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ENERGY STAR for New Homes Standard Version 17.1—Revision 2

January 2020



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Preface

The *ENERGY STAR*¹ for New Homes—Standard—Version 17.1 is the first edition of the *ENERGY STAR Standard* using the *EnerGuide*² Rating System—Standard—Version 15 gigajoule (GJ) scale.

Key changes in the *ENERGY STAR for New Homes—Standard—Version 17.1* include:

- **Transition to the *gigajoule* scale.** A revised scale that uses actual units of energy (*gigajoules* per year) was introduced with the *EnerGuide Rating System—Standard—Version 15*. This version of the *ENERGY STAR for New Homes Standard* uses the *gigajoule* scale as its baseline. Prior to this *Standard*, technical requirements for ESNH were based on the *EnerGuide Rating System 0-100* scale.
- **Revised targets for performance and prescriptive paths.** To account for the changes introduced in the *EnerGuide Rating System—Standard—Version 15*, such as the updated standard operating conditions, the targets for performance and prescriptive paths have been revised.
- **Changes to the electrical savings.** *ENERGY STAR certified* homes, regardless of the compliance approach taken, must now have *ENERGY STAR certified fixtures* or light bulbs installed in at least 75% of the entire house. This ensures a certain level of electrical savings in ESNH certified homes and provides consistent branding messaging.
- **Revised values for various Builder Option Package options.** To account for revised standard operating conditions in the *EnerGuide Rating System—Standard—Version 15*, point values for options in airtightness, drain water heat recovery and heat recovery ventilator have been revised. New categories for lighting, HRV/ERV fan efficacy and *ENERGY STAR* appliances have been added.
- **New target option for the performance path.** For low energy consumption houses, a new performance target has been introduced where the house must meet the following two conditions: a maximum ERS rating of 60 GJ/year and an ERS rating at least 10% less than that of the *reference house*.
- **Revised values for the *normalized leakage area* and *normalized leakage rate* values.** Houses complying with the airtightness requirement using NLA and NLR values usually present less energy savings than those using the air change per hour values. The NLA and NLR values are consequently revised to make sure using these will result in energy savings.

¹ The *ENERGY STAR*® name and the *ENERGY STAR*® symbol are registered trademarks of the United States Environmental Protection Agency and are used with permission.

² *EnerGuide* is an official mark of Natural Resources Canada.

- **Using a building code *reference house* as the baseline.** The *reference house* is based on minimum energy efficiency requirements under the National Building Code or the Ontario Building Code. It forms the baseline for the determination of the energy target. This ensures that ESNH is complementary to building codes that include energy efficiency requirements.

Summary of changes

Section	Technical Change
Preface	Revision. Text changed to explain the key changes made to the <i>ENERGY STAR for New Homes—Standard—Version 17.1</i> .
Global	Revision. ENERGY STAR qualified changed to <i>ENERGY STAR certified</i> .
Next Generation ENERGY STAR for New Homes Advisory Committee	Deletion.
Working Group on Building Envelope	Deletion.
Builder Option Package Working Groups	Deletion.
Technical Advisory Committee	Addition.
Introduction	Addition. Increased efficiency also results in reduced energy consumption and greenhouse gas emissions.
Introduction	Revision. It is mandatory that 75% of lighting <i>fixtures</i> or light bulbs be <i>ENERGY STAR certified</i> .
Introduction footnote 2	Deletion. Reference to the final energy target being ≥ 80 based on the 0-100 scale.
1.2.1	Revision. Align eligible housing types with the <i>EnerGuide Rating System—Standard—Version 15</i> .
1.3.3	Revision. Effective date updated.
2.1	Revision. Documents produced by Natural Resources Canada table updated.
2.2	Revision. Documents published by other organizations table updated.
3.1	Addition. <i>MURB single unit</i> and <i>reference house</i> definitions added.
3.1	Revision. Definitions for <i>approved compliance software</i> , <i>attached house</i> , <i>duplex</i> , <i>EnerGuide Rating</i> , <i>ENERGY STAR®</i> , <i>multi-unit residential building (MURB)</i> , <i>secondary suite</i> , <i>semi-detached</i> , <i>triplex</i> and <i>water heater</i> revised to align with the <i>EnerGuide Rating System—Standard—Version 15</i> .
3.1	Deletion. Definitions for apartment building and triplex.
3.1	Revision. Residential unit changed to <i>dwelling unit</i> .
3.2	Addition. ERS, HDD, LTRH, NFRC, SHGC and UEF abbreviations.
4.2.1	Clarification. The <i>airtightness test</i> is as described in the <i>EnerGuide Rating System—Technical Procedures—Version 15.7</i> or more recent version.
4.2.2.1	Clarification. Redundancy about Note 3 removed.
4.2.2.2	Revision. List of standards updated.
4.2.2.2	Addition. Assemblies evaluated by the Canadian Construction Materials Centre (CCMC) are permitted to be used as reported by the CCMC.
4.2.2.4	Addition. Insulation levels may be reduced to the extent required by the slope of the roof.

4.2.3.3	Addition. New section on the low solar heat gain fenestration exemption pilot introduced in <i>ENERGY STAR for New Homes—Standard—Version 12.8 and 17.0 Ontario</i> amendment.
4.3.4	Addition. Solid-fuel-burning appliances must meet the requirements of this section.
4.3.4.1	Revision. Automatically-fuelled appliances must be installed according to manufacturer's instructions.
4.3.4.2, 4.3.4.3	Revision. U.S. EPA 40 CFR Part 60 includes the whole standard and not only Subpart AAA.
4.3.4.3 (c)	Deletion. Phase 2 EPA Hydronic Heater Program.
4.5	Revision. Updated to align with more recent requirements.
4.7.1.2 (a)	Revision. Updated to allow for testing only at 0 °C for specific locations.
4.8	Revision. The 400 kWh/yr electrical savings requirement and former Table 4 have been removed and replaced with the requirement to have 75% <i>ENERGY STAR certified fixtures</i> or light bulbs products installed in the entire house, and in each <i>unit</i> and common area of a MURB.
5.1.1	Revision. Reference to the EnerGuide Rating System documents added.
5.1.2	Deletion. Note 2.
5.1.3	Clarification. Most recent version of HOT2000 is to be used.
5.1.4	Deletion. Section on energy credits.
5.2.1	Deletion. Note 2, the BOP for additional provinces and territories are now included.
5.2.2 (c)(i)(1) and (c)(ii)(1).	Revision. References to the MURB procedures is replaced by the <i>EnerGuide Rating System—Technical Procedures—Version 15.7</i> or more recent.
6.1.1	Clarification. More concise text to present the climate zone table.
Table 4	Revision. Table numbers adjusted from this point onward.
Table 4, 7, 10, 13, 16, 19, 22, 25, 28, 31, 34, 37	Revision. Table header "Region" changed to "Climate Zone". Note 1 of the tables deleted.
6.1.2, 6.2.2, 6.3.2, 6.4.2, 6.5.2, 6.6.2, 6.7.2, 6.8.2, 6.9.2, 6.10.2, 6.11.2, 6.12.2	Revision. "Electrical savings options" section removed and replaced by "Performance target".
Global	Deletion. Tables for electrical savings from air conditioning removed.
Global	Deletion. Tables for Minimum EnerGuide Rating (0-100 scale) under the performance approach removed.
Table 5, 8, 11, 14, 17, 23, 29, 32, 35	Addition. UEF metric is added to the "Domestic water heating" category.
Table 5, 8, 11, 14, 17, 23, 29, 32, 35	Revision. Electrical savings changed from 400 kWh/yr to 75% ENERGY STAR lighting.
Table 5, 8, 11, 14, 17, 23, 29, 32, 35	Revision. BOP Options required values revised.
Table 5, 8, 11, 14, 17, 23, 29, 32, 35	Deletion. Note 2 on thermal resistance requirements needed to comply with table 2 removed.
Table 5, 8, 11, 14, 17, 23, 32, 35	Clarification. Note 2, addition of "Includes skylight and door systems" for the fenestration requirements.

Table 5, 35	Revision. Furnace fan efficiency requirement removed.
Table 5, 8, 11, 14, 17, 23, 29, 32, 35	Revision. Note 6 on 400 kWh/yr electrical savings removed and replaced with new ENERGY STAR lighting requirement.
Table 6, 9, 12, 15, 18, 24, 33, 36	Revision. Values for Airtightness, Airtightness+HRV/ERV, Airtightness+HRV/ERV – MURBs, HRV/ERV, HRV/ERV – MURBs, DWHR, DWHR – MURBs, Electrical Savings.
Table 6, 9, 12, 15, 18, 24, 33, 36	Addition. BOP option added for HRV/ERV fan efficacy of SRE $\geq 75\%$ at 0 °C, ≥ 0.57 L/s/W.
Table 6, 9, 12, 15, 18, 24, 33, 36	Addition. Options with the UEF metric.
Table 6, 9, 12, 15, 18, 24, 33, 36	Revision. For SDHW category, “Attached/detached” changed to “Single dwelling”.
Table 6, 9, 12, 15, 18, 24, 33, 36	Addition. <i>ENERGY STAR certified</i> appliances option.
Table 6, 9, 12, 15, 18, 24, 33, 36	Revision. Addition of “Includes skylight and door systems”. Calculation method for HRV/ERV in MURBs revised. New note, only one option between ACH and ACH+HRV can be chosen. New note, BOP option HRV/ERV fan efficacy can be chosen with the HRV/ERV option. Clarification about the connection between DWHR and shower stack. Calculation method for DWHR in MURBs revised. New note, clarification on <i>ENERGY STAR certified</i> appliances. New note, clarification on 100% ENERGY STAR lighting under electrical savings.
Appendix A Table A-1, Table A-2, Table A-3	Revision. Values for NLA/NLR on levels 2-5. Clarification on the <i>MURB single units</i> requirement. Clarification on the NLA/NLR values’ validity period.

Revision 1

Section	Technical Change
Table 6, 9, 12, 15, 18, 24, 33, 36	Revision. Values for DWHR, DWHR – MURBs.

Revision 2

Section	Technical Change
2.2	Revision. Documents published by other organizations table updated.
3.1	Clarification. Definition for <i>normalized leakage rate at 50 pascals</i> .
4.2.2.5	Clarification. Inclusion of foundation headers.
4.7.1.2	Addition. HRV/ERV can be tested by a third party accredited by the Standards Council of Canada according to CSA C439-18.
5.2.2	Revision. Airtightness level 3, 4 or 5 can be applied to MURBs if the NLA or NLR threshold for airtightness level 3, 4 or 5 is met as per Appendix A.

6.9.2, 6.9.3	Addition. Ontario regional specifications.
6.12.2	Revision. Performance target for Yukon changed to be at least 40.0% LTRH.
6.12.2	Deletion. Alternate compliance path of at least 10.0% LTRH and maximum 60 GJ/year.
Appendix A Table A-1, A-2, A-3	Revision. Transition period for NLA and NLR Level 1 airtightness values extended to January 1, 2021.

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Members of the advisory committee

This version of the *Standard* was developed with contributions from the ENERGY STAR for New Homes Technical Advisory Committee.

Peter Sundberg (Chair)	City Green Solutions
Jack Zhou	A&J Energy Consultants
Denise Larocque	AmeriSpec of Canada
Vanessa Joehl	CHBA of BC
Lauren Lipka	CHBA of NB
André Gagné	Energy Branch, Government of Yukon
Angela Bustamante	Building Knowledge Canada Inc.
Andy Oding	Building Knowledge Canada Inc.
Mark Rosen	Building Energy Inc.
Toby Smith	Building Knowledge Canada Inc.
Christephania Uy	EnerQuality Corporation
Kyle Anders	Building Knowledge Canada Inc.
Greg Furlong	EnviroCentre
Francis Belle	FM Residential
Ross Elliott	Homesol Building Solutions
Daljit Basan	Mindscape Innovations
Darcy Bzdel	Sun Ridge Residential Inc.
David Fetsch	Sun Ridge Residential Inc.
Keith Hanson	Sun Ridge Residential Inc.
Kent Mohn	Sun Ridge Residential Inc.
Matt Brownlow	Sustainable Housing and Education Consultants Incorporated
Charlie Fudge	Sustainable Housing and Education Consultants Incorporated
Roya Khaleeli	The Minto Group
Jordan McDonald	ThermalWise

With the participation of the following Natural Resources Canada committee members:

Ekaterina Bellehumeur
Marius Farcasiu
Alain Gagnon
John Harris
Maggie Johnston
Anil Parekh
Simon Poirier
Leslie-Ann Robertson
Louise Roux
Maxime Savard
Christine Spady

Introduction

The international ENERGY STAR program was developed by the U.S. Environmental Protection Agency (EPA) in 1992. The program was designed to encourage energy-efficient practices that help to reduce greenhouse gas emissions. By identifying and promoting energy-saving products, the initiative helps protect the environment and lowers energy bills at the same time. The Office of Energy Efficiency (OEE) of Natural Resources Canada has promoted the international ENERGY STAR symbol in Canada and monitored its use since 2001.

The ENERGY STAR for New Homes (ESNH) initiative promotes energy efficiency guidelines that enable new homes to be approximately 20 percent more energy efficient than those built to the provincial or national building code³. The increased efficiency of these homes translates into reduced energy costs for homeowners and reduced energy consumption and greenhouse gas emissions.

Overview

An *ENERGY STAR certified* home is a home that has been built by a licensed ENERGY STAR for New Homes builder who incorporates energy-efficient features into the home so that it can meet the specifications in the ESNH *Standard*. A sampling of *ENERGY STAR certified* new homes are evaluated *on site* by an independent energy advisor (i.e. one not employed by the builder). ESNH energy advisors are recruited, trained and certified by an ESNH service organization that is licensed by Natural Resources Canada.

Features

Some of the features that builders typically incorporate into *ENERGY STAR certified* new homes include:

- **Heating and cooling systems:** More energy efficient space conditioning systems, such as furnaces, air conditioners, and *water heaters*.
- **Windows, patio doors and skylights:** Fenestration products, such as windows, glass doors and skylights, that are *ENERGY STAR certified*. This feature alone may reduce energy costs by more than 10 percent.
- **Walls and ceilings:** There is often more insulation in the ceilings and walls of an *ENERGY STAR certified* home than required by the building code.
- **Airtightness:** *ENERGY STAR certified* houses must meet specified maximum air leakage limits, which helps save energy for heating and cooling as well as increases comfort.
- **Electrical savings:** Each *ENERGY STAR certified* house has a minimum of 75% of its lighting using *ENERGY STAR certified fixtures* or light bulbs, which help reduce electrical loads.

³ The National Building Code will be applied in regions where energy provisions are not included in the provincial building code.

1 Scope and application

1.1 Scope

The ESNH *Standard* specifies the technical requirements for a house to be an *ENERGY STAR certified* home. It covers topics such as eligibility requirements, pertinent references, and terms and definitions used in the program. It also specifies the minimum requirements common to all *ENERGY STAR certified* new homes, outlines the compliance options, and details the prescriptive packages, also known as the Builder Option Packages (BOPs).

1.2 Application

1.2.1 Eligible housing types

The ESNH *Standard* applies to new houses and new *multi-unit residential buildings* that are no more than six months old following the date of first occupancy and meet the requirements of **section 1.2.1.1** or **section 1.2.1.2**.

1.2.1.1 Houses

Houses that contain only one *dwelling unit*, without non-residential occupancies, are eligible to be evaluated under the ESNH if they meet the following conditions:

- not greater than three storeys in *building height*;
- not greater than 600 m² (6458 sq. ft.) in *building area*;
- are on *permanent foundations* (this includes a parking garage), or are permanently moored *float homes*; and
- do not contain non-residential occupancies.

NOTES:

- 1) Row houses and *semi-detached* houses are to be assessed as houses unless they are comprised of fully or partially stacked *units* or are joined by a *common space*, in which case they are to be assessed as a *multi-unit residential building*.
- 2) Houses with *secondary suites* are considered *multi-unit residential buildings*.
- 3) Refer to the *EnerGuide Rating System—Standard—Version 15.7* or more recent version for the *building height* requirement.

1.2.1.2 Multi-unit residential buildings

Multi-unit residential building (MURB): For a building to be eligible as a MURB under ESNH, it must meet the requirements in **section 1.2.1.1**'s bulleted list and the following conditions:

- contains between two and 100 *units*;
- *dwelling units* do not share cooking or sanitary facilities;
- each *dwelling unit* has a private entrance either from the outside of the building or from a *common space* (e.g. hallway, lobby, vestibule, or interior stairway) that can be used without passing through another *dwelling unit*;
- *units* are fully or partially stacked or joined by a *common space*; and
- *secondary suites* are fully or partially stacked, side-by-side or joined by a *common space*.

NOTES:

- 1) Houses with *secondary suites* are considered *multi-unit residential buildings*.
- 2) When the preceding conditions are met, the building or house with a *secondary suite* can be evaluated as a whole MURB or as individual *dwelling units*.

Multi-unit residential building (individual dwelling units): Single *dwelling units* within an eligible MURB may be assessed individually.

1.2.2 Climatic Data

1.2.2.1 Determination of number of heating degree days

Where required in this *Standard*, the number of *heating degree days* shall be defined based on applicable building code requirements. Where the applicable building code does not define the number of *heating degree days*, or where no applicable provincial building code exists, NBC 2015 Appendix C shall be used.

1.2.2.2 Determination of frost-line depth

The National Building Code of Canada requires that the depth of frost penetration (i.e. the frost line) be established on the basis of local experience. The governmental body responsible for the enforcement of the building code or the official or agency designated by that body to exercise such a function can advise users of this *Standard* as to the frost line depth in their region.

