be as prescribed in Sentence (4), when determining the wind loads on the main structural system.

2) For *buildings* in open terrain, as defined in Clause 4.1.7.3.(5)(a), the value of C_e for the design of the main structural system shall be calculated as follows:

$$C_e = \left(\frac{h}{10}\right)^{0.28}, \text{ but } 1.0 \le C_e \le 2.5$$

(See Note A-4.1.7.8.(2) and (3).)

3) For *buildings* in rough terrain, as defined in Clause 4.1.7.3.(5)(b), the value of C_e for the design of the main structural system shall be calculated as follows:

$$C_e = 0.5\left(\frac{h}{12.7}\right)^{0.50}, \text{ but } 0.5 \le C_e \le 2.5$$

(See Note A-4.1.7.8.(2) and (3).)

4) For the design of the main structural system, C_g shall be calculated as follows:

$$C_g = 1 + g_p\frac{\sigma}{\mu}$$

where

g_p = peak factor calculated as $\sqrt{2\ln(\nu T)} + \frac{0.577}{\sqrt{2\ln(\nu T)}}$, and

$\sigma/\mu = \sqrt{\frac{K}{C_{eH}}\left(B + \frac{sF}{\beta}\right)}$,

where

ν = average fluctuation rate calculated as $f_{nD}\sqrt{\frac{sF}{sF+\beta B}}$,

T = 3 600 s,

K = 0.08 for open terrain and 0.10 for rough terrain,

C_{eH} = exposure factor evaluated at reference height h = H,

B = background turbulence factor, a function of w/H determined from Figure 4.1.7.8.,

s = size reduction factor calculated as $\frac{\pi}{3}\left[\frac{1}{1+\frac{8f_{nD}H}{3V_H}}\right]\left[\frac{1}{1+\frac{10f_{nD}W}{V_H}}\right]$,

F = gust energy ratio calculated as $\frac{x_0^2}{(1+x_0^2)^{4/3}}$, where $x_0 = (1\,220 f_{nD}/V_H)$, and

β = damping ratio, which shall be determined by a rational method, or may be taken to be 0.01 for steel structures, 0.02 for concrete structures, and 0.015 for composite structures,

where

f_{nD} = natural frequency of vibration of the *building* in the along-wind direction, in Hz,

H = height of the *building*,

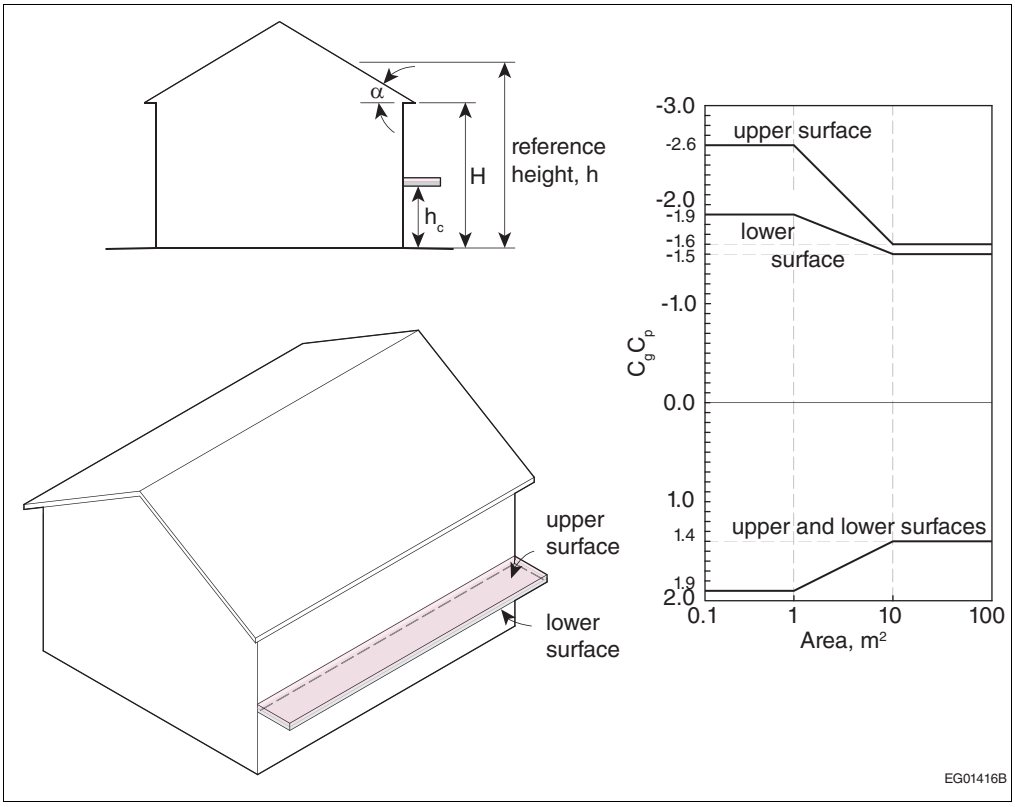
w = effective width of windward face of the *building* calculated as $\frac{\sum h_i w_i}{\sum h_i}$, where w_i = width normal to wind direction at height h_i, and

V_H = mean wind speed at the top of the structure, in m/s, calculated as $\bar{V}\sqrt{C_{eH}}$,

where

$\bar{V}$ = reference wind speed at a height of 10 m, in m/s, calculated as $\sqrt{\frac{2I_W q}{\rho}}$,

Figure 4.1.7.12.-A
Gust pressure coefficients on the upper and lower surfaces of attached canopies with no gap between the canopy and the building
Forming Part of Sentence 4.1.7.12.(2)



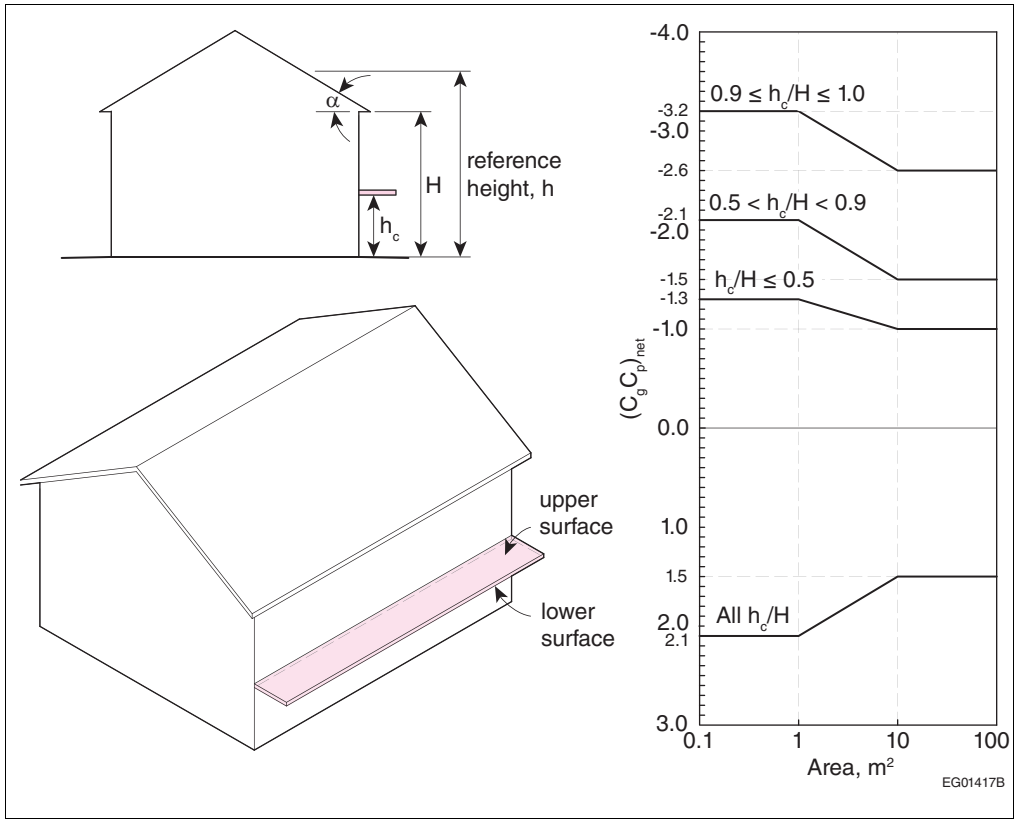
Notes to Figure 4.1.7.12.-A:

(1) The coefficients apply for any roof slope, α.

(2) The reference height, h, is the mid-height of the roof or 6 m, whichever is greater.

(3) Positive C_gC_p values denote forces acting towards the upper or lower surface of the canopy, whereas negative C_gC_p values denote forces acting away from the surface. Each structural element must be designed to resist both the positive and negative forces.

Figure 4.1.7.12.-B
Net gust pressure coefficients on attached canopies, considering simultaneous contributions from the upper and lower surfaces of the canopy
Forming Part of Sentence 4.1.7.12.(2)



Notes to Figure 4.1.7.12.-B:

(1) The coefficients apply for any roof slope, α.
(2) The reference height, h, is the mid-height of the roof or 6 m, whichever is greater.
(3) Positive $(C_g C_p)_{net}$ values denote net forces acting in a downward direction on the canopy, whereas negative $(C_g C_p)_{net}$ values denote net forces acting in an upward direction on the canopy. The canopy must be designed to resist both the positive and negative net forces.

4.1.7.13. Roof-Mounted Solar Panels on Buildings of Any Height

(See Note A-4.1.7.13.)

1) Where solar panels are installed on a roof, the roof wind loads shall account for the wind loads on the solar panels, as determined in accordance with Sentences (2) to (7), or shall be determined in the same way as for the roof without solar panels, whichever approach results in the most critical effect.

2) For an array of solar panels where the panels are installed close and parallel to the roof surface with their upper surface not more than 250 mm above the roof surface and with gaps around the panels of not less than 6 mm, the net positive or negative pressure difference between the upper and lower surfaces of a panel or the array shall be calculated as follows:

$$p = I_W q C_e C_t C_g C_p E \gamma_a$$

where

I_W, q, C_e, C_t, C_g, C_p = as defined in Sentence 4.1.7.3.(1), determined in the same manner as for the roof cladding,
E = edge factor, as provided in Sentence (4), and
γ_a = pressure equalization factor, as provided in Sentence (3).

Table 4.1.8.9. (Continued)

Type of SFRS	R_d	R_o	Restrictions[2]			
			Seismic Category			
			SC1	SC2	SC3	SC4
Limited ductility cross-laminated timber shear walls: platform-type construction	1.0	1.3	30	30	30	20
Braced or moment-resisting frames with ductile connections						
Moderately ductile	2.0	1.5	NL	NL	20	20
Limited ductility	1.5	1.5	NL	NL	15	15
Other wood- or gypsum-based SFRSs not listed above	1.0	1.0	15	15	NP	NP
Masonry Structures Designed and Detailed According to CSA S304						
Ductile shear walls	3.0	1.5	NL	NL	60	40
Moderately ductile shear walls	2.0	1.5	NL	NL	60	40
Conventional construction						
Shear walls	1.5	1.5	NL	60	30	15
Moment-resisting frames	1.5	1.5	NL	30	NP	NP
Unreinforced masonry	1.0	1.0	30	15	NP	NP
Other masonry SFRSs not listed above	1.0	1.0	15	NP	NP	NP
Cold-Formed Steel Structures Designed and Detailed According to CSA S136						
Shear walls						
Screw-connected shear walls – wood-based panels	2.5	1.7	20	20	20	20
Screw-connected shear walls – wood-based and gypsum panels in combination	1.5	1.7	20	20	20	20
Diagonal strap concentrically braced walls						
Limited ductility	1.9	1.3	20	20	20	20
Conventional construction	1.2	1.3	15	15	NP	NP
Other cold-formed SFRSs not defined above	1.0	1.0	15	15	NP	NP

Notes to Table 4.1.8.9.:

(1) See Article 4.1.8.10.

(2) NP = system is not permitted.
NL = system is permitted and not limited in height as an SFRS.
Numbers in this Table are maximum height limits above *grade*, in m.
Height may be limited in other Parts of the Code.
The most stringent requirement governs.

(3) Higher design force levels are prescribed in CSA S16 for some heights of *buildings*.

(4) See Note A-Table 4.1.8.9.

(5) Frames are limited to a maximum of 2 *storeys*.

(6) The maximum height limit is permitted to be increased to 15 m where $I_E S(1.0) \leq 0.3$.

(7) Frames are limited to a maximum of 3 *storeys*.

4.1.8.10. Additional System Restrictions

1) Except as required by Clauses (2)(b) and (3)(b), structures with a Type 6 irregularity, Discontinuity in Capacity - Weak Storey, as described in Table 4.1.8.6., are not permitted unless the Seismic Category is SC1 and the forces used for design of the SFRS are multiplied by $R_d R_o$.

2) *Post-disaster buildings* shall

a) not have Type 1, 3, 4, 5, 7, 9 or 10 irregularities as described in Table 4.1.8.6., where the Seismic Category is SC3 or SC4,

b) not have a Type 6 irregularity as described in Table 4.1.8.6.,

c) have an SFRS with an R_d of 2.0 or greater,

14) Except as provided in Sentence (15), the relative displacement of glass in glazing systems, $D_{fallout}$, shall be equal to the greater of

a) $D_{fallout} \geq 1.25 I_E D_p$, where

$D_{fallout}$ = relative displacement at which glass fallout occurs, and

D_p = relative earthquake displacement that the component must be designed to accommodate, calculated in accordance with Article 4.1.8.13. and applied over the height of the glass component, or

b) 13 mm.

(See Note A-4.1.8.18.(14) and (15).)

