

# 2017 National Energy Code of Canada for Buildings (NECB)

## 2018 Revisions and Errata Package

Selected replacement pages have been produced for the NECB.

Please print and insert in your copy of the Code.



# Revisions and Errata

## Issued by the Canadian Commission on Building and Fire Codes

The Change Summary table that follows describes revisions and errata that apply to the National Energy Code of Canada for Buildings 2017:

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

Code pages containing revisions and/or errata are identified with the words “Amended Page” in the footer.

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

### Change Summary — National Energy Code of Canada for Buildings 2017

Division	Code Reference	Change	Date (Y-M-D)	Description of Change
A	1.3.1.1.(1)	erratum	2018-09-28	Sentence was corrected to read "Division A contains ..."
B	1.3.1.1.(1)	revision	2018-09-28	Date stated in Sentence was revised to read "30 June 2017"
	Table 1.3.1.2.	revision	2018-09-28	Document references were updated as applicable to reflect more recent editions published as of June 30, 2017
	Figure A-1.1.2.1.	erratum	2018-09-28	"NECB 2015" at the top of the flow chart was corrected to read "NECB 2017"
	Table 3.5.1.1.	errata	2018-09-28	Table was corrected as follows:
				Sentence 3.2.3.1.(3): "[F92,F95-OE1.1]" was corrected to read "[F92-OE1.1]"
				Sentence 3.2.3.1.(4): "[F92-OE1.1]" was corrected to read "[F92,F95-OE1.1]"
				Sentence 3.3.1.1.(7): entry was deleted
	Table 4.5.1.1.	errata	2018-09-28	Table was corrected as follows:
				Sentence 4.2.2.3.(9): entry was deleted
				Sentences 4.3.2.7.(2) and (3): entries were deleted
	Table 5.5.1.1.	errata	2018-09-28	Table was corrected as follows:
				Article 5.2.2.7.: entry was added as follows: "5.2.2.7. Cooling with Outdoor Air (1) [F95-OE1.1]"
				Article 5.2.3.4.: "(2) [F95,F97-OE1.1]" was added
Article 5.2.6.1.: entry was added as follows: "5.2.6.1. Application (2) [F95-OE1.1]"				
Article 5.3.1.3.: entry was deleted				
6.3.2.1.(3)	erratum	2018-09-28	Definition for ToV <sub>11</sub> was added as follows: "ToV <sub>11</sub> = boiler efficiency, determined as per Article 6.3.2.5."	
Table 6.5.1.1.	erratum	2018-09-28	Table was corrected as follows:	
			Article 6.3.1.3.: entry was deleted	

**Change Summary — National Energy Code of Canada for Buildings 2017 (Continued)**

Division	Code Reference	Change	Date (Y-M-D)	Description of Change
B (continued)	Table 7.5.1.1.	erratum	2018-09-28	Table was corrected as follows:
				Article 7.2.1.1.: entry was added as follows: "7.2.1.1. Monitoring (1) [F97-OE1.1] (2) [F97-OE1.1]"
	Table 8.5.1.1.	errata	2018-09-28	Table was corrected as follows:
				Article 8.4.3.4.: "(4) [F99-OE1.1]" was added
Sentence 8.4.4.7.(2): "(2)" was corrected to read "(3)"				
			Sentence 8.4.4.19.(3): "(3) (a) [F99-OE1.1] (a),(b),(d) [F100-OE1.1]" was corrected to read "(3) [F100-OE1.1]"	

# Part 1

## Compliance

### Section 1.1. General

#### 1.1.1. Application of this Code

##### 1.1.1.1. Application of this Code

**1)** Except as provided in Sentence (2), this Code applies to the design and construction of all new *buildings* described in Sentence 1.3.3.2.(1) of Division A of the NBC and to *additions*. (See Note A-1.1.1.1.(1).)

**2)** This Code does not apply to *farm buildings*.

##### 1.1.1.2. Building Parameters Covered by this Code

- 1)** This Code contains requirements for
- a) the design and construction of the *building envelope*,
  - b) the design and construction or specification of systems and equipment for
    - i) heating, ventilating or air-conditioning,
    - ii) *service water* heating, and
    - iii) lighting, and
  - c) the provision of electrical power systems and motors, excluding process loads.

##### 1.1.1.3. Relationship to Other Building Regulations

**1)** This Code shall be used in conjunction with applicable federal, provincial or territorial regulations or municipal bylaws or, in the absence of such regulations or bylaws, in conjunction with the NBC.

**2)** Where the requirements of this Code are in conflict with the requirements of the regulations or bylaws referred to in Sentence (1) or, where applicable, with the NBC, the requirements providing the greatest performance level shall govern.

### Section 1.2. Compliance

#### 1.2.1. Compliance with this Code

##### 1.2.1.1. Compliance with this Code

- 1)** Compliance with this Code shall be achieved by
- a) complying with the applicable acceptable solutions in Division B (see Note A-1.2.1.1.(1)(a)), or
  - b) using alternative solutions that will achieve at least the minimum level of performance required by Division B in the areas defined by the objective and functional statements attributed to the applicable acceptable solutions (see Note A-1.2.1.1.(1)(b)).

**2)** For the purposes of compliance with this Code as required in Clause (1)(b), the objective and functional statements attributed to the acceptable solutions in Division B shall be the objective and functional statements referred to in Subsection 1.1.2. of Division B.

**1.2.2. Materials, Appliances, Systems and Equipment****1.2.2.1. Characteristics of Materials, Appliances, Systems and Equipment**

1) All materials, appliances, systems and equipment installed to meet the requirements of this Code shall possess the necessary characteristics to perform their intended functions when installed in a *building*.

**1.2.2.2. Storage on the Building Site**

1) All *building* materials, appliances and equipment on the *building* site shall be stored in such a way as to prevent the deterioration or impairment of their essential properties.

**1.2.2.3. Used Materials, Appliances and Equipment**

1) Unless otherwise specified, used materials, appliances and equipment are permitted to be reused when they meet the requirements of this Code for new materials and are satisfactory for the intended use.

**Section 1.3. Divisions A, B and C of this Code****1.3.1. General****1.3.1.1. Scope of Division A**

1) Division A contains the compliance and application provisions, objectives and functional statements of this Code.

**1.3.1.2. Scope of Division B**

1) Division B contains the acceptable solutions of this Code.

**1.3.1.3. Scope of Division C**

1) Division C contains the administrative provisions of this Code.

**1.3.1.4. Internal Cross-references**

1) Where the Division of a referenced provision is not specified in this Code, it shall mean that the referenced provision is in the same Division as the referencing provision.

**1.3.2. Application of Division A****1.3.2.1. Application of Parts 1, 2 and 3**

1) Parts 1, 2 and 3 of Division A apply to all *buildings* covered in this Code. (See Article 1.1.1.1.)

**1.3.3. Application of Division B****1.3.3.1. Application of Parts 1 to 8**

1) Parts 1 to 8 of Division B apply to all *buildings* covered in this Code. (See Article 1.1.1.1.)

**1.3.4. Application of Division C****1.3.4.1. Application of Parts 1 and 2**

1) Parts 1 and 2 of Division C apply to all *buildings* covered in this Code. (See Article 1.1.1.1.)

# **Part 1 General**

## **Section 1.1. General**

### **1.1.1. Application**

#### **1.1.1.1. Application**

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

### **1.1.2. Compliance**

#### **1.1.2.1. Prescriptive, Trade-off or Performance Compliance**

(See Note A-1.1.2.1.)

- 1)** *Buildings* shall comply with
- a) the prescriptive or trade-off requirements stated in Parts 3 to 7, or
  - b) the performance requirements stated in Part 8.

### **1.1.3. Objective and Functional Statements**

#### **1.1.3.1. Attributions to Acceptable Solutions**

**1)** For the purpose of compliance with this Code as required in Clause 1.2.1.1.(1)(b) of Division A, the objective and functional statements attributed to the acceptable solutions in Division B shall be the objective and functional statements identified in Sections 3.5., 4.5., 5.5., 6.5., 7.5. and 8.5. (See Note A-1.1.3.1.(1).)

### **1.1.4. Basic Data and Calculation Methods**

#### **1.1.4.1. Climatic Values**

**1)** The climatic values required for the design of *buildings* under this Code shall be in conformance with the values established by the *authority having jurisdiction* or, in the absence of such data, with the climatic values in Table C-1 for the location nearest to the *building* site. (See Note A-1.1.4.1.(1).)

#### **1.1.4.2. Calculation Procedures**

- 1)** Calculations carried out to ensure compliance with this Code and not described in the balance of this Subsection or in other Parts of the Code shall be carried out using procedures recognized for the particular purposes, such as those described in, but not limited to:
- a) ASHRAE Handbooks, Standards and Guidelines,
  - b) "HRAI Digest,"
  - c) Hydronics Institute Manuals, and
  - d) ISO 13790, "Energy performance of buildings – Calculation of energy use for space heating and cooling."

## 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 3 to 8.

#### 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.

**2)** For the purposes of this Code, a semi-heated *building* is considered to be a *building* with a design set-point temperature of less than 15°C.

### 1.2.2. Symbols and Other Abbreviations

#### 1.2.2.1. Symbols and Other Abbreviations

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

## Section 1.3. Referenced Documents and Organizations

### 1.3.1. Referenced Documents

#### 1.3.1.1. Effective Date

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

#### 1.3.1.2. Applicable Editions

**1)** Where documents are referenced in this Code, they shall be the editions designated in Table 1.3.1.2. (See also Note A-1.5.1.1.(1) of Division A.)