1.3 Compliance

1.3.1 Minimum requirements

All *ENERGY STAR certified* homes shall comply with the minimum requirements specified in **section 4**.

1.3.2 Compliance options

All *ENERGY STAR certified* homes shall follow one of the compliance options specified in **section 5**.

1.3.3 Effective date

This *Standard* comes into effect on January 1, 2020. Houses enrolled as of this date shall comply with this *Standard*.

2 Reference publications

The following referenced documents are required for the administration and application of this *Standard*.

2.1 Documents produced by Natural Resources Canada

The following referenced documents are required for the administration of this *Standard*. References to these documents in this *Standard* apply to the most current versions. If you are already a Natural Resources Canada program participant, you may find these documents on the [members-only resource centre](#). Otherwise, click on the “Contact us” hyperlink at the following address to request access.

<https://www.nrcan.gc.ca/energy/efficiency/homes/20596>

Title and description
ENERGY STAR® for New Homes—Technical Procedures—Version 17.1
Defines required <i>on-site</i> data collection and evaluation procedures and protocols
ENERGY STAR® for New Homes—Administrative Procedures—Version 17.1
Defines key roles, responsibilities and required administrative procedures
ENERGY STAR® for New Homes—Tables for Calculating Effective Thermal Resistance of Opaque Assemblies
Climate Zones— ENERGY STAR® (Fenestration)
EnerGuide Rating System—Technical Procedures—Version 15.x
Defines required <i>on-site</i> data collection and evaluation procedures and protocols
EnerGuide Rating System—HOT2000 User Guide—Version 15.x
Defines procedures and protocols for the use of the HOT2000⁴ energy modelling software in producing EnerGuide ratings and other outputs of the EnerGuide Rating System
EnerGuide Rating System—Administrative Procedures—Version 15.x
Defines key roles, responsibilities and required administrative procedures
EnerGuide Rating System—Quality Assurance Procedures—Version 15.x
Defines the quality assurance audit process that validates overall service organization and energy advisor performance, effectiveness, and compliance with program procedures and guidelines
Maps of Climate Data
Defines climate data to be used for modelling purposes under the EnerGuide Rating System for all geographical locations in Canada

To obtain information concerning Natural Resources Canada’s suite of housing programs or the documents cited herein, contact us by email: nrcan.homes-maisons.nrcan@canada.ca

⁴ HOT2000 is an official mark of Natural Resources Canada.

2.2 Documents published by other organizations

Issuing Agency	Document Number	Title of Document	ESNH Reference
ANSI/ASHRAE	62.1-2010	Ventilation for Acceptable Indoor Air Quality	4.7.1.5
CCBFC	NRCC 56190	National Building Code of Canada 2015	1.2.2
CGSB	51-GP-27M-1979	Thermal Insulation, Polystyrene, Loose Fill	4.2.2.2
CGSB	CAN/CGSB-51.25-M87	Thermal Insulation, Phenolic, Faced	4.2.2.2
CGSB	CAN/CGSB-149.10-M86	Determination of the Airtightness of Building Envelopes by the Fan Depressurization Method	4.2.1
CSA	C828-13	Performance requirements for thermostats used with individual room electric space heating devices	6.2.3 6.4.3 6.5.3 6.7.3 6.10.3
CSA	F378.1-11	Glazed and unglazed liquid heating solar collectors - Test methods	4.5
CSA	P.7-10	Test method for Measuring Energy Loss of Gas-Fired <i>Instantaneous Water Heaters</i>	3.1
CSA	P.9-11	Test method for determining the performance of <i>combined space and water heating systems</i> (combos)	4.3.2
CSA	P.10-07	Performance of <i>Integrated Mechanical Systems</i> for Residential Heating and Ventilation	4.3.1 4.7.1
CSA	CAN/CSA-B415.1-10	Performance Testing of Solid-Fuel-Burning Heating Appliances	3.1 4.3.4.2 4.3.4.3
CSA	CAN/CSA F326	Residential Mechanical Ventilation Systems	Table 3
CSA	CAN/CSA F379 Series-09	Packaged Solar Domestic Hot Water Systems (liquid to liquid heat transfer)	4.5
CSA	CSA C439-18	Laboratory Methods Of Test For Rating The Performance Of Heat/Energy-Recovery Ventilators	4.7.1.2
EPA	40 Code of Federal Regulations (CFR) Part 60	Standards of Performance for New Residential Wood Heaters, New Residential Hydronic Heaters and Forced-Air	4.3.4.2 4.3.4.3
ICC	ICC 900/ICC-SRCC 300	Solar Thermal System Standard	4.5
ICC	ICC 901/ICC-SRCC 100	Solar Thermal Collector Standard	4.5

Issuing Agency	Document Number	Title of Document	ESNH Reference
ULC	CAN/ULC-S701.1:2017	Standard for Thermal Insulation, Polystyrene Boards	4.2.2.2
ULC	CAN/ULC-S702.1-14-AMD1	Standard for Mineral Fibre Thermal Insulation for Buildings, Part 1: Material Specification	4.2.2.2
ULC	CAN/ULC-S703-09	Standard for Cellulose Fibre Insulation for Buildings	4.2.2.2
ULC	CAN/ULC-S704.1:2017	Standard for Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Faced	4.2.2.2
ULC	CAN/ULC-S705.1:2018	Standard for Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density – Material Specification	4.2.2.2
ULC	CAN/ULC-S706.1:2016	Standard for Wood Fibre Insulating Boards for Buildings	4.2.2.2
ULC	CAN/ULC-S712.1:2017	Standard for Thermal Insulation - Light Density, Open Cell Spray Applied Semi-Rigid Polyurethane Foam - Material Specification	4.2.2.2
ULC	CAN/ULC-S716.1-12-R2018	Standard for Exterior Insulation and Finish Systems (EIFS) - Materials and Systems	4.2.2.2

3 Definitions and abbreviated terms

3.1 Definitions

Words and phrases used in this *Standard* that are not included in this section 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.

The following terms and definitions are italicized throughout the document and apply for the purposes of this document.

above-grade wall area

The above grade wall area is measured on the basis of interior wall dimensions and includes all perimeter boundary walls that are exposed to the exterior or common to another heated *unit* and perimeter floor framing (i.e. rim joists) extending from the line of *finished ground* to the ceiling of the uppermost floor.

air changes per hour at 50 Pa

The number of times per hour the entire *heated volume* of air in a house is replaced when the building envelope is subjected to a differential pressure of 50 pascals with the exterior.

air-source heat pumps

Air-source heat pumps come in two configurations: split system and single package. Split system air-source heat pumps are comprised of a matched condenser coil (outdoor unit comprising a condenser coil, compressor and cooling fan) and indoor coil (typically located with the furnace or air handler). A single package system has all components in one cabinet and is located on the roof or through the wall.

NOTES:

- 1) The inclusion of an energy-efficient DC blower motor in the furnace or air handler may be used to determine the energy efficiency rating of the matched split system to qualify as an ENERGY STAR product.
- 2) For modelling purposes, energy efficiency ratings for air source heat pumps are listed at: a) Single package: http://oee.nrcan.gc.ca/pml-lmp/index.cfm?action=app.search-recherche&appliance=HP_SP and b) split-system http://oee.nrcan.gc.ca/pml-lmp/index.cfm?action=app.search-recherche&appliance=HP_SS.

airtightness test

A test method specified in the *EnerGuide Rating System—Technical Procedures* to measure the air leakage of the building under the test conditions.

approved compliance software

Energy simulation software approved by Natural Resources Canada for use with the EnerGuide Rating System.

attached house

One *residential unit* that shares a wall with one or more adjacent dwellings, each with a separate entrance. Alternate names are row house, townhouse, and *semi-detached*.

NOTE: *Attached houses* do not include *units* that are stacked or joined by a *common space* – those *units* fall under *multi-unit residential buildings*.

builder option package (BOP)

A set of predetermined building envelope, mechanical and electrical specifications which have been validated against a representative standard set of house archetypes developed by Natural Resources Canada to ensure, on average, a specified performance level.

building area

The greatest horizontal area of a building above grade within the outside surface of the exterior walls or within the outside surface of exterior walls and the centre line of firewalls.

building height

Building height is determined in conformity with the National Building Code of Canada, or the provincial or territorial building code in force, or, is the number of storeys fully above the highest point of *finished ground* with no more than a combination of four full or partial storeys above the lowest point of *finished ground*.

combined space and water heating system

A system that provides both space heating and domestic hot water using a *fuel-fired boiler* or a storage-type or tankless *water heater*. The system may or may not include a secondary storage tank.

common space

A heated space in a building (maintained at standard operating condition set point temperatures for simulation purposes) not intended to be used as or be part of a residential or non-residential *unit*, and which may be used by all occupants of the building (or for which access may be limited, such as solely by the building owner/operator) such as a hallway, staircase, common laundry room or mechanical room.

detached house

A *dwelling unit* with walls, floors, ceilings and roof independent of any other building, as opposed to *semi-detached* or row houses sharing common walls.

direct-vent

A venting system in which all the combustion air is supplied directly from the outdoors and the products of combustion are vented directly to the outdoors via independent, totally enclosed passageways connected directly to the appliance.

duplex

A *multi-unit residential building* that has two stacked or partially stacked *residential units*, or joined by a *common space* if not stacked.

dwelling unit

A building or part of a building operated as a housekeeping *unit*, used or intended to be used by one or more persons and usually containing cooking, eating, living, sleeping and sanitary facilities.

effective thermal resistance

Represents the combined resistance to the flow of heat of all the elements of a given assembly, taking into account the various thermal properties of these elements; measured in *R-value*.

EnerGuide Rating

The energy performance rating of the house, stated in *gigajoules* per year, determined using the standard operating conditions and calculated by subtracting the annual renewable energy contributions from the annual energy consumption.

energy efficiency ratio (EER)

A measure of energy performance for cooling equipment and heat pump systems. The steady-state rate of heat energy removal (i.e. cooling capacity) by the equipment measured in Btu/h divided by the steady-state rate of energy input to the equipment measured in watts at specified temperatures.

ENERGY STAR®

A registered trademark identifying an international energy efficiency program developed by the U.S. Environmental Protection Agency (EPA) in 1992; the Office of Energy Efficiency (OEE) of Natural Resources Canada has promoted the international *ENERGY STAR* symbol in Canada and monitored its use since 2001.

ENERGY STAR certified

ENERGY STAR certified products have been tested according to prescribed procedures and been found to meet or exceed higher energy efficiency levels without compromising performance. For *ENERGY STAR certified* categories and products in Canada,
<https://www.nrcan.gc.ca/energy-efficiency/energy-star-canada/energy-star-products/12519>

equivalent leakage area

The size of the hole through which would pass the same amount of air that passes through all of the air leakage holes in the building envelope when the pressure across all holes is equal. It is the area of a sharp edged orifice (a sharp round hole cut in a thin plate) that would leak the same amount of air as the building does at a pressure difference of 10 pascals; expressed in cm² or sq in.

exterior door system

An *exterior door system* is a door that is exposed to the outdoors, and includes the door slab, frame, and all packaged integrated glazing, transoms and sidelights.

finished grade

The average elevation of *finished ground* as determined between two points extending from one corner to the next corner along a wall of the building.

finished ground

The elevation of the built and natural environment adjoining the exterior of the building, as determined at any single point.

fixture

A lighting unit consisting of a lamp or lamps, housing, and a connection to a source of electrical power. Floor and desk lamps, chandeliers, vanity light bars, pendulum lights and wall sconces are all considered "fixtures". Also known as a luminaire or lamp.

float home

A structure floating in water which incorporates a floatation system maintaining the building envelope above the waterline under normal load conditions, not primarily intended for, or usable in, navigation and does not include a water craft designed or intended for navigation.

fuel-fired boiler

A self-contained fuel burning appliance with an energy input of less than 300,000 Btu/h, for supplying low-pressure steam or hot water for space heating. The energy efficiency performance over a heating season for a boiler is measured by the annual fuel utilization efficiency (AFUE). Eligible units fall under Canada's Energy Efficiency Regulations and are listed on Natural Resources Canada's searchable product list.

NOTE: Natural Resources Canada's searchable product list for residential equipment is found at:

<http://oee.nrcan.gc.ca/pml-lmp/index.cfm?action=app.welcome-bienvenue>

gigajoule (GJ)

A standard unit of energy in the International System of Units (SI) equal to 1,000,000,000 (one billion) joules. One GJ is approximately equal to the energy content of: 278 kilowatt hours (kWh) of electricity, 27 cubic metres (m³) of natural gas, 39 litres (L) of propane, 26 L of residential fuel oil, 72 kg of mixed wood or 947,817 British Thermal Units (BTUs).

heating degree days

The summation of the number of Celsius degrees for which the mean daily temperature is below 18 °C (64 °F) for a calendar year.

heated volume

The volume of heated space contained within the house during the heating season, as determined in accordance with the *airtightness test*.

instantaneous (water heater)

Also referred to as a tankless *water heater* or an on-demand *water heater*. See *water heater* for more information.

integrated HRV air handler

A product that provides air circulation and distribution of fresh air as well as ventilation with heat recovery.

integrated mechanical system

A product or set of products that provides all of the following functions: space heating; potable water heating; ventilation with heat recovery; and air circulation and distribution of fresh air.

mechanically vented

An appliance or piece of equipment and its combustion venting system in which the products of combustion are entirely exhausted to the outdoors by a mechanical device, such as a fan, blower or aspirator, upstream or downstream from the combustion zone of the appliance or equipment, and the portion of the combustion venting system that is downstream of the fan, blower or aspirator is sealed and does not include draft hoods or draft control devices.

mixed-use building

A building that consists of both residential and non-residential occupancies.

multi-unit residential building (MURB)

A building that has two or more *units* fully or partially stacked, or joined by a *common space* if not stacked, that may consist of a combination of residential and non-residential occupancies. MURBs with mixed-used occupancy are not eligible under ESNH.

MURB single unit

A single *dwelling unit* located within a MURB that meets the eligibility requirements.

non-residential occupancy

The occupancy of a building or part of a building, such as for commercial or institutional use, not intended to be used as residential. Examples of non-residential occupancies are a non-residential *unit* in a MURB and a room used for a commercial office in a house.

nominal thermal resistance

Represents the resistance to the flow of heat of the installed insulation of a given assembly; measured in *R-value*.

normalized leakage area

The ratio of the *equivalent leakage area* to the area of the building envelope, where the area of the building envelope is defined as all floors, walls (including doors and windows) and ceilings (flat or sloping) that are correspondingly below, above and adjacent to unheated spaces and spaces heated to less than 10 °C (50 °F), and are based on interior dimensions; expressed in cm²/m² or sq. in./sq. ft.

normalized leakage rate at 50 pascals

The quantity of air that leaks into or out of the building per hour, divided by the total envelope surface area (in m² or ft²) at a differential pressure of 50 Pa, where total envelope surface area is defined as all floors, walls (including doors and windows) and ceilings (flat or sloping), and are based on interior dimensions; expressed in L/s • m² at 50Pa or CFM/ft² at 50 Pa.

NOTE: All surfaces (walls, ceilings, floors) which are common with another heated *unit* are included in the total envelope surface area.

on site/on-site

Located within the property boundaries of the municipal or rural lot on which the house is situated.

opaque assembly

A building assembly that does not let any light pass through, excluding opaque components of door and window units.

permanent foundation

An assembly that transfers loads from the building to the supporting soil or rock, and renders the building immovable.

principal ventilation capacity

The airflow rate of the ventilation system which is 40% to 60% of the *total ventilation capacity*.

R-value

The measure of thermal resistance. The higher the *R-value*, the greater the resistance to heat. When used in this *Standard*, the metric *R-value*, denoted as ‘RSI’, will be followed by the imperial *R-value* in parenthesis, denoted by ‘R’, e.g. RSI 1.76 (R10). The conversion rate is: 1 RSI (m²•°C/W) = 5.678 R (ft²•°F•hr/BTU).

reference house

The house being rated as if it were built according to the energy efficiency requirements of the building code.

residential occupancy

The occupancy or use of a building or part of a building, by persons for whom sleeping accommodations is provided. In the context of the EnerGuide Rating System, “*dwelling unit*” is considered *residential occupancy*.

secondary suite

A self-contained *dwelling unit* located in a house where both *dwelling units* constitute a single real estate entity. In the case of houses with *secondary suites*, the *units* may be located side-by-side, fully or partially stacked or joined by a common area.

seasonal energy efficiency ratio (SEER)

A measure of seasonal energy performance for cooling equipment. The cooling output energy in Btu during a typical cooling season divided by the total electric energy input in watt-hours during the same period.

semi-detached

One of a pair of attached residential buildings divided vertically from each other by a common wall.

slab-on-grade foundation

A foundation where the distance between the slab and ceiling is greater than 1.2 m (4 ft.) with the slab at or within 0.6 m (2 ft.) of *finished grade*.

solid fuel

A biomass fuel (in the context of ESNH).

NOTE: Consistent with definition in CSA B415.1-10 “Performance Testing of Solid-Fuel-Burning Heating Appliances”, this includes cordwood, wood chips, sawdust, fire logs, wood, paper, other biomass pellets and briquettes, and kernel corn and other grains.

total ventilation capacity

The minimum rate required, averaged over a 24 hour period, at which the ventilation system shall be capable of supplying outdoor air.

water heater

Equipment used to heat potable domestic hot water. Its energy efficiency performance is called the energy factor (EF), uniform energy factor (UEF), thermal efficiency (TE) or standby loss (measured in watts). ESNH eligible units are listed on Natural Resources Canada’s searchable product list and either fall under Canada’s Energy Efficiency Regulations, or, in the case of gas-fired *instantaneous* units, meet CSA-P.7-10 “Test Method for Measuring Energy Loss of Gas-Fired Instantaneous Water Heaters”.