15) Glass need not comply with Sentence (14), provided at least one of the following conditions is met:

a) the Seismic Category is SC1 or SC2,

b) the glass has sufficient clearance from its frame such that $D_{clear} \geq 1.25 D_p$ calculated as follows:

$$D_{clear} = 2C_1 \left(1 + h_p C_2 / \left(b_p C_1\right)\right)$$

where

D_{clear} = relative horizontal displacement measured over the height of the glass panel, which causes initial glass-to-frame contact,

C_1 = average of the clearances on both sides between the vertical glass edges and the frame,

h_p = height of the rectangular glass panel,

C_2 = averages of the top and bottom clearances between the horizontal glass edges and the frame, and

b_p = width of the rectangular glass panel,

c) the glass is fully tempered, monolithic, installed in a non-*post-disaster building*, and no part of the glass is located more than 3 m above a walking surface, or

d) the glass is annealed or heat-strengthened laminated glass in a single thickness with an interlayer no less than 0.76 mm and captured mechanically in a wall system glazing pocket with the perimeter secured to the frame by a wet, glazed, gunable, curing, elastomeric sealant perimeter bead of 13 mm minimum glass contact width.

(See Note A-4.1.8.18.(14) and (15).)

16) For structures with supplemental energy dissipation, elements and components of *buildings* described in Table 4.1.8.18. and their connections to the structure shall be designed for a specified lateral earthquake force, V_p, determined at each floor level as follows:

$$V_p = S_{sed} I_E \left(C_p A_r / R_p\right) W_p$$

where

S_{sed} = peak spectral acceleration in the period range of T = 0 s to T = 0.5 s determined from the mean 5%-damped floor spectral acceleration values by averaging the individual 5%-damped floor response spectra at the centroid of the floor area at that floor level determined using Non-linear Dynamic Analysis, and

I_E, C_p, A_r, R_p, W_p = as defined in Sentence (1).

(See Note A-4.1.8.18.(16).)

17) For a ballasted array of interconnected solar panels mounted on a roof, where $I_E S(0.2)$ is less than or equal to 1.0, friction due to gravity loads is permitted to be considered to provide resistance to seismic forces, provided

a) the roof is not normally occupied,

have a minimum width of 1 100 mm and may serve as collectors for aisles; they are therefore part of the exit system and are required to be designed for a minimum live load of 4.8 kPa.

Floor Areas That Could Be Used As Viewing Areas

Some interior balconies, mezzanines, corridors, lobbies and aisles that are not intended to be used by an assembly of people as viewing areas are sometimes used as such; consequently, they are subject to loadings much higher than those for the occupancies they serve. Floor areas that may be subject to such higher loads must, therefore, be designed for a loading of 4.8 kPa.

Lecture Halls and Classrooms

For the purposes of applying the requirements of Table 4.1.5.3., lecture halls with fixed seats are similar to theatres in configuration (the seats may have a writing tablet affixed to one arm). Classrooms are typically furnished with full-sized desks having separate or integrated seats.

Minimum Roof Live Load

Articles 4.1.5.3. and 4.1.5.10. stipulate a minimum uniform roof live load of 1.0 kPa and a minimum concentrated live load of 1.3 kN. These live loads are "use and occupancy loads" intended to provide for maintenance loadings: they are not reduced as a function of area or as a function of the roof slope due to their variability in distribution and location.

Office Areas

The general minimum specified load for office areas, including mezzanines, is 2.4 kPa.

A minimum specified load of 4.8 kPa applies to office areas in basements, which are normally slab-on-grade, and to office areas in floor areas that may be subject to an increase in loading for brief periods, for example, when tenants temporarily use that floor area to store furniture, equipment and files while moving in or out of the building.

Where an office building is situated on a level site, all floors are uniform in elevation, and there are no mezzanines, allocating the correct loads is straightforward. However, where the site is steeply sloped, the situation is more complex—even more so where there are also mezzanines.

The principle is that floor levels and mezzanines with access to the exterior at ground level could be used as staging areas during a move, and so, must be designed for a minimum of 4.8 kPa. Also, there is usually an area adjacent to the exterior exit that can accommodate trucks.

Vehicle Loads

A special study should be undertaken to determine the distributed loads to be used for the design of floors and areas used by vehicles exceeding 9 000 kg gross weight and of driveways and sidewalks over areaways and basements. Where appropriate, the designer should refer to CSA S6, "Canadian Highway Bridge Design Code."

A-4.1.5.5. Loads on Exterior Areas. In Article 4.1.5.5., "accessible" refers to the lack of a physical barrier that prevents or restricts access by vehicles or persons to the site in the context of the specific use.

Information on the design of roof parking decks and exterior areas that are accessible to vehicular traffic can be found in the Commentary entitled Live Loads Due to Use and Occupancy in the "Structural Commentaries (User's Guide – NBC 2020: Part 4 of Division B)."

A-4.1.5.8. Tributary Area. Information on tributary area can be found in the Commentary entitled Live Loads Due to Use and Occupancy in the "Structural Commentaries (User's Guide – NBC 2020: Part 4 of Division B)."

A-Table 4.1.5.9. Loads Due to Concentrations. Special study is required to determine concentrated loads for the design of floors and areas used by vehicles exceeding 9 000 kg gross weight, and of driveways and sidewalks over areaways and basements. Where appropriate the designer should refer to CSA S6, "Canadian Highway Bridge Design Code."

A-4.1.5.11. Crane-Supporting Structures. Guidance on crane-supporting structures can be found in CSA S16, "Design of steel structures."

A-4.1.6.16.(5)(b) Snow Loads for a Sloped Roof with Parallel Raised Solar Panels. Figure A-4.1.6.16.(5)(b) shows the snow loads for a sloped roof with Parallel Raised solar panels.

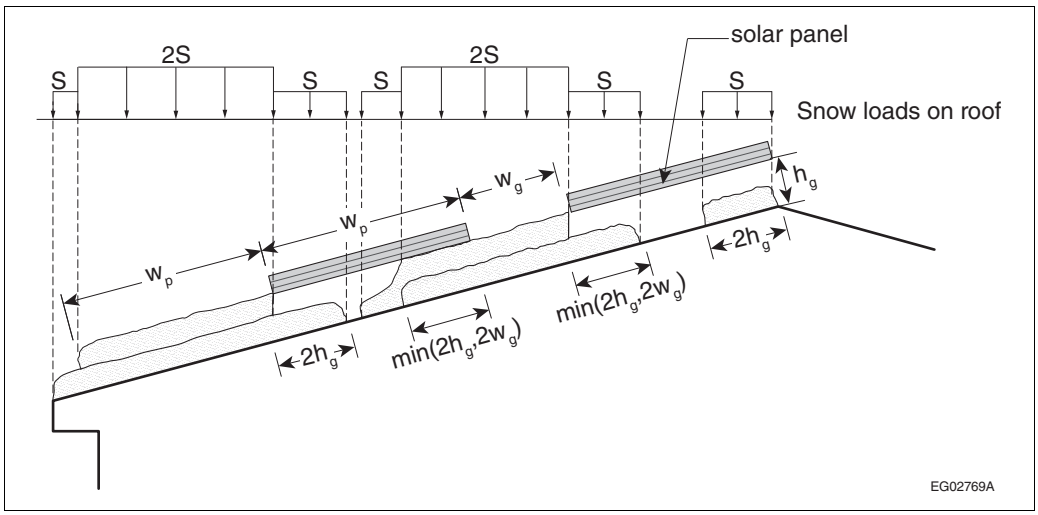


Figure A-4.1.6.16.(5)(b)
Snow loads for a sloped roof with Parallel Raised solar panels

A-4.1.6.16.(6) Snow Loads for a Flat Roof with Tilted Solar Panels. Figure A-4.1.6.16.(6) shows the snow loads for a flat roof with Tilted solar panels.

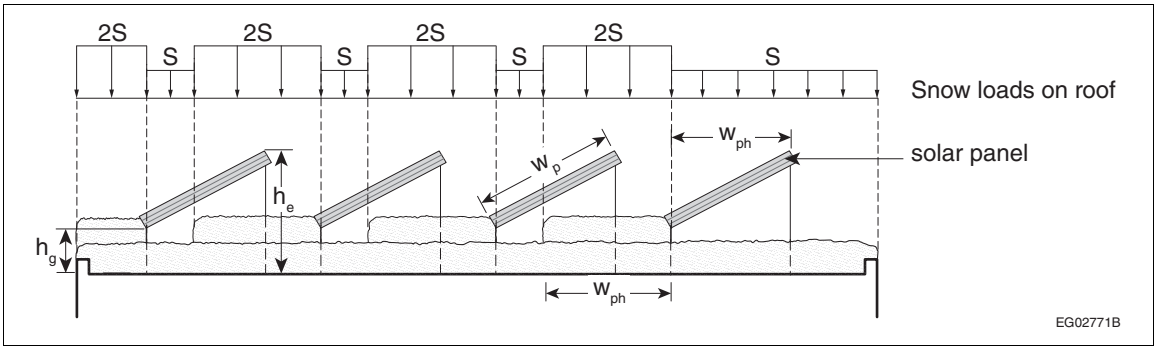


Figure A-4.1.6.16.(6)
Snow loads for a flat roof with Tilted solar panels

A-4.1.6.16.(6)(c) Variation of C_a with $h_g - C_bC_wS_s/\gamma$. Figure A-4.1.6.16.(6)(c) shows the variation of the accumulation factor, C_a, with the height of the lowest edge of the panels above the surface of the uniform snow load, $h_g - C_bC_wS_s/\gamma$, for a flat roof with Tilted solar panels.

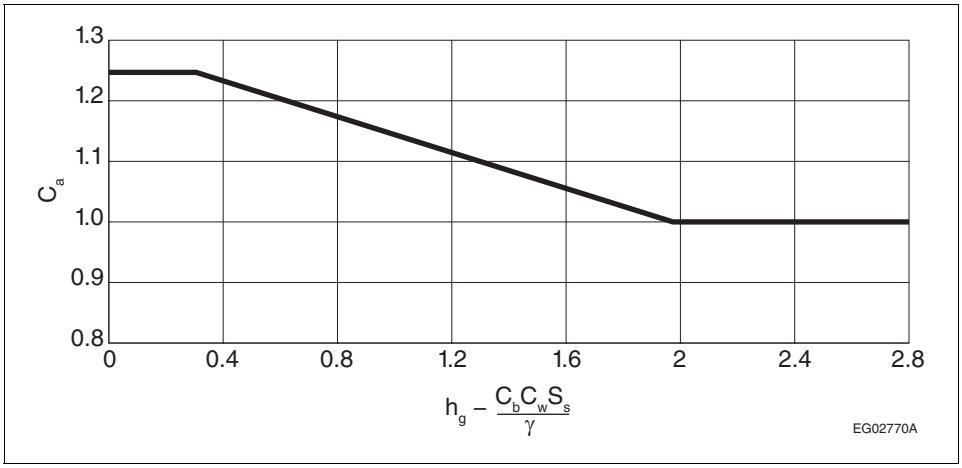


Figure A-4.1.6.16.(6)(c)
Variation of C_a with $h_g - C_bC_wS_s/\gamma$ for a flat roof with Tilted solar panels

A-4.1.7.1.(6) Computational Fluid Dynamics (CFD). It is not currently possible to verify the reliability and accuracy of CFD and no standards address it; as such, this method is not permitted to be used to determine specified wind loads.

A-4.1.7.2. Natural Frequency. Information on calculating the natural frequency of a building can be found in the Commentary entitled Wind Load and Effects in the "Structural Commentaries (User's Guide – NBC 2020: Part 4 of Division B)."

A-4.1.7.3.(5)(c) Procedure for Calculating Intermediate C_e. Information on calculating intermediate values of C_e between two exposures can be found in the Commentary entitled Wind Load and Effects in the "Structural Commentaries (User's Guide – NBC 2020: Part 4 of Division B)."

A-4.1.7.3.(10) Internal Gust Effect Factor, C_{gi}. The effect of building envelope flexibility can be included in the calculation of C_{gi}. See the Commentary entitled Wind Load and Effects in the "Structural Commentaries (User's Guide – NBC 2020: Part 4 of Division B)."

A-4.1.7.5.(4) Pressure Coefficients for Roof and Wall Claddings and Secondary Structural Supports of Cladding on Rectangular Buildings.

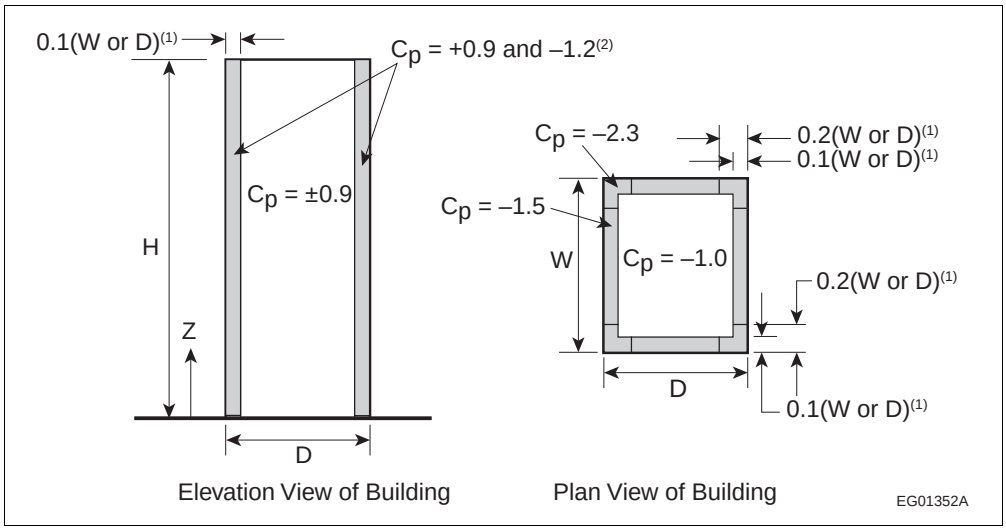


Figure A-4.1.7.5.(4)

Values of C_p for roof and wall claddings and secondary structural supports of cladding on rectangular buildings

Notes to Figure A-4.1.7.5.(4):

(1) The larger of W or D is to be used.