**Table 1.3.1.2.**  
Documents Referenced in the National Energy Code of Canada for Buildings 2017  
Forming Part of Sentence 1.3.1.2.(1)

Issuing Agency	Document Number <sup>(1)</sup>	Title of Document <sup>(2)</sup>	Code Reference
AAMA	501.5-07	Thermal Cycling of Exterior Walls	3.2.4.3.(2)
AHRI	ANSI/AHRI 210/240-2008	Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment	Table 5.2.12.1.
AHRI	AHRI 310/380-2014/CSA C744-14	Packaged Terminal Air-Conditioners and Heat Pumps	Table 5.2.12.1.



**Table 1.3.1.2. (Continued)**

Issuing Agency	Document Number <sup>(1)</sup>	Title of Document <sup>(2)</sup>	Code Reference
AHRI	ANSI/AHRI 340/360-2007	Performance Rating of Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment	Table 5.2.12.1.
AHRI	ANSI/AHRI 366 (SI)-2009	Performance Rating of Commercial and Industrial Unitary Air-Conditioning Condensing Units	Table 5.2.12.1.
AHRI	ANSI/AHRI 390-2003	Performance Rating of Single Package Vertical Air-Conditioners and Heat Pumps	Table 5.2.12.1.
AHRI	ANSI/AHRI 460-2005	Performance Rating of Remote Mechanical-Draft Air-Cooled Refrigerant Condensers	Table 5.2.12.2.
AHRI	1061 (SI)-2013	Performance Rating of Air-to-Air Exchangers for Energy Recovery Ventilation Equipment	5.2.10.1.(5) A-5.2.10.1.(4)
AMCA	ANSI/AMCA 500-D-12	Testing Dampers for Rating	5.2.4.2.(2)
AMCA	ANSI/AMCA 500-L-12	Testing Louvers for Rating	5.2.4.2.(2)
ANSI/CSA	ANSI Z21.10.3-2013/CSA 4.3-2013	Gas-Fired Water Heaters, Volume III, Storage Water Heaters With Input Ratings Above 75,000 Btu Per Hour, Circulating and Instantaneous	Table 6.2.2.1.
ANSI/CSA	ANSI Z21.13-2017/CSA 4.9-2017	Gas-Fired Low Pressure Steam and Hot Water Boilers	Table 5.2.12.1.
ANSI/CSA	ANSI Z21.56-2013/CSA 4.7-2013	Gas-Fired Pool Heaters	Table 6.2.2.1.
ANSI/CSA	ANSI Z83.8-2013/CSA 2.6-2013	Gas Unit Heaters, Gas Packaged Heaters, Gas Utility Heaters and Gas-Fired Duct Furnaces	Table 5.2.12.1.
ASHRAE	2013	ASHRAE Handbook – Fundamentals	3.1.1.5.(4) 3.1.1.5.(5) A-8.4.4.4.(1)
ASHRAE	2011	ASHRAE Handbook – HVAC Applications	A-6.2.4.1.(1)
ASHRAE	RP-1365–2011	Thermal Performance of Building Envelope Details for Mid- and High-Rise Buildings	A-3.1.1.5.(5)(a)
ASHRAE	ANSI/ASHRAE 55-2013	Thermal Environmental Conditions for Human Occupancy	A-5.2.8.3.(1)
ASHRAE	ANSI/ASHRAE 62.1-2007	Ventilation for Acceptable Indoor Air Quality	A-5.2.3.4.(1)
ASHRAE	ANSI/ASHRAE 84-2013	Air-to-Air Heat/Energy Exchangers	5.2.10.1.(5)
ASHRAE	ANSI/ASHRAE/IES 90.1-2013	Energy Standard for Buildings Except Low-Rise Residential Buildings	A-Table 3.2.2.2. A-5.2.3.4.(2)
ASHRAE	ASHRAE/IES 90.1-2013	User's Manual	A-5.2.10.1.(4) A-5.2.10.4.(5) A-6.2.3.1.(1)
ASHRAE	ANSI/ASHRAE 111-2008	Measurement, Testing, Adjusting and Balancing of Building HVAC Systems	A-5.2.5.2.(1)
ASHRAE	ANSI/ASHRAE 127-2012	Rating Computer and Data Processing Room Unitary Air-Conditioners	Table 5.2.12.1.
ASHRAE	ANSI/ASHRAE 140-2011	Evaluation of Building Energy Analysis Computer Programs	8.4.2.2.(4)
ASME/CSA	ASME A112.18.1-2012/CSA B125.1-12	Plumbing Supply Fittings	6.2.6.1.(1) 6.2.6.2.(1)
ASME	PTC 4-2013	Fired Steam Generators	Table 5.2.12.1.
ASTM	C 177-13	Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus	3.1.1.5.(1)
ASTM	C 335/C 335M-10e1	Steady-State Heat Transfer Properties of Pipe Insulation	5.2.5.3.(6) 6.2.3.1.(4)
ASTM	C 518-10	Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus	3.1.1.5.(1)
ASTM	C 1363-11	Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus	3.1.1.5.(4) 3.1.1.5.(5)

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number <sup>(1)</sup>	Title of Document <sup>(2)</sup>	Code Reference
ASTM	E 283-04	Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen	3.2.4.3.(2) 3.2.4.4.(1) 3.2.4.4.(2) 3.2.4.4.(3)
ASTM	E 2357-11	Determining Air Leakage of Air Barrier Assemblies	3.2.4.2.(3) A-3.2.4.2.(2) and (3)
BC Hydro	2014	Building Envelope Thermal Bridging Guide	A-3.1.1.5.(5)(a)
CCBFC	NRCC 56190	National Building Code of Canada 2015	1.1.1.1.(1) <sup>(3)</sup> 1.1.1.3.(1) <sup>(3)</sup> 1.1.1.3.(2) <sup>(3)</sup> 1.4.1.2.(1) <sup>(3)</sup> 3.1.1.5.(1) 5.2.1.1.(1) 5.2.2.1.(1) 5.2.2.8.(2) 5.2.5.1.(1) A-3.2.1.1.(1) <sup>(3)</sup> A-3.2.3.1.(3) A-5.2.2.8.(2) A-5.2.8.4.(1) A-5.2.10.4.(1) A-5.2.10.4.(5) A-8.4.3.6.(1)
CCBFC	NRCC 56192	National Fire Code of Canada 2015	1.4.1.2.(1) <sup>(3)</sup> A-3.2.1.1.(1) <sup>(3)</sup>
CCBFC	NRCC 56193	National Plumbing Code of Canada 2015	6.2.1.1.(1) A-3.2.1.1.(1) <sup>(3)</sup> A-5.2.10.4.(1) A-6.2.6.1.(1) A-8.4.4.20.(6) A-8.4.4.20.(7)
CSA	AAMA/WDMA/CSA 101/I.S.2/A440-11	NAFS – North American Fenestration Standard/Specification for Windows, Doors, and Skylights	3.2.4.3.(3) 3.2.4.3.(4)
CSA	A440.2-14/A440.3-14	Fenestration Energy Performance/User Guide to CSA A440.2-14, Fenestration Energy Performance	3.1.1.5.(3) A-3.1.1.6.(1)
CSA	CAN/CSA-B140.4-04	Oil-Fired Warm Air Furnaces	Table 5.2.12.1.
CSA	CAN/CSA-B211-00	Energy Efficiency of Oil-Fired Storage Tank Water Heaters	Table 6.2.2.1.
CSA	C22.1-12	Canadian Electrical Code, Part I	A-7.2.1.1.
CSA	CAN/CSA-C191-04	Performance of Electric Storage Tank Water Heaters for Domestic Hot Water Service	Table 6.2.2.1.
CSA	C368.1-14	Energy Performance of Room Air Conditioners	Table 5.2.12.1.
CSA	C390-10	Test Methods, Marking Requirements, and Energy Efficiency Levels for Three-Phase Induction Motors	7.2.4.1.(1)
CSA	CAN/CSA-C439-09	Rating the Performance of Heat/Energy-Recovery Ventilators	5.2.10.1.(5) 5.2.10.4.(2) Table 5.2.10.4. A-5.2.10.4.(2)
CSA	C654-14	Fluorescent Lamp Ballast Efficacy Measurements	4.2.1.2.(1) 4.2.1.2.(2)
CSA	C656-14	Split-System and Single-Package Air Conditioners and Heat Pumps	Table 5.2.12.1.
CSA	CAN/CSA-C743-09	Rating Packaged Water Chillers	Table 5.2.12.1.
CSA	CAN/CSA-C745-03	Energy Efficiency of Electric Storage Tank Water Heaters and Heat Pump Water Heaters	Table 6.2.2.1.