NOTE: Natural Resources Canada’s searchable product list for residential equipment is found at: <http://oee.nrcan.gc.ca/pml-lmp/index.cfm?action=app.welcome-bienvenue>

unit

A *dwelling unit* or non-residential *unit* located within an eligible MURB.

3.2 Abbreviated terms

ACH	air changes per hour
AFUE	annual fuel utilization efficiency
BOP	Builder Option Package
BTU	British thermal unit
CCBFC	Canadian Commission on Building and Fire Codes
CFL	compact fluorescent light bulb
CFM	cubic feet per minute
CSA	Canadian Standards Association
DWHR	drain water heat recovery
EER	<i>energy efficiency ratio</i>
EF	energy factor
ELA	<i>equivalent leakage area</i>
EPA	Environmental Protection Agency (U.S.)
ERS	EnerGuide Rating System
ERV	energy (or enthalpy) recovery ventilator
ESNH	ENERGY STAR for New Homes
GJ	<i>gigajoule</i>
HDD	<i>heating degree days</i>
HRV	heat recovery ventilator
HVI	Home Ventilating Institute
ICF	insulated concrete form
IMS	<i>integrated mechanical system</i>
kWh	kilowatt hour
LPM	litres per minute
LTRH	less than <i>reference house</i>
MURB	<i>multi-unit residential building</i>
NBC	National Building Code of Canada
NFRC	U.S. National Fenestration Rating Council
NLA	<i>normalized leakage area</i>
NLR50	<i>normalized leakage rate at 50 pascals</i>
OBC	Ontario Building Code
OSB	oriented strand board
Pa	pascal
SDHW	solar domestic hot water
SEER	<i>seasonal energy efficiency ratio</i>
SHGC	solar heat gain coefficient
SIP	structural insulated panel
SL	standby loss
SRE	sensible heat recovery efficiency
TPF	thermal performance factor
UEF	uniform energy factor
ULC	Underwriters Laboratories of Canada

W watt

4 Minimum requirements

4.1 Applicable regulations

4.1.1 Building codes and regulations

The *ENERGY STAR for New Homes Standard* is not a substitute for local building codes or regulations. It is an additional set of requirements that may be more stringent in the area of energy efficiency. Where a conflict may be present, all local building codes and regulations take precedence over the measures outlined in this *Standard*. Where building code requirements or regulations exceed those of ESNH, or vice versa, the more stringent requirement shall apply.

4.1.2 Energy Efficiency Regulations

Equipment and products that are regulated in Canada under Canada’s “Energy Efficiency Act” and installed in ESNH housing shall comply with Canada’s “Energy Efficiency Regulations.”

NOTES:

- 1) The intent of this requirement is to ensure that all equipment and products installed in ESNH housing meet the CSA standards specified in Canada’s “Energy Efficiency Regulations.”
- 2) For more information on Canada’s “Energy Efficiency Regulations”, refer to:
<https://www.nrcan.gc.ca/energy-efficiency/energy-efficiency-regulations/guide-canadas-energy-efficiency-regulations/6861>

4.2 Building envelope

4.2.1 Airtightness

The house shall be constructed sufficiently airtight such that the whole house air leakage is less than or equal to one of the airtightness targets specified in **Table 1**. The *airtightness test* must be performed in accordance with the as-operated method based on CAN/CGSB 149.10-M86 “Determination of the Airtightness of Building Envelopes by the Fan Depressurization Method”, as outlined in the *EnerGuide Rating System—Technical Procedures—Version 15.7* or more recent.

Table 1 - Airtightness Targets

Forming part of **section 4.2.1**

Building Type	ACH at 50 Pa	NLA at 10 Pa		NLR at 50 Pa	
		cm ² /m ²	in ² /100 ft ²	L/s/m ²	cfm50/ft ²
Attached	3.0	2.12	3.06	1.32	0.26
Detached	2.5	1.26	1.81	0.93	0.18

NOTES:

1) Refer to the *EnerGuide Rating System—Technical Procedures—Version 15.7* or more recent for details on the test method.

2) Buildings are considered attached or detached depending on their configuration. For example, a *duplex* not attached to any other building is considered a detached building, whereas *duplexes* in a row configuration are considered an attached building. For more information on MURBs, refer to the *EnerGuide Rating System—Technical Procedures—Version 15.7* or more recent.

4.2.2 Opaque assemblies

4.2.2.1 Minimum effective resistance of opaque assemblies

Effective thermal resistance of opaque assemblies shall not be less than those specified in **Table 2**.

Table 2 - Minimum Effective Thermal Resistance of Opaque Assemblies¹

Forming part of **section 4.2.2.1**

Building Assembly	Heating Degree Days ²					
	RSI (R)					
	< 3000	3000 - 3999	4000-4999	5000-5999	6000-6999	≥ 7000
Ceilings below attics	6.91 (39.2)	8.67 (49.2)	8.67 (49.2)	10.43 (59.2)	10.43 (59.2)	10.43 (59.2)
Cathedral ceilings and flat roofs	4.67 (26.5)	4.67 (26.5)	4.67 (26.5)	5.02 (28.5)	5.02 (28.5)	5.02 (28.5)
Walls above grade ³	2.78 (15.8)	3.08 (17.5)	3.08 (17.5)	3.08 (17.5)	3.85 (21.9)	3.85 (21.9)
Floors over unheated spaces	4.67 (26.5)	4.67 (26.5)	4.67 (26.5)	5.02 (28.5)	5.02 (28.5)	5.02 (28.5)
Foundation walls below or in contact with the ground	1.99 (11.3)	2.98 (16.9)	2.98 (16.9)	3.46 (19.6)	3.46 (19.6)	3.97 (22.5)
Unheated floors below frost line	-	-	-	-	-	-
Unheated floors on ground above frost line ^{4,5,6}	1.96 (11.1)	1.96 (11.1)	1.96 (11.1)	1.96 (11.1)	1.96 (11.1)	1.96 (11.1)
Heated or unheated floors on ground on permafrost ⁵	-	-	-	-	4.44 (25.2)	4.44 (25.2)
Heated floors on ground ⁵	2.32 (13.2)	2.32 (13.2)	2.32 (13.2)	2.85 (16.2)	2.85 (16.2)	2.85 (16.2)
Slabs-on-grade with integral footing ^{4,7,8}	1.96 (11.1)	1.96 (11.1)	1.96 (11.1)	3.72 (21.1)	3.72 (21.1)	4.59 (26.1)

NOTES:

1) Where local building code values are greater, the local code requirements take precedence, per **section 4.1.1**.

2) *Heating degree days* as determined by **section 1.2.2.1**.

3) Applies to walls that are not common to another heated *unit*.

- 4) A nominal RSI 1.76 (R10) will meet the RSI 1.96 (R11.1) requirement and a nominal RSI 3.52 (R20) will meet the RSI 3.72 (R 21.1) requirement.
- 5) Applies to the entire area.
- 6) Includes non-structural slab on grade.
- 7) Except where prohibited by structural requirements of the building code in effect, insulation requirements apply to under the entire slab, and to a 900 mm (3 ft.) skirt of the same nominal value.
- 8) Where a slab on grade is also a heated floor, the higher insulation value shall apply.

4.2.2.2 Eligible insulation materials

- (a) Except as permitted in **section 4.2.2.2 (b)**, thermal characteristics of eligible insulation materials shall conform to the requirements of:

- CAN/CGSB-51.25-M87 “Thermal Insulation, Phenolic, Faced”
- CGSB 51-GP-27M-1979 “Thermal Insulation, Polystyrene, Loose Fill”
- CAN/ULC-S701.1:2017, *Standard for Thermal Insulation, Polystyrene Boards*
- CAN/ULC-S702.1-14-AMD1, *Standard for Mineral Fibre Thermal Insulation for Buildings, Part 1: Material Specification*
- CAN/ULC-S703-09, *Standard for Cellulose Fibre Insulation for Buildings*
- CAN/ULC-S704.1:2017, *Standard for Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Faced*
- CAN/ULC-S705.1:2018, *Standard for Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density – Material Specification*
- CAN/ULC-S706.1:2016, *Standard for Wood Fibre Insulating Boards for Buildings*
- CAN/ULC-S712.1:2017, *Standard for Thermal Insulation - Light Density, Open Cell Spray Applied Semi-Rigid Polyurethane Foam - Material Specification* or
- CAN/ULC-S716.1-12-R2018, *Standard for Exterior Insulation and Finish Systems (EIFS) - Materials and Systems*

- (b) For a specific insulation product or assembly not conforming to the standards listed in **section 4.2.2.2 (a)**, the thermal resistance, or long term thermal resistance values where applicable, are permitted to be used as reported by the Canadian Construction Materials Centre (CCMC) in the evaluation of such a product or assembly.

4.2.2.3 Wall and floor assemblies below or in contact with the ground

- (a) Where the distance between the top of a foundation wall and the line of the *finished grade* is more than 600 mm (2 ft.), the *effective thermal resistance* for the above-ground portion of the foundation wall shall be not less than that required for the thermal resistance for walls above grade per **section 4.2.2.1**.
- (b) Except as permitted in **section 4.2.2.3 (c)**, the below ground portion of insulation required for foundation walls below or in contact with ground shall extend down to the level of the top of the floor

that comprises part of the heated boundary.

- (c) A gap of not greater than 150 mm (6") is permitted between the bottom edge of the interior foundation wall insulation and the floor where insulation is provided on the interior face of a foundation wall below or in contact with ground, and where the top of the floor in contact with the ground that comprises part of the heated boundary is equal to or greater than 1.2 m (4 ft.) below *finished grade*.
- (d) The foundation wall insulation is permitted to be split into interior and exterior portions provided the interior and exterior portions each have an *effective thermal resistance* not less than is required in **section 4.2.2.1**, and they are overlapped a distance of not less than four times the distance separating the planes of insulation.
- (e) Except where prohibited by structural requirements of the building code in effect, or, where there is insulation on the exterior of the foundation wall down to the footing, basement floor assemblies where sub-slab insulation has been installed shall have a thermal break between the basement floor slab and foundation walls with a thermal resistance, at a minimum, equivalent to the sub-slab insulation installed.

4.2.2.4 Ceilings below attics

For ceilings below attics under sloped roofs, the thermal resistance shall be continuous to the outermost edge of the exterior wall. Insulation levels may be reduced to the extent required by the slope of the roof no less than an RSI of 3.52 at the inner edge of the exterior wall.

4.2.2.5 Rim joists

Rim joists, including foundation headers, shall have a thermal resistance not less than that of walls above grade.

4.2.3 Fenestration and door systems

4.2.3.1 Fenestration

- (a) With the exception of **section 4.2.3.1 (b)**, **(c)** and **section 4.2.3.3**, windows and skylights, including tubular skylights, shall be *ENERGY STAR certified* for the climate zone in which they are installed.

NOTE: Climate zones for ENERGY STAR fenestration products are defined in "Climate Zones ENERGY STAR," refer to: <http://oee.nrcan.gc.ca/pml-lmp/index.cfm?action=app.welcome-bienvenue&lang=en>.

- (b) Windows in walls below or in contact with the ground, where the distance from the top of the floor in contact with the ground below the window and the line of the *finished ground* is equal to or greater than 1.2 m (4 ft.), need not comply with **section 4.2.3.1 (a)** but shall meet the following requirements, at a minimum:

- (i) be double-glazed with low-e glass,
 - (ii) be filled with inert gas,
 - (iii) have an insulated spacer, and
 - (iv) if the frame or sash is made from metal, it shall be thermally broken.
- (c) Decorative windows, including side lights, integrated glazing in doors, half-circle windows, leaded windows, transoms and other specialty glazing products, need not comply with **section 4.2.3.1 (a)** provided that the total glazing area of such decorative glazing does not exceed 1.85 m² (20 ft²).

NOTE: Fenestration in door systems, e.g. integrated glazing, sidelights and transoms, applies only to the door system not covered under **section 4.2.3.2 (b)**.

4.2.3.2 Door systems

- (a) With the exception of **section 4.2.3.2 (b)** and **(c)**, *exterior door systems* shall be *ENERGY STAR certified* for the climate zone in which they are installed.

NOTE: Climate zones for ENERGY STAR doors are defined in “Climate Zones – ENERGY STAR,” refer to: <http://oee.nrcan.gc.ca/pml-lmp/index.cfm?action=app.welcome-bienvenue&lang=en>.

- (b) A maximum of one *exterior door system* (to a maximum of one single or one double door) that does not comply with **section 4.2.3.2 (a)** is permitted per house.
- (c) Doors to unheated enclosed spaces shall have an insulated core and be installed with weatherstripping.

NOTE: This requirement includes, but is not limited to, doors to cold cellars and doors to attached garages.

4.2.3.3 Fenestration⁵ in performance approach homes

Homes following the Performance Approach need not comply with **section 4.2.3.1 (a)** provided they meet the following:

- (a) Are located in regions < 5000 HDD;
- (b) Have a maximum ACH in accordance with **Table 1**;
- (c) Fenestration has a SHGC ≤ 0.3 and a U-factor ≤ 1.60 W/(m²·K) (0.28 Btu/h·ft.²·°F);
- (d) Fenestration has been certified for energy performance using CSA A440.2-09 or CSA A440.2 -14 “Fenestration Energy Performance” or NFRC 100-10 “Procedure for Determining Fenestration Product U-factors” and NFRC 200-10 “Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence”; and
- (e) Energy performance data for the fenestration is listed on one of the following databases:

⁵ Including patio doors.

- (i) ENERGY STAR Canada: <http://oee.nrcan.gc.ca/pml-lmp/index.cfm?action=app.welcome-bienvenue>,
- (ii) NFRC: <http://search.nfrc.org/search/searchDefault.aspx>,
- (iii) CSA Group: <http://www.csagroup.org/services/testing-and-certification/certified-product-listing/>, or
- (iv) Intertek: https://whdirectory.intertek.com/Pages/DLP_Search.aspx.

NOTES:

- 1) Provision covered under **section 4.2.3.3** is included on a pilot basis and will remain in place pending evaluation of the pilot.
- 2) NLA or NLR cannot be used for compliance to this sub-section.
- 3) Use of this provision requires submission of an “ESNH Energy Advisor Verification Checklist” with a completed “Fenestration Exemption” tab. For further instructions on the pilot requirements please refer to the “ESNH Energy Advisor Verification Checklist”.
- 4) Additional conditions for using this exemption are: (a) Builders must always make home buyers aware that some or all fenestration in their *ENERGY STAR certified* home is not *ENERGY STAR certified*. (b) If the fenestration installed is *ENERGY STAR certified* for a lower zone than that in which it is installed, the ENERGY STAR label must be removed prior to the home buyer taking possession. (c) Builders cannot use marketing messages with statements indicating that an *ENERGY STAR certified* home has *ENERGY STAR certified* windows.

4.3 Space heating and cooling equipment

4.3.1 Integrated mechanical systems

Where installed, an *integrated mechanical system* shall be:

- (a) of the condensing type, and
- (b) tested by a third party accredited by the Standards Council of Canada according to CSA P.10-07 “Performance of Integrated Mechanical Systems for Residential Heating and Ventilation” and meet or exceed the Standard's premium performance requirements.

4.3.2 Combined space and water heating systems

Where installed, a *combined space and water heating system* shall be:

- (a) of the condensing type, and
- (b) tested by a third party accredited by the Standards Council of Canada⁶ according to CSA P.9-11 “Test method for determining the performance of *combined space and water heating systems* (combos)” (applies to forced-air space heating systems only).

⁶ Or an accreditation body that is a signatory to the International Laboratory Accreditation Cooperation.

NOTE: CSA P.9-tested systems are listed at: <http://oee.nrcan.gc.ca/pml-imp/index.cfm?action=app.search-recherche&appliance=P9COMBO>.

4.3.3 Natural gas or propane fireplaces

Where installed, natural gas or propane fireplaces shall be *direct-vent* with spark ignition (also referred to as “intermittent” or “on-demand”).

NOTES:

- 1) For eligible products, refer to:
<http://oee.nrcan.gc.ca/residential/business/manufacturers/search/fireplace-search.cfm>
- 2) Standing pilot light types may be used in the performance approach, but the pilot light usage must be accounted for.

4.3.4 Solid-fuel-burning appliances

Solid-fuel-burning appliances must meet the requirements in this section.

NOTES:

- 1) Coal products are not permitted.
- 2) When used for primary heating purposes, appliances under **section 4.3.4** must be modelled by following the performance approach.

4.3.4.1 Indoor automatically-fuelled appliances

Where installed, automatically-fuelled appliances, including pellet stoves, central pellet furnaces and boilers, and pellet fireplaces, shall be installed according to manufacturer’s instructions and have no barometric dampers.

4.3.4.2 Indoor manually-fuelled appliances

Where installed, indoor manually-fuelled appliances, including stoves, fireplaces, fireplace inserts, and central furnaces and boilers, shall:

- (a) be certified to:
 - (i) CAN/CSA-B415.1-10 “Performance testing of solid-fuel-burning heating appliances”, or
 - (ii) U.S. Environmental Protection Agency (EPA) 40 Code of Federal Regulations (CFR) Part 60 - Standards of Performance for New Residential Wood Heaters, New Residential Hydronic Heaters and Forced-Air Furnaces, and
- (b) have no barometric dampers.