(2) Where vertical ribs deeper than 1 m are present on the walls, the dimensions 0.1D and 0.1W must be changed to 0.2D and 0.2W and the negative value of C_p must be changed from –1.2 to –1.4.

A-4.1.7.5.(9) and 4.1.7.7.(2) Cladding on Parapets. Information on the design of cladding on parapets can be found in the Commentary entitled Wind Load and Effects in the "Structural Commentaries (User's Guide – NBC 2020: Part 4 of Division B)."

A-4.3.4.1.(1) Welded Construction. Qualification for fabricators and erectors of welded construction is found in Clause 24.3 of CSA S16, "Design of steel structures."

A-4.3.4.2.(1) Cold-Formed Stainless Steel Members. There is currently no Canadian standard for the design of cold-formed stainless steel structural members. As an interim measure, design may be carried out using the limit states design provisions of ASCE/SEI 8, "Specification for the Design of Cold-Formed Stainless Steel Structural Members," except that load factors, load combinations and load combination factors shall be in accordance with Subsection 4.1.3.

A-4.3.6.1.(1) Design Basis for Glass. The load factors in Tables 4.1.3.2.-A and 4.1.3.2.-B must be applied to the adjusted wind load before designing in accordance with the referenced standard. Additional information is given in the Commentary entitled Wind Load and Effects in the "Structural Commentaries (User's Guide – NBC 2020: Part 4 of Division B)."

A-4.4.2.1.(1) Design Basis for Storage Garages and Repair Garages. Although the scope of CSA S413, "Parking structures," is limited to structural steel and reinforced concrete (including prestressed and post-tensioned), the intent of Sentence 4.4.2.1.(1) is to require any type of material used in the construction of storage garages and repair garages to conform to the performance level outlined in the standard.

See the Commentary entitled Live Loads Due to Use and Occupancy in the "Structural Commentaries (User's Guide – NBC 2020: Part 4 of Division B)."

accordance with ASTM E336, "Standard Test Method for Measurement of Airborne Sound Attenuation between Rooms in Buildings," or

b) calculated in accordance with
   i) the detailed method described in Article 5.8.1.4., or
   ii) the simplified method described in Article 5.8.1.5.

5.8.1.3. Compliance with Required Ratings

1) Compliance with the required *STC* ratings shall be demonstrated through
a) measurements carried out in accordance with Sentence 5.8.1.2.(1), or
b) the construction of separating assemblies conforming to those presented in Table 9.10.3.1.-A or 9.10.3.1.-B, as applicable.

2) Compliance with the required *ASTC* ratings shall be demonstrated through
a) measurements or calculations carried out in accordance with Sentence 5.8.1.2.(2), or
b) the construction of separating assemblies conforming to those presented in Table 9.10.3.1.-A or 9.10.3.1.-B, as applicable, that have an *STC* rating of not less than 50 in conjunction with flanking assemblies constructed in accordance with Article 9.11.1.4.

5.8.1.4. Detailed Method for Calculating ASTC

(See Note A-5.8.1.4.)

1) The sound transmission loss measured in accordance with ASTM E90, "Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements," shall be used in lieu of the sound reduction index required in ISO 12354-1, "Building acoustics - Estimation of acoustic performance of buildings from the performance of elements - Part 1: Airborne sound insulation between rooms."

2) The vibration reduction index for the junctions between separating assemblies shall be
a) determined using the equations presented in Annex E of ISO 12354-1, "Building acoustics - Estimation of acoustic performance of buildings from the performance of elements - Part 1: Airborne sound insulation between rooms," or
b) measured in accordance with Parts 1 to 4 of ISO 10848-1, "Acoustics – Laboratory measurement of the flanking transmission of airborne and impact sound between adjoining rooms – Part 1: Frame document."

3) The normalized flanking level difference shall be measured in accordance with Parts 1 to 4 of ISO 10848-1, "Acoustics – Laboratory measurement of the flanking transmission of airborne and impact sound between adjoining rooms – Part 1: Frame document."

4) The direct sound reduction index for the separating assembly in situ shall be determined using Clause (a) or (b), depending on the type of construction:
a) for a separating wall or floor assembly with lightweight wood or steel framing, the index shall be taken as equal to the sound transmission loss, without correction;
b) for a separating wall or floor assembly that behaves like a homogeneous panel, the index shall be determined in accordance with the detailed method for structure-borne transmission presented in ISO 12354-1, "Building acoustics - Estimation of acoustic performance of buildings from the performance of elements - Part 1: Airborne sound insulation between rooms" (see Note A-5.8.1.4.(4)(b)).

5) The flanking sound reduction index for each flanking path at each edge of the separating assembly shall be determined using Clause (a), (b) or (c), depending on the type of construction:
a) for a separating wall or floor assembly with lightweight wood or steel framing and connected flanking assemblies with lightweight wood or steel framing, the index shall be taken as equal to the normalized flanking level difference re-normalized for the *ASTC* field situation in accordance

with Annex G of ISO 12354-1, "Building acoustics - Estimation of acoustic performance of buildings from the performance of elements - Part 1: Airborne sound insulation between rooms,"

b) for a separating wall or floor assembly that behaves like a homogeneous panel and connected flanking assemblies that behave like a homogeneous panel, the index shall be determined in accordance with the detailed method for structure-borne transmission presented in ISO 12354-1, "Building acoustics - Estimation of acoustic performance of buildings from the performance of elements - Part 1: Airborne sound insulation between rooms" (see Note A-5.8.1.4.(4)(b)),

c) for a mixture of assemblies with lightweight wood or steel framing and assemblies that behave like a homogeneous panel, the index shall be determined in accordance with Clause (a) or (b) (see Note A-5.8.1.4.(4)(b)).

6) Once the pertinent indices and measurements referred to in Sentences (1) to (5) have been determined based on the type of construction, the apparent sound reduction index shall then be determined in accordance with ISO 12354-1, "Building acoustics - Estimation of acoustic performance of buildings from the performance of elements - Part 1: Airborne sound insulation between rooms."

7) The *ASTC* shall be calculated in accordance with ASTM E413, "Classification for Rating Sound Insulation," using the apparent sound reduction index determined in Sentence (6), which shall be treated as equivalent to the values of apparent sound transmission loss measured in accordance with ASTM E336, "Standard Test Method for Measurement of Airborne Sound Attenuation between Rooms in Buildings."

5.8.1.5. Simplified Method for Calculating ASTC

(See Note A-5.8.1.4.)

1) The *STC* rating shall be used in lieu of the weighted sound reduction index required in ISO 12354-1, "Building acoustics - Estimation of acoustic performance of buildings from the performance of elements - Part 1: Airborne sound insulation between rooms."

2) The vibration reduction index for the junctions between separating assemblies shall be

a) determined using the equations presented in Annex E of ISO 12354-1, "Building acoustics - Estimation of acoustic performance of buildings from the performance of elements - Part 1: Airborne sound insulation between rooms," or

b) measured in accordance with Parts 1 to 4 of ISO 10848-1, "Acoustics – Laboratory measurement of the flanking transmission of airborne and impact sound between adjoining rooms – Part 1: Frame document."

3) The weighted normalized flanking level difference shall be determined in accordance with ASTM E413, "Classification for Rating Sound Insulation," using the results from measurements carried out in accordance with Parts 1 to 4 of ISO 10848-1, "Acoustics – Laboratory measurement of the flanking transmission of airborne and impact sound between adjoining rooms – Part 1: Frame document."

4) The direct weighted sound reduction index for the separating assembly shall be taken as equal to the *STC*, without correction.

5) The weighted flanking sound reduction index for each flanking path at each edge of the separating assembly shall be determined using Clause (a) or (b), depending on the type of construction:

a) for a separating wall or floor assembly with lightweight wood or steel framing and connected flanking assemblies with lightweight wood or steel framing, the index shall be taken as equal to the weighted normalized flanking level difference re-normalized for the *ASTC* field situation in accordance with Annex G of ISO 12354-1, "Building acoustics - Estimation of acoustic performance of buildings from the performance of elements - Part 1: Airborne sound insulation between rooms";

b) for a separating wall or floor assembly that behaves like a homogeneous panel and connected flanking assemblies that behave like a homogeneous

panel, the index shall be determined in accordance with the simplified method for structure-borne transmission presented in ISO 12354-1, "Building acoustics - Estimation of acoustic performance of buildings from the performance of elements - Part 1: Airborne sound insulation between rooms" (see Note A-5.8.1.4.(4)(b)).

6) Once the pertinent indices and measurements referred to in Sentences (1) to (5) have been determined based on the type of construction, the *ASTC* shall then be calculated in accordance with ISO 12354-1, "Building acoustics - Estimation of acoustic performance of buildings from the performance of elements - Part 1: Airborne sound insulation between rooms."

Section 5.9. Standards

5.9.1. Applicable Standards

5.9.1.1. Compliance with Applicable Standards

1) Except as provided in Sentence (2) and elsewhere in this Part, materials and components, and their installation, shall conform to the requirements of the applicable standards in Table 5.9.1.1. where those materials or components are

a) incorporated into environmental separators or assemblies exposed to the exterior, and
b) installed to fulfill the requirements of this Part.

(See Note A-5.9.1.1.(1).)

2) The requirements for *flame-spread ratings* contained in thermal insulation standards shall be applied only as required in Part 3.

Table 5.9.1.1.
Standards Applicable to Environmental Separators and Assemblies Exposed to the Exterior
Forming Part of Sentence 5.9.1.1.(1)

Issuing Agency	Document Number	Title of Document
ANSI	A135.6	Engineered Wood Siding
ASME	B18.6.1	Wood Screws (Inch Series)
ASTM	A123/A123M	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM	A153/A153M	Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM	A653/A653M	Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM	C4	Standard Specification for Clay Drain Tile and Perforated Clay Drain Tile
ASTM	C73	Standard Specification for Calcium Silicate Brick (Sand-Lime Brick)
ASTM	C126	Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units
ASTM	C212	Standard Specification for Structural Clay Facing Tile
ASTM	C412M	Standard Specification for Concrete Drain Tile
ASTM	C444M	Standard Specification for Perforated Concrete Pipe
ASTM	C553	Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications
ASTM	C612	Standard Specification for Mineral Fiber Block and Board Thermal Insulation
ASTM	C700	Standard Specification for Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated
ASTM	C726	Standard Specification for Mineral Wool Roof Insulation Board
ASTM	C834(1)	Standard Specification for Latex Sealants
ASTM	C840	Standard Specification for Application and Finishing of Gypsum Board

Table 5.9.1.1. (Continued)

Issuing Agency	Document Number	Title of Document
ASTM	C920	Standard Specification for Elastomeric Joint Sealants
ASTM	C991	Standard Specification for Flexible Fibrous Glass Insulation for Metal Buildings
ASTM	C1002	Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
ASTM	C1177/C1177M	Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
ASTM	C1178/C1178M	Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel
ASTM	C1184(1)	Standard Specification for Structural Silicone Sealants
ASTM	C1280	Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing
ASTM	C1311(1)	Standard Specification for Solvent Release Sealants
ASTM	C1330(1)	Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants
ASTM	C1396/C1396M(2)	Standard Specification for Gypsum Board
ASTM	C1658/C1658M(3)	Standard Specification for Glass Mat Gypsum Panels
ASTM	D1227/D1227M	Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing
ASTM	D2178/D2178M	Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing
ASTM	D3019/D3019M(4)	Standard Specification for Lap Cement Used with Asphalt Roll Roofing, Non-Fibered, and Fibered
ASTM	D4479/D4479M	Standard Specification for Asphalt Roof Coatings – Asbestos-Free
ASTM	D4637/D4637M	Standard Specification for EPDM Sheet Used In Single-Ply Roof Membrane
ASTM	D4811/D4811M	Standard Specification for Nonvulcanized (Uncured) Rubber Sheet Used as Roof Flashing
ASTM	D6878/D6878M	Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing
ASTM	E2190	Standard Specification for Insulating Glass Unit Performance and Evaluation
BNQ	BNQ 3624-115	Polyethylene (PE) Pipe and Fittings for Soil and Foundation Drainage
CGSB	CAN/CGSB-11.3-M	Hardboard
CGSB	CAN/CGSB-12.1	Safety Glazing
CGSB	CAN/CGSB-12.2-M	Flat, Clear Sheet Glass
CGSB	CAN/CGSB-12.3-M	Flat, Clear Float Glass
CGSB	CAN/CGSB-12.4-M	Heat Absorbing Glass
CGSB	CAN/CGSB-12.8	Insulating glass units
CGSB	CAN/CGSB-12.9	Spandrel glass
CGSB	37-GP-9Ma	Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing
CGSB	CAN/CGSB-37.50-M	Hot-Applied, Rubberized Asphalt for Roofing and Waterproofing
CGSB	CAN/CGSB-37.54	Polyvinyl Chloride Roofing and Waterproofing Membrane
CGSB	CAN/CGSB-37.58-M	Membrane, Elastomeric, Cold-Applied Liquid, for Non-Exposed Use in Roofing and Waterproofing
CGSB	CAN/CGSB-41.24	Rigid Vinyl Siding, Soffits and Fascia
CGSB	CAN/CGSB-51.32-M	Sheathing, Membrane, Breather Type
CGSB	CAN/CGSB-51.33-M	Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction
CGSB	CAN/CGSB-51.34	Polyethylene sheet for use in building construction – Material specification
CGSB	CAN/CGSB-93.1-M	Sheet, Aluminum Alloy, Prefinished, Residential
CGSB	CAN/CGSB-93.2-M	Prefinished Aluminum Siding, Soffits, and Fascia, for Residential Use
CSA	A23.1	Concrete materials and methods of concrete construction

Table 5.9.1.1. (Continued)