**Table 1.3.1.2. (Continued)**

Issuing Agency	Document Number <sup>(1)</sup>	Title of Document <sup>(2)</sup>	Code Reference
CSA	CAN/CSA-C746-06	Rating Large and Single Packaged Vertical Air Conditioners and Heat Pumps	Table 5.2.12.1.
CSA	C748-13	Direct-Expansion (DX) Ground-Source Heat Pumps	Table 5.2.12.1.
CSA	C802.1-13	Minimum Efficiency Values for Liquid-Filled Distribution Transformers	7.2.3.1.(1)
CSA	C802.2-12	Minimum Efficiency Values for Dry-Type Transformers	7.2.3.1.(1)
CSA	CAN/CSA-C802.3-01	Maximum Losses for Power Transformers	7.2.3.1.(1)
CSA	C828-13	Thermostats Used with Individual Room Electric Space Heating Devices	5.2.8.6.(4)
CSA	CAN/CSA-C860-11	Internally Lighted Exit Signs	4.2.1.1.(1)
CSA	C873.4-14	Building Energy Estimation Methodology – Part 4 – Energy Consumption for Lighting	4.3.1.3.(1) 4.3.1.3.(2) 4.3.1.3.(3) 4.3.1.3.(4) 4.3.1.3.(5)
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, with Canadian Deviations)	Table 5.2.12.1.
CSA	CAN/CSA-F379 SERIES-09 (excluding Supplement F379S1-11)	Packaged Solar Domestic Hot Water Systems (Liquid-to-Liquid Heat Transfer)	6.2.2.3.(1)
CSA	CAN/CSA-P2-13	Measuring the Annual Fuel Utilization Efficiency of Residential Gas-Fired or Oil-Fired Furnaces and Boilers	Table 5.2.12.1.
CSA	CAN/CSA-P3-04	Measuring Energy Consumption and Determining Efficiencies of Gas-Fired Storage Water Heaters	Table 6.2.2.1.
CSA	CAN/CSA-P7-10	Measuring Energy Loss of Gas-Fired Instantaneous Water Heaters	Table 6.2.2.1.
CSA	CAN/CSA-P8-09	Thermal Efficiencies of Industrial and Commercial Gas-Fired Package Furnaces	Table 5.2.12.1.
CTI	ATC-105-00	Acceptance Test Code	Table 5.2.12.2.
CTI	ATC-106-11	Acceptance Test Code for Mechanical Draft Evaporative Vapor Condensers	Table 5.2.12.2.
CTI	STD-2010M-11	Thermal Performance Certification of Evaporative Heat Rejection Equipment	Table 5.2.12.1.
CTI	STD-201-2011	Thermal Certification of Cooling Towers	Table 5.2.12.2.
DOE	10 CFR, Part 430-2011	Energy, Energy Conservation Program for Consumer Products	Table 6.2.2.1.
HRAI	SAR-G1	HRAI Digest 2005	1.1.4.2.(1) A-5.2.1.1.(1)
HVI	HVI Publication 911	Certified Home Ventilating Products Directory	A-5.2.10.4.(2)
IES	10th Edition	The Lighting Handbook	A-Table 4.3.2.8.
IES	ANSI/IES RP-28-07	Lighting and the Visual Environment for Senior Living	Table 4.2.1.6. Table 4.3.2.10.-A A-8.4.3.2.(2) Table A-8.4.3.2.(2)-B
ISO	13790:2008	Energy performance of buildings – Calculation of energy use for space heating and cooling	1.1.4.2.(1)
ISO	14683:2007	Thermal bridges in building construction – Linear thermal transmittance – Simplified methods and default values	3.1.1.5.(5)
NEMA	ANSI_ANSLG C82.11:2011	American National Standard for Lamp Ballasts–High-Frequency Fluorescent Lamp Ballasts	4.2.1.2.(2)
NFRC	100-2010	Determining Fenestration Product U-factors	3.1.1.5.(3)

Table 1.3.1.2. (Continued)

Issuing Agency	Document Number <sup>(1)</sup>	Title of Document <sup>(2)</sup>	Code Reference
NRCan	SOR/94-651-2013	Energy Efficiency Act and its Regulations	Table 5.2.12.1. 5.2.12.4.(1) Table 6.2.2.1. 6.2.2.4.(2) 6.2.2.5.(1) A-5.2.12.1.(1) and 6.2.2.1.(1)
SMACNA	ANSI/SMACNA 006-2006	HVAC Duct Construction Standards – Metal and Flexible	5.2.2.3.(1) Table 5.2.2.3. A-5.2.2.1.(1)
SMACNA	ANSI/SMACNA 016-2012	HVAC Air Duct Leakage Test Manual	5.2.2.4.(1) A-5.2.2.1.(1)
SMACNA	2003	Fibrous Glass Duct Construction Standards	A-5.2.2.1.(1)
SMACNA	2006	HVAC Systems – Duct Design	A-5.2.2.1.(1)
TIAC	2013	Mechanical Insulation Best Practices Guide	A-5.2.2.5.(7) and 5.2.5.3.(7)
ULC	CAN/ULC-S742-11	Air Barrier Assemblies – Specification	3.2.4.2.(2) A-3.2.4.2.(2) and (3)

**Notes to Table 1.3.1.2.:**

- (1) Some documents may have been reaffirmed or reapproved. Check with the applicable issuing agency for up-to-date information.  
(2) Some titles have been abridged to omit superfluous wording.  
(3) Code reference is in Division A.

**1.3.2. Organizations****1.3.2.1. Abbreviations of Proper Names**

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

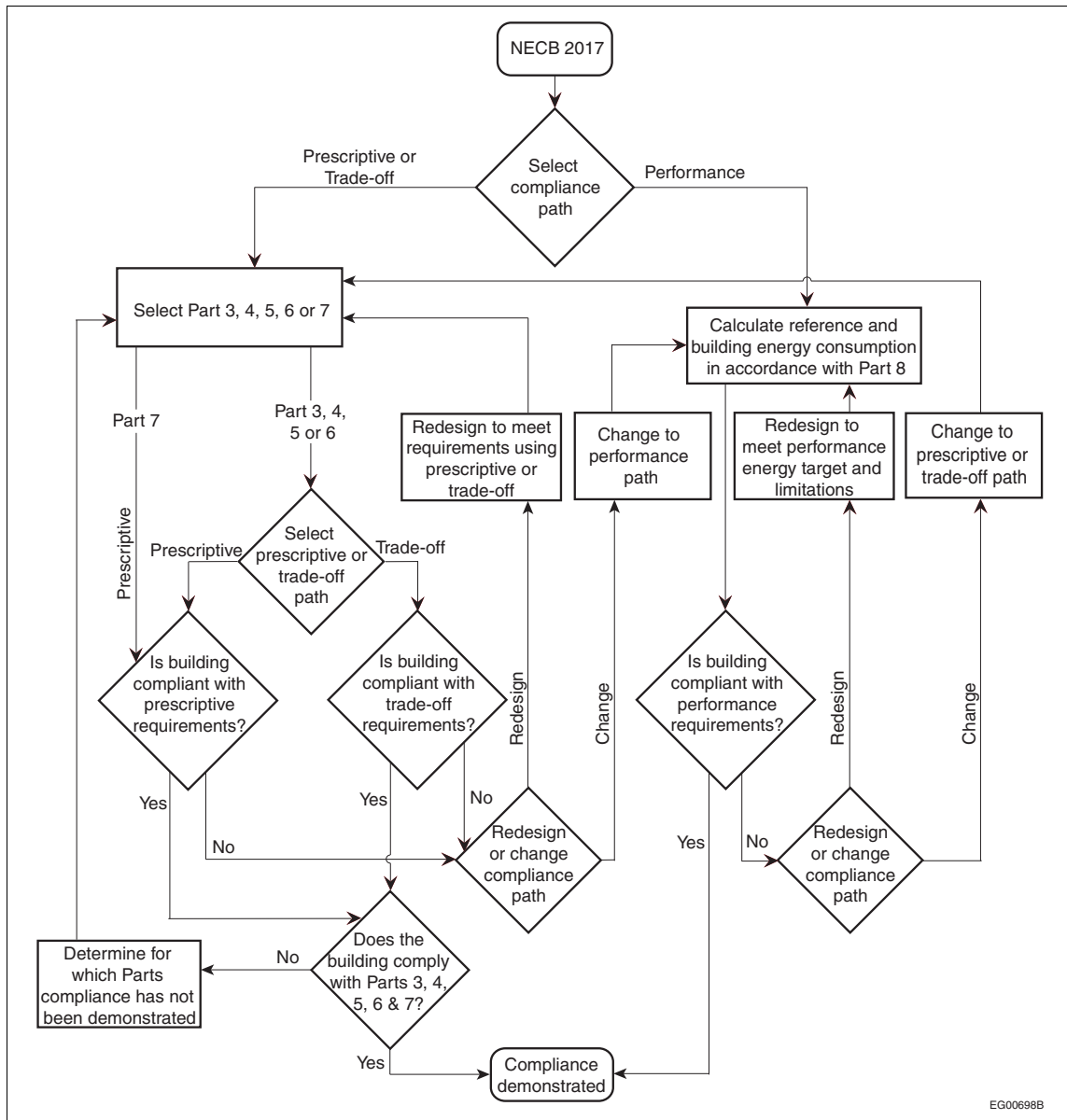
- AAMA ..... American Architectural Manufacturers Association  
(www.aamanet.org)
- AHRI ..... Air-Conditioning, Heating and Refrigeration Institute  
(www.ahrinet.org)
- AMCA ..... Air Movement and Control Association (www.amca.org)
- ANSI ..... American National Standards Institute (www.ansi.org)
- ASHRAE ..... American Society of Heating, Refrigerating and Air-Conditioning  
Engineers (www.ashrae.org)
- ASME ..... American Society of Mechanical Engineers (www.asme.org)
- ASTM ..... American Society for Testing and Materials International  
(www.astm.org)
- CAN ..... National Standard of Canada designation
- CCBFC ..... Canadian Commission on Building and Fire Codes (see NRC)
- CSA ..... CSA Group (www.csagroup.ca)
- CTI ..... Cooling Technology Institute (www.cti.org)
- DOE ..... U.S. Department of Energy (www.energy.gov)
- HRAI ..... Heating, Refrigeration and Air Conditioning Institute of Canada  
(www.hrai.ca)
- HVI ..... Home Ventilating Institute (www.hvi.org)
- IES ..... Illuminating Engineering Society (www.ies.org)

ISO .....	International Organization for Standardization ( <a href="http://www.iso.org">www.iso.org</a> )
NBC .....	National Building Code of Canada 2015
NECB .....	National Energy Code of Canada for Buildings 2017
NEMA .....	National Electrical Manufacturers Association ( <a href="http://www.nema.org">www.nema.org</a> )
NFC .....	National Fire Code of Canada 2015
NFRC .....	National Fenestration Rating Council ( <a href="http://www.nfrc.org">www.nfrc.org</a> )
NPC .....	National Plumbing Code of Canada 2015
NRC .....	National Research Council of Canada (Ottawa, Ontario K1A 0R6; <a href="http://www.nrc-cnrc.gc.ca">www.nrc-cnrc.gc.ca</a> )
NRCan .....	Natural Resources Canada ( <a href="http://www.nrcan.gc.ca">www.nrcan.gc.ca</a> )
SMACNA ....	Sheet Metal and Air Conditioning Contractors' National Association ( <a href="http://www.smacna.org">www.smacna.org</a> )
TIAC .....	Thermal Insulation Association of Canada ( <a href="http://www.tiac.ca">www.tiac.ca</a> )
ULC .....	ULC Standards ( <a href="http://canada.ul.com/ulcstandards">canada.ul.com/ulcstandards</a> )
WDMA .....	Window & Door Manufacturers Association ( <a href="http://www.wdma.com">www.wdma.com</a> )



# Notes to Part 1 General

**A-1.1.2.1. NECB Compliance Options.** Figure A-1.1.2.1. shows the three compliance options available in Division B.



**Figure A-1.1.2.1.**  
**Decision flow chart for Code compliance**

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.