4.3.4.3 Outdoor central heating appliances

Where installed, outdoor central heating appliances, such as hydronic heaters and furnaces, shall be certified to:

- (a) CAN/CSA-B415.1-10 “Performance testing of solid-fuel-burning heating appliances”, or
- (b) U.S. Environmental Protection Agency (EPA) 40 Code of Federal Regulations (CFR) Part 60 - Standards of Performance for New Residential Wood Heaters, New Residential Hydronic Heaters and Forced-Air Furnaces.

4.3.4.4 Masonry heaters

Where installed, masonry heaters shall be constructed with:

- (a) tight-fitting fuel loading doors that are closed during the burn cycle,
- (b) combustion air control providing high-fire burn only,
- (c) a minimum mass of 800 kg (1760 lbs),
- (d) a firebox and heat exchange channels built from refractory components with an overall average wall thickness not exceeding 250 mm (10in.),
- (e) a gas path through the internal heat exchange channels downstream of the firebox with at least one 180-degree change in flow direction before entering the chimney, and
- (f) the length of the shortest single path from the firebox exit to the chimney entrance at least twice the largest firebox dimension.

NOTE: Site-built fireplaces, with the exception of masonry heaters as specified in **section 4.3.4.4**, are not permitted in ESNH houses.

4.4 Drain water heat recovery

Where installed, drain water heat recovery (DWHR) units shall:

- (a) be installed according to the manufacturer’s instructions,
- (b) recover heat from at least one shower stack, and
- (c) be listed on Natural Resources Canada’s searchable product list at: <http://oee.nrcan.gc.ca/pml-lmp/index.cfm?action=app.search-recherche&appliance=DWHR>.

4.5 Solar domestic hot water

Where installed, solar domestic hot water (SDHW) units shall be certified to:

- (a) either ICC 900/ICC-SRCC™ 300 Solar Thermal System Standard or CSA F379 Series-09 “Packaged Solar Domestic Hot Water Systems”, and

- (b) either ICC 901/ICC-SRCC™ 100 Solar Thermal Collector Standard or CSA F378.1-11 “Glazed and unglazed liquid heating solar collectors - Test methods”.

NOTES:

- 1) The CSA F378.1-11 Standard applies to: (a) glazed flat plate liquid heating solar collectors; (b) glazed vacuum tube or vacuum envelope liquid heating solar collectors; (c) unglazed flat plate liquid heating solar collectors; (d) integral collector storage (ICS) systems with time constants of less than 30 minutes; and (e) concentrating collectors with an acceptance angle greater than 60°. The OG-100 collector rating database can be found on the Solar Rating & Certification Corporation (SRCC) website at: <http://www.solar-rating.org/>.
- 2) For a list of annual performance ratings for solar collector systems, see the Performance Directory of Solar Domestic Hot Water Systems, available at: <https://www.nrcan.gc.ca/energy/energy-sources-distribution/renewables/solar-thermal/performance-directory-solar-domestic-hot-water-systems/7337> or for OG-300 systems, the rating can be found on the SRCC website at: <http://www.solar-rating.org/>. The SRCC Canada Single Day Rating provides annual estimated energy savings for pumped (active) systems determined through simulations using the standard day conditions specified in the CAN/CSA F379 SERIES-09 (R2013) standard.
- 3) MURBs do not need to comply with (a).

4.6 Venting and combustion air supply of fuel-fired equipment

4.6.1 Natural gas-fired and propane-fired equipment

Where installed, natural gas-fired and propane-fired space and water heating equipment shall be:

- (a) equipped with electronic ignition, and
- (b) independently vented with a sealed vent connected to a:
 - (i) *direct-vent* system, or
 - (ii) *mechanically vented* system.

NOTE: The intent of this requirement is to reduce the possibility for combustion spillage, thereby reducing health and safety risk to the occupants. Naturally-aspirated appliances or appliances with standing pilot lights do not meet this requirement.

4.6.2 Oil-fired equipment

Where installed, oil-fired space and water heating equipment shall be independently vented with a sealed-vent connected to a:

- (a) *direct-vent* system,
- (b) forced-draft system, or
- (c) terminally mounted induced-draft power venter.

NOTE: The intent of this requirement is to reduce the possibility for combustion spillage, thereby reducing health and safety risk to the occupants. Naturally-aspirated appliances or barometric dampers do not meet these requirements.

4.6.3 Combustion air supply

- (a) Combustion air supply ducts and damper systems shall serve no more than one piece of equipment.
- (b) Combustion air supply for space or water heating equipment terminating in conditioned space shall be equipped with an approved device to control unintended air leakage when air is not required for combustion.

NOTE: This requirement does not apply to natural gas-fired or propane-fired water heating equipment.

4.7 Ventilation and distribution systems

4.7.1 Ventilation systems

4.7.1.1 Principal ventilation capacity

The *principal ventilation capacity* for *residential units* shall be achieved through either a heat recovery ventilator (HRV), an energy recovery ventilator (ERV), or an *integrated mechanical system*.

4.7.1.2 HRV/ERV requirements

- (a) The HRV/ERV shall be:
 - (i) certified by the Home Ventilating Institute (HVI) as an HRV or ERV, be *ENERGY STAR certified*, or be tested by a third party accredited by the Standards Council of Canada according to CSA C439-18,
 - (ii) tested at 0 °C for locations with a 2.5% January design temperature greater than or equal to -10°C,
 - (iii) tested at 0 °C and -25 °C for locations with a 2.5% January design temperature less than -10°C, and

- (iv) installed such that the supply and exhaust flows are measured and balanced within 10% at high speed, with a label attached to the equipment indicating the installing company and the measured flow rates.
- (b) The sensible heat recovery efficiency (i.e. which is either modelled under the Performance Approach or selected from a BOP table under the Prescriptive Approach) shall be taken at an airflow rate greater than or equal to the airflow rate indicated in **Table 3**.

NOTE: The applicable SRE corresponding to the airflow rate indicated in **Table 3** can also be determined by interpolating between two airflow rates. Extrapolation of SRE values beyond those reported in the HVI Directory is not allowed.

Table 3 - Minimum airflow rates
Forming part of **section 4.7.1.2 (b)**

Number of Bedrooms	Minimum Airflow Rate (at 0 °C)	
	L/s	CFM
1	16	34
2	18	38
3	22	47
4	26	55
5	30	64
> 5	As per good practice such as that described in CAN/CSA-F326-M91 (R2010) "Residential Mechanical Ventilation Systems"	

NOTES:

- 1) The applicable airflow rate is determined by the number of bedrooms that was used in the design of the ventilation system.
- 2) For a listing of products, refer to section 3 in the HVI "Certified Home Ventilating Products Directory©", available at: <http://hvi.org/proddirectory/index.cfm>.
- 3) For a listing of *ENERGY STAR* certified equipment, refer to: <http://www.nrcan.gc.ca/energy/products/energystar/why-buy/13631>.

4.7.1.3 IMS requirements

The IMS ventilation energy recovery module shall be installed such that the supply and exhaust flows are measured and balanced within 10% at high speed, with a label attached to the equipment indicating the installing company and the measured flow rates.

4.7.1.4 Integrated HRV air-handler requirements

Integrated HRV air handlers shall:

- (a) be tested to section 8 of CSA P.10-07 “Performance of Integrated Mechanical Systems for Residential Heating and Ventilation”, and
- (b) have a defrost mechanism.

4.7.1.5 Ventilation of public corridors in *MURBs*

Public corridors that serve more than one *residential unit* shall:

- (a) have a ventilation rate not less than 0.3 L/s/m² (0.06 cfm/ft²), and
- (b) have airtight gaskets or weatherstripping on doors between each *residential unit* and the corridor.

NOTE: The ventilation rate is consistent with ASHRAE 62.1-2010 “Ventilation for Acceptable Indoor Air Quality.”

4.7.2 Distribution systems

4.7.2.1 Interconnection to forced-air distribution system

Where a central forced air system is utilized either fully or in part to distribute ventilation air, the principal exhaust fan control shall be interconnected with the forced air distribution system such that switching on the principal exhaust fan operates the forced air distribution fan.

4.7.2.2 Duct location

All ducts for heating, ventilation and air conditioning shall be located within the heated boundary, where the heated boundary shall have a thermal resistance not less than that provided in **Table 2**.

NOTES:

- 1) The intent of this requirement is to ensure that there is full insulation between the duct and the exterior surface of the *opaque assembly*.
- 2) This requirement does not pertain to exhaust-only ventilation.

4.7.2.3 Duct sealing

(a) Except for **4.7.2.3 (d)**, heating and cooling system ducts shall be sealed as follows:

- (i) seal all supply transverse joints, branch take-offs, branch supply joints and manufactured beaded joints on round perimeter pipes located on all floors.
- (ii) for common return ducts, the more stringent of (1) or (2) shall apply:
 - (1) The drop to the furnace and at least one horizontal metre of return duct(s) measured from the furnace/air handler connection must be sealed with tape or mastic approved for the application; or
 - (2) Within a framed or closed mechanical room, all the return ducts, including joist returns, must be sealed with tape or mastic approved for the application.

NOTE: See **Figure 1** for an illustration of these requirements.

- (b) HRV/ERV, *integrated HRV air handlers*, and IMS connections to the outdoor vent hoods must be sealed and insulated.
- (c) For dedicated fully ducted ventilation ductwork (e.g. HRV/ERV ducts), all manufactured and site assembled joints must be sealed.
- (d) The following joints are exempt from additional sealing: self-sealing manufactured pipe, take-offs, and fittings (with manufactured seal or incorporated gaskets); snap lock and folded seam longitudinal duct joints; and knurled adjustable joints on manufactured elbows.

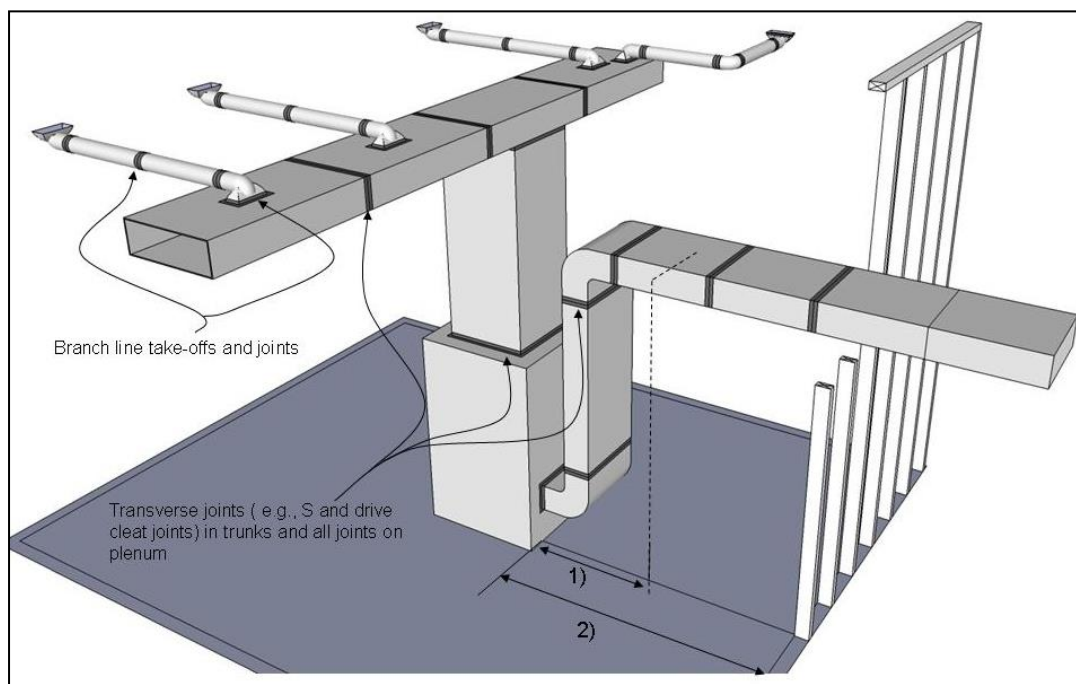


Figure 1 - Duct sealing requirements
Forming part of **section 0 (a) (ii)**

4.7.2.4 Solar hot water system distribution

Where distribution piping for solar hot water systems is located in an unconditioned space, they shall be thermally insulated to the greater of:

- (a) the manufacturer's installation specifications, or
- (b) RSI 0.5 (R3)

4.8 Electrical savings

All *ENERGY STAR certified* homes must have at least 75% *ENERGY STAR certified fixtures* or light bulbs¹ products installed in the entire house, and in each *unit* and common area of a MURB.

NOTE: Applies to all lighting in the building, including decorative, stair and exterior lighting.

5 Compliance options

5.1 Performance approach

5.1.1 General

ENERGY STAR certified homes built following the performance approach shall comply with **section 5.1.2** in addition to meeting the minimum requirements laid out in **section 4**, and the *EnerGuide Rating System—Standard, Technical Procedures, HOT2000 User Guide, Quality Assurance Procedures—Version 15.7* or more recent.

5.1.2 Energy target

ENERGY STAR certified homes built following the performance approach shall comply with the performance targets that apply to the relevant climate zone and region, as provided in **section 6**.

NOTE: The evaluation conducted under the Performance Approach is limited to the specific house that is modelled and labelled.

5.1.3 Approved compliance software

The energy target in **section 5.1.2** shall be assessed using the more recent version of HOT2000 (11.7 or more recent), unless otherwise specified by Natural Resources Canada.

5.2 Prescriptive approach

5.2.1 General

ENERGY STAR certified homes built following the prescriptive approach shall comply with **section 5.2.2** to **5.2.4** in addition to meeting the minimum requirements laid out in **section 4**.

NOTES:

- 1) The Prescriptive Approach allows a builder to choose a Builder Option Package (BOP) that has been pre-determined to meet, on average, the energy performance specifications for an *ENERGY STAR certified* new home. No modelling is required under this approach.
- 2) Refer to **section 6** for BOP details.

5.2.2 Builder option packages

- (a) *ENERGY STAR certified* homes shall comply with the BOP for the relevant region and climate zone per **section 6**.

- (b) The lowest level of the following, installed in a building or a *unit* of a building shall apply for the purpose of compliance:
 - (i) thermal resistance of an *opaque assembly*,
 - (ii) ENERGY STAR climate zone for windows and doors, and
 - (iii) efficiency of mechanical equipment.
- (c) For airtightness in MURBs, the following shall apply:
 - (i) For MURBs with one to three zones:
Level 2, 3, 4 or 5, per **Appendix A: Airtightness metrics**, can be applied if the ACH, NLA or NLR threshold is met using one of the methods described in the *EnerGuide Rating System - Technical Procedures version 15.7* or more recent. Note that pressure is required to be taken in all zones during the test.
 - (ii) For MURBs with four or more zones:
Level 2, 3, 4 or 5, per **Appendix A: Airtightness metrics**, can be applied if the ACH, NLA or NLR threshold is met using the method described in the *EnerGuide Rating System—Technical Procedures—Version 15.7* or more recent and Appendix A of the *ESNH—Technical Procedures*. Note that pressure is not required to be taken in all zones during the test.

5.2.3 Effective thermal resistance of opaque assemblies

- (a) Opaque assemblies shall be constructed to achieve the applicable *effective thermal resistance* levels specified in the applicable BOP, as calculated by following the procedures provided in “*ENERGY STAR® for New Homes Tables for Calculating Effective Thermal Resistance of Opaque Assemblies*” to achieve the *effective thermal resistance* levels in the applicable BOP.
- (b) Where a component of the building envelope is protected by an enclosed unconditioned space, such as a sun porch, enclosed veranda, vestibule or attached garage, the thermal buffering effect of said space shall be considered to be RSI 0.16 (R 0.9).

NOTES:

- 1) For the purposes of this clause, enclosed unconditioned spaces also include heated garages.
- 2) When calculating the overall thermal resistance of an *opaque assembly* for demonstrating compliance with **section 6**, the thermal buffering effect of the enclosed unconditioned space can be considered as a continuous material with a thermal resistance of RSI 0.16 (R 0.9), provided this is in accordance with local building codes and regulations.

5.2.4 Window to wall ratio

The total area of all windows, sliding glass doors and skylights is limited to a maximum of 20% of the *above grade wall area*. Exceeding this limit precludes use of the prescriptive approach.

NOTE: The total area referred to is the sum of all the areas of the structural rough openings for the windows, sliding glass doors and skylights, as well as transoms and sidelights.

6 Regional specifications

6.1 Alberta

6.1.1 Climate zones for Alberta

The climate zones for **section 6.1.3** are defined by **Table 4**, where the *heating degree days* are determined as per **section 1.2.2.1**.

Table 4 - ESNH Climate Zones for Alberta
Forming part of **section 6.1.1**

Climate Zone	<i>Heating Degree Days</i>
ESNH AB Zone 1	< 5000
ESNH AB Zone 2	5000-5999
ESNH AB Zone 3	≥ 6000

6.1.2 Performance targets for Alberta

For ENERGY STAR certification using the performance approach, the percentage difference between the house rating and the EnerGuide Rating System *reference house* rating shall be:

- (a) At least 20.0% lower than the EnerGuide Rating System *reference house* (% LTRH) for houses, MURB whole building and *MURB single units*, or
- (b) At least 10.0% LTRH and maximum 60 GJ/year, excluding *MURB single units*.

NOTE: *On-site* electricity production shall be excluded from the ERS Rating for the purpose of compliance with the performance target.

6.1.3 Builder option packages for Alberta

Apply all BOP elements for the applicable climate zone, per **Table 5**.