Issuing Agency	Document Number	Title of Document
CSA	CAN/CSA-A82	Fired masonry brick made from clay or shale
CSA	CAN3-A93-M	Natural Airflow Ventilators for Buildings
CSA	CAN/CSA-A123.2	Asphalt-Coated Roofing Sheets
CSA	A123.3	Asphalt Saturated Organic Roofing Felt
CSA	CAN/CSA-A123.4	Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems
CSA	A123.5	Asphalt shingles made from glass felt and surfaced with mineral granules
CSA	CAN/CSA-A123.16	Asphalt-coated glass-base sheets
CSA	A123.17	Asphalt Glass Felt Used in Roofing and Waterproofing
CSA	A123.23	Product specification for polymer-modified bitumen sheet, prefabricated and reinforced
CSA	A123.51	Asphalt shingle application on roof slopes 1:6 and steeper
CSA	A165.1	Concrete block masonry units
CSA	A165.2	Concrete Brick Masonry Units
CSA	A165.3	Prefaced concrete masonry units
CSA	CAN/CSA-A179	Mortar and Grout for Unit Masonry
CSA	CAN/CSA-A220 Series	Concrete Roof Tiles
CSA	CAN/CSA-A371	Masonry Construction for Buildings
CSA	A3001	Cementitious Materials for Use in Concrete
CSA	CAN/CSA-B182.1	Plastic drain and sewer pipe and pipe fittings
CSA	G40.21	Structural quality steel
CSA	CAN/CSA-G401	Corrugated steel pipe products
CSA	CAN/CSA-O80 Series	Wood preservation
CSA	O118.1	Western Red Cedar Shakes and Shingles
CSA	O118.2	Eastern White Cedar Shingles
CSA	O121	Douglas fir plywood
CSA	O141	Softwood Lumber
CSA	O151	Canadian softwood plywood
CSA	O153	Poplar plywood
CSA	O325	Construction sheathing
CSA	O437.0	OSB and Waferboard
HPVA	ANSI/HPVA HP-1	American National Standard for Hardwood and Decorative Plywood
ULC	CAN/ULC-S701.1	Standard for Thermal Insulation, Polystyrene Boards
ULC	CAN/ULC-S702.1	Standard for Mineral Fibre Thermal Insulation for Buildings, Part 1: Material Specification
ULC	CAN/ULC-S703	Standard for Cellulose Fibre Insulation (CFI) for Buildings
ULC	CAN/ULC-S704.1	Standard for Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Faced
ULC	CAN/ULC-S705.1	Standard for Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density – Material Specification
ULC	CAN/ULC-S705.2	Standard for Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density – Application
ULC	CAN/ULC-S706.1	Standard for Insulating Wood Fibre Boards for Buildings
ULC	CAN/ULC-S710.1	Standard for Bead-Applied One Component Polyurethane Air Sealant Foam, Part 1: Material Specification

Table 5.9.1.1. (Continued)

Issuing Agency	Document Number	Title of Document
ULC	CAN/ULC-S711.1	Standard for Bead-Applied Two Component Polyurethane Air Sealant Foam, Part 1: Material Specification
ULC	CAN/ULC-S717.1	Standard for Flat Wall Insulating Concrete Form (ICF) Units – Material Properties

Notes to Table 5.9.1.1.:

(1) See Note A-Table 5.9.1.1.

(2) The *flame-spread rating* of gypsum board shall be determined in accordance with CAN/ULC-S102 in lieu of ASTM E84 as indicated in ASTM C1396/C1396M.

(3) The *flame-spread rating* of gypsum panels shall be determined in accordance with CAN/ULC-S102 in lieu of ASTM E84 as indicated in ASTM C1658/C1658M.

(4) For the purpose of compliance with Part 5, ASTM D3019/D3019M shall only apply to the non-fibered and non-asbestos-fibered types of asphalt roll roofing.

5.9.2. Windows, Doors and Skylights

5.9.2.1. General

1) This Subsection applies to windows, doors and skylights, including their components, that separate

a) interior space from exterior space, or
b) environmentally dissimilar interior spaces.

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

3) Where a wired glass assembly is installed in a required *fire separation*, it need not conform to the requirements of this Subsection. (See Note A-5.9.2.1.(3).)

5.9.2.2. Applicable Standards

(See Note A-5.9.2.2.)

1) Windows, doors and skylights shall conform to the requirements in

a) AAMA/WDMA/CSA 101/I.S.2/A440, "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/A440-17, North American Fenestration Standard/Specification for windows, doors, and skylights."

2) Performance grades for windows, doors and skylights shall be selected according to the Canadian Supplement referenced in Clause (1)(b) so as to be appropriate for the conditions and geographic location in which the window, door or skylight will be installed.

3) Windows, doors and skylights shall conform to the performance grades selected in Sentence (2) when tested in accordance with the Harmonized Standard referenced in Clause (1)(a).

5.9.2.3. Structural and Environmental Loads, Air Leakage and Water Penetration

1) Windows, doors, skylights and their components shall be designed and constructed in accordance with

a) Article 5.1.4.1., Section 5.4. and Section 5.6., where they are not covered in the scope of the standards listed in Sentence 5.9.2.2.(1), or
b) Article 5.9.2.2., where they are covered in the scope of the standards listed in Sentence 5.9.2.2.(1).

(See Note A-5.9.2.3.(1).)

Table D-1.1.2.
Documents Referenced in Appendix D(1)

Issuing Agency	Document Number(2)	Title of Document	Code Reference
ANSI	A208.1-2016	Particleboard	D-3.1.1.
ASTM	C330/C330M-17a	Standard Specification for Lightweight Aggregates for Structural Concrete	D-1.4.3.
ASTM	C840-20	Standard Specification for Application and Finishing of Gypsum Board	D-2.3.9.
ASTM	C1396/C1396M-17	Standard Specification for Gypsum Board	D-1.5.1. D-3.1.1.
ASTM	D2898-10	Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing	D-6.1.1.
CCBFC	NRCC 30629	Supplement to the National Building Code of Canada 1990	D-7.2. D-7.3.
CGSB	4-GP-36M-1978	Carpet Underlay, Fiber Type	D-3.1.1.
CGSB	CAN/CGSB-4.129-93	Carpet for Commercial Use	D-3.1.1.
CGSB	CAN/CGSB-92.2-M90	Trowel or Spray Applied Acoustical Material	D-2.3.4.
CSA	A23.1:19/A23.2:19	Concrete materials and methods of concrete construction/Test methods and standard practices for concrete	D-1.4.3.
CSA	A23.3:19	Design of concrete structures	D-2.1.5. D-2.6.6. D-2.8.2.
CSA	CAN/CSA-A82:14	Fired masonry brick made from clay or shale	D-2.6.1.
CSA	A82.22-M1977	Gypsum Plasters	D-3.1.1.
CSA	CAN/CSA-A82.27-M91	Gypsum Board	D-1.5.1. D-3.1.1.
CSA	A82.30-M1980	Interior Furring, Lathing and Gypsum Plastering	D-1.7.2. D-2.3.9. D-2.5.1.
CSA	A165.1-14	Concrete block masonry units	D-2.1.1.
CSA	O86:19	Engineering design in wood	D-2.11.3. D-2.11.4.
CSA	O112.10-08	Evaluation of Adhesives for Structural Wood Products (Limited Moisture Exposure)	D-2.3.6.
CSA	O121-17	Douglas fir plywood	D-3.1.1.
CSA	O141:05	Softwood Lumber	D-2.3.6. D-2.4.1.
CSA	O151-17	Canadian softwood plywood	D-3.1.1.
CSA	O153:19	Poplar plywood	D-3.1.1.
CSA	O325:21	Construction sheathing	D-3.1.1.
CSA	O437.0-93	OSB and Waferboard	D-3.1.1.
CSA	S16:19	Design of steel structures	D-2.6.6.
NFPA	80-2013	Standard for Fire Doors and Other Opening Protectives	D-5.2.1.
ULC	CAN/ULC-S101-14	Standard Method of Fire Endurance Tests of Building Construction and Materials	D-1.1.1. D-1.12.1. D-2.3.2. D-2.11.1.
ULC	CAN/ULC-S102:2018	Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies	D-1.1.1. D-6.1.1.
ULC	CAN/ULC-S102.2:2018	Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies	D-1.1.1. D-3.1.1.

Table D-1.1.2. (Continued)

Issuing Agency	Document Number[2]	Title of Document	Code Reference
ULC	CAN/ULC-S112.2-07	Standard Method of Fire Test of Ceiling Firestop Flap Assemblies	D-2.3.10. D-2.3.11.
ULC	CAN/ULC-S114:2018	Standard Method of Test for Determination of Non-Combustibility in Building Materials	D-1.1.1. D-4.1.1. D-4.2.1.
ULC	CAN/ULC-S134-13	Standard Method of Fire Test of Exterior Wall Assemblies	D-1.1.1. D-6.1.1.
ULC	CAN/ULC-S702.1:2021	Standard for Mineral Fibre Thermal Insulation for Buildings, Part 1: Material Specification	D-2.3.4. D-2.3.5. D-2.6.1. D-6.1.1. D-7.4.
ULC	CAN/ULC-S703-09	Standard for Cellulose Fibre Insulation (CFI) for Buildings	D-2.3.4.
ULC	CAN/ULC-S706.1:2020	Standard for Insulating Wood Fibre Boards for Buildings	D-3.1.1.

Notes to Table D-1.1.2.:

(1) While every effort was made to ensure the accuracy of the information in this Table, the NRC is not responsible for the accuracy, timeliness or reliability of the content presented therein. For all purposes of interpreting and applying the referenced standards, Code users should refer to the most recent official versions of the referenced editions.

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

D-1.1.3. Applicability of Ratings

The ratings shown in this document apply if more specific test values are not available. The construction of an assembly that is the subject of an individual test report must be followed in all essential details if the fire-resistance rating reported is to be applied for use with this Code.

D-1.1.4. Higher Ratings

The authority having jurisdiction may allow higher fire-resistance ratings than those derived from this Appendix, where supporting evidence justifies a higher rating. Additional information is provided in summaries of published test information and the reports of fire tests carried out by NRC, which are included in Section D-7, Background Information.

D-1.1.5. Additional Information on Fire Rated Assemblies

Assemblies containing materials for which there is no nationally recognized standard are not included in this Appendix. Many such assemblies have been rated by Underwriters' Laboratories Inc. (UL), ULC Standards (ULC), or Intertek Testing Services NA Ltd. (ITS).

D-1.2. Interpretation of Test Results

D-1.2.1. Limitations

1) The fire-performance ratings set out in this Appendix are based on those that would be obtained from the standard methods of test described in the Code. The test methods are essentially a means of comparing the performance of one building component or assembly with another in relation to its performance in fire.

2) Since it is not practicable to measure the fire resistance of constructions in situ, they must be evaluated under some agreed test conditions. A specified fire-resistance rating is not necessarily the actual time that the assembly would endure in situ in a building fire, but is that which the particular construction must meet under the specified methods of test.

3) Considerations arising from departures in use from the conditions established in the standard test methods may, in some circumstances, have to be taken into account by the designer and the authority having jurisdiction. Some of these conditions are covered at present by the provisions of the Code.

D-1.7. Contribution of Plaster or Gypsum Board Finish to Fire Resistance of Masonry or Concrete

D-1.7.1. Determination of Contribution

1) Except as provided in Sentences (2) to (5), the contribution of a plaster or gypsum board finish to the fire resistance of a masonry or concrete wall, floor or roof assembly shall be determined by multiplying the actual thickness of the finish by the factor shown in Table D-1.7.1., depending on the type of masonry or concrete to which it is applied. This corrected thickness shall then be included in the equivalent thickness as described in Subsection D-1.6.

Table D-1.7.1.
Multiplying Factors for Masonry or Concrete Construction

Type of Surface Protection	Type of Masonry or Concrete			
	Solid Clay Brick, Unit Masonry and Monolithic Concrete, Type N or S	Cored Clay Brick, Clay Tile, Monolithic Concrete, Type L40S and Unit Masonry, Type $L_1$20S	Concrete Unit Masonry, Type L_1 or $L_2$20S and Monolithic Concrete, Type L	Concrete Unit Masonry, Type L_2
Portland cement-sand plaster or lime sand plaster	1	0.75	0.75	0.50
Gypsum-sand plaster, wood fibred gypsum plaster or gypsum board	1.25	1	1	1
Vermiculite or perlite aggregate plaster	1.75	1.5	1.25	1.25

2) Where a plaster or gypsum board finish is applied to a concrete or masonry wall, the calculated fire-resistance rating of the assembly shall not exceed twice the fire-resistance rating provided by the masonry or concrete because structural collapse may occur before the limiting temperature is reached on the surface of the non-fire-exposed side of the assembly.

3) Where a plaster or gypsum board finish is applied only on the non-fire-exposed side of a hollow clay tile wall, no increase in fire resistance is permitted because structural collapse may occur before the limiting temperature is reached on the surface of the non-fire-exposed side of the assembly.

4) The contribution to fire resistance of a plaster or gypsum board finish applied to the non-fire-exposed side of a monolithic concrete or unit masonry wall shall be determined in conformance with Sentence (1), but shall not exceed 0.5 times the contribution of the concrete or masonry wall.

5) When applied to the fire-exposed side, the contribution of a gypsum lath and plaster or gypsum board finish to the fire resistance of masonry or concrete wall, floor or roof assemblies shall be determined from Tables D-2.3.4.-A to D-2.3.4.-D.

D-1.7.2. Plaster

1) Gypsum plastering shall conform to CSA A82.30-M, "Interior Furring, Lathing and Gypsum Plastering."

2) Portland cement-sand plaster shall be applied in 2 coats: the first coat containing 1 part Portland cement to 2 parts sand by volume, and the second coat containing 1 part Portland cement to 3 parts sand by volume.

3) Plaster finish shall be securely bonded to the wall or ceiling.