**Prescriptive Path**

The first compliance option is to apply the prescriptive requirements of the Code, which generally dictate minimum thermal characteristics for envelope elements and energy efficiency measures that can be stated as specific instructions.

**Trade-off Path**

The second option affords some degree of flexibility in the application of the prescriptive requirements. For example, the trade-off paths for Part 3 allow Code users to vary the thermal characteristics of one or more components of the building envelope and/or vary the fenestration and door area from that permitted in Section 3.2., provided it can be demonstrated that the resultant building envelope will not transfer more energy than it would if all its components complied with that Section. The trade-off options present an easy way to make small adjustments to the characteristics of the building without having to follow the whole-building performance route.

**Performance Path**

The third option is a performance path: if some aspects of the prescriptive and trade-off routes are considered too limiting, the building could, for example, be designed with any thermal characteristics desired (subject to certain limitations), provided that it would not have a calculated energy consumption under standardized conditions that is greater than it would have been had the building been designed in strict conformity with the prescriptive requirements, all other aspects of the building (those that are not the object of a requirement in this Code) remaining the same in both cases. The proof of compliance when using the performance path option is achieved through two energy analyses: one on the building as if it met the prescriptive requirements, which gives the “target” performance, and the other on the actual design for which a building permit is requested.

**A-1.1.3.1.(1) Objective and Functional Statements Attributed to Acceptable**

**Solutions.** The objective and functional statements attributed to each Code provision are shown in Tables at the end of each Part in Division B.

Many provisions in Division B serve as modifiers of or pointers to other provisions, or serve other clarification or explanatory purposes. In most cases, no objective and functional statements have been attributed to such provisions, which therefore do not appear in the above-mentioned tables.

For provisions that serve as modifiers of or pointers to other referenced provisions and that do not have an objective and functional statements attributed to them, the objective and functional statements that should be used are those attributed to the provisions they reference.

**A-1.1.4.1.(1) Climatic Values.** Climatic values for municipalities not listed in Table C-1 may be obtained by contacting the Meteorological Service of Canada, Environment Canada, 4905 Dufferin Street, Downsview, Ontario M3H 5T4; [www.climate.weather.gc.ca](http://www.climate.weather.gc.ca).

Hourly climatic values are available from multiple sources such as Environment Canada, Natural Resources Canada, the Regional Conservation Authority and other such public agencies that record this type of information. Hourly weather data are also available from public and private agencies that format this information for use with annual energy consumption simulation software; in some cases, these data have been incorporated into the software.



**Table 3.5.1.1.**  
**Objectives and Functional Statements Attributed to the**  
**Acceptable Solutions in Part 3**  
 Forming Part of Sentence 3.5.1.1.(1)

Functional Statements and Objectives <sup>(1)</sup>	
<b>3.1.1.5. Thermal Characteristics of Building Assemblies</b>	
(1)	[F92-OE1.1]
(2)	[F92-OE1.1]
(3)	[F92-OE1.1]
(4)	[F92-OE1.1]
(5)	[F92-OE1.1]
<b>3.1.1.7. Calculation of Overall Thermal Transmittance</b>	
(1)	[F92-OE1.1]
(5)	[F92-OE1.1]
(6)	[F92-OE1.1]
(7)	[F92-OE1.1]
(8)	[F92-OE1.1]
<b>3.2.1.1. Protection of Insulation Materials</b>	
(1)	[F92-OE1.1]
(2)	[F92-OE1.1]
<b>3.2.1.2. Continuity of Insulation</b>	
(1)	[F92-OE1.1]
(2)	[F92-OE1.1]
<b>3.2.1.3. Spaces Heated to Different Temperatures</b>	
(1)	[F92-OE1.1]
<b>3.2.1.4. Allowable Fenestration and Door Area</b>	
(1)	[F92,F99-OE1.1]
(2)	[F92,F99-OE1.1]
<b>3.2.2.1. Vestibules</b>	
(1)	[F90-OE1.1]
(2)	[F90-OE1.1]
<b>3.2.2.2. Thermal Characteristics of Above-ground Opaque Building Assemblies</b>	
(1)	[F92-OE1.1]
(2)	[F92-OE1.1]
(3)	[F92-OE1.1]
(4)	[F92,F95-OE1.1]
<b>3.2.2.3. Thermal Characteristics of Fenestration</b>	
(2)	[F92-OE1.1]
(3)	[F92-OE1.1]
<b>3.2.2.4. Thermal Characteristics of Doors and Access Hatches</b>	
(1)	[F92-OE1.1]
(2)	[F92-OE1.1]
(3)	[F92-OE1.1]
(4)	[F92-OE1.1]

**Table 3.5.1.1. (Continued)**

Functional Statements and Objectives <sup>(1)</sup>	
<b>3.2.3.1. Thermal Characteristics of Walls in Contact with the Ground</b>	
(1)	[F92-OE1.1]
(2)	[F92-OE1.1]
(3)	[F92-OE1.1]
(4)	[F92,F95-OE1.1]
(5)	[F92-OE1.1]
<b>3.2.3.2. Thermal Characteristics of Roofs in Contact with the Ground</b>	
(1)	[F92-OE1.1]
(2)	[F92-OE1.1]
<b>3.2.3.3. Thermal Characteristics of Floors in Contact with the Ground</b>	
(1)	[F92-OE1.1]
(2)	[F92-OE1.1]
(3)	[F92-OE1.1]
(4)	[F92,F95-OE1.1]
(5)	[F92-OE1.1]
<b>3.2.4.1. General</b>	
(1)	[F90-OE1.1]
<b>3.2.4.2. Opaque Building Assemblies</b>	
(1)	[F90-OE1.1]
(2)	[F90-OE1.1]
(3)	[F90-OE1.1]
<b>3.2.4.3. Fenestration</b>	
(2)	[F90-OE1.1]
(3)	[F90-OE1.1]
(4)	[F90-OE1.1]
<b>3.2.4.4. Doors</b>	
(1)	[F90-OE1.1]
(4)	[F90-OE1.1]
<b>3.2.4.5. Fireplace Doors</b>	
(1)	[F90-OE1.1]
<b>3.3.1.1. Application and Limitations</b>	
(2)	[F92-OE1.1]
(3)	[F92-OE1.1]
(4)	[F92-OE1.1]
(5)	[F92,F95-OE1.1]
(6)	[F90,F91,F92-OE1.1]
<b>3.3.1.2. Simple Trade-off Calculations</b>	
(1)	[F92-OE1.1]
(2)	[F92-OE1.1]
<b>3.4.1.2. Limitations</b>	
(1)	[F90,F92-OE1.1]

**Table 3.5.1.1. (Continued)****Notes to Table 3.5.1.1.:**

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

**Table 4.5.1.1.**  
**Objectives and Functional Statements Attributed to the**  
**Acceptable Solutions in Part 4**  
 Forming Part of Sentence 4.5.1.1.(1)

Functional Statements and Objectives <sup>(1)</sup>	
<b>4.2.1.1. Exit Signs</b>	
(1)	[F94-OE1.1]
<b>4.2.1.2. Fluorescent Lamp Ballasts</b>	
(1)	[F94,F98-OE1.1]
(2)	[F94,F98-OE1.1]
<b>4.2.1.3. Limits to Installed Interior Lighting Power</b>	
(1)	[F94-OE1.1]
(3)	[F94-OE1.1]
<b>4.2.1.4. Determination of the Installed Interior Lighting Power</b>	
(1)	[F94-OE1.1]
(2)	[F94-OE1.1]
(3)	[F94-OE1.1]
<b>4.2.1.5. Calculation of Interior Lighting Power Allowance Using the Building Area Method</b>	
(1)	[F94-OE1.1]
(2)	[F94-OE1.1]
(3)	[F94-OE1.1]
(4)	[F94-OE1.1]
(5)	[F94-OE1.1]
<b>4.2.1.6. Calculation of Interior Lighting Power Allowance Using the Space-by-Space Method</b>	
(1)	[F94-OE1.1]
<b>4.2.2.1. Interior Lighting Controls</b>	
(1)	[F94-OE1.1]
(2)	[F94-OE1.1]
(3)	[F94-OE1.1]
(4)	[F94-OE1.1]
(6)	[F94-OE1.1]
(8)	[F94-OE1.1]
(9)	[F94-OE1.1]
(10)	[F94-OE1.1]
(11)	[F94-OE1.1]
(13)	[F94-OE1.1]
(14)	[F94-OE1.1]
(16)	[F94-OE1.1]
(18)	[F94-OE1.1]
(20)	[F94-OE1.1]
(21)	[F94-OE1.1]
(22)	[F94-OE1.1]
<b>4.2.2.2. Lighting Controls in Storage Garages</b>	
(1)	[F94-OE1.1]
(2)	[F94-OE1.1]