Table 5¹ - Alberta Core BOP
Forming part of **section 6.1.3**

Item	ESNH AB Zone 1	ESNH AB Zone 2	ESNH AB Zone 3
	RSI (R)	RSI (R)	RSI (R)
Ceilings below attics	8.67 (49.2)	10.43 (59.2)	10.43 (59.2)
Cathedral ceilings and flat roofs	4.67 (26.5)	5.02 (28.5)	5.02 (28.5)
Walls above grade	3.08 (17.5)	3.08 (17.5)	3.85 (21.9)
Floors over unheated spaces	4.67 (26.5)	5.02 (28.5)	5.02 (28.5)
Foundation walls below or in contact with the ground	2.98 (16.9)	3.46 (19.6)	3.46 (19.6)
Unheated floors on ground above frost line	1.96 (11.1)	1.96 (11.1)	1.96 (11.1)
Heated or unheated floors on ground on permafrost	n/a	n/a	4.44 (25.2)
Heated floors on ground	2.32 (13.2)	2.85 (16.2)	2.85 (16.2)
Slabs-on-grade with an integral footing	1.96 (11.1)	3.72 (21.1)	3.72 (21.1)
Fenestration ²	ENERGY STAR Zone 2	ENERGY STAR Zone 2	ENERGY STAR Zone 3
Space heating	95% AFUE <i>ENERGY STAR certified</i> fuel-fired furnace³ or boiler, - Air-source heat pump, or - Ground-source heat pump		
Domestic water heating	Fuel-fired: EF or UEF 0.67 ⁴		
Ventilation ⁵	60% SRE at 0°C; 55% SRE at -25°C		
Electrical savings ⁶	75% ENERGY STAR lighting		
BOP points required ⁷	1.9	2.0	1.8

NOTES:

- 1) Thermal resistance requirements are listed in effective RSI (R) values.
- 2) Includes skylights and door systems. Climate zones for ENERGY STAR fenestration products are defined in "Climate Zones – ENERGY STAR," refer to: <http://www.nrcan.gc.ca/energy/products/for-participants/specifications/13720>.
- 3) Furnaces shall be ENERGY STAR certified, or have an AFUE ≥ 95% and an electronically commutated fan motor (ECM).
- 4) Cannot be used in combined space and water heating configurations.
- 5) Refer to **section 4.7.1.2 (b)** for how to determine the SRE at 0 °C.
- 6) This applies to all lighting in the house, including decorative, stair and exterior lighting. Lighting must be *ENERGY STAR certified fixtures* or light bulbs.
- 7) Select options from **Table 6** such that the points assigned total not less than the amount of points indicated in this table for the applicable climate zone.

Table 6¹ - Alberta BOP options
Forming part of **section 6.1.3**

Category		Item	ESNH AB Zone 1	ESNH AB Zone 2	ESNH AB Zone 3
Ceilings²	Ceilings Below Attic (100%)	R 52 (nominal) at heel w/ R 60 (nominal)	0.1	n/a	n/a
	Cathedral Ceilings and Flat Roofs (100%)	R 40 (nominal)	0.1	n/a	n/a
	Ceilings Below Attic and Cathedral Ceilings/Flat Roofs³	Attic–R 60 (nominal); flat/cathedral–R 40 (nominal)	0.1	n/a	n/a
Walls Above Grade		RSI 3.41 (R 19.4)	0.5	0.6	n/a
		RSI 3.59 (R 20.4)	0.6	0.7	n/a
		RSI 3.78 (R 21.5)	0.9	1.0	n/a
		RSI 3.90 (R 22.1)	1.0	1.1	0.1
		RSI 4.03 (R 22.9)	1.0	1.2	0.2
		RSI 4.48 (R 25.4)	1.4	1.5	0.6
		RSI 4.79 (R 27.2)	1.6	1.8	0.8
Foundation Walls		RSI 3.67 (R 20.8)	0.3	0.1	0.1
		RSI 3.94 (R 22.4)	0.5	0.3	0.3
		RSI 4.19 (R 23.8)	0.5	0.3	0.3
Unheated Floors Below Frost Line⁴		RSI 0.88 (R 5.0) full slab	0.1	0.3	0.3
		RSI 1.76 (R 10.0) full slab	0.2	0.4	0.3
Fenestration⁵		ENERGY STAR Zone 2	0.1	0.2	n/a
		ENERGY STAR Zone 3	0.3	0.4	0.3
Airtightness⁶		Level 2	0.5	0.5	0.5
		Level 3	0.9	1.0	1.2
		Level 4	1.4	1.6	1.7
Airtightness + HRV/ERV⁶,⁷,⁹		Level 4 + ≥ 84% SRE at 0 °C	1.5	1.8	2.6
Airtightness + HRV/ERV - MURBs⁶,⁷,⁸,⁹		Level 4 + minimum 2 units with HRV/ERV ≥ 84% SRE at 0 °C	max. 1.5	max. 1.8	max. 2.6
Heat Recovery Ventilator / Energy Recovery Ventilator (HRV/ERV)⁷		≥ 75% SRE at 0°C	0.1	0.1	0.1
HRV/ERV – MURBs⁷,⁸		≥ 75% SRE at 0°C	max. 0.1	max. 0.1	max. 0.1

HRV/ERV fan efficacy¹⁰	SRE ≥ 75% at 0°C, ≥ 0.57 L/s/W	0.1	0.1	0.1
Domestic Water Heating¹¹	<i>Instantaneous</i> condensing min. EF 0.90	0.8	0.7	0.7
	<i>Instantaneous</i> condensing min. UEF 0.90	1.0	1.1	1.1
	<i>Instantaneous</i> condensing min. EF 0.95	0.9	0.8	0.8
	<i>Instantaneous</i> condensing min. UEF 0.95	1.1	1.2	1.2
	Tank condensing min. EF 0.80	0.7	0.7	0.7
	Tank condensing min. TE 90%	0.7	0.7	0.7
	Tank condensing min. TE 94%	0.8	0.7	0.7
	Tank condensing min. UEF 0.75	0.8	0.9	1
	Tank condensing min. UEF 0.80	0.9	1.0	1.1
SDHW	Single dwelling: ≥ 6000 MJ/yr	1.0	0.9	0.7
	MURBs: ≥ 3000 MJ/yr/unit ¹²	1.0	0.9	0.7
Drain Water Heat Recovery (DWHR)¹³	≥ 30% to < 42% - one shower	0.2	0.2	0.2
	≥ 30% to < 42% - two showers	0.3	0.3	0.3
	≥ 42% to < 54% - one shower	0.2	0.2	0.2
	≥ 42% to < 54% - two showers	0.3	0.4	0.4
	≥ 54% to < 62% - one shower	0.2	0.3	0.3
	≥ 54% to < 62% - two showers	0.4	0.5	0.5
	≥ 62% to < 70% - one shower	0.3	0.3	0.3
	≥ 62% to < 70% - two showers	0.5	0.6	0.6
	≥ 70% - one shower	0.3	0.3	0.3
	≥ 70% - two showers	0.5	0.6	0.6
DWHR – MURBs^{13,14}	≥ 30% to < 42% - one shower	max. 0.2	max. 0.2	max. 0.2
	≥ 30% to < 42% - two showers	max. 0.3	max. 0.3	max. 0.3
	≥ 42% to < 54% - one shower	max. 0.2	max. 0.2	max. 0.2
	≥ 42% to < 54% - two showers	max. 0.3	max. 0.4	max. 0.4
	≥ 54% to < 62% - one shower	max. 0.2	max. 0.3	max. 0.3
	≥ 54% to < 62% - two showers	max. 0.4	max. 0.5	max. 0.5
	≥ 62% to < 70% - one shower	max. 0.3	max. 0.3	max. 0.3
	≥ 62% to < 70% - two showers	max. 0.5	max. 0.6	max. 0.6
	≥ 70% - one shower	max. 0.3	max. 0.3	max. 0.3
	≥ 70% - two showers	max. 0.5	max. 0.6	max. 0.6
ENERGY STAR Certified Appliances¹⁵	Minimum of 3 types of <i>ENERGY STAR certified</i> appliances installed	0.1	0.1	0.1
Electrical Savings	100% ENERGY STAR lighting ¹⁶	0.1	0.1	0.1

NOTES:

- 1) Thermal resistance requirements are listed in effective values, unless otherwise indicated with (nominal) for nominal value. An 'n/a' indicates that an upgrade is not possible, likely due to a higher core BOP requirement.
- 2) Only one of the three sub-categories under Ceilings may be chosen.
- 3) Where both ceilings below attics and cathedral or flat roofs are present, both options must be applied.
- 4) Full slab thermal resistance values do not apply to slab on grade foundations.
- 5) Includes skylights and door systems. Climate zones for ENERGY STAR fenestration products are defined in "Climate Zones – ENERGY STAR," refer to: <http://www.nrcan.gc.ca/energy/products/for-participants/specifications/13720>.
- 6) See **Appendix A: Airtightness metrics** for ACH, NLA and NLR values for each level.
- 7) Refer to **section 4.7.1.2 (b)** for how to determine the SRE at 0 °C.
- 8) BOP points are calculated as follows: First calculate the number of points per *unit* using:

$$\text{Points per unit} = \text{max points} / \# \text{MURB units in building, rounding to the nearest 0.1.}$$
 Then calculate the BOP points as follows: BOP points = points per *unit* * #MURB *units* connected to a HRV/ERV, without exceeding max. points.
- 9) Only one of Airtightness or Airtightness + HRV/ERV option may be chosen.
- 10) HRV/ERV fan efficacy option can be chosen with HRV/ERV option.
- 11) This option applies only to stand-alone *water heaters* and not those that form part of a *combined space and water heating system*.
- 12) The minimum of 3000 MJ/yr/*unit* must be met for all *units* in the building.
- 13) This option is based on the number of shower stacks from which heat is being recovered, not the number of DWHR units, with one exception: houses with a total of one shower may claim the points for two showers since the DWHR unit is recovering heat from all the showers in the house. The maximum allowable amount is two showers.
- 14) BOP points are calculated as follows: First calculate the number of points per *unit* using:

$$\text{Points per unit} = \text{max points} / \# \text{MURB units in building, rounding to the nearest 0.1.}$$
 Then calculate the BOP points as follows: BOP points = points per *unit* * # MURB *units* (recovering heat from at least one shower stack) connected to a DWHR, without exceeding max. points.
- 15) Three *ENERGY STAR certified* appliances must be chosen out of the following appliance types: dishwasher, clothes washer, clothes dryer and refrigerator. Each type of appliance can only be selected once.
- 16) This applies to all lighting in the house, including decorative, stair and exterior lighting. Lighting must be *ENERGY STAR certified* fixtures or light bulbs. One non-*ENERGY STAR certified fixture* per house is allowed.

6.2 British Columbia

6.2.1 Climate zones for British Columbia

The climate zones for **section 6.2.3** are defined by **Table 7**, where the *heating degree days* are determined as per **section 1.2.2.1**.

Table 7 - ESNH Climate Zones for British Columbia
Forming part of **section 6.2.1**

Climate Zone	Heating Degree Days
ESNH BC Zone 1	< 2999
ESNH BC Zone 2	3000-3999
ESNH BC Zone 3	4000-4999
ESNH BC Zone 4	5000-5999
ESNH BC Zone 5	≥ 6000

6.2.2 Performance targets for British Columbia

For ENERGY STAR certification using the performance approach, the percentage difference between the house rating and the EnerGuide Rating System *reference house* rating shall be:

- (a) At least 20.0% lower than the EnerGuide Rating System *reference house* (% LTRH) for houses, MURB whole building and *MURB single units*, or
- (b) At least 10.0% LTRH and maximum 60 GJ/year, excluding *MURB single units*.

NOTE: *On-site* electricity production shall be excluded from the ERS Rating for the purpose of compliance with the performance target.

6.2.3 Builder option packages for British Columbia

Apply all BOP elements for the applicable climate zone, per **Table 8**.

Table 8¹ - British Columbia Core BOP
Forming part of **section 6.2.3**

Item	ESNH BC Zone 1	ESNH BC Zone 2	ESNH BC Zone 3	ESNH BC Zone 4	ESNH BC Zone 5
	RSI (R)	RSI (R)	RSI (R)	RSI (R)	RSI (R)
Ceilings below attics	6.91 (39.2)	8.67 (49.2)	8.67 (49.2)	10.43 (59.2)	10.43 (59.2)
Cathedral ceilings and flat roofs	4.67 (26.5)	4.67 (26.5)	4.67 (26.5)	5.02 (28.5)	5.02 (28.5)
Walls above grade	2.78 (15.8)	3.08 (17.5)	3.08 (17.5)	3.08 (17.5)	3.85 (21.9)
Floors over unheated spaces	4.67 (26.5)	4.67 (26.5)	4.67 (26.5)	5.02 (28.5)	5.02 (28.5)
Foundation walls below or in contact with the ground	1.99 (11.3)	2.98 (16.9)	2.98 (16.9)	3.46 (19.6)	3.46 (19.6)
Unheated floors on ground above frost line	1.96 (11.1)	1.96 (11.1)	1.96 (11.1)	1.96 (11.1)	1.96 (11.1)
Heated or unheated floors on ground on permafrost	n/a	n/a	n/a	n/a	4.44 (25.2)
Heated floors on ground	2.32 (13.2)	2.32 (13.2)	2.32 (13.2)	2.85 (16.2)	2.85 (16.2)
Slabs-on-grade with an integral footing	1.96 (11.1)	1.96 (11.1)	1.96 (11.1)	3.72 (21.1)	3.72 (21.1)
Fenestration ²	ENERGY STAR Zone 1	ENERGY STAR Zone 1	ENERGY STAR Zone 2	ENERGY STAR Zone 2	ENERGY STAR Zone 3
Space heating	• Electric resistance heater with line voltage thermostat³, • 92% AFUE fuel-fired furnace or boiler, • Air-source heat pump, or • Ground-source heat pump				
Domestic water heating ⁴	Electric: • 50 L - 270 L, bottom inlet, max. SL ≤ 66 W • 50 L - 270 L, top inlet, max. SL ≤ 61W • > 270 L - 454 L, bottom inlet, max. SL ≤ 89 W + heat trap (on outlet only) and pipe insulation (3 m with RSI 0.70 (R 4) or 1.2 m with RSI 1.41 (R 8)) • > 270 L - 454 L, top inlet, max. SL ≤ 84 W + heat trap (on both inlet and outlet) and pipe insulation (3 m with RSI 0.70 (R 4) or 1.2 m with RSI 1.41 (R 8)) Fuel-fired: EF or UEF 0.67				
Combined space and water heating	TPF 0.85	TPF 0.86	TPF 0.86	TPF 0.87	TPF 0.87
	92% AFUE boiler ⁵				
Ventilation ^{6,7}	60% SRE at 0°C, 55% SRE at -25°C				
Electrical savings ⁸	75% ENERGY STAR lighting				
BOP points required ⁹	2.4	2.5	2.4	2.5	2.5

NOTES:

- 1) Thermal resistance requirements are listed in effective RSI (R) values.
- 2) Includes skylights and door systems. Climate zones for ENERGY STAR fenestration products are defined in "Climate Zones – ENERGY STAR," refer to: <http://www.nrcan.gc.ca/energy/products/for-participants/specifications/13720>.
- 3) Line voltage thermostat shall be certified to C828-13 "Performance requirements for thermostats used with individual room electric space heating devices".
- 4) Cannot be used in combined space and water heating configurations.
- 5) Can only be used where the distribution system is one hundred percent (100%) hydronic.
- 6) Refer to **section 4.7.1.2 (b)** for how to determine the SRE at 0 °C.
- 7) The HRV/ERV requirements at -25 °C do not apply where the 2.5% January Design Temperature is greater than or equal to -10 °C.
- 8) This applies to all lighting in the house, including decorative, stair and exterior lighting. Lighting must be *ENERGY STAR certified fixtures* or light bulbs.
- 9) Select options from **Table 9** such that the points assigned total not less than the amount of points indicated in this table for the applicable climate zone.