4) The thickness of plaster finish applied directly to monolithic concrete without metal lath shall not exceed 10 mm on ceilings and 16 mm on walls.

5) Where the thickness of plaster finish on masonry or concrete exceeds 38 mm, wire mesh with 1.57 mm diam wire and openings not exceeding 50 mm by 50 mm shall be embedded midway in the plaster.

D-2.3.3. Limitations of Component Additive Method

(See Section D-7, Background Information.)

1) The fire-resistance rating of a framed assembly depends primarily on the time during which the membrane on the fire-exposed side remains in place.

2) The assigned times in Sentences D-2.3.4.(2) to (4) are not intended to be construed as the fire-resistance ratings of the individual components of an assembly, nor are they intended to be construed as times that are applicable or acceptable for use beyond the method and systems described in this Subsection. These assigned times are the individual contributions of each component to the overall fire-resistance rating of an assembly, which is permitted to be derived using the component additive method described in this Subsection.

3) The fire-resistance rating calculated by the component additive method cannot be increased by installing membranes in multiple layers, other than as specified in Tables D-2.3.4.-A, D-2.3.4.-B and D-2.3.4.-C.

D-2.3.4. Method of Calculation

1) In the component additive method, the fire-resistance rating of a framed assembly is calculated by adding the time assigned in Sentence (2) for the membrane on the fire-exposed side to the time assigned in Sentence (3) for the framing members and then adding any time assigned in Sentence (4) for additional protective measures, such as the inclusion of insulation or of reinforcement for a membrane. For loadbearing walls where resilient metal channels are installed with a single layer of gypsum board membrane in accordance with Table D-2.3.4.-A, the fire-resistance rating determined using this method of calculation must be reduced by 10 min.

2) The times to be used in the component additive method that have been assigned to membranes on the fire-exposed side of the assembly, which are partly based on their ability to remain in place during fire tests, are listed in Tables D-2.3.4.-A to D-2.3.4.-D. (This is not to be confused with the fire-resistance rating of the membrane, which also takes into account the rise in temperature on the unexposed side of the membrane. [See Sentence D-2.3.3.(2).])

Table D-2.3.4.-A
Time Assigned to Protective Membranes on Fire-Exposed Side of Wood-Framed and Cold-Formed-Steel-Framed Walls

Description of Finish	Time, min	
	Loadbearing Walls	Non-Loadbearing Walls
11.0 mm Douglas Fir plywood phenolic bonded	–	10(1)
14.0 mm Douglas Fir plywood phenolic bonded	–	15(1)
12.7 mm Type X gypsum board	25(2)	25
15.9 mm Type X gypsum board	40(2)	40(3)
Double 12.7 mm Type X gypsum board(4)	50	80

Notes to Table D-2.3.4.-A:

(1) Applies to stud cavities filled with mineral wool conforming to CAN/ULC-S702.1, "Standard for Mineral Fibre Thermal Insulation for Buildings, Part 1: Material Specification," and having a mass per unit area of not less than 2 kg/m^2, with no additional credit for insulation according to Table D-2.3.4.-G.

(2) Applies only to wood-framed walls.

(3) Applies only to steel-framed walls.

(4) Resilient metal channels are permitted to be installed at a spacing of 400 mm o.c. with no effect on the rating of the wall assembly.

Table D-2.3.4.-B
Time Assigned to Gypsum Board Membranes on Fire-Exposed Side of Floors

Description of Finish	Resilient Metal Channels(1)	Time, min	
		Floors with Wood or Steel Joists	Floors with Open-Web Steel Joists
12.7 mm Type X gypsum board	Spaced ≤ 400 mm o.c.(2)	25(3)	—
15.9 mm Type X gypsum board		40(3)	—
12.7 mm Type X gypsum board	—	25(4)	25
15.9 mm Type X gypsum board		40(4)	40

Table D-2.3.4.-B (Continued)

Description of Finish	Resilient Metal Channels(1)	Time, min	
		Floors with Wood or Steel Joists	Floors with Open-Web Steel Joists
Double 12.7 mm Type X gypsum board	Spaced ≤ 400 mm o.c.(5)	50(3)	—
Double 12.7 mm Type X gypsum board	Spaced at 600 mm o.c.(6)	45(3)	—
Double 15.9 mm Type X gypsum board	Spaced ≤ 600 mm o.c.(6)	60(3)	—

Notes to Table D-2.3.4.-B:

(1) See Figures A-9.10.3.1.-A, A-9.10.3.1.-B and A-9.10.3.1.-D in Note A-9.10.3.1. for the attachment of single and double layers of gypsum board to resilient metal channels.

(2) Resilient metal channels must be installed to achieve the stated rating.

(3) Applies to wood joists, wood trusses, wood I-joists and cold-formed steel joists (C-shaped joists).

(4) Applies to wood joists and pre-fabricated metal-plate-connected wood trusses.

(5) Resilient metal channels must be installed or gypsum board must be applied directly to the structural members, which must be spaced not more than 400 mm o.c.

(6) Resilient metal channels are permitted to be installed with no effect on the rating of the floor assembly. Gypsum board is also permitted to be directly applied to the structural members.

Table D-2.3.4.-C
Time Assigned to Gypsum Board Membranes on Fire-Exposed Side of Roofs

Description of Finish	Time, min(1)
12.7 mm Type X gypsum board	25
15.9 mm Type X gypsum board	40

Notes to Table D-2.3.4.-C:

(1) Applies to wood joists, pre-fabricated metal-plate-connected wood trusses, and open-web steel joists with ceiling supports spaced ≤ 400 mm o.c.

Table D-2.3.4.-D
Time Assigned for Contribution of Lath and Plaster Protection on Fire-Exposed Side

Type of Lath	Plaster Thickness, mm	Type of Plaster Finish		
		Portland Cement and Sand(1) or Lime and Sand	Gypsum and Sand or Gypsum Wood Fibre	Gypsum and Perlite or Gypsum and Vermiculite
		Time, min(2)		
9.5 mm gypsum	13	—	35	55
	16	—	40	65
	19	—	50	80(3)
Metal	19	20	50	80(3)
	23	25	65	80(3)
	26	30	80	80(3)

Notes to Table D-2.3.4.-D:

(1) For mixture of Portland cement-sand plaster, see Sentence D-1.7.2.(2).

(2) Applies to loadbearing and non-loadbearing wood studs or non-loadbearing cold-formed-steel studs, to floors constructed of wood joists or open-web steel joists, and to roofs constructed of wood joists, pre-manufactured metal-plate-connected wood trusses, or open-web steel joists.

(3) Values shown for these membranes have been limited to 80 min because the fire-resistance ratings of framed assemblies derived from these Tables must not exceed 1.5 h.

3) The times to be used in the component additive method that have been assigned to wall framing members and to floor and roof framing members are listed in Tables D-2.3.4.-E and D-2.3.4.-F respectively.

- Documentation is the “paper trail” of the alternative solution negotiated between the designer and the regulator and should demonstrate that a rational process led to the acceptance of the alternative solution as an equivalency.
- It is possible that over time a particular alternative solution may be shown to be inadequate. It would be advantageous for a jurisdiction to know which buildings included that alternative solution as part of their design: documentation will facilitate this type of analysis.
- Project documentation provides important information to a forensic team that is called to investigate an accident or why a design failed to provide the level of performance expected.

This subject is discussed in further detail in “Recommended Documentation Requirements for Projects Using Alternative Solutions in the Context of Objective-Based Codes,” which was prepared for the CCBFC Task Group on Implementation of Objective-Based Codes and is available on the CBHCC's website.

3) Properties of windows and doors within *exits* shall conform to Section 9.9.

4) Windows and doors installed to provide the required *means of egress* from bedrooms shall conform to Subsection 9.9.10.

5) The location and protection of windows, doors and skylights in order to control the spread of fire shall conform to Subsection 9.10.12.

6) Doors between *dwelling units* and attached garages shall conform to Article 9.10.13.15.

7) The surface *flame-spread rating* for doors and skylights shall conform to Article 9.10.17.1.

8) Windows and doors installed to provide the required access to a *building* for firefighting purposes shall conform to Subsection 9.10.20.

9) Windows and skylights installed to provide required non-heating season ventilation shall conform to Article 9.32.2.2.

10) Windows, doors and skylights shall conform to the energy efficiency requirements in Section 9.36.

9.7.3. Performance of Windows, Doors and Skylights

9.7.3.1. General Performance Expectations

1) Except as provided in Sentences (2) to (4), windows, doors and skylights and their components separating *conditioned space* from unconditioned space or the exterior shall be designed, constructed and installed so that, when in the closed position, they

a) resist the ingress of precipitation into interior space (see Note A-9.7.4.2.(1)),
b) resist wind loads,
c) control air leakage,
d) resist the ingress of insects and vermin,
e) where required, resist forced entry, and
f) are easily operable when not intended to be fixed.

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

3) Where windows, doors and skylights and their components separate *suites* from the remainder of the *building*, they shall be designed, constructed and installed so that, when in the closed position, they

a) control air leakage,
b) where required, resist forced entry, and
c) are easily operable when not intended to be fixed.

4) Storm doors for sliding doors and their components shall be designed, constructed and installed so that, when in the closed position, they

a) resist wind loads,
b) control air leakage to a minimum allowable 5 (m^3/h)/m and a maximum allowable 8.35 (m^3/h)/m,
c) resist the ingress of insects and vermin, and
d) be easily operable.

5) Compliance with the performance requirements described in Sentences (1) to (4) shall be demonstrated by

a) complying with the requirements in
   i) Subsection 9.7.4. or 9.7.5., and
   ii) Subsection 9.7.6., or
b) design and construction conforming to Part 5.

2) Except as otherwise specified in this Section, materials used for exterior dampproofing shall

a) conform to one of the following standards:
   i) ASTM D1227/D1227M, "Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing," Type III, Class I,
   ii) ASTM D4479/D4479M, "Standard Specification for Asphalt Roof Coatings – Asbestos-Free," Type III,
   iii) CAN/CGSB-51.34, "Polyethylene sheet for use in building construction – Material specification," or
   iv) CAN/CSA-A123.4, "Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems,"or
b) have a water vapour permeance of not more than 43 ng/(Pa×s×m^2) when tested in accordance with Procedure B (wet cup) of ASTM E96/E96M, "Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials," and consist of one of the following material types:
   i) a vapour-resistant coating,
   ii) a cold-fluid-applied or hot-rubberized bituminous dampproofing membrane,
   iii) a liquid-applied or spray-applied asphalt-based emulsion dampproofing, or
   iv) a type III hot-applied asphalt.

9.13.2.3. Preparation of Surface

1) The area in which dampproofing is to be carried out shall be kept free of water during the application and curing of the dampproofing system.

2) The surface to be dampproofed shall be prepared in accordance with the instructions of the dampproofing material manufacturer.

3) Where the dampproofing material is to be applied on insulating concrete form (ICF) walls, the instructions of the ICF wall manufacturer shall be followed.

4) Unit masonry walls to be dampproofed shall be parged on the exterior face below ground level with not less than 6 mm of mortar conforming to Section 9.20. coved over the footing.

5) Concrete walls to be dampproofed shall have holes and recesses sealed with cement mortar or a mastic or sealant that is suitable for vertical applications and compatible with the dampproofing material.

6) The surface required to be dampproofed shall be clean and dry and free of ice, snow, frost, dust, dirt, oil, grease, cracks, projections and depressions, loose particles and debris that could be detrimental to the performance of the material to be applied.

9.13.2.4. Application of Dampproofing Material

1) Exterior dampproofing shall be applied from finished ground level to the top of the exterior of the footing.

2) Unless otherwise stated in this Subsection, dampproofing shall be installed in accordance with the manufacturer's instructions with regard to

a) surface priming,
b) conditions during application,
c) application quantity and rate, and
d) curing times.

3) Joints, cracks and penetrations shall be sealed to maintain the continuity of the dampproofing, where the dampproofing material is not capable of bridging such discontinuities.

9.13.2.5. Moisture Protection for Interior Finishes

(See Note A-9.13.2.5.)

1) The interior surface of *foundation* walls below ground level shall be protected by means that minimize the ingress of moisture from the *foundation* wall into interior spaces, where

a) a separate interior finish is applied to a concrete or unit masonry wall that is in contact with the *soil*, or
b) wood members are placed in contact with such walls for the installation of insulation or finish.

2) Except as provided in Sentence (3), where the protection of interior finishes required in Sentence (1) consists of membranes or coatings,

a) the membrane or coating shall extend from the *basement* floor surface up to the highest extent of the interior insulation or finish, but not higher than the exterior finished ground level, and
b) no membrane or coating with a permeance less than 170 ng/(Pa×s×m^2) shall be applied to the interior surface of the *foundation* wall above ground level between the insulation and the *foundation* wall.

3) Where insulation functions as both moisture protection for interior finishes and as a *vapour barrier* in accordance with Subsection 9.25.4., it shall be applied over the entire interior surface of the *foundation* wall.

9.13.2.6. Dampproofing of Floors-on-Ground

1) Where dampproofing is installed below the floor, it shall consist of

a) polyethylene not less than 0.15 mm thick with joints lapped not less than 100 mm,
b) type S roll roofing with joints lapped not less than 100 mm, or
c) rigid extruded/expanded polystyrene with sealed or ship-lapped joints that has
   i) sufficient compressive strength to support the floor assembly, and
   ii) a water vapour permeance complying with Clause 9.13.2.2.(2)(b).

2) Where dampproofing is installed between a floor-on-ground and a finished floor, it shall consist of

a) rigid extruded/expanded polystyrene with sealed or ship-lapped joints that has
   i) sufficient compressive strength to support the floor assembly, and
   ii) a water vapour permeance complying with Clause 9.13.2.2.(2)(b), or
b) polyethylene not less than 0.05 mm thick with joints lapped not less than 100 mm.