**Table 4.5.1.1. (Continued)**

Functional Statements and Objectives <sup>(1)</sup>	
(3)	[F94-OE1.1]
(4)	[F94-OE1.1]
<b>4.2.2.3. Determination of Primary and Secondary Sidelighted Areas</b>	
(1)	[F94-OE1.1]
(2)	[F94-OE1.1]
(3)	[F94-OE1.1]
(4)	[F94-OE1.1]
(5)	[F94-OE1.1]
(6)	[F94-OE1.1]
(7)	[F94-OE1.1]
(8)	[F94-OE1.1]
<b>4.2.2.4. Determination of Daylighted Area Under Roof Monitors</b>	
(1)	[F94-OE1.1]
(2)	[F94-OE1.1]
<b>4.2.2.5. Determination of Daylighted Area Under Skylights</b>	
(1)	[F94-OE1.1]
(2)	[F94-OE1.1]
<b>4.2.2.6. Special Applications</b>	
(1)	[F94-OE1.1]
(2)	[F94-OE1.1]
(3)	[F94-OE1.1]
(4)	[F94-OE1.1]
<b>4.2.3.1. Exterior Lighting</b>	
(1)	[F94-OE1.1]
(2)	[F94-OE1.1]
(3)	[F94-OE1.1]
(4)	[F94-OE1.1]
<b>4.2.4.1. Requirements</b>	
(1)	[F94-OE1.1]
(2)	[F94-OE1.1]
(4)	[F94-OE1.1]
(5)	[F94-OE1.1]
(6)	[F94-OE1.1]
<b>4.3.1.3. Compliance</b>	
(1)	[F94-OE1.1]
(2)	[F94-OE1.1]
(3)	[F94-OE1.1]
(4)	[F94-OE1.1]
(5)	[F94-OE1.1]
<b>4.3.2.1. Determination of Installed Interior Lighting Energy</b>	
(1)	[F94-OE1.1]
(2)	[F94-OE1.1]

Table 4.5.1.1. (Continued)

Functional Statements and Objectives <sup>(1)</sup>	
<b>4.3.2.2. Determination of Lighting Power Density</b>	
(1)	[F94-OE1.1]
<b>4.3.2.3. Determination of Daylighted Area</b>	
(1)	[F94-OE1.1]
(2)	[F94-OE1.1]
<b>4.3.2.4. Determination of Non-Daylighted Area</b>	
(1)	[F94-OE1.1]
<b>4.3.2.5. Determination of Effective Annual Operational Times</b>	
(1)	[F94-OE1.1]
(2)	[F94-OE1.1]
(3)	[F94-OE1.1]
<b>4.3.2.6. Determination of Operational Times</b>	
(1)	[F94-OE1.1]
(2)	[F94-OE1.1]
<b>4.3.2.7. Determination of Factor for Daylight Harvesting</b>	
(1)	[F94-OE1.1]
(4)	[F94-OE1.1]
(5)	[F94-OE1.1]
<b>4.3.2.8. Determination of the Daylight Supply Factor for Sidelighting</b>	
(1)	[F94-OE1.1]
(2)	[F94-OE1.1]
(3)	[F94-OE1.1]
(4)	[F94-OE1.1]
<b>4.3.2.9. Determination of the Daylight Supply Factor for Toplighting</b>	
(1)	[F94-OE1.1]
(2)	[F94-OE1.1]
(3)	[F94-OE1.1]
<b>4.3.2.10. Determination of Factors for Occupancy Control and Personal Control</b>	
(1)	[F94-OE1.1]
(2)	[F94-OE1.1]
(3)	[F94-OE1.1]
<b>4.3.3.1. Determination of Interior Lighting Energy Allowance</b>	
(1)	[F94-OE1.1]
(2)	[F94-OE1.1]
<b>4.3.3.2. Determination of Lighting Power Density</b>	
(1)	[F94-OE1.1]
<b>4.3.3.3. Determination of Daylighted Area</b>	
(1)	[F94-OE1.1]
<b>4.3.3.4. Determination of Non-Daylighted Area</b>	
(1)	[F94-OE1.1]

Table 4.5.1.1. (Continued)

Functional Statements and Objectives <sup>(1)</sup>	
<b>4.3.3.5. Determination of Effective Annual Operational Times</b>	
(1)	[F94-OE1.1]
(2)	[F94-OE1.1]
(3)	[F94-OE1.1]
<b>4.3.3.7. Determination of Factor for Daylight Harvesting</b>	
(1)	[F94-OE1.1]
(4)	[F94-OE1.1]
(5)	[F94-OE1.1]
<b>4.3.3.10. Determination of Factors for Occupancy Control and Personal Control</b>	
(1)	[F94-OE1.1]
(2)	[F94-OE1.1]

**Notes to Table 4.5.1.1.:**

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

**Table 5.3.2.8.-AA**  
**Coefficient Values for System Type HVAC-27**  
**(Radiation with Optional Make-up Air Unit)**  
 Forming Part of Sentences 5.3.2.6.(1) and 5.3.2.8.(1)

Trade-off Values for Component i, ToV <sub>i</sub>	Climatic Parameter for Component i, XDD <sub>i</sub>	Coefficient Values					
		$\alpha_{1i}$	$\alpha_{2i}$	$\alpha_{3i}$	$\beta_{1i}$	$\beta_{2i}$	$\beta_{3i}$
ToV <sub>1</sub>	HDD	1.78E+00	-4.20E-04	2.90E-08	-9.97E-01	2.34E-04	-1.62E-08
ToV <sub>2</sub>	HDD	1.20E+00	-2.80E-04	1.92E-08	-4.78E-01	1.11E-04	-7.59E-09
ToV <sub>3</sub>	TDD	1.47E+00	-3.22E-04	2.12E-08	-1.32E+00	2.89E-04	-1.90E-08
ToV <sub>4</sub>	TDD	6.88E-01	-1.51E-04	9.90E-09	-3.07E-01	6.73E-05	-4.42E-09
ToV <sub>5</sub>	TDD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ToV <sub>6</sub>	HDD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ToV <sub>7</sub>	HDD	-6.04E-04	1.45E-07	-1.01E-11	2.97E-08	-9.35E-12	7.06E-16
ToV <sub>8</sub>	TDD	3.13E-01	9.63E-06	1.41E-09	-1.80E-01	-4.64E-06	-8.73E-10
ToV <sub>9</sub>	TDD	-9.80E-04	2.15E-07	-1.41E-11	2.36E-08	-5.18E-12	3.40E-16
ToV <sub>10</sub>	HDD	9.89E-04	2.43E-10	-2.91E-12	0.00E+00	0.00E+00	0.00E+00
ToV <sub>11</sub>	HDD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ToV <sub>12</sub>	HDD	4.19E-01	1.72E-04	-1.12E-08	0.00E+00	0.00E+00	0.00E+00
ToV <sub>13</sub>	CDD	-1.13E-05	1.18E-04	-1.43E-07	-2.72E-06	-7.50E-06	9.07E-09
ToV <sub>14</sub>	CDD	-4.94E-03	-2.19E-04	3.11E-07	0.00E+00	0.00E+00	0.00E+00
ToV <sub>15</sub>	CDD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ToV <sub>16</sub>	HDD	3.83E+00	-5.36E-04	-1.17E-10	-1.97E+00	3.89E-04	-2.79E-09
ToV <sub>17</sub>	TDD	-1.97E-02	1.83E-05	-1.10E-09	0.00E+00	0.00E+00	0.00E+00
ToV <sub>18</sub>	TDD	2.54E-03	-3.17E-07	1.11E-11	-1.68E-03	2.10E-07	-7.33E-12
ToV <sub>19</sub>	HDD	7.26E-01	-1.65E-04	1.17E-08	-2.17E-01	4.71E-05	-3.29E-09
ToV <sub>20</sub>	CDD	-2.85E-04	1.82E-04	-2.36E-07	2.61E-04	-6.26E-05	8.18E-08
ToV <sub>21</sub>	HDD	-7.51E-05	-7.37E-10	2.66E-13	1.76E-08	-7.50E-12	6.27E-16
ToV <sub>22</sub>	CDD	-4.85E-06	-6.96E-07	9.12E-10	-1.20E-08	1.32E-10	-1.02E-13
ToV <sub>23</sub>	HDD	6.61E-03	2.23E-05	-1.90E-09	1.04E-02	-1.73E-05	1.43E-09
ToV <sub>24</sub>	CDD	5.32E-03	3.61E-04	-4.64E-07	-2.99E-03	-1.88E-04	2.34E-07
ToV <sub>25</sub>	HDD	-3.44E-02	3.23E-05	-2.64E-09	2.65E-02	-1.76E-05	1.42E-09
ToV <sub>26</sub>	CDD	1.74E-02	2.77E-04	-5.06E-07	-9.32E-03	-1.20E-04	2.39E-07
ToV <sub>27</sub>	HDD	4.57E+00	-1.08E-03	7.21E-08	-1.66E+01	5.65E-03	-4.13E-07
ToV <sub>28</sub>	CDD	3.87E-01	4.36E-03	-5.68E-06	-3.80E+00	2.63E-02	-3.36E-05
ToV <sub>29</sub>	HDD	2.96E+00	-5.64E-04	3.28E-08	-2.14E+01	7.64E-03	-6.11E-07
ToV <sub>30</sub>	CDD	1.08E-01	7.68E-03	-1.16E-05	-4.45E+00	1.72E-02	-6.08E-06
ToV <sub>31</sub>	HDD	2.05E+00	-2.66E-04	1.14E-08	-8.58E+01	2.41E-02	-1.33E-06
ToV <sub>32</sub>	CDD	3.45E-02	6.74E-03	-8.65E-06	3.94E+00	-1.62E-02	7.71E-06

## Section 5.4. Performance Path

(See Note A-1.1.2.1.)