Table 9¹ - British Columbia BOP Options
Forming part of **section 6.2.3**

Category		Item	ESNH BC Zone 1	ESNH BC Zone 2	ESNH BC Zone 3	ESNH BC Zone 4	ESNH BC Zone 5
Ceilings ²	Ceilings Below Attic (100%)	R 42 (nominal) at heel	n/a	0.1	n/a	n/a	n/a
		R 60 (nominal)	0.3	0.1	0.1	n/a	n/a
		R 52 (nominal) at heel w/ R 60 (nominal)	0.3	0.2	0.2	0.1	0.1
	Cathedral Ceilings and Flat Roofs (100%)	R 40 (nominal)	0.3	0.1	0.1	n/a	n/a
	Ceilings Below Attic and Cathedral Ceilings/Flat Roofs ³	R 42 (nominal) at heel	n/a	0.1	n/a	n/a	n/a
		Attic–R 60 (nominal); flat/cathedral–R 40 (nominal)	0.3	0.1	0.1	n/a	n/a
		R 52 (nominal) at heel w/ R 60 (nominal) in attic; flat/cathedral–R 40 (nominal)	0.3	0.2	0.2	0.1	0.1
Walls Above Grade		RSI 3.41 (R 19.4)	1.0	0.6	0.6	0.6	n/a
		RSI 3.59 (R 20.4)	1.0	0.6	0.7	0.7	n/a
		RSI 3.78 (R 21.5)	1.3	0.9	1.0	1.0	n/a
		RSI 3.90 (R 22.1)	1.3	0.9	1.0	1.1	0.1
		RSI 4.03 (R 22.9)	1.4	1.0	1.1	1.2	0.2
		RSI 4.48 (R 25.4)	1.7	1.3	1.4	1.6	0.6
		RSI 4.79 (R 27.2)	1.9	1.6	1.7	1.8	0.8
Foundation Walls		RSI 3.67 (R 20.8)	0.7	0.3	0.3	0.1	0.1
		RSI 3.94 (R 22.4)	0.9	0.5	0.5	0.3	0.3
		RSI 4.19 (R 23.8)	0.9	0.5	0.5	0.3	0.3
Unheated Floors Below Frost Line ⁴		RSI 0.88 (R 5.0) full slab	0.2	0.1	0.1	0.3	0.3
		RSI 1.76 (R 10.0) full slab	0.3	0.2	0.2	0.4	0.4
Fenestration ⁵		ENERGY STAR Zone 1	0.9	1.0	n/a	n/a	n/a
		ENERGY STAR Zone 2	1.0	1.1	0.2	0.2	n/a
		ENERGY STAR Zone 3	1.2	1.4	0.5	0.5	0.4
Airtightness ⁶		Level 2	0.3	0.4	0.4	0.5	0.5
		Level 3	0.5	0.7	0.9	0.9	1.2
		Level 4	0.7	1.0	1.3	1.4	1.7
		Level 5	0.9	1.3	1.7	2.0	2.3
Airtightness + HRV/ERV ^{6,7}		Level 4 or 5 + ≥ 84% SRE at 0 °C	0.9	1.2	1.5	1.9	2.9

Category	Item	ESNH BC Zone 1	ESNH BC Zone 2	ESNH BC Zone 3	ESNH BC Zone 4	ESNH BC Zone 5
Airtightness + HRV/ERV – MURBs^{6,7,8,9}	Level 4 + minimum 2 units with HRV/ERV $\geq 84\%$ SRE at 0 °C	max. 0.9	max. 1.2	max. 1.5	max. 1.9	max. 2.9
Heat Recovery Ventilator / Energy Recovery Ventilator (HRV/ERV)⁷	≥ 65 to $< 75\%$ SRE at 0 °C	n/a	n/a	n/a	n/a	0.1
	≥ 75 to $< 84\%$ SRE at 0 °C	0.1	0.1	0.1	0.1	0.1
	$\geq 84\%$ SRE at 0 °C	0.1	0.1	0.2	0.2	0.2
HRV/ERV – MURBs^{7,8}	≥ 65 to $< 75\%$ SRE at 0 °C	n/a	n/a	n/a	n/a	max. 0.1
	≥ 75 to $< 84\%$ SRE at 0 °C	max. 0.1	max. 0.1	max. 0.1	max. 0.1	max. 0.1
	$\geq 84\%$ SRE at 0 °C	max. 0.1	max. 0.1	max. 0.2	max. 0.2	max. 0.2
HRV/ERV fan efficacy¹⁰	SRE $\geq 75\%$ at 0 °C, ≥ 0.57 L/s/W	0.1	0.1	0.1	0.1	0.1
Domestic Water Heating¹²	Heat trap and pipe insulation (3 m w/ RSI 0.70 (R4)) ¹¹	0.1	0.1	0.1	n/a	n/a
	<i>ENERGY STAR certified</i> heat pump water heater	1.2	1.2	1.1	1.0	0.9
	Heat trap and pipe insulation (3 m w/ RSI 0.70 (R4)) ¹¹ and <i>ENERGY STAR certified</i> heat pump water heater	1.3	1.3	1.2	1.0	0.9
	<i>Instantaneous</i> min. EF 0.82	0.6	0.6	0.5	0.5	0.6
	<i>Instantaneous</i> min. UEF 0.82	0.5	0.5	0.5	0.5	0.5
	<i>Instantaneous</i> condensing min. EF 0.90	0.8	0.8	0.7	0.7	0.7
	<i>Instantaneous</i> condensing min. EF 0.95	0.9	0.9	0.8	0.8	0.8
	<i>Instantaneous</i> condensing min. UEF 0.90	0.8	0.9	0.9	1.0	1.2
	<i>Instantaneous</i> condensing min. UEF 0.95	0.9	1.0	1.0	1.1	1.3
	Tank condensing min. EF 0.80	0.8	0.7	0.7	0.7	0.8
	Tank condensing min. TE 90%	0.7	0.6	0.7	0.7	0.7
	Tank condensing min. TE 94%	0.8	0.7	0.7	0.7	0.8
	Tank condensing min. UEF 0.75	0.5	0.6	0.7	0.8	1.0

Category	Item	ESNH BC Zone 1	ESNH BC Zone 2	ESNH BC Zone 3	ESNH BC Zone 4	ESNH BC Zone 5
	Tank condensing min. UEF 0.8	0.7	0.7	0.8	0.9	1.1
	Tank condensing min. UEF 0.82	0.7	0.8	0.8	0.9	1.2
Combined Space and Water Heating System¹³	TPF 0.92	0.6	0.8	0.7	0.8	0.8
SDHW	Single dwelling : ≥ 6000 MJ/yr	1.2	1.3	1.1	1.0	1.0
	MURBs: ≥ 3000 MJ/yr/unit ¹⁴	1.2	1.3	1.1	1.0	1.0
Drain Water Heat Recovery (DWHR)¹⁵	$\geq 30\%$ to $< 42\%$ - one shower	0.1	0.1	0.1	0.2	0.2
	$\geq 30\%$ to $< 42\%$ - two showers	0.2	0.2	0.2	0.3	0.3
	$\geq 42\%$ to $< 54\%$ - one shower	0.2	0.2	0.2	0.2	0.2
	$\geq 42\%$ to $< 54\%$ - two showers	0.3	0.3	0.3	0.4	0.4
	$\geq 54\%$ to $< 62\%$ - one shower	0.2	0.2	0.2	0.3	0.3
	$\geq 54\%$ to $< 62\%$ - two showers	0.4	0.4	0.4	0.5	0.5
	$\geq 62\%$ to $< 70\%$ - one shower	0.2	0.2	0.3	0.3	0.3
	$\geq 62\%$ to $< 70\%$ - two showers	0.4	0.4	0.5	0.5	0.6
	$\geq 70\%$ - one shower	0.3	0.3	0.3	0.3	0.3
	$\geq 70\%$ - two showers	0.5	0.5	0.5	0.6	0.6

Category	Item	ESNH BC Zone 1	ESNH BC Zone 2	ESNH BC Zone 3	ESNH BC Zone 4	ESNH BC Zone 5
DWHR – MURBs^{15,16}	≥ 30% to < 42% - one shower	max. 0.1	max. 0.1	max. 0.1	max. 0.2	max. 0.2
	≥ 30% to < 42% - two showers	max. 0.2	max. 0.2	max. 0.2	max. 0.3	max. 0.3
	≥ 42% to < 54% - one shower	max. 0.2	max. 0.2	max. 0.2	max. 0.2	max. 0.2
	≥ 42% to < 54% - two showers	max. 0.3	max. 0.3	max. 0.3	max. 0.4	max. 0.4
	≥ 54% to < 62% - one shower	max. 0.2	max. 0.2	max. 0.2	max. 0.3	max. 0.3
	≥ 54% to < 62% - two showers	max. 0.4	max. 0.4	max. 0.4	max. 0.5	max. 0.5
	≥ 62% to < 70% - one shower	max. 0.2	max. 0.2	max. 0.3	max. 0.3	max. 0.3
	≥ 62% to < 70% - two showers	max. 0.4	max. 0.4	max. 0.5	max. 0.5	max. 0.6
	≥ 70% - one shower	max. 0.3	max. 0.3	max. 0.3	max. 0.3	max. 0.3
	≥ 70% - two showers	max. 0.5	max. 0.5	max. 0.5	max. 0.6	max. 0.6
ENERGY STAR Certified Appliances¹⁷	Minimum of 3 types of <i>ENERGY STAR</i> certified appliances installed	0.1	0.1	0.1	0.1	0.1
Electrical Savings	100% ENERGY STAR lighting ¹⁸	0.1	0.1	0.1	0.1	0.1

NOTES:

- 1) Thermal resistance requirements are listed in effective values, unless otherwise indicated with (nominal) for nominal value. An 'n/a' indicates that an option is not possible, likely due to a higher core BOP requirement.
- 2) Only one of the three sub-categories under Ceilings may be chosen.
- 3) Where both attics below ceilings and cathedral ceilings or flat roofs are present, both options must be applied.
- 4) Full slab thermal resistance values do not apply to slab on grade foundations.
- 5) Includes skylights and door systems. Climate zones for ENERGY STAR fenestration products are defined in "Climate Zones – ENERGY STAR," refer to: <http://www.nrcan.gc.ca/energy/products/for-participants/specifications/13720>.
- 6) See **Appendix A: Airtightness metrics** for ACH, NLA and NLR values for each level.
- 7) Refer to **section 4.7.1.2 (b)** for how to determine the SRE at 0 °C.
- 8) BOP points are calculated as follows: First calculate the number of points per *unit* using:
Points per *unit* = max points / #MURB *units* in building, rounding to the nearest 0.1.
Then calculate the BOP points as follows: BOP points = points per *unit* * #MURB *units* connected to a HRV/ERV, without exceeding max. points.
- 9) Only one of Airtightness or Airtightness + HRV/ERV option may be chosen.
- 10) HRV/ERV fan efficacy option can be chosen with HRV/ERV option.
- 11) Applies only to 50-270 L electric tanks. Heat trap required on both inlet and outlet for top inlet types, and outlet only for bottom inlet types.
- 12) This option applies only to stand-alone *water heaters* and not those that form part of a *combined space and water heating system*.
- 13) This option cannot be used in conjunction with domestic *water heater* options.

- 14) The minimum of 3000 MJ/yr/*unit* must be met for all *units* in the building.
- 15) This option is based on the number of shower stacks from which heat is being recovered, not the number of DWHR units, with one exception: houses with a total of one shower may claim the points for two showers since the DWHR unit is recovering heat from all the showers in the house. The maximum allowable amount is two showers.
- 16) BOP points are calculated as follows: First calculate the number of points per *unit* using:
Points per *unit* = max points / #MURB *units* in building, rounding to the nearest 0.1.
Then calculate the BOP points as follows: BOP points = points per *unit* * # MURB *units* (recovering heat from at least one shower stack) connected to a DWHR, without exceeding max. points.
- 17) Three *ENERGY STAR certified* appliances must be chosen out of the following appliance types: dishwasher, clothes washer, clothes dryer and refrigerator. Each type of appliance can only be selected once.
- 18) This applies to all lighting in the house, including decorative, stair and exterior lighting. Lighting must be *ENERGY STAR certified fixtures* or light bulbs. One non-*ENERGY STAR certified fixture* per house is allowed.

6.3 Manitoba

6.3.1 Climate zones for Manitoba

The climate zones for **section 6.3.3** are defined by **Table 10**, where the *heating degree days* are determined as per **section 1.2.2.1**.

Table 10 - Climate Zones for Manitoba
Forming part of **section 6.3.1**

Climate Zone	Heating Degree Days
ESNH MB Zone 1	5000-5999
ESNH MB Zone 2	6000-6999
ESNH MB Zone 3	≥ 7000

6.3.2 Performance targets for Manitoba

For ENERGY STAR certification using the performance approach, the percentage difference between the house rating and the EnerGuide Rating System *reference house* rating shall be:

- (a) At least 20.0% lower than the EnerGuide Rating System *reference house* (% LTRH) for houses, MURB whole building and *MURB single units*, or
- (b) At least 10.0% LTRH and maximum 60 GJ/year, excluding *MURB single units*.

NOTE: *On-site* electricity production shall be excluded from the ERS Rating for the purpose of compliance with the performance target.

6.3.3 Builder option packages for Manitoba

Apply all BOP elements for the applicable climate zone, per **Table 11**.

Table 11¹ - Manitoba Core BOP
Forming part of **section 6.3.3**

Item	ESNH MB Zone 1	ESNH MB Zone 2	ESNH MB Zone 3
	RSI (R)	RSI (R)	RSI (R)
Ceilings below attics	10.43 (59.2)	10.43 (59.2)	10.43 (59.2)
Cathedral ceilings and flat roofs	5.02 (28.5)	5.02 (28.5)	5.02 (28.5)
Walls above grade	3.08 (17.5)	3.85 (21.9)	3.85 (21.9)
Floors over unheated spaces	5.02 (28.5)	5.02 (28.5)	5.02 (28.5)
Foundation walls below or in contact with the ground	3.46 (19.6)	3.46 (19.6)	3.97 (22.5)

Unheated floors on ground above frost line	1.96 (11.1)	1.96 (11.1)	1.96 (11.1)
Heated or unheated floors on ground on permafrost	n/a	4.44 (25.2)	4.44 (25.2)
Heated floors on ground	2.85 (16.2)	2.85 (16.2)	2.85 (16.2)
Slabs-on-grade with an integral footing	3.72 (21.1)	3.72 (21.1)	4.59 (26.1)
Fenestration ²	ENERGY STAR Zone 2	ENERGY STAR Zone 3	ENERGY STAR Zone 3
Airtightness ³	2.5 ACH at 50 Pa (applies to all houses, i.e. detached and attached)		
Space heating	• Electric furnace, • 94% AFUE furnace, • Air-source heat pump, or • Ground-source heat pump.		
Domestic water heating ⁴	Electric: • 50 L – 270 L, bottom inlet, max. SL ≤ 66 W • 50 L - 270 L, top inlet, max. SL ≤ 61W • > 270 L – 454 L, bottom inlet, max. SL ≤ 89 W + heat trap and pipe insulation (3 m with RSI 0.70 (R4) or 1.2 m with RSI 1.41 (R8)) • > 270 L – 454 L, top inlet, max. SL ≤ 84 W + heat trap and pipe insulation (3 m with RSI 0.70 (R4) or 1.2 m with RSI 1.41 (R8)) Fuel-fired: EF or UEF 0.67		
Ventilation ⁵	60% SRE at 0°C, 55% SRE at -25°C		
Drain water heat recovery	42% steady state		
Electrical savings ⁶	75% ENERGY STAR lighting		
BOP points required ⁷	1.7	1.1	1.9

NOTES:

- 1) Thermal resistance requirements are listed in effective RSI (R) values.
- 2) Includes skylights and door systems. Climate zones for ENERGY STAR fenestration products are defined in “Climate Zones – ENERGY STAR,” refer to: <http://www.nrcan.gc.ca/energy/products/for-participants/specifications/13720>.
- 3) See **Appendix A: Airtightness metrics** for alternate NLA and NLR values.
- 4) Cannot be used in combined space and water heating configurations.
- 5) Refer to **section 4.7.1.2 (b)** for how to determine the SRE at 0°C.
- 6) This applies to all lighting in the house, including decorative, stair and exterior lighting. Lighting must be *ENERGY STAR certified fixtures* or light bulbs.
- 7) Select options from **Table 12** such that the points assigned total not less than the amount of points indicated in this table for the applicable climate zone.

Table 12¹ - Manitoba BOP Options
Forming part of **section 6.3.3**

Category	Item	ESNH MB Zone 1	ESNH MB Zone 2	ESNH MB Zone 3
Ceilings Below Attic (100%)	R 52 (nominal) at heel	n/a	0.1	n/a
Walls Above Grade	RSI 3.41 (R 19.4)	0.6	n/a	n/a
	RSI 3.59 (R 20.4)	0.8	n/a	n/a
	RSI 3.78 (R 21.5)	1.1	n/a	n/a
	RSI 3.90 (R 22.1)	1.1	0.1	0.1
	RSI 4.03 (R 22.9)	1.2	0.2	0.2
	RSI 4.48 (R 25.4)	1.6	0.6	0.6
	RSI 4.79 (R 27.2)	1.9	0.9	0.9
Foundation Walls	RSI 3.67 (R 20.8)	0.1	0.1	n/a
	RSI 3.94 (R 22.4)	0.3	0.3	n/a
	RSI 4.19 (R 23.8)	0.3	0.3	0.1
Unheated Floors Below Frost Line²	RSI 0.88 (R 5.0) full slab	0.3	0.3	0.1
	RSI 1.76 (R 10.0) full slab	0.4	0.4	0.2
Fenestration³	ENERGY STAR Zone 3	0.3	0.4	0.4
Airtightness⁴	Level 2	0.7	0.7	0.7
	Level 3	1.2	1.3	1.4
	Level 4	1.8	2.0	2.1
	Level 5	2.3	2.5	2.7
Airtightness + HRV/ERV^{4,5,7}	Level 4 or 5 + $\geq 84\%$ SRE at 0 °C	2.2	3.1	3.4
Airtightness + HRV/ERV – MURBs^{4,5,6,7}	Level 4 or 5 + minimum 2 units with HRV/ERV $\geq 84\%$ SRE at 0 °C	max. 2.2	max. 3.1	max. 3.4
Heat Recovery Ventilator / Energy Recovery Ventilator (HRV/ERV)⁵	≥ 65 to $< 75\%$ SRE at 0 °C	n/a	0.1	0.1
	≥ 75 to $< 84\%$ SRE at 0 °C	0.1	0.1	0.2
	$\geq 84\%$ SRE at 0 °C	0.2	0.2	0.2
HRV/ERV – MURBs^{5,6}	≥ 65 to $< 75\%$ SRE at 0 °C	n/a	max. 0.1	max. 0.1
	≥ 75 to $< 84\%$ SRE at 0 °C	max. 0.1	max. 0.1	max. 0.2
	$\geq 84\%$ SRE at 0 °C	max. 0.2	max. 0.2	max. 0.2
HRV/ERV fan efficacy⁸	SRE $\geq 75\%$ at 0 °C, ≥ 0.57 L/s/W	0.1	0.1	0.1
Domestic	Heat trap and pipe insulation	0.1	n/a	n/a