9.13.3. Waterproofing

9.13.3.1. Required Waterproofing

1) Where hydrostatic pressure occurs, waterproofing is required for assemblies separating interior space from the ground to prevent the ingress of water into *building* assemblies and interior spaces.

2) Waterproofing is required for roofs of underground structures to prevent the ingress of water into *building* assemblies and interior spaces.

9.13.3.2. Waterproofing Materials

1) Materials installed to provide required waterproofing shall be

a) compatible with adjoining materials, and
b) resistant to mechanisms of deterioration that may reasonably be expected, given the nature, function and exposure of the materials.

9.23.6. Anchorage

9.23.6.1. Anchorage of Building Frames

1) Except as required by Sentence 9.23.6.3.(1), *building* frames shall be anchored to the *foundation* unless a structural analysis that considers wind and earthquake loads and lateral earth pressures shows that anchorage is not required.

2) Except as provided in Sentences (3) to (6), anchorage shall be provided by
a) embedding the ends of the first floor joists in concrete, or
b) fastening the sill plate to the *foundation* with not less than 12.7 mm diam anchor bolts spaced not more than 2.4 m o.c.

3) For *buildings* with 2 or more floors supported by frame walls that are in areas where the seismic spectral acceleration, $S_a(0.2)$, is not greater than 0.70 or the 1-in-50 hourly wind pressure (HWP) is equal to or greater than 0.80 kPa but not greater than 1.20 kPa, anchorage shall be provided by fastening the sill plate to the *foundation* with not less than two anchor bolts per *braced wall panel*, where all anchor bolts used are
a) not less than 15.9 mm in diameter, located within 0.5 m of the end of the *foundation*, and spaced not more than 2.4 m o.c, or
b) not less than 12.7 mm in diameter, located within 0.5 m of the end of the *foundation*, and spaced not more than 1.7 m o.c.

4) For *buildings* supported by frame walls that are in areas where the seismic spectral acceleration, $S_a(0.2)$, is greater than 0.70 but not greater than 1.8 and the 1-in-50 hourly wind pressure (HWP) is not greater than 1.20 kPa, anchorage shall be provided by fastening the sill plate to the *foundation* with not less than two anchor bolts per *braced wall panel* located within 0.5 m of the end of the *foundation* and spaced in accordance with Table 9.23.6.1.

Table 9.23.6.1.
Anchor Bolt Spacing where the 1-in-50 HWP ≤ 1.20 kPa and 0.70 < $S_a(0.2)$ ≤ 1.8
Forming Part of Sentence 9.23.6.1.(4)

Anchor Bolt Diameter, mm	$S_a(0.2)$	Maximum Spacing of Anchor Bolts Along *Braced Wall Band*, m				
		Light Construction			Heavy Construction[1]	
		Number of Floors Supported[2]				
		1	2	3	1	2
12.7	$0.70 < S_a(0.2) \le 0.80$	2.4	2.3	1.8	2.4	2.0
	$0.80 < S_a(0.2) \le 0.90$	2.4	2.3	1.8	2.4	2.0
	$0.90 < S_a(0.2) \le 1.0$	2.4	2.2	1.5	2.4	1.8
	$1.0 < S_a(0.2) \le 1.1$	2.4	2.1	1.4	2.4	1.6
	$1.1 < S_a(0.2) \le 1.2$	2.4	2.0	1.3	2.4	1.5
	$1.2 < S_a(0.2) \le 1.3$	2.4	1.9	1.3	2.4	1.5
	$1.3 < S_a(0.2) \le 1.35$	2.4	1.8	1.2	2.3	1.4
	$1.35 < S_a(0.2) \le 1.8$	2.4	1.8	1.1	2.3	1.4
15.9	$0.70 < S_a(0.2) \le 0.80$	2.4	2.4	2.2	2.4	2.4
	$0.80 < S_a(0.2) \le 0.90$	2.4	2.4	2.2	2.4	2.4
	$0.90 < S_a(0.2) \le 1.0$	2.4	2.4	2.1	2.4	2.3
	$1.0 < S_a(0.2) \le 1.1$	2.4	2.4	1.9	2.4	2.3
	$1.1 < S_a(0.2) \le 1.2$	2.4	2.4	1.9	2.4	2.2
	$1.2 < S_a(0.2) \le 1.3$	2.4	2.4	1.8	2.4	2.1
	$1.3 < S_a(0.2) \le 1.35$	2.4	2.3	1.7	2.4	2.0
	$1.35 < S_a(0.2) \le 1.8$	2.4	2.2	1.6	2.4	1.9

9.25.4. Vapour Barriers

9.25.4.1. Required Barrier to Vapour Diffusion

1) Thermally insulated wall, ceiling and floor assemblies shall be constructed with a *vapour barrier* so as to provide a barrier to diffusion of water vapour from the interior into wall spaces, floor spaces or *attic or roof spaces*.

9.25.4.2. Vapour Barrier Materials

1) Except as provided in Sentence (2), *vapour barriers* shall have a permeance not greater than 60 ng/(Pa×s×m^2) measured in accordance with ASTM E96/E96M, "Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials," using the desiccant method (dry cup).

2) Thermally insulated *foundation* wall assemblies are permitted to be constructed with variable-permeance *vapour barriers* having a permeance not greater than 60 ng/(Pa×s×m^2) using the desiccant method (dry cup) and greater than 300 ng/(Pa×s×m^2) using the water method (wet cup) measured in accordance with ASTM E96/E96M, "Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials."(See Note A-9.25.4.2.(2).)

3) Where the intended use of the interior space will result in high moisture generation, the assembly shall be designed according to Part 5. (See Note A-9.25.4.2.(3).)

4) Where polyethylene is installed to serve only as the *vapour barrier*, it shall comply with Clause 9.3, Outdoor weathering resistance and retained tensile elongation, and Clause 9.4, Oxidative induction time, of CAN/CGSB-51.34, "Polyethylene sheet for use in building construction – Material specification."

5) Membrane-type *vapour barriers* other than polyethylene shall conform to the requirements of CAN/CGSB-51.33-M, "Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction."

6) Membrane-type *vapour barriers* other than polyethylene that are susceptible to deterioration under prolonged exposure to direct ultraviolet radiation shall

a) be covered, or
b) only be installed in locations that are not exposed to direct ultraviolet radiation after the completion of construction.

(See Note A-9.25.4.2.(6).)

7) Where a coating is applied to gypsum board to function as the *vapour barrier*, the permeance of the coating shall be determined in accordance with CAN/CGSB-1.501-M, "Method for Permeance of Coated Wallboard."

8) Where foamed plastic insulation functions as the *vapour barrier*, it shall be sufficiently thick so as to meet the requirement of Sentence (1).

9.25.4.3. Installation of Vapour Barriers

1) Products installed to function as the *vapour barrier* shall protect the warm side of wall, ceiling and floor assemblies.

2) Where different products are used for the *vapour barrier* and the insulation, the *vapour barrier* shall be installed sufficiently close to the warm side of the insulation to prevent condensation at design conditions. (See Notes A-9.25.4.3.(2) and A-9.25.5.1.(1).)

3) Where the same product is used for the *vapour barrier* and the insulation, the product shall be installed sufficiently close to the warm side of the assembly to prevent condensation at design conditions. (See Notes A-9.25.4.3.(2), A-9.25.5.1.(1) and A-9.25.5.2.)

9.26.13.2. Support

1) Except as provided in Sentence 9.23.16.1.(1), where sheet metal roofing is not supported by roof decking but spans between spaced supports, the panels shall be designed to support the specified *live loads* for roofs.

9.26.14. Glass Reinforced Polyester Roofing

9.26.14.1. Support

1) Except as provided in Sentence 9.23.16.1.(1), where glass-reinforced polyester roofing panels are not supported by roof decking but span between spaced supports, the panels shall be designed to support the specified live roof loads.

9.26.15. Hot Applied Rubberized Asphalt Roofing

9.26.15.1. Installation

1) Hot applied rubberized asphalt roofing shall be installed in accordance with CAN/CGSB-37.51-M, "Application for Hot-Applied Rubberized Asphalt for Roofing and Waterproofing."

9.26.16. Polyvinyl Chloride Sheet Roofing

9.26.16.1. Installation

1) Polyvinyl chloride sheet applied roofing membrane shall be installed in accordance with CGSB 37-GP-55M, "Application of Sheet Applied Flexible Polyvinyl Chloride Roofing Membrane."

9.26.17. Concrete Roof Tiles

9.26.17.1. Installation

1) Except as provided in Sentence 9.23.16.1.(1), concrete roof tiles shall be installed according to CAN/CSA-A220 Series, "Concrete Roof Tiles." (See Note A-9.26.17.1.(1).)

9.26.18. Roof Drains and Downspouts

9.26.18.1. Roof Drains

1) When roof drains are provided they shall conform to Part 7.

9.26.18.2. Downspouts

1) Where downspouts are provided and are not connected to a sewer, extensions shall be provided to carry rainwater away from the *building* in a manner which will prevent *soil* erosion.

Section 9.27. Cladding

9.27.1. Application

9.27.1.1. General

1) Where lumber, wood shingles, shakes, fibre-cement shingles, planks or sheets, plywood, OSB, waferboard, hardboard, vinyl, insulated vinyl, polypropylene, aluminum or steel, including trim and soffits, is installed as cladding on wood-frame walls or above-ground flat insulating concrete form walls exposed to precipitation, the cladding assembly shall comply with

a) Subsections 9.27.2. to 9.27.13., or
b) Part 5.

Table 9.36.3.10. (Continued)

(6) Decorative gas-fired fireplaces and *stoves* shall not be used to satisfy heating requirements or as part of the heating system required by Section 9.33.
(7) Does not include *stoves* with an oven whose volume is greater than 0.028 m^3.
(8) Minimum performance values are omitted from the Table in cases where the referenced standard itself contains such requirements. Equipment tested to the referenced standards provides an acceptable level of energy performance.
(9) See Sentence 9.36.3.6.(3).

2) Natural gas and propane fireplaces shall be
a) direct-vent (sealed), and
b) pilot-on-demand, interrupted or intermittent ignition systems without a standing pilot light.

3) The heat source component of combined space- and service water heating systems that are not within the scope of CAN/CSA-P.9, "Test method for determining the performance of combined space and water heating systems (combos)," shall meet the performance requirements stated in Table 9.36.3.10. for the applicable equipment type. (See Note A-9.36.3.10.(3).)

9.36.3.11. Solar Thermal Systems

1) Space-heating systems that use solar thermal technology shall conform to the manufacturer's design requirements and installation procedures.

2) Service water heating systems that use solar thermal technology shall be installed in accordance with the NPC.

3) Hot water storage tanks associated with the systems referred to in Sentence (2) shall be installed in a *conditioned space*.

9.36.4. Service Water Heating Systems

9.36.4.1. Scope and Application

1) This Subsection is concerned with the efficient use of energy by systems used to heat service water for household use as well as for indoor pools and hot tubs.

2) Where service water heating equipment or techniques other than those described in this Subsection are used, the *building* shall be designed and constructed in accordance with the energy efficiency requirements of the NECB.

9.36.4.2. Equipment Efficiency

1) *Service water heaters*, *boilers*, pool heaters and storage tanks shall comply with the performance requirements stated in Table 9.36.4.2. (See Note A-9.36.4.2.(1).)

2) Hot service water storage tanks not listed in Table 9.36.4.2. shall be covered with insulation having a minimum thermal resistance of 1.8 (m^2×K)/W.

Table 9.36.5.15.-C
Part-Load Adjustment Factors for Boilers, Combination Systems and Integrated Mechanical Systems
Forming Part of Subclause 9.36.5.15.(6)(b)(iii)

Fuel Source	Type of Equipment	Part-Load Ratio		
		0.15	0.4	1.0
		Adjustment Factors		
Gas	*Boiler*	1.03	1.02	1.0
	Integrated mechanical systems(1) within the scope of CSA P.10(2)	N/A	N/A	N/A
	Combination space- and service water heating systems within the scope of CAN/CSA-P.9(2)	N/A	N/A	N/A
	Combination space- and service water heating systems not within the scope of CAN/CSA-P.9	Same as gas *boiler*		
Oil	*Boiler*	1.03	1.02	1.0
	Combination space- and service water heating systems within the scope of CAN/CSA-P.9(2)	N/A	N/A	N/A
	Combination space- and service water heating systems not within the scope of CAN/CSA-P.9	Same as oil *boiler*		

Notes to Table 9.36.5.15.-C:
(1) Integrated mechanical systems perform all three functions of space-heating, water-heating and heat-recovery ventilation.
(2) The part-load characteristics of these types of systems shall not be accounted for in the energy model calculations.

7) The performance of the HVAC equipment in the reference house shall be modeled
a) as conforming to Table 9.36.3.10. for the corresponding type, fuel source and capacity of equipment in the proposed house, or
b) where the HVAC equipment for the proposed house is not addressed in Table 9.36.3.10., as a gas-fired warm-air *furnace* using single-phase electric current conforming to Table 9.36.3.10.

8) Where a heat-recovery ventilator is installed in the reference house, the energy model calculations shall only account for the recovery of sensible heat using the efficiency ratings in Sentence 9.36.3.9.(3). (See Note A-9.36.5.15.(8).)

9) The energy model calculations shall assume all ventilation and circulation fans required to be modeled in the reference house are equipped with permanent-split capacitor (PSC) motors.

10) Where a forced-air system is installed in the reference house, the energy model calculations shall assume the circulation fan operates when the heating, cooling or principal ventilation system is called for.

11) Where the reference house contains multiple HVAC systems, the circulation fan power shall be the sum of the circulation fan power capacity of each system.

12) The principal ventilation flow rate, in L/s, prescribed in Section 9.32. shall be multiplied by 2.32 W/L/s to determine the ventilation fan power capacity, in W, to be used in the energy model calculations for each fan on the exhaust side and, where applicable, on the supply side.