### 5.4.1. General

#### 5.4.1.1. Scope

1) Subject to the limitations stated in Article 5.4.1.2., where the heating, ventilating and air-conditioning system does not comply with the requirements of Section 5.2. or 5.3., it shall comply with Part 8.

#### 5.4.1.2. Limitations

1) Notwithstanding use of the performance path, all HVAC appliances and equipment shall comply with the applicable appliance or equipment energy efficiency act or, in the absence of such an act or where the appliance or equipment is not covered by such an act, with the applicable performance standard.

2) This Section does not apply to back-up HVAC systems, which shall comply with Sentence 5.1.1.3.(2).

## Section 5.5. Objective and Functional Statements

### 5.5.1. Objective and Functional Statements

#### 5.5.1.1. Attributions to Acceptable Solutions

1) For the purpose of compliance with this Code as required in Clause 1.2.1.1.(1)(b) of Division A, the objective and functional statements attributed to the acceptable solutions in this Part shall be the objective and functional statements listed in Table 5.5.1.1. (See Note A-1.1.3.1.(1).)

**Table 5.5.1.1.**  
**Objectives and Functional Statements Attributed to the**  
**Acceptable Solutions in Part 5**  
 Forming Part of Sentence 5.5.1.1.(1)

Functional Statements and Objectives <sup>(1)</sup>	
<b>5.2.2.2. Provision for Balancing</b>	
(1)	[F95,F99-OE1.1]
<b>5.2.2.3. Duct Sealing</b>	
(1)	[F91,F99-OE1.1]
(2)	[F91,F99-OE1.1]
(5)	[F91,F99-OE1.1]
<b>5.2.2.4. Leakage Testing of Ducts</b>	
(1)	[F91,F99-OE1.1]
(2)	[F91,F99-OE1.1]
<b>5.2.2.5. Duct and Plenum Insulation</b>	
(1)	[F92,F93-OE1.1]
(2)	[F93,F95-OE1.1]
(5)	[F93-OE1.1]
(7)	[F92,F93-OE1.1]
(8)	[F93,F95,F99-OE1.1]

**Table 5.5.1.1. (Continued)**

Functional Statements and Objectives <sup>(1)</sup>	
<b>5.2.2.6. Protection of Duct Insulation</b>	
(1)	[F92,F93,F95-OE1.1]
(2)	[F92,F93,F95-OE1.1]
<b>5.2.2.7. Cooling with Outdoor Air</b>	
(1)	[F95-OE1.1]
<b>5.2.2.8. Cooling by Direct Use of Outdoor Air (Air Economizer System)</b>	
(1)	[F95-OE1.1]
(2)	[F95-OE1.1]
(3)	[F95-OE1.1]
(4)	[F95-OE1.1]
(5)	[F95-OE1.1]
<b>5.2.2.9. Cooling by Indirect Use of Outdoor Air (Water Economizer System)</b>	
(1)	[F95-OE1.1]
(2)	[F95-OE1.1]
<b>5.2.3.1. Application</b>	
(2)	[F95,F97-OE1.1]

**Table 5.5.1.1. (Continued)**

Functional Statements and Objectives <sup>(1)</sup>	
<b>5.2.3.2. Constant-Volume Fan Systems</b>	
(1)	[F95,F97-OE1.1]
<b>5.2.3.3. Variable-Air-Volume Fan Systems</b>	
(1)	[F95,F97-OE1.1]
(2)	[F95,F97-OE1.1]
(3)	[F95,F97-OE1.1]
<b>5.2.3.4. Demand Control Ventilation Systems</b>	
(1)	[F95,F97-OE1.1]
(2)	[F95,F97-OE1.1]
<b>5.2.4.1. Required Dampers</b>	
(1)	[F91,F95-OE1.1]
<b>5.2.4.2. Type and Location of Dampers</b>	
(1)	[F90,F91,F95-OE1.1]
(2)	[F90,F91,F95-OE1.1]
(3)	[F92,F95-OE1.1]
<b>5.2.5.2. Provision for Balancing</b>	
(1)	[F95,F99-OE1.1]
<b>5.2.5.3. Piping Insulation</b>	
(1)	[F92,F93-OE1.1]
(4)	[F92,F93-OE1.1]
(6)	[F92,F93-OE1.1]
(7)	[F92,F93-OE1.1]
(8)	[F93,F95-OE1.1]
<b>5.2.5.4. Protection of Piping Insulation</b>	
(1)	[F92,F93,F95-OE1.1]
(2)	[F92,F93,F95-OE1.1]
<b>5.2.6.1. Application</b>	
(2)	[F95-OE1.1]
<b>5.2.6.2. Variable-Flow Pumping Systems</b>	
(1)	[F95,F97-OE1.1]
<b>5.2.6.3. Pumping Power Demand</b>	
(1)	[F95,F97,F98,F99-OE1.1]
<b>5.2.7.1. Manufacturer's Designation</b>	
(1)	[F95,F99-OE1.1]
<b>5.2.8.1. Temperature Controls</b>	
(1)	[F95-OE1.1]
(2)	[F95-OE1.1]
<b>5.2.8.2. Temperature Control within Dwelling Units</b>	
(1)	[F95-OE1.1]
(2)	[F95-OE1.1]
<b>5.2.8.3. Temperature Control in Guest Rooms and Suites in Commercial Temporary Lodgings</b>	
(1)	[F95-OE1.1]

**Table 5.5.1.1. (Continued)**

Functional Statements and Objectives <sup>(1)</sup>	
<b>5.2.8.4. Installation of Thermostats</b>	
(1)	[F95-OE1.1]
<b>5.2.8.5. Heat Pump Controls</b>	
(1)	[F95,F97,F99-OE1.1]
<b>5.2.8.6. Space Temperature Control</b>	
(1)	[F95-OE1.1]
(2)	[F95-OE1.1]
(3)	[F95-OE1.1]
(4)	[F95-OE1.1]
(5)	[F95-OE1.1]
<b>5.2.8.7. Ice- and Snow-Melting Heater Controls</b>	
(1)	[F95-OE1.1]
<b>5.2.8.8. Control of Temperature of Air Leaving the Supply Air Handler</b>	
(1)	[F95-OE1.1]
<b>5.2.8.9. Control of Space Temperature by Reheating or Recooling</b>	
(1)	[F95-OE1.1]
(2)	[F95-OE1.1]
(3)	[F95-OE1.1]
<b>5.2.9.1. Humidification Controls</b>	
(1)	[F95-OE1.1]
<b>5.2.10.1. Energy Recovery Systems</b>	
(1)	[F95,F100-OE1.1]
(2)	[F95,F100-OE1.1]
(4)	[F95,F100-OE1.1]
(5)	[F95,F100-OE1.1]
(6)	[F95-OE1.1]
<b>5.2.10.2. Heat Recovery from Dehumidification in Swimming Pools</b>	
(1)	[F95,F100-OE1.1]
<b>5.2.10.3. Heat Recovery from Ice-making Machines in Ice Arenas and Curling Rinks</b>	
(1)	[F95,F96,F100-OE1.1]
<b>5.2.10.4. Heat Recovery in Dwelling Units</b>	
(1)	[F95,F100-OE1.1]
(2)	[F95,F100-OE1.1]
(3)	[F95,F100-OE1.1]
(4)	[F95,F100-OE1.1]
(5)	[F95,F100-OE1.1]
<b>5.2.11.1. Off-hours Controls</b>	
(1)	[F95-OE1.1]
(2)	[F95-OE1.1]
(4)	[F95-OE1.1]

Table 5.5.1.1. (Continued)

Functional Statements and Objectives <sup>(1)</sup>	
<b>5.2.11.2. Airflow Control Areas</b>	
(1)	[F95,F97-OE1.1]
(2)	[F95,F97-OE1.1]
(3)	[F95,F97-OE1.1]
(4)	[F95,F97-OE1.1]
(5)	[F95,F97-OE1.1]
(6)	[F95,F97-OE1.1]
(7)	[F95,F97,F99-OE1.1]
<b>5.2.11.3. Seasonal Shutdown</b>	
(1)	[F97-OE1.1]
<b>5.2.11.4. Multiple Boilers</b>	
(1)	[F93-OE1.1]
(2)	[F95-OE1.1]
(3)	[F95-OE1.1]
<b>5.2.11.5. Loop Temperature Reset for Chilled- and Hot-Water Systems</b>	
(1)	[F95,F98-OE1.1]
<b>5.2.12.1. Unitary and Packaged HVAC Equipment</b>	
(1)	[F95,F98,F99-OE1.1]
<b>5.2.12.2. Heat Rejection Equipment</b>	
(2)	[F95,F97,F98,F99-OE1.1]
(3)	[F95,F97-OE1.1]
<b>5.2.12.3. Field-Assembled Equipment and Components</b>	
(1)	[F99-OE1.1]
<b>5.2.12.4. Service Water Heating Equipment Used for Space Heating</b>	
(1)	[F98-OE1.1]
<b>5.3.1.1. Application</b>	
(1)	[F95,F99-OE1.1]
<b>5.3.2.1. HVAC Trade-off Index</b>	
(1)	[F95,F99-OE1.1]
<b>5.3.2.2. Determination of Components to Be Included, <math>\gamma_i</math></b>	
(1)	[F95,F99-OE1.1]
<b>5.3.2.3. Determination of Trade-off Value of Components, <math>ToV_i</math></b>	
(1)	[F95,F99-OE1.1]
<b>5.3.2.4. Determination of Base Value of Components, <math>BaV_i</math></b>	
(1)	[F95,F99-OE1.1]
<b>5.3.2.5. Determination of Weighting Factor Linking the Component Efficiency Variation to the System Efficiency Variation, <math>\alpha_i</math> and <math>\beta_i</math></b>	
(1)	[F95,F99-OE1.1]
(2)	[F95,F99-OE1.1]
<b>5.3.2.6. Determination of Climatic Parameter Relevant to the Component, <math>XDD_i</math></b>	
(1)	[F95,F99-OE1.1]

Table 5.5.1.1. (Continued)

Functional Statements and Objectives <sup>(1)</sup>	
<b>5.3.2.7. Determination of Trade-off Value of Component, <math>ToV_i</math></b>	
(1)	[F95,F99-OE1.1]
<b>5.3.2.8. Coefficient Values: <math>\alpha_{1i}</math>, <math>\alpha_{2i}</math>, <math>\alpha_{3i}</math>, <math>\beta_{1i}</math>, <math>\beta_{2i}</math> and <math>\beta_{3i}</math></b>	
(1)	[F95,F99-OE1.1]
<b>5.4.1.2. Limitations</b>	
(1)	[F98,F99-OE1.1]

**Notes to Table 5.5.1.1.:**

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



## Section 6.3. Trade-off Path

(See Note A-1.1.2.1.)