Category	Item	ESNH MB Zone 1	ESNH MB Zone 2	ESNH MB Zone 3
Water Heating⁹	(3 m with RSI 0.70 (R 4) or 1.2 m with RSI 1.41 (R 8)) ¹⁰			
	<i>ENERGY STAR certified heat pump water heater</i>	0.9	0.8	0.7
	Heat trap and pipe insulation (3 m w/ RSI 0.70 (R4)) ¹⁰ and <i>ENERGY STAR certified heat pump water heater</i>	2.0	0.8	0.7
	<i>Instantaneous min. EF 0.82</i>	0.6	0.6	0.6
	<i>Instantaneous min. UEF 0.82</i>	0.5	0.5	0.5
	<i>Instantaneous condensing min. EF 0.90</i>	0.8	0.7	0.7
	<i>Instantaneous condensing min. EF 0.95</i>	0.8	0.8	0.8
	<i>Instantaneous condensing min. UEF 0.90</i>	1.1	1.2	1.3
	<i>Instantaneous condensing min. UEF 0.95</i>	1.2	1.3	1.4
	<i>Tank condensing min. EF 0.80</i>	0.7	0.7	0.8
	<i>Tank condensing min. TE 90%</i>	0.7	0.7	0.7
	<i>Tank condensing min. TE 94%</i>	0.8	0.8	0.8
	<i>Tank condensing min. UEF 0.75</i>	0.9	1.0	1.2
	<i>Tank condensing min. UEF 0.8</i>	1.0	1.1	1.2
	<i>Tank condensing min. UEF 0.82</i>	1.1	1.1	1.3
SDHW	Single dwelling: ≥ 6000 MJ/yr	1.0	0.9	0.8
	MURBs: ≥ 3000 MJ/yr/unit ¹¹	1.0	0.9	0.8
Drain Water Heat Recovery (DWHR)¹²	$\geq 42\%$ to $< 54\%$ - one shower	0.2	0.2	0.2
	$\geq 42\%$ to $< 54\%$ - two showers	0.4	0.4	0.4
	$\geq 54\%$ to $< 62\%$ - one shower	0.3	0.3	0.3
	$\geq 54\%$ to $< 62\%$ - two showers	0.5	0.5	0.5
	$\geq 62\%$ to $< 70\%$ - one shower	0.3	0.3	0.3
	$\geq 62\%$ to $< 70\%$ - two showers	0.5	0.6	0.6
	$\geq 70\%$ - one shower	0.3	0.3	0.4
	$\geq 70\%$ - two showers	0.6	0.6	0.7
DWHR – MURBs^{12,13}	$\geq 42\%$ to $< 54\%$ - one shower	max. 0.2	max. 0.2	max. 0.2
	$\geq 42\%$ to $< 54\%$ - two showers	max. 0.4	max. 0.4	max. 0.4
	$\geq 54\%$ to $< 62\%$ - one shower	max. 0.3	max. 0.3	max. 0.3
	$\geq 54\%$ to $< 62\%$ - two showers	max. 0.5	max. 0.5	max. 0.5
	$\geq 62\%$ to $< 70\%$ - one shower	max. 0.3	max. 0.3	max. 0.3
	$\geq 62\%$ to $< 70\%$ - two showers	max. 0.5	max. 0.6	max. 0.6
	$\geq 70\%$ - one shower	max. 0.3	max. 0.3	max. 0.4
	$\geq 70\%$ - two showers	max. 0.6	max. 0.6	max. 0.7

Category	Item	ESNH MB Zone 1	ESNH MB Zone 2	ESNH MB Zone 3
ENERGY STAR Certified Appliances¹⁴	Minimum of 3 types of <i>ENERGY STAR certified</i> appliances installed	0.1	0.1	0.1
Electrical Savings	100% ENERGY STAR lighting ¹⁵	0.1	0.1	0.1

NOTES:

- 1) Thermal resistance requirements are listed in effective values, unless otherwise indicated with (nominal) for nominal value. An 'n/a' indicates that an option is not possible, likely due to a higher core BOP requirement.
- 2) Full slab thermal resistance values do not apply to slab on grade foundations.
- 3) Includes skylights and door systems. Climate zones for ENERGY STAR fenestration products are defined in "Climate Zones – ENERGY STAR," refer to: <http://www.nrcan.gc.ca/energy/products/for-participants/specifications/13720>.
- 4) See **Appendix A: Airtightness metrics** for ACH, NLA and NLR values for each level.
- 5) Refer to **section 4.7.1.2 (b)** for how to determine the SRE at 0 °C.
- 6) BOP points are calculated as follows: First calculate the number of points per *unit* using:
 $\text{Points per unit} = \text{max points} / \# \text{MURB units in building}$, rounding to the nearest 0.1.
 Then calculate the BOP points as follows: $\text{BOP points} = \text{points per unit} * \# \text{MURB units connected to a HRV/ERV}$, without exceeding max. points.
- 7) Only one of Airtightness or Airtightness + HRV/ERV option may be chosen.
- 8) HRV/ERV fan efficacy option can be chosen with HRV/ERV option.
- 9) This option applies only to stand-alone *water heaters* and not those that form part of a *combined space and water heating system*.
- 10) Applies only to 50-270 L tanks. Heat trap required on both inlet and outlet for top inlet types, and outlet only for bottom inlet types.
- 11) The minimum of 3000 MJ/yr/*unit* must be met for all *units* in the building.
- 12) This option is based on the number of shower stacks from which heat is being recovered, not the number of DWHR units, with one exception: houses with a total of one shower may claim the points for two showers since the DWHR unit is recovering heat from all the showers in the house. The maximum allowable amount is two showers.
- 13) BOP points are calculated as follows: First calculate the number of points per *unit* using:
 $\text{Points per unit} = \text{max points} / \# \text{MURB units in building}$, rounding to the nearest 0.1.
 Then calculate the BOP points as follows: $\text{BOP points} = \text{points per unit} * \# \text{MURB units (recovering heat from at least one shower stack)}$ connected to a DWHR, without exceeding max. points.
- 14) Three *ENERGY STAR certified* appliances must be chosen out of the following appliance types: dishwasher, clothes washer, clothes dryer and refrigerator. Each type of appliance can only be selected once.
- 15) This applies to all lighting in the house, including decorative, stair and exterior lighting. Lighting must be *ENERGY STAR certified fixtures* or light bulbs. One non-*ENERGY STAR certified fixture* per house is allowed.

6.4 New Brunswick

6.4.1 Climate zones for New Brunswick

The climate zones for **section 6.4.3** are defined by **Table 13**, where the *heating degree days* are determined as per **section 1.2.2.1**.

Table 13 - ESNH Climate Zones for New Brunswick
Forming part of **section 6.4.1**

Climate Zone	Heating Degree Days
ESNH NB Zone 1	< 5000
ESNH NB Zone 2	≥ 5000

6.4.2 Performance targets for New Brunswick

For ENERGY STAR certification using the performance approach, the percentage difference between the house rating and the EnerGuide Rating System *reference house* rating shall be:

- (a) At least 20.0% lower than the EnerGuide Rating System *reference house* (% LTRH) for houses, MURB whole building and *MURB single units*, or
- (b) At least 10.0% LTRH and maximum 60 GJ/year, excluding *MURB single units*.

NOTE: *On-site* electricity production shall be excluded from the ERS Rating for the purpose of compliance with the performance target.

6.4.3 Builder option packages for New Brunswick

Apply all BOP elements for the applicable climate zone, per **Table 14**.

Table 14¹ - New Brunswick Core BOP
Forming part of **section 6.4.3**

Item	ESNH NB Zone 1	ESNH NB Zone 2
	RSI (R)	RSI (R)
Ceilings below attics	8.67 (49.2)	10.43 (59.2)
Cathedral ceilings and flat roofs	4.67 (26.5)	5.02 (28.5)
Walls above grade	3.08 (17.5)	3.08 (17.5)
Floors over unheated spaces	4.67 (26.5)	5.02 (28.5)
Foundation walls below or in contact with the ground	2.98 (16.9)	3.46 (19.6)
Unheated floors on ground above frost line	1.96 (11.1)	1.96 (11.1)
Heated floors on ground	2.32 (13.2)	2.85 (16.2)

Slabs-on-grade with an integral footing		1.96 (11.1)	3.72 (21.1)
Fenestration ²		ENERGY STAR Zone 2	
Space heating	• Electric resistance heater with line voltage thermostat³, • Electric furnace or boiler, • 85% AFUE <i>ENERGY STAR certified</i> oil-fired furnace or boiler, • 75% thermal efficiency <i>solid fuel</i>, • Air-source heat pump (ASHP), • Ground-source heat pump (GSHP) , • Dual system: Electric resistance with 75% thermal efficiency <i>solid fuel</i>, • Dual system: Electric resistance with ASHP or GSHP, or • 90% AFUE fuel-fired furnace or boiler		
Domestic water heating ⁴	Electric: • 50 L – 270 L, bottom inlet, max. SL ≤ 66 W • 50 L - 270 L, top inlet, max. SL ≤ 61 W • > 270 L – 454 L, bottom inlet, max. SL ≤ 89 W + heat trap (on outlet only) and pipe insulation (3 m with RSI 0.70 (R 4) or 1.2 m with RSI 1.41 (R 8)) • > 270 L - 454 L, top inlet, max. SL ≤ 84 W + heat trap (on both inlet and outlet) and pipe insulation (3 m with RSI 0.70 (R 4) or 1.2 m with RSI 1.41 (R 8)) Fuel-fired: EF or UEF 0.67		
Ventilation ⁵		60% SRE at 0°C; 55% SRE at -25°C	
Electrical savings ⁶		75% ENERGY STAR lighting	
BOP points required ⁷		2.5	2.9

NOTES:

- 1) Thermal resistance requirements are listed in effective RSI (R) values.
- 2) Includes skylights and door systems. Climate zones for ENERGY STAR fenestration products are defined in "Climate Zones – ENERGY STAR," refer to: <http://www.nrcan.gc.ca/energy/products/for-participants/specifications/13720>.
- 3) Line voltage thermostat shall be certified to C828-13 "Performance requirements for thermostats used with individual room electric space heating devices".
- 4) Cannot be used in combined space and water heating configurations.
- 5) Refer to section 4.7.1.2 (b) for how to determine the SRE at 0 °C.
- 6) This applies to all lighting in the house, including decorative, stair and exterior lighting. Lighting must be *ENERGY STAR certified fixtures* or light bulbs.
- 7) Select options from **Table 15** such that the points assigned total not less than the amount of points indicated in this table for the applicable climate zone.

Table 15¹ - New Brunswick BOP Options
Forming part of **section 6.4.3**

Category		Item	ESNH NB Zone 1	ESNH NB Zone 2
Ceilings ²	Ceilings Below Attic (100%)	R 60 (nominal)	0.1	n/a
		R 52 (nominal) at heel w/ R 60 (nominal)	0.2	n/a
	Cathedral Ceilings and Flat Roofs (100%)	R 40 (nominal)	0.1	n/a
	Ceilings Below Attic and Cathedral Ceilings/Flat Roofs ³	Attic–R 60 (nominal); flat/cathedral–R 40 (nominal)	0.1	n/a
		R 52 (nominal) at heel w/ R 60 (nominal) in attic; flat/cathedral–R 40 (nominal)	0.2	n/a
Walls Above Grade		RSI 3.41 (R 19.4)	0.6	0.7
		RSI 3.59 (R 20.4)	0.8	0.7
		RSI 3.78 (R 21.5)	1.0	1.1
		RSI 3.90 (R 22.1)	1.1	1.2
		RSI 4.03 (R 22.9)	1.2	1.3
		RSI 4.48 (R 25.4)	1.5	1.7
		RSI 4.79 (R 27.2)	1.8	1.9
Foundation Walls		RSI 3.67 (R 20.8)	0.3	0.1
		RSI 3.94 (R 22.4)	0.5	0.3
		RSI 4.19 (R 23.8)	0.6	0.4
Unheated Floors Below Frost Line ⁴		RSI 0.88 (R 5.0) full slab	0.1	0.3
		RSI 1.76 (R 10.0) full slab	0.2	0.4
Fenestration ⁵		ENERGY STAR Zone 2	0.2	0.2
		ENERGY STAR Zone 3	0.4	0.4
Airtightness ⁶		Level 2	0.5	0.5
		Level 3	1.0	1.2
		Level 4	1.4	1.7
Airtightness + HRV/ERV ^{6,7,9}		Level 4 + ≥ 84% SRE at 0 °C	1.7	2.1
Airtightness + HRV/ERV – MURBs ^{6,7,8,9}		Level 4 + minimum 2 units with HRV/ERV ≥ 84% SRE at 0 °C	max. 1.7	max. 2.1
Heat Recovery Ventilator / Energy Recovery Ventilator (HRV/ERV) ⁷		≥ 75 to < 84% SRE at 0 °C	0.1	0.1
		≥ 84% SRE at 0 °C	0.2	0.2

Category	Item	ESNH NB Zone 1	ESNH NB Zone 2
HRV/ERV – MURBs ^{7,8}	≥ 75 to < 84% SRE at 0 °C	max. 0.1	max. 0.1
	≥ 84% SRE at 0 °C	max. 0.2	max. 0.2
HRV/ERV fan efficacy ¹⁰	SRE ≥ 75% at 0 °C, ≥ 0.57 L/s/W	0.1	0.1
Domestic Water Heating ¹²	Heat trap and pipe insulation (3 m with RSI 0.70 (R 4) or 1.2 m with RSI 1.41 (R 8)) ¹¹	0.1	n/a
	<i>Instantaneous</i> min. EF 0.82	0.6	0.5
	<i>Instantaneous</i> min. UEF 0.82	0.5	0.5
	<i>Instantaneous</i> condensing min. EF 0.90	0.8	0.8
	<i>Instantaneous</i> condensing min. EF 0.95	0.8	0.8
	<i>Instantaneous</i> condensing min. UEF 0.90	1.0	1.0
	<i>Instantaneous</i> condensing min. UEF 0.95	1.1	1.1
	Tank condensing min. TE 90%	0.7	0.7
	Tank condensing min. TE 94%	0.8	0.8
	Tank condensing min. UEF 0.75	0.8	0.7
	Tank condensing min. UEF 0.82	0.9	1.0
SDHW	Single dwelling: ≥ 6000 MJ/yr	1.1	1.1
	MURBs: ≥ 3000 MJ/yr/unit ¹³	1.1	1.1
Drain Water Heat Recovery (DWHR) ¹⁴	≥ 30% to < 42% - one shower	0.2	0.2
	≥ 30% to < 42% - two showers	0.3	0.3
	≥ 42% to < 54% - one shower	0.2	0.2
	≥ 42% to < 54% - two showers	0.3	0.3
	≥ 54% to < 62% - one shower	0.2	0.3
	≥ 54% to < 62% - two showers	0.4	0.5
	≥ 62% to < 70% - one shower	0.3	0.3
	≥ 62% to < 70% - two showers	0.5	0.5
	≥ 70% - one shower	0.3	0.3
DWHR – MURBs ^{14,15}	≥ 70% - two showers	0.5	0.6
	≥ 30% to < 42% - one shower	max. 0.2	max. 0.2
	≥ 30% to < 42% - two showers	max. 0.3	max. 0.3
	≥ 42% to < 54% - one shower	max. 0.2	max. 0.2
	≥ 42% to < 54% - two showers	max. 0.3	max. 0.3
	≥ 54% to < 62% - one shower	max. 0.2	max. 0.3
	≥ 54% to < 62% - two showers	max. 0.4	max. 0.5
	≥ 62% to < 70% - one shower	max. 0.3	max. 0.3
	≥ 62% to < 70% - two showers	max. 0.5	max. 0.5
	≥ 70% - one shower	max. 0.3	max. 0.3
	≥ 70% - two showers	max. 0.5	max. 0.6

Category	Item	ESNH NB Zone 1	ESNH NB Zone 2
ENERGY STAR Certified Appliances¹⁶	Minimum of 3 types of <i>ENERGY STAR certified</i> appliances installed	0.1	0.1
Electrical Savings	100% ENERGY STAR lighting ¹⁷	0.1	0.1

NOTES:

- 1) Thermal resistance requirements are listed in effective values, unless otherwise indicated with (nominal) for nominal value. An 'n/a' indicates that an option is not possible, likely due to a higher core BOP requirement.
- 2) Only one of the three sub-categories under Ceilings may be chosen.
- 3) Where both ceilings below attics and cathedral ceilings or flat roofs are present, both options must be applied.
- 4) Full slab thermal resistance values do not apply to slab on grade foundations.
- 5) Includes skylights and door systems. Climate zones for ENERGY STAR fenestration products are defined in "Climate Zones – ENERGY STAR," refer to: <http://www.nrcan.gc.ca/energy/products/for-participants/specifications/13720>.
- 6) See **Appendix A: Airtightness metrics** for ACH, NLA and NLR values for each level.
- 7) Refer to **section 4.7.1.2 (b)** for how to determine the SRE at 0 °C.
- 8) BOP points are calculated as follows: First calculate the number of points per *unit* using:
 $\text{Points per unit} = \text{max points} / \# \text{MURB units in building}$, rounding to the nearest 0.1.
 Then calculate the BOP points as follows: BOP points = points per *unit* * #MURB units connected to a HRV/ERV, without exceeding max. points.
- 9) Only one of Airtightness or Airtightness + HRV/ERV option may be chosen.
- 10) HRV/ERV fan efficacy option can be chosen with HRV/ERV option.
- 11) Applies only to 50-270 L electric tanks. Heat trap required on both inlet and outlet for top inlet types, and outlet only for bottom inlet types.
- 12) This option applies only to stand-alone *water heaters* and not those that form part of a *combined space and water heating system*.
- 13) The minimum of 3000 MJ/yr/*unit* must be met for all *units* in the building.
- 14) This option is based on the number of shower stacks from which heat is being recovered, not the number of DWHR units, with one exception: houses with a total of one shower may claim the points for two showers since the DWHR unit is recovering heat from all the showers in the house. The maximum allowable amount is two showers.
- 15) BOP points are calculated as follows: First calculate the number of points per *unit* using:
 $\text{Points per unit} = \text{max points} / \# \text{MURB units in building}$, rounding to the nearest 0.1.
 Then calculate the BOP points as follows: BOP points = points per *unit* * # MURB units (recovering heat from at least one shower stack) connected to a DWHR, without exceeding max. points.
- 16) Three *ENERGY STAR certified* appliances must be chosen out of the following appliance types: dishwasher, clothes washer, clothes dryer and refrigerator. Each type of appliance can only be selected once.
- 17) This applies to all lighting in the house, including decorative, stair and exterior lighting. Lighting must be *ENERGY STAR certified fixtures* or light bulbs. One non-*ENERGY STAR certified fixture* per house is allowed.