13) Where a heat-recovery ventilator is required in the reference house in accordance with Article 9.36.3.8., the ventilation flow rate, in L/s, in the zone served by the pool or hot tub shall be multiplied by 4.18 W/L/s to determine the heat-recovery ventilator power, in W, to be used in the energy model calculations.

14) Where a forced-air system is installed in the reference house, the system's capacity, in W, shall be multiplied by one of the following factors to determine the circulation fan flow rate, in L/s:

a) 0.0604 for heat pumps, and
b) 0.0251 for all other types of heating systems.

15) Where a forced-air system is installed in the reference house, the circulation fan flow rate, in L/s, shall be multiplied by 2.30 W/L/s to determine the circulation fan power capacity, in W.

16) For natural gas-, oil-, propane- and wood-burning heating systems, the energy model calculations shall set the auxiliary electricity capacity, including that of combustion fans, to 208 W during operation.

9.36.5.16. Modeling Service Water Heating System of Reference House

1) The energy source of the reference house's service water heating system, which is gas, electricity, oil, propane, wood or a heat pump, shall be the same as that for the system in the proposed house.

2) The service water heating system in the reference house shall be sized in accordance with Subsection 9.31.6. with regard to output capacity.

3) Except as required by Table 9.36.5.16., the performance of the service water heating equipment in the reference house shall be modeled as conforming to Table 9.36.4.2. for the energy source, capacity and type of service water heating equipment in the proposed house.

Table 9.36.5.16.
Performance of Service Water Heating (SWH) Equipment in the Reference House
Forming Part of Sentence 9.36.5.16.(3)

Type of SWH Equipment in Proposed House	Input for Proposed SWH Equipment	Type of SWH Equipment to be Used for Reference House	Input for Reference SWH Equipment
Gas-fired tankless *service water heater*	≤ 73.2 kW	Gas-fired storage type	≤ 22 kW
	> 73.2 kW		> 22 kW
Oil-fired tankless *service water heater*	≤ 61.5 kW(1)	Oil-fired storage type	≤ 30.5 kW(1)
	Other		> 30.5 kW
Not listed in Table 9.36.4.2.	—	Gas-fired storage type	> 22 kW, modeled as conforming to Table 9.36.4.2.

Notes to Table 9.36.5.16.:
(1) Consistent with the U.S. Congress "National Appliance Energy Conservation Act of 1987."

9.36.6. Airtightness of Building Envelope

9.36.6.1. Scope and Application

1) This Subsection is concerned with

a) determining the airtightness of *buildings* and *dwelling units* and parts thereof
   i) for use in the energy model calculations described in Subsection 9.36.5., or
   ii) for use in determining the Airtightness Level for the purposes of Clause (b), and
b) determining the Airtightness Level for a *building* or *dwelling unit* to demonstrate compliance with Article 9.36.8.8.

9.36.8.7. Energy Conservation Measures for Opaque Building Assemblies Below-Grade or in Contact with the Ground

1) Opaque *building* assemblies below-grade or in contact with the ground shall be designed and constructed in accordance with Sentences 9.36.2.8.(2) to (10) and this Article.

2) Except as permitted by Article 9.36.2.5., the effective thermal resistance of *foundation* walls shall be not less than that shown for the applicable heating degree-days of the *building* location in Table 9.36.2.8.-B.

3) *Foundation* walls that comply with one of the energy conservation measures prescribed in Table 9.36.8.7. shall be credited with the corresponding energy conservation points stipulated therein.

4) Where *foundation* walls are constructed with more than one effective thermal resistance (RSI) value, the lowest effective RSI value of any of these walls shall be used to determine the applicable energy conservation points from Table 9.36.8.7.

Table 9.36.8.7.
Energy Conservation Measures and Points for Opaque Building Assemblies Below-Grade or In Contact with Ground
Forming Part of Sentences 9.36.8.7.(3) and (4)

Energy Conservation Measures for *Foundation* Walls – Minimum Effective RSI Values, $(m^2 \times K)/W$	Heating Degree-Days of *Building* Location, 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
	Energy Conservation Points					
2.98	1.7	–	–	–	–	–
3.09	1.8	0.2	0.2	0.2	0.2	–
3.46	2.2	0.6	0.8	0.6	0.7	–
3.90	2.6	1.2	1.4	1.1	1.3	–

9.36.8.8. Energy Conservation Measures Relating to Airtightness

1) *Buildings* to which this Subsection applies shall be designed and constructed in accordance with

a) Articles 9.36.2.9. and 9.36.2.10., or
b) Article 9.36.2.9. and Sentences 9.36.2.10.(1) to (7) and shall, where airtightness testing is carried out in accordance with Subsection 9.36.6., comply with an Airtightness Level listed in Table 9.36.6.4.-A or 9.36.6.4.-B.

2) *Buildings* that comply with an Airtightness Level determined in accordance with Clause (1)(b) shall be credited with the corresponding energy conservation points stipulated in Table 9.36.8.8.

Table 9.36.8.8.
Energy Conservation Measures and Points for Airtightness
Forming Part of Sentence 9.36.8.8.(2)

Energy Conservation Measures for Airtightness – Airtightness Levels(1)	Heating Degree-Days of *Building* Location, 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
	Energy Conservation Points					
Airtightness Levels from Table 9.36.6.4.-A						
AL-1A	–	–	–	–	–	–
AL-2A	2.2	3.0	3.5	4.6	4.1	4.6

Table 9.36.8.8. (Continued)

Energy Conservation Measures for Airtightness – Airtightness Levels(1)	Heating Degree-Days of *Building* Location, 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
	Energy Conservation Points					
AL-3A	4.0	6.0	6.9	9.1	8.2	9.3
AL-4A	6.0	9.1	10.4	13.6	12.3	14.2
AL-5A	7.7	11.6	13.3	17.4	15.6	18.2
Airtightness Levels from Table 9.36.6.4.-B						
AL-1B	–	–	–	–	–	–
AL-2B	2.0	3.4	3.5	4.6	6.1	6.1
AL-3B	4.0	6.7	7.0	9.3	12.1	12.1
AL-4B	5.9	10.1	10.5	13.9	18.0	18.0
AL-5B	7.6	13.0	13.4	17.8	22.7	22.7

Notes to Table 9.36.8.8.:

(1) All *dwelling units* and common spaces in a *building*, or the whole *building*, must meet the Airtightness Level for which energy conservation points are being credited.

9.36.8.9. Energy Conservation Measures for HVAC Systems

1) HVAC systems, equipment and installations shall be designed and constructed in accordance with Articles 9.36.3.2. to 9.36.3.8. and this Article.

2) Where HVAC systems, equipment or techniques other than those described in Articles 9.36.3.2. to 9.36.3.8. and this Article are used, the *building* shall be designed and constructed in accordance with the NECB.

3) Ventilation systems serving *buildings* to which this Subsection applies shall be equipped with a heat-recovery ventilator conforming to Article 9.36.3.9.

4) Heat-recovery ventilators that comply with one of the energy conservation measures prescribed in Table 9.36.8.9. shall be credited with the corresponding energy conservation points stipulated therein.

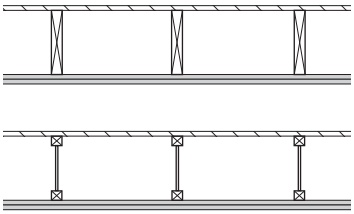
Table 9.36.8.9.
Energy Conservation Measures and Points for Ventilation Systems
Forming Part of Sentence 9.36.8.9.(4)

Energy Conservation Measures for Ventilation Systems – Sensible Heat-Recovery Efficiency, SRE(1)	Heating Degree-Days of *Building* Location, 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
	Energy Conservation Points					
60% ≤ SRE < 65%	0.7	0.7	0.7	0.6	0.8	0.4
65% ≤ SRE < 75%	2.1	2.1	2.2	1.7	2.3	1.2
75% ≤ SRE < 84%	3.4	3.2	3.5	2.7	3.7	1.8

Notes to Table 9.36.8.9.:

(1) SRE = sensible recovery efficiency measured at an outside air test temperature of 0°C

Table 9.10.3.1.-B (Continued)

Type of Assembly	Assembly Number	Description[2][3][4]	*Fire-Resistance Rating*[5][6][7][8]	Typical *Sound Transmission Class* [5][6][7][9][10][11] (*STC*)	Typical Impact Insulation Class[5][9][12] (IIC)
	F3c	F3 with • no absorptive material in cavity • 12.7 mm Type X gypsum board	-	27	26
	F3d	F3 with • absorptive material in cavity • 12.7 mm Type X gypsum board	-	29	29
	F3e	F3 with • no absorptive material in cavity • 12.7 mm regular gypsum board	-	27	25
	F3f	F3 with • absorptive material in cavity • 12.7 mm regular gypsum board	-	29	28
	F4[14]	• subfloor of 15.5 mm plywood, OSB or waferboard, or 17 mm tongue and groove lumber • on wood joists or wood I-joists spaced not more than 600 mm o.c. • with or without absorptive material in cavity • 2 layers of gypsum board on ceiling side	 GG00103A		
	F4a	F4 with • wood joists or wood I-joists spaced 400 mm o.c. • no absorptive material in cavity • 15.9 mm Type X gypsum board	1 h	33	31
	F4b	F4 with • wood joists or wood I-joists spaced 600 mm o.c. • no absorptive material in cavity • 15.9 mm Type X gypsum board	1 h	34	31
	F4c	F4 with • wood joists or wood I-joists spaced 400 mm o.c. • absorptive material in cavity • 15.9 mm Type X gypsum board	45 min [1 h][15]	35	34
	F4d	F4 with • wood joists or wood I-joists spaced 600 mm o.c. • absorptive material in cavity • 15.9 mm Type X gypsum board	45 min	38	34
	F4e	F4 with • wood joists or wood I-joists spaced 400 mm o.c. • no absorptive material in cavity • 12.7 mm Type X gypsum board	1 h	32	30
	F4f	F4 with • wood joists or wood I-joists spaced 600 mm o.c. • no absorptive material in cavity • 12.7 mm Type X gypsum board	45 min	33	30
	F4g	F4 with • wood joists or wood I-joists spaced 400 mm o.c. • absorptive material in cavity • 12.7 mm Type X gypsum board	45 min	34	33
	F4h	F4 with • wood joists or wood I-joists spaced 600 mm o.c. • absorptive material in cavity • 12.7 mm Type X gypsum board	-	35	33

and deep to accommodate a person's fingers and thumb must be provided on both sides of the handrail, at the bottom of the graspable portion, which must not have any sharp edges.

A-9.8.7.7. Attachment of Handrails. Handrails are intended to provide guidance and support to the stair user and to arrest falls. The loads on handrails may therefore be considerable. The attachment of handrails serving a single dwelling unit may be accepted on the basis of experience or structural design.

A-9.8.8.1. Required Guards. The requirements relating to guards stated in Part 9 are based on the premise that, wherever there is a difference in elevation of 600 mm or more between two floors, or between a floor or other surface to which access is provided for other than maintenance purposes and the next lower surface, the risk of injury in a fall from the higher surface is sufficient to warrant the installation of some kind of barrier to reduce the chances of such a fall. A wall along the edge of the higher surface will obviously prevent such a fall, provided the wall is sufficiently strong that a person cannot fall through it. Where there is no wall, a guard must be installed. Because guards clearly provide less protection than walls, additional requirements apply to guards to ensure that a minimum level of protection is provided. These relate to the characteristics described in Notes A-9.8.8.3., A-9.8.8.5.(1) and (3), A-9.8.8.5.(4) and A-9.8.8.6.(1).

Examples of such surfaces where the difference in elevation could exceed 600 mm and consequently where guards would be required include, but are not limited to, landings, porches, balconies, mezzanines, galleries, and raised walkways. Especially in exterior settings, surfaces adjacent to walking surfaces, stairs or ramps often are not parallel to the walking surface or the surface of the treads or ramps. Consequently, the walking surface, stair or ramp may need protection in some locations but not in others. (See Figure A-9.8.8.1.) In some instances, grades are artificially raised close to walking surfaces, stairs or ramps to avoid installing guards. This provides little or no protection for the users. That is why the requirements specify differences in elevation not only immediately adjacent to the construction but also for a distance of 1.2 m from it. (See Figure A-9.8.8.1.)

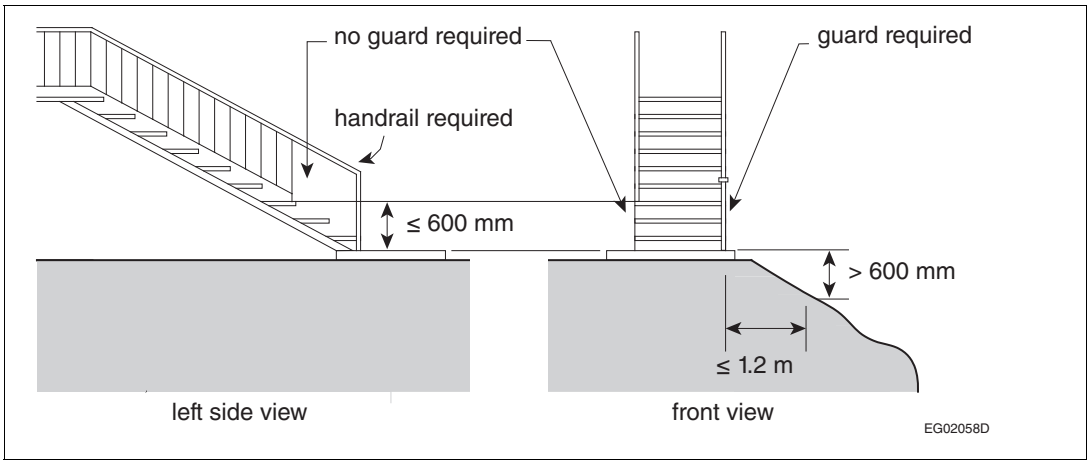


Figure A-9.8.8.1.
Guards for exterior walking surfaces

A-9.8.8.1.(4) Window Fall Prevention. The primary intent of the requirement is to minimize the likelihood of small children falling significant heights from open windows. Reflecting reported cases, the requirement applies to openable windows in dwelling units and generally those located on the second floor or higher of residential or mixed use buildings.