### 6.3.1. General

#### 6.3.1.1. Application

- 1) Except as provided in Article 6.3.1.2., this Section applies only to *buildings*
  - a) whose *occupancy* is known,
  - b) for which sufficient information is known from the specifications for the *service water* heating (SWH) components listed in Article 6.3.2.2., and
  - c) whose SWH system meets the following criteria:
    - i) it is one of the types listed in Table 6.3.1.1.,
    - ii) its heating energy type is natural gas, propane, fuel oil or electricity, and
    - iii) its heat pump energy type is electricity.

**Table 6.3.1.1.**  
**Types of SWH System**  
Forming Part of Sentence 6.3.1.1.(1)

SWH System Type ID	SWH System Type Description
SWH-1	Tank
SWH-2	Tankless (Instantaneous)
SWH-3	Space-heating <i>boiler</i>

#### 6.3.1.2. Application Limitation

- 1) This Section does not apply to back-up SWH systems, which shall comply with Sentence 6.1.1.3.(2).

#### 6.3.1.3. Compliance

- 1) A SWH system shall be deemed to comply with Section 6.3. if its SWH trade-off index, SWH-TOI, as calculated in accordance with Subsection 6.3.2., is greater than or equal to 0.

### 6.3.2. Calculation of Service Water Heating Trade-off Index

#### 6.3.2.1. SWH Trade-off Index

- 1) The *service water* heating trade-off index, SWH-TOI, for an SWH-1 tank system shall be calculated using the following equation:

$$\text{SWH - TOI} = 2.813 \cdot \left\{ \frac{2.813 \cdot \text{PDR}}{\text{ToV}_1} \cdot \{1 - 0.6514 \cdot \text{ToV}_6 \cdot e^{-0.312 \cdot \text{ToV}_6}\} + 0.11667 \cdot \left( \frac{A_{\text{norm}}}{\text{ToV}_2} + \frac{2.4322}{\text{ToV}_3} \right) + \frac{0.00677}{\text{ToV}_4 \cdot \text{ToV}_5} \right\}^{-1} - 2.813 \cdot \left\{ \frac{2.813}{\eta_{\text{ref}}} + 0.11667 \cdot \left( \frac{A_{\text{norm}}}{2.222} + 3.3515 \right) + 0.0141 \right\}^{-1}$$

where

- PDR = peak daily flow ratio, determined as per Article 6.3.2.2.,
- ToV<sub>1</sub> = *service water* heating equipment efficiency, determined as per Article 6.3.2.5.,
- ToV<sub>2</sub> = tank insulation value, determined as per Article 6.3.2.5.,
- ToV<sub>3</sub> = piping insulation value, determined as per Article 6.3.2.5.,
- ToV<sub>4</sub> = pump motor efficiency, determined as per Article 6.3.2.5.,
- ToV<sub>5</sub> = pump efficiency, determined as per Article 6.3.2.5.,

ToV<sub>6</sub> = heat recovery ratio, determined as per Article 6.3.2.5.,  
 A<sub>norm</sub> = normalized tank area, determined as per Article 6.3.2.3., and  
 η<sub>ref</sub> = reference heat generator efficiency, determined as per Article 6.3.2.6.

**2)** The SWH-TOI for an SWH-2 tankless system shall be calculated using the following equation:

$$\text{SWH - TOI} = 2.813 \cdot \left\{ \frac{2.813 \cdot \text{PDR}}{\text{ToV}_1} \cdot \{1 - 0.6514 \cdot \text{ToV}_6 \cdot e^{-0.312 \cdot \text{ToV}_6}\} + \frac{0.2838}{\text{ToV}_3} + \frac{0.00677}{\text{ToV}_4 \cdot \text{ToV}_5} \right\}^{-1} - 2.813 \cdot \left\{ \frac{2.813}{\eta_{\text{ref}}} + 0.4051 \right\}^{-1}$$

where

PDR = peak daily flow ratio, determined as per Article 6.3.2.2.,  
 ToV<sub>1</sub> = *service water* heating equipment efficiency, determined as per Article 6.3.2.5.,  
 ToV<sub>3</sub> = piping insulation value, determined as per Article 6.3.2.5.,  
 ToV<sub>4</sub> = pump motor efficiency, determined as per Article 6.3.2.5.,  
 ToV<sub>5</sub> = pump efficiency, determined as per Article 6.3.2.5.,  
 ToV<sub>6</sub> = heat recovery ratio, determined as per Article 6.3.2.5., and  
 η<sub>ref</sub> = reference heat generator efficiency, determined as per Article 6.3.2.6.

**3)** The SWH-TOI for an SWH-3 space-heating *boiler* system shall be calculated using the following equation:

$$\text{SWH - TOI} = 2.813 \cdot \left\{ \frac{2.813 \cdot \text{PDR}}{\text{ToV}_{11}} \cdot \{1 - 0.6514 \cdot \text{ToV}_6 \cdot e^{-0.312 \cdot \text{ToV}_6}\} + 0.11667 \cdot \left( \frac{A_{\text{norm}}}{\text{ToV}_2} + \frac{2.4322}{\text{ToV}_3} \right) + \frac{0.00677}{\text{ToV}_4 \cdot \text{ToV}_5} \right\}^{-1} - 2.813 \cdot \left\{ \frac{2.813}{\eta_{\text{ref}}} + 0.11667 \cdot \left( \frac{A_{\text{norm}}}{2.222} + 3.3515 \right) + 0.0141 \right\}^{-1}$$

where

PDR = peak daily flow ratio, determined as per Article 6.3.2.2.,  
 ToV<sub>2</sub> = tank insulation value, determined as per Article 6.3.2.5.,  
 ToV<sub>3</sub> = piping insulation value, determined as per Article 6.3.2.5.,  
 ToV<sub>4</sub> = pump motor efficiency, determined as per Article 6.3.2.5.,  
 ToV<sub>5</sub> = pump efficiency, determined as per Article 6.3.2.5.,  
 ToV<sub>6</sub> = heat recovery ratio, determined as per Article 6.3.2.5.,  
 ToV<sub>11</sub> = *boiler* efficiency, determined as per Article 6.3.2.5.,  
 A<sub>norm</sub> = normalized tank area, determined as per Article 6.3.2.3., and  
 η<sub>ref</sub> = reference heat generator efficiency, determined as per Article 6.3.2.6.

### 6.3.2.2. Determination of Peak Daily Flow Ratio

**1)** The peak daily flow ratio, PDR, shall be calculated using the following equation:

$$\text{PDR} = \frac{\text{ToV}_7 \cdot \text{ToV}_9 + \text{ToV}_8 \cdot \text{ToV}_{10} + \text{AFOU} \cdot (1 - \text{ToV}_9 - \text{ToV}_{10})}{5.7 \cdot \text{ToV}_9 + 7.6 \cdot \text{ToV}_{10} + \text{AFOU} \cdot (1 - \text{ToV}_9 - \text{ToV}_{10})}$$

where

ToV<sub>7</sub> = average flow of all faucets, determined as per Article 6.3.2.5.,  
 ToV<sub>8</sub> = average flow of all showers, determined as per Article 6.3.2.5.,  
 ToV<sub>9</sub> = faucet flow ratio, determined as per Article 6.3.2.5.,  
 ToV<sub>10</sub> = shower flow ratio, determined as per Article 6.3.2.5., and  
 AFOU = average flow of other uses, in L/min, as per specification.

**Table 6.5.1.1. (Continued)**

Functional Statements and Objectives <sup>(1)</sup>	
<b>6.2.6.2. Lavatories</b>	
(1)	[F96-OE1.1]
(2)	[F96-OE1.1]
<b>6.2.7.1. Controls</b>	
(1)	[F95,F96,F99-OE1.1]
(2)	[F95,F96,F99-OE1.1]
<b>6.2.7.2. Pool and Hot Tub Covers</b>	
(1)	[F95-OE1.1]
(2)	[F95-OE1.1]
<b>6.2.8.1. Size of Water Storage Tank</b>	
(1)	[F97,F99-OE1.1]
(2)	[F97,F99-OE1.1]
<b>6.2.8.2. Pressure Control</b>	
(1)	[F96,F97-OE1.1]
(2)	[F96,F97-OE1.1]
<b>6.3.1.1. Application</b>	
(1)	[F96,F99-OE1.1]
<b>6.3.2.1. SWH Trade-off Index</b>	
(1)	[F96,F99-OE1.1]
(2)	[F96,F99-OE1.1]
(3)	[F96,F99-OE1.1]
<b>6.3.2.2. Determination of Peak Daily Flow Ratio</b>	
(1)	[F96,F99-OE1.1]
<b>6.3.2.3. Determination of Normalized Tank Area</b>	
(1)	[F96,F99-OE1.1]
<b>6.3.2.4. Determination of Normalized Tank Diameter</b>	
(1)	[F96,F99-OE1.1]
<b>6.3.2.5. Determination of Trade-off Values of Components, ToV<sub>i</sub></b>	
(1)	[F96,F99-OE1.1]
<b>6.3.2.6. Determination of Reference Heat Generator Efficiency, <math>\eta_{ref}</math></b>	
(1)	[F96,F99-OE1.1]
<b>6.4.1.2. Limitations</b>	
(1)	[F98,F99-OE1.1]

**Notes to Table 6.5.1.1.:**

<sup>(1)</sup> See Parts 2 and 3 of Division A.