Once cracked open, some openable windows can be opened further by simply pushing on the openable part of the window. Care must be taken in selecting windows, as some with special operating hardware can still be opened further by simply pushing on the window or by deactivating a spring-loaded button or other mechanism that is not considered a window opening control device (WOCD) that could be inadvertently operated by a young child. A technical description of WOCDs can be found in ASTM F2090, "Standard Specification for Window Fall Prevention Devices With Emergency Escape (Egress) Release Mechanisms."

Examples of mechanisms that can limit window openings to a maximum of 100 mm as required by Clause 9.8.8.1.(4)(b) include, but are not limited to, a fixed-stop lever, a fixed-length cable and a fixed-position stop block. It is important to note that rotary opening mechanisms cannot limit window openings to 100 mm as required by Clause 9.8.8.1.(4)(b) and that windows with such mechanisms cannot act as guards as required

by Clause 9.8.8.1.(4)(a), even when the crank handle is removed. Similarly, awning windows with scissor hardware may not keep the window from swinging open once it is unlatched. Hopper windows would be affected only if an opening is created at the bottom as well as at the top of the window. The requirement will impact primarily on the use of sliding windows which do not incorporate devices in their construction that can be used to limit the openable area of the window.

The 100 mm opening limit stated in Sentence 9.8.8.1.(4) is recognized as the maximum opening size required to protect small children from falling through open windows. The minimum 900 mm height of the openable portion of windows required by Sentence 9.8.8.1.(5) corresponds to the minimum height of guards required by Sentence 9.8.8.3.(2) as a means of fall protection in residential occupancies.

A-9.8.8.2. Loads on Guards. Guards must be constructed so as to be strong enough to protect persons from falling under normal use. Many guards installed in dwelling units or on exterior stairs serving one or two dwelling units have demonstrated acceptable performance over time. The loading described in the first row of Table 9.8.8.2. is intended to be consistent with the performance provided by these guards. Examples of guard construction presented in the "2012 Building Code Compendium, Volume 2, Supplementary Standard SB-7, Guards for Housing and Small Buildings" meet the criteria set in the National Building Code for loads on guards, including the more stringent requirements of Sentences 9.8.8.2.(1) and (3).

The load on guards within dwelling units, or on exterior guards serving not more than two dwelling units, is to be imposed over an area of the guard such that, where standard balusters are used and installed at the maximum 100 mm spacing permitted for required guards, 3 balusters will be engaged. Where the balusters are wider, only two may be engaged unless they are spaced closer together. Where the guard is not required, and balusters are installed more than 100 mm apart, fewer balusters may be required to carry the imposed load.

A-9.8.8.3. Minimum Heights. Guard heights are generally based on the waist heights of average persons. Generally, lower heights are permitted in dwelling units because the occupants become familiar with the potential hazards, and situations which lead to pushing and jostling under crowded conditions are less likely to arise.

A-9.8.8.5.(1) and (3) Risk of Falling through Guards. The risk of falling through a guard is especially prevalent for children. Therefore the requirements are stringent for guards in all buildings except industrial buildings, where children are unlikely to be present except under strict supervision.

A-9.8.8.5.(4) Risk of Children Getting Their Head Stuck between Balusters. The requirements to prevent children falling through guards also serve to provide adequate protection against this problem. However, guards are often installed where they are not required by the Code; i.e., in places where the difference in elevation is less than 600 mm. In these cases, there is no need to require the openings between balusters to be less than 100 mm. However, there is a range of openings between 100 mm and 200 mm in which children can get their head stuck. Therefore, openings in this range are not permitted except in buildings of industrial occupancy, where children are unlikely to be present except under strict supervision.

A-9.8.8.6.(1) Configuration of Members, Attachments or Openings in Guards so as to not Facilitate Climbing. Some configurations of members, attachments or openings may be part of a guard design and still comply with Sentence 9.8.8.6.(1). Figures A-9.8.8.6.(1)-A to A-9.8.8.6.(1)-D present a few examples of designs that are considered to not facilitate climbing.

Protrusions that are greater than 450 mm apart horizontally and vertically are considered sufficiently far apart to reduce the likelihood that young children will be able to get a handhold or toehold on the protrusions and climb the guard.

These span tables may be used where members support a uniform live load only. Where the members are required to be designed to support a concentrated load, they must be designed in conformance with Subsection 4.3.1.

Supported joist length in Span Tables 9.23.4.2.-H, 9.23.4.2.-I and 9.23.4.2.-J means half the sum of the joist spans on both sides of the beam. For supported joist lengths between those shown in the tables, straight line interpolation may be used in determining the maximum beam span.

Span Tables 9.23.4.2.-A to 9.23.12.3.-D cover only the most common configurations. Especially in the area of floors, a wide variety of other configurations is possible: glued subfloors, concrete toppings, machine stress rated lumber, etc. The Canadian Wood Council publishes "The Span Book," a compilation of span tables covering many of these alternative configurations. Although these tables have not been subject to the formal committee review process, the Canadian Wood Council generated all of the Code's span tables for wood structural components; thus Code users can be confident that the alternative span tables in "The Span Book" are consistent with the span tables in the Code and with relevant Code requirements.

Spans for wood joists, rafters and beams which fall outside the scope of these tables, including those for U.S. species and individual species not marketed in the commercial species combinations described in the span tables, can be calculated in conformance with CSA O86, "Engineering design in wood."

A-9.23.4.2.(2) Numerical Method to Establish Vibration-Controlled Spans for Wood-Frame Floors. In addition to the normal strength and deflection analyses, the calculations on which the floor joist span tables are based include a method of ensuring that the spans are not so long that floor vibrations could lead to occupants perceiving the floors as too "bouncy" or "springy." Limiting deflection under the normal uniformly distributed loads to 1/360 of the span does not provide this assurance.

Normally, vibration analysis requires detailed dynamic modeling. However, the calculations for the span tables use the following simplified static analysis method of estimating vibration-acceptable spans:

- The span which will result in a 2 mm deflection of a single joist supporting a 1 kN concentrated midpoint load is calculated.
- This span is multiplied by a factor, K, to determine the "vibration-controlled" span for the entire floor system. If this span is less than the strength- or deflection-controlled span under uniformly distributed load, the vibration-controlled span becomes the maximum span.
- The K factor is determined from the following relationship:

$$\ln(K) = A - B \times \ln(S_i/S_{184}) + G$$

where

A, B = constants, the values of which are determined from Tables A-9.23.4.2.(2)-A or A-9.23.4.2.(2)-B,
G = constant, the value of which is determined from Table A-9.23.4.2.(2)-C,
S_i = span which results in a 2 mm deflection of the joist in question under a 1 kN concentrated midpoint load,
S_{184} = span which results in a 2 mm deflection of a 38 × 184 mm joist of same species and grade as the joist in question under a 1 kN concentrated midpoint load.

For a given joist species and grade, the value of K shall not be greater than K_3, the value which results in a vibration-controlled span of exactly 3 m. This means that for vibration-controlled spans 3 m or less, K always equals K_3, and for vibration-controlled spans greater than 3 m, K is as calculated.

Note that, for a sawn lumber joist, the ratio S_i/S_{184} is equivalent to its depth (mm) divided by 184.

Due to rounding differences, the method, as presented here, might produce results slightly different from those produced by the computer program used to generate the span tables.

Table A-9.36.1.3.
Energy Efficiency Compliance Options for Part 9 Buildings

Building Types and Sizes	Energy Efficiency Compliance Options			
	NBC 9.36.2. to 9.36.4. (Prescriptive)	NBC 9.36.5. (Performance) or NBC 9.36.7. (Tiered Performance)	NBC 9.36.8. (Tiered Prescriptive)	NECB
• Houses with or without a secondary suite • Buildings containing only dwelling units with common spaces ≤ 20% of building's total floor area(1)	✓	✓	✓	✓
• Other buildings of residential occupancy to which Part 9 applies(2)	✓	X	✓	✓
• Buildings containing Group D, E or F3 occupancies whose combined total floor area ≤ 300 m² (excluding parking garages that serve residential occupancies) • Buildings with a mix of Group C and Group D, E or F3 occupancies where the non-residential portion's combined total floor area ≤ 300 m² (excluding parking garages that serve residential occupancies)	✓	X	X	✓
• Buildings containing Group D, E or F3 occupancies whose combined total floor area > 300 m² • Buildings containing F2 occupancies of any size	X	X	X	✓

Notes to Table A-9.36.1.3.:

(1) The walls that enclose a common space are excluded from the calculation of floor area of that common space.

(2) Refers to buildings other than
- houses with or without a secondary suite, and
- buildings containing only dwelling units with common spaces ≤ 20% of building's total floor area.

A-9.36.1.3.(3) Houses and Common Spaces.

Houses

For the purpose of Sentence 9.36.1.3.(3), the term "houses" includes detached houses, semi-detached houses, duplexes, triplexes, townhouses, row houses and boarding houses.

Common spaces

The walls that enclose a common space are excluded from the calculation of floor area of that common space.

A-9.36.1.3.(6) Exemptions. Examples of buildings and spaces that are exempted from the requirements of Section 9.36. include seasonally heated buildings, storage and parking garages, small service buildings or service rooms and unconditioned spaces in buildings. However, note that, where a building envelope assembly of an exempted building is adjacent to a conditioned space, this assembly must meet the requirements of Section 9.36.

A-9.36.2.1.(2) Wall or Floor between a Garage and a Conditioned Space. A wall or a floor between a conditioned space and a residential garage must be airtight and insulated because, even if the garage is equipped with space-heating equipment, it may in fact be kept unheated most of the time.

A-9.36.2.2.(3) Calculation Tools. The thermal characteristics of windows, doors and skylights can be calculated using software tools such as THERM and WINDOW.

A-9.36.3.8.(4)(a) Heat Recovery from Dehumidification in Spaces with an Indoor Pool or Hot Tub. Sentence 9.36.3.8.(4) is not intended to require that all air exhausted from a swimming pool or hot tub area pass through a heat-recovery unit, only sufficient air to recover 40% of the total sensible heat. Most heat-recovery units can recover more than 40% of the sensible heat from the exhausted air, but because it may not be cost-effective to reclaim heat from all exhaust systems, the overall recovery requirement is set at 40%.

A-9.36.3.9.(1) Heat Recovery in Dwelling Units. Whereas Section 9.32. addresses the effectiveness of mechanical ventilation systems in dwelling units from a health and safety perspective, Section 9.36. is concerned with their functioning from an energy efficiency perspective.

The requirements of Subsection 9.32.3. can be met using one of several types of ventilation equipment, among them heat-recovery ventilators (HRVs), which are typically the system of choice in cases where heat recovery from the exhaust component of the ventilation system is required. As such, Article 9.36.3.9. should be read in conjunction with the provisions in Subsection 9.32.3. that deal with HRVs.

A-9.36.3.9.(3) Efficiency of Heat-Recovery Ventilators (HRVs). HRVs are required to be tested in conformance with CAN/CSA-C439, "Laboratory methods of test for rating the performance of heat/energy-recovery ventilators," under different conditions to obtain a rating: to be rated for colder locations, HRVs must be tested at two different temperatures, as stated in Clause 9.36.3.9.(3)(b), whereas their rating for locations in mild climates relies only on the 0°C test temperature, as stated in Clause 9.36.3.9.(3)(a).

The performance of an HRV product and its compliance with Sentence 9.36.3.9.(3) can be verified using the sensible heat recovery at the 0°C and/or –25°C test station (i.e. location where the temperature is measured) published in the manufacturer's literature or in product directories, such as HVI's Certified Home Ventilating Products Directory.

The rating of HRVs also depends on the flow rate used during testing. Therefore, the minimum flow rate required in Section 9.32. needs to be taken into consideration when selecting an HRV product.

A-9.36.3.10.(1) Unit and Packaged Equipment. The minimum performance values stated in Table 9.36.3.10. were developed based on values and technologies found in the Model National Energy Code of Canada for Houses 1997, the NECB, federal, provincial and territorial energy efficiency regulations as well as in applicable standards on equipment typically installed in housing and small buildings.

In some cases—after a review of current industry practices (industry sales figures)—the performance requirements were increased from regulated minimums where it could be shown that the cost and availability of the equipment are acceptable. Some of the performance requirements are based on anticipated efficiency improvements in the energy efficiency regulations and revisions to standards.

A-9.36.3.10.(3) Multiple Component Manufacturers. Where components from more than one manufacturer are used as parts of a heating, ventilating or air-conditioning system, the system should be designed in accordance with good practice using component efficiency data provided by the component manufacturers to achieve the overall efficiency required by Article 9.36.3.10.

A-9.36.4.2.(1) Unit and Packaged Equipment. The minimum performance values stated in Table 9.36.4.2. were developed based on values and technologies found in the Model National Energy Code of Canada for Houses 1997, the NECB, federal, provincial and territorial energy efficiency regulations as well as in applicable standards on equipment typically installed in housing and small buildings.

In some cases—after a review of current industry practices (industry sales figures)—the performance requirements were increased from regulated minimums where it could be shown that the cost and availability of the equipment are acceptable.

A-9.36.4.2.(3) Exception. Components of solar hot water systems and heat pump systems are examples of service water heating equipment that is required to be installed outdoors.

A-9.36.4.6.(2) Required Operation of Pump. The water in indoor pools is pumped through filtration equipment at rates that will help prevent the build-up of harmful bacteria and algae based on water volume and temperature, frequency of pool use, number of swimmers, etc.

H

U

V

W