**Table 7.5.1.1.**  
**Objectives and Functional Statements Attributed to the**  
**Acceptable Solutions in Part 7**  
 Forming Part of Sentence 7.5.1.1.(1)

Functional Statements and Objectives <sup>(1)</sup>	
<b>7.2.1.1. Monitoring</b>	
(1)	[F97-OE1.1]
(2)	[F97-OE1.1]
<b>7.2.2.1. Feeders</b>	
(1)	[F99-OE1.1]
<b>7.2.2.2. Branch Circuits</b>	
(1)	[F99-OE1.1]
<b>7.2.3.1. Transformer Selection</b>	
(1)	[F97,F98-OE1.1]
<b>7.2.4.1. Efficiency</b>	
(1)	[F97,F98,F99-OE1.1]

**Notes to Table 7.5.1.1.:**

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



**Table 8.5.1.1. (Continued)**

Functional Statements and Objectives <sup>(1)</sup>	
<b>8.4.2.3. Climatic Data</b>	
(1)	[F99-OE1.1]
(2)	[F99-OE1.1]
<b>8.4.2.4. Thermal Mass</b>	
(1)	[F99-OE1.1]
<b>8.4.2.5. Space Temperature</b>	
(1)	[F99-OE1.1]
<b>8.4.2.6. Heat Transfer Between Thermal Blocks</b>	
(1)	[F99-OE1.1]
(2)	[F99-OE1.1]
<b>8.4.2.7. Internal and Service Water Heating Loads</b>	
(1)	[F99-OE1.1]
(2)	[F99-OE1.1]
(3)	[F99-OE1.1]
(4)	[F99-OE1.1]
(5)	[F99-OE1.1]
<b>8.4.2.8. Building Envelope</b>	
(1)	[F99-OE1.1]
(2)	[F99-OE1.1]
(3)	[F99-OE1.1]
(4)	[F99-OE1.1]
(5)	[F99-OE1.1]
(6)	[F99-OE1.1]
(7)	[F99-OE1.1]
(8)	[F99-OE1.1]
(9)	[F99-OE1.1]
(10)	[F99-OE1.1]
<b>8.4.2.9. Air Leakage</b>	
(1)	[F99-OE1.1]
<b>8.4.2.10. HVAC Systems Calculations</b>	
(1)	[F99-OE1.1]
(2)	[F99-OE1.1]
(3)	[F99-OE1.1]
(4)	[F99-OE1.1]
(5)	[F99-OE1.1]
<b>8.4.3.1. General</b>	
(2)	[F99-OE1.1]
(3)	[F99-OE1.1]
(4)	[F99-OE1.1]
(5)	[F99-OE1.1]
(7)	[F99-OE1.1]
(8)	[F99-OE1.1]

**Table 8.5.1.1. (Continued)**

Functional Statements and Objectives <sup>(1)</sup>	
<b>8.4.3.2. Operating Schedules, Internal Loads, Service Water Heating Loads and Set-point Temperature</b>	
(1)	[F99-OE1.1]
(2)	[F99-OE1.1]
(3)	[F99-OE1.1]
<b>8.4.3.3. Building Envelope Components</b>	
(1)	[F99-OE1.1]
(2)	[F99-OE1.1]
(3)	[F99-OE1.1]
<b>8.4.3.4. Interior Lighting</b>	
(1)	[F99-OE1.1]
(2)	[F99-OE1.1]
(3)	[F99-OE1.1]
(4)	[F99-OE1.1]
<b>8.4.3.5. Purchased Energy</b>	
(2)	[F99-OE1.1]
(3)	[F99-OE1.1]
(4)	[F99-OE1.1]
(5)	[F99-OE1.1]
<b>8.4.3.6. Outdoor Air</b>	
(1)	[F99-OE1.1]
<b>8.4.3.7. Space Temperature Control</b>	
(1)	[F99-OE1.1]
<b>8.4.3.8. Part-Load Performance Curves</b>	
(1)	[F99-OE1.1]
(2)	[F99-OE1.1]
<b>8.4.3.9. Ice Plants</b>	
(1)	[F99-OE1.1]
<b>8.4.4.1. General</b>	
(2)	[F99-OE1.1]
(3)	[F99-OE1.1]
(4)	[F99-OE1.1]
(5)	[F99-OE1.1]
(6)	[F99-OE1.1]
(7)	[F99-OE1.1]
<b>8.4.4.2. Operating Schedules, Internal Loads, Service Water Heating Loads and Set-point Temperature</b>	
(1)	[F99-OE1.1]
(2)	[F99-OE1.1]
(3)	[F99-OE1.1]
<b>8.4.4.3. Building Envelope Components</b>	
(1)	[F99-OE1.1]
(2)	(a) [F99-OE1.1]
(3)	[F99-OE1.1]

Table 8.5.1.1. (Continued)

Functional Statements and Objectives <sup>(1)</sup>	
(4)	[F99-OE1.1]
(5)	[F99-OE1.1]
(6)	[F99-OE1.1]
(7)	[F99-OE1.1]
(8)	[F99-OE1.1]
<b>8.4.4.4. Thermal Mass</b>	
(2)	[F99-OE1.1]
<b>8.4.4.5. Lighting</b>	
(1)	[F99-OE1.1]
(2)	[F99-OE1.1]
(3)	[F99-OE1.1]
(4)	[F99-OE1.1]
(5)	[F99-OE1.1]
(6)	[F99-OE1.1]
(7)	[F99-OE1.1]
(8)	[F99-OE1.1]
(9)	[F99-OE1.1]
(10)	[F99-OE1.1]
(11)	[F99-OE1.1]
(12)	[F99-OE1.1]
<b>8.4.4.6. Purchased Energy</b>	
(1)	[F99-OE1.1]
(2)	[F99-OE1.1]
(3)	[F99-OE1.1]
(4)	[F99-OE1.1]
<b>8.4.4.7. HVAC System Selection</b>	
(1)	[F99-OE1.1]
(3)	[F99-OE1.1]
(4)	[F99-OE1.1]
<b>8.4.4.8. Equipment Oversizing</b>	
(1)	[F99-OE1.1]
(2)	[F99-OE1.1]
<b>8.4.4.9. Heating System</b>	
(1)	[F99-OE1.1]
(3)	[F99-OE1.1]
(4)	[F99-OE1.1]
(5)	[F99-OE1.1]
(6)	[F99-OE1.1]
(7)	[F99-OE1.1]
(8)	[F99-OE1.1]
<b>8.4.4.10. Cooling Systems</b>	
(1)	[F99-OE1.1]
(3)	[F99-OE1.1]

Table 8.5.1.1. (Continued)

Functional Statements and Objectives <sup>(1)</sup>	
(4)	[F99-OE1.1]
(5)	[F99-OE1.1]
(6)	[F99-OE1.1]
(7)	[F99-OE1.1]
(8)	[F99-OE1.1]
(9)	[F99,F100-OE1.1]
<b>8.4.4.11. Cooling Tower Systems</b>	
(1)	[F99-OE1.1]
(2)	[F99-OE1.1]
(3)	[F99-OE1.1]
(4)	[F99-OE1.1]
(5)	[F99-OE1.1]
(6)	[F99-OE1.1]
<b>8.4.4.12. Cooling with Outside Air</b>	
(1)	[F99-OE1.1]
<b>8.4.4.13. Heat Pumps</b>	
(1)	[F99-OE1.1]
(2)	[F99-OE1.1]
<b>8.4.4.14. Hydronic Pumps</b>	
(1)	[F99-OE1.1]
(2)	[F99-OE1.1]
(3)	[F99-OE1.1]
(4)	[F99-OE1.1]
(5)	[F99-OE1.1]
(6)	[F99-OE1.1]
<b>8.4.4.15. Outdoor Air</b>	
(1)	[F99-OE1.1]
(2)	[F99-OE1.1]
<b>8.4.4.16. Space Temperature Control</b>	
(1)	[F99-OE1.1]
(2)	[F99-OE1.1]
<b>8.4.4.17. Fans</b>	
(1)	[F99-OE1.1]
(2)	[F99-OE1.1]
(3)	[F99-OE1.1]
(4)	[F99-OE1.1]
(5)	[F99-OE1.1]
<b>8.4.4.18. Supply Air Systems</b>	
(1)	[F99-OE1.1]
(2)	[F99-OE1.1]
(3)	[F99-OE1.1]
(4)	[F99-OE1.1]
(5)	[F99-OE1.1]



**Table 8.5.1.1. (Continued)**

Functional Statements and Objectives <sup>(1)</sup>	
(6)	[F99-OE1.1]
<b>8.4.4.19. Energy Recovery Systems</b>	
(1)	[F99,F100-OE1.1]
(2)	[F99,F100-OE1.1]
(3)	[F100-OE1.1]
<b>8.4.4.20. Service Water Heating Systems</b>	
(1)	[F99-OE1.1]
(2)	[F99-OE1.1]
(3)	[F99-OE1.1]
(4)	[F99-OE1.1]
(5)	[F99-OE1.1]
(6)	[F99-OE1.1]
(7)	[F99-OE1.1]
(8)	[F99-OE1.1]
(9)	[F99-OE1.1]
<b>8.4.4.21. Part-Load Performance Curves</b>	
(1)	[F99-OE1.1]

**Notes to Table 8.5.1.1.:**

<sup>(1)</sup> See Parts 2 and 3 of Division A.