6.5 Newfoundland and Labrador

6.5.1 Climate zones for Newfoundland and Labrador

The climate zones for **section 6.5.3** are defined by **Table 16**, where the *heating degree days* are determined as per **section 1.2.2.1**.

Table 16 – ESNH Climate Zones for Newfoundland and Labrador
Forming part of **section 6.5.1**

Climate Zone	Heating Degree Days
ESNH NL Zone 1	< 5000
ESNH NL Zone 2	5000-5999
ESNH NL Zone 3	≥ 6000

6.5.2 Performance targets for Newfoundland and Labrador

For ENERGY STAR certification using the performance approach, the percentage difference between the house rating and the EnerGuide Rating System *reference house* rating shall be:

- (a) At least 20.0% lower than the EnerGuide Rating System *reference house* (% LTRH) for houses, MURB whole building and *MURB single units*, or
- (b) At least 10.0% LTRH and maximum 60 GJ/year, excluding *MURB single units*.

NOTE: *On-site* electricity production shall be excluded from the ERS Rating for the purpose of compliance with the performance target.

6.5.3 Builder option packages for Newfoundland and Labrador

Apply all BOP elements for the applicable climate zone, per **Table 17**.

Table 17¹ - Newfoundland and Labrador Core BOP
Forming part of **section 6.5.3**

Item	ESNH NL Zone 1	ESNH NL Zone 2	ESNH NL Zone 3
	RSI (R)	RSI (R)	RSI (R)
Ceilings below attics	8.67 (49.2)	10.43 (59.2)	10.43 (59.2)
Cathedral ceilings and flat roofs	4.67 (26.5)	5.02 (28.5)	5.02 (28.5)
Walls above grade	3.08 (17.5)	3.08 (17.5)	3.85 (21.9)
Floors over unheated spaces	4.67 (26.5)	5.02 (28.5)	5.02 (28.5)
Foundation walls below or in contact with the ground	2.98 (16.9)	3.46 (19.6)	3.46 (19.6)

Unheated floors on ground above frost line	1.96 (11.1)	1.96 (11.1)	1.96 (11.1)
Heated or unheated floors on ground on permafrost	n/a	n/a	4.44 (25.2)
Heated floors on ground	2.32 (13.2)	2.85 (16.2)	2.85 (16.2)
Slabs-on-grade with an integral footing	1.96 (11.1)	3.72 (21.1)	3.72 (21.1)
Fenestration ²	ENERGY STAR Zone 2	ENERGY STAR Zone 2	ENERGY STAR Zone 3
Space heating	- Electric resistance heater with line voltage thermostat³ <i>Solid fuel</i>, 75% thermal efficiency, - Air-source heat pump, or - Ground-source heat pump		
Domestic water heating ⁴	Electric: 50 L – 270 L, bottom inlet, max. SL ≤ 66 W 50 L - 270 L, top inlet, max. SL ≤ 61 W > 270 L – 454 L, bottom inlet, max. SL ≤ 89 W + heat trap (on outlet only) and pipe insulation (3 m with RSI 0.70 (R 4) or 1.2 m with RSI 1.41 (R 8)) > 270 L - 454 L, top inlet, max. SL ≤ 84 W + heat trap (on both inlet and outlet) and pipe insulation (3 m with RSI 0.70 (R 4) or 1.2 m with RSI 1.41 (R 8)) Fuel-fired: EF or UEF 0.67		
Ventilation ⁵	60% SRE at 0°C; 55% SRE at -25°C		
Electrical savings ⁶	75% ENERGY STAR lighting		
BOP points required ⁷	2.5	2.7	2.8

NOTES:

- 1) Thermal resistance requirements are listed in effective RSI (R) values.
- 2) Includes skylights and door systems. Climate zones for ENERGY STAR fenestration products are defined in "Climate Zones – ENERGY STAR," refer to: <http://www.nrcan.gc.ca/energy/products/for-participants/specifications/13720>.
- 3) Line voltage thermostat shall be certified to C828-13 "Performance requirements for thermostats used with individual room electric space heating devices".
- 4) Cannot be used in combined space and water heating configurations.
- 5) Refer to **section 4.7.1.2 (b)** for how to determine the SRE at 0 °C.
- 6) This applies to all lighting in the house, including decorative, stair and exterior lighting. Lighting must be *ENERGY STAR certified fixtures* or light bulbs.
- 7) Select options from **Table 18** such that the points assigned total not less than the amount of points indicated in this table for the applicable climate zone.

Table 18¹ - Newfoundland and Labrador BOP Options
Forming part of **section 6.5.3**

Category		Item	ESNH NL Zone 1	ESNH NL Zone 2	ESNH NL Zone 3
Ceilings ²	Ceilings Below Attic (100%)	R 60 (nominal)	0.1	n/a	n/a
		R 52 (nominal) at heel w/ R 60 (nominal)	0.2	n/a	n/a
	Cathedral Ceilings and Flat Roofs (100%)	R 40 (nominal)	0.1	n/a	n/a
	Ceilings Below Attic and Cathedral Ceilings/Flat Roofs ³	Attic–R 60 (nominal); flat/cathedral–R 40 (nominal)	0.1	n/a	n/a
		R 52 (nominal) at heel w/ R 60 (nominal) in attic; flat/cathedral–R 40 (nominal)	0.2	n/a	n/a
Walls Above Grade		RSI 3.41 (R 19.4)	0.7	0.6	n/a
		RSI 3.59 (R 20.4)	0.7	0.8	n/a
		RSI 3.78 (R 21.5)	1.1	1.1	n/a
		RSI 3.90 (R 22.1)	1.2	1.1	0.1
		RSI 4.03 (R 22.9)	1.2	1.3	0.2
		RSI 4.48 (R 25.4)	1.6	1.6	0.6
		RSI 4.79 (R 27.2)	1.9	1.9	0.9
Foundation Walls		RSI 3.67 (R 20.8)	0.3	0.1	0.1
		RSI 3.94 (R 22.4)	0.6	0.3	0.3
		RSI 4.19 (R 23.8)	0.6	0.3	0.4
Unheated Floors Below Frost Line ⁴		RSI 0.88 (R 5.0) full slab	0.2	0.3	0.3
		RSI 1.76 (R 10.0) full slab	0.2	0.4	0.4
Fenestration ⁵		ENERGY STAR Zone 2	0.2	0.2	n/a
		ENERGY STAR Zone 3	0.4	0.4	0.4
Airtightness ⁶		Level 2	0.7	0.7	0.7
		Level 3	1.3	1.2	1.3
		Level 4	1.8	1.8	2.1
		Level 5	2.5	2.3	2.7
Airtightness + HRV/ERV ^{6,7,9}		Level 4 + ≥ 84% SRE at 0 °C	1.8	2.1	3.3
Airtightness + HRV/ERV – MURBs ^{6,7,8,9}		Level 4 + minimum 2 units with HRV/ERV ≥ 84% SRE at 0 °C	max. 1.8	max. 2.1	max. 3.3
Heat Recovery Ventilator / Energy Recovery Ventilator (HRV/ERV) ⁷		≥ 65 to < 75% SRE at 0 °C	n/a	n/a	0.1
		≥ 75 to < 84% SRE at 0 °C	0.1	0.1	0.1
		≥ 84% SRE at 0 °C	0.1	0.2	0.2
HRV/ERV		≥ 65 to < 75% SRE at 0 °C	n/a	n/a	max. 0.1

Category	Item	ESNH NL Zone 1	ESNH NL Zone 2	ESNH NL Zone 3
– MURBs ^{7,8}	≥ 75 to < 84% SRE at 0 °C	max. 0.1	max. 0.1	max. 0.1
	≥ 84% SRE at 0 °C	max. 0.1	max. 0.2	max. 0.2
HRV/ERV fan efficacy ¹⁰	SRE ≥ 75% at 0 °C, ≥ 0.57 L/s/W	0.1	0.1	0.1
Domestic Water Heating ¹¹	<i>ENERGY STAR</i> certified heat pump water heater	0.9	0.9	0.8
	<i>Instantaneous</i> min. EF 0.82	0.6	0.6	0.6
	<i>Instantaneous</i> min. UEF 0.82	0.5	0.5	0.4
	<i>Instantaneous</i> condensing min. EF 0.90	0.8	0.7	0.7
	<i>Instantaneous</i> condensing min. EF 0.95	0.8	0.8	0.8
	<i>Instantaneous</i> condensing min. UEF 0.90	1.0	1.0	1.1
	<i>Instantaneous</i> condensing min. UEF 0.95	1.1	1.1	1.2
	Tank condensing min. EF 0.80	0.8	0.8	0.8
	Tank condensing min. TE 90%	0.8	0.8	0.8
	Tank condensing min. TE 94%	0.8	0.8	0.8
	Tank condensing min. UEF 0.75	0.9	0.9	1.0
	Tank condensing min. UEF 0.8	1.0	1.0	1.1
SDHW	Single dwelling: ≥ 6000 MJ/yr	1.0	1.0	0.9
	MURBs: ≥ 3000 MJ/yr/unit ¹²	1.0	1.0	0.9

Category	Item	ESNH NL Zone 1	ESNH NL Zone 2	ESNH NL Zone 3
Drain Water Heat Recovery (DWHR)¹³	≥ 30% to < 42% - one shower	0.2	0.2	0.2
	≥ 30% to < 42% - two showers	0.3	0.3	0.3
	≥ 42% to < 54% - one shower	0.2	0.2	0.2
	≥ 42% to < 54% - two showers	0.3	0.3	0.4
	≥ 54% to < 62% - one shower	0.3	0.3	0.3
	≥ 54% to < 62% - two showers	0.5	0.5	0.5
	≥ 62% to < 70% - one shower	0.3	0.3	0.3
	≥ 62% to < 70% - two showers	0.5	0.5	0.6
	≥ 70% - one shower	0.3	0.3	0.3
	≥ 70% - two showers	0.6	0.6	0.6
DWHR – MURBs^{13,14}	≥ 30% to < 42% - one shower	max. 0.2	max. 0.2	max. 0.2
	≥ 30% to < 42% - two showers	max. 0.3	max. 0.3	max. 0.3
	≥ 42% to < 54% - one shower	max. 0.2	max. 0.2	max. 0.2
	≥ 42% to < 54% - two showers	max. 0.3	max. 0.3	max. 0.4
	≥ 54% to < 62% - one shower	max. 0.3	max. 0.3	max. 0.3
	≥ 54% to < 62% - two showers	max. 0.5	max. 0.5	max. 0.5
	≥ 62% to < 70% - one shower	max. 0.3	max. 0.3	max. 0.3
	≥ 62% to < 70% - two showers	max. 0.5	max. 0.5	max. 0.6
	≥ 70% - one shower	max. 0.3	max. 0.3	max. 0.3
	≥ 70% - two showers	max. 0.6	max. 0.6	max. 0.6
ENERGY STAR Certified Appliances¹⁵	Minimum of 3 types of <i>ENERGY STAR certified</i> appliances installed	0.1	0.1	0.1
Electrical Savings	100% ENERGY STAR lighting ¹⁶	0.1	0.1	0.1

NOTES:

- 1) Thermal resistance requirements are listed in effective values, unless otherwise indicated with (nominal) for nominal value. An 'n/a' indicates that an option is not possible, likely due to a higher core BOP requirement.
- 2) Only one of the three sub-categories under Ceilings may be chosen.
- 3) Where both attics below ceilings and cathedral ceilings or flat roofs are present, both options must be applied.
- 4) Full slab thermal resistance values do not apply to slab on grade foundations.
- 5) Includes skylights and door systems. Climate zones for ENERGY STAR fenestration products are defined in "Climate Zones – ENERGY STAR," refer to: <http://www.nrcan.gc.ca/energy/products/for-participants/specifications/13720>.
- 6) See **Appendix A: Airtightness metrics** for ACH, NLA and NLR values for each level.
- 7) Refer to **section 4.7.1.2 (b)** for how to determine the SRE at 0 °C.
- 8) BOP points are calculated as follows: First calculate the number of points per *unit* using:
Points per *unit* = max points / #MURB *units* in building, rounding to the nearest 0.1.
Then calculate the BOP points as follows: BOP points = points per *unit* * #MURB *units* connected to a HRV/ERV, without exceeding max. points.
- 9) Only one of Airtightness or Airtightness + HRV/ERV option may be chosen.
- 10) HRV/ERV fan efficacy option can be chosen with HRV/ERV option.
- 11) This option applies only to stand-alone *water heaters* and not those that form part of a *combined space and water heating system*.
- 12) The minimum of 3000 MJ/yr/*unit* must be met for all *units* in the building.
- 13) This option is based on the number of shower stacks from which heat is being recovered, not the number of DWHR units, with one exception: houses with a total of one shower may claim the points for two showers since the DWHR unit is recovering heat from all the showers in the house. The maximum allowable amount is two showers.
- 14) BOP points are calculated as follows: First calculate the number of points per *unit* using:
Points per *unit* = max points / #MURB *units* in building, rounding to the nearest 0.1.

Then calculate the BOP points as follows: BOP points = points per *unit* * # MURB *units* (recovering heat from at least one shower stack) connected to a DWHR, without exceeding max. points.

- 15) Three *ENERGY STAR certified* appliances must be chosen out of the following appliance types: dishwasher, clothes washer, clothes dryer and refrigerator. Each type of appliance can only be selected once.
- 16) This applies to all lighting in the house, including decorative, stair and exterior lighting. Lighting must be *ENERGY STAR certified fixtures* or light bulbs. One non-*ENERGY STAR certified fixture* per house is allowed.

6.6 Northwest Territories

6.6.1 Climate zone for Northwest Territories

The climate zone for **section 6.6.3** is defined by **Table 19**, where the *heating degree days* are determined as per **section 1.2.2.1**.

Table 19 - ESNH Climate Zone for Northwest Territories
Forming part of **section 6.6.1**

Climate Zone	Heating Degree Days
ESNH NT Zone 1	≥ 7000

6.6.2 Performance targets for Northwest Territories

For ENERGY STAR certification using the performance approach, the percentage difference between the house rating and the EnerGuide Rating System *reference house* rating shall be:

- (a) At least 20.0% lower than the EnerGuide Rating System *reference house* (% LTRH) for houses, MURB whole building and *MURB single units*, or
- (b) At least 10.0% LTRH and maximum 60 GJ/year, excluding *MURB single units*.

NOTE: *On-site* electricity production shall be excluded from the ERS Rating for the purpose of compliance with the performance target.

6.6.3 Builder option packages for Northwest Territories

Apply all BOP elements for the applicable climate zone, per **Table 20**.

Table 20 - Northwest Territories Core BOP
Forming part of **section 6.6.3**

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Table 21 - Northwest Territories BOP Options
Forming part of **section 6.6.3**

<PLACEHOLDER>

6.7 Nova Scotia

6.7.1 Climate zone for Nova Scotia

The climate zone for **section 6.7.3** is defined by **Table 22**, where the *heating degree days* are determined as per **section 1.2.2.1**.

Table 22 - ESNH Climate Zone for Nova Scotia
Forming part of **section 6.7.1**

Climate Zone	Heating Degree Days
ESNH NS Zone 1	< 5000

6.7.2 Performance targets for Nova Scotia

For ENERGY STAR certification using the performance approach, the percentage difference between the house rating and the EnerGuide Rating System *reference house* rating shall be:

- (a) At least 20.0% lower than the EnerGuide Rating System *reference house* (% LTRH) for houses, MURB whole building and *MURB single units*, or
- (b) At least 10.0% LTRH and maximum 60 GJ/year, excluding *MURB single units*.

NOTE: *On-site* electricity production shall be excluded from the ERS Rating for the purpose of compliance with the performance target.

6.7.3 Builder option packages for Nova Scotia

Apply all BOP elements for the applicable climate zone, per **Table 23**.

Table 23¹ - Nova Scotia Core BOP
Forming part of **section 6.7.3**

Item	ESNH NS Zone 1
	RSI (R)
Ceilings below attics	8.67 (49.2)
Cathedral ceilings and flat roofs	4.67 (26.5)
Walls above grade	3.08 (17.5)
Floors over unheated spaces	4.67 (26.5)
Foundation walls below or in contact with the ground	2.98 (16.9)
Unheated floors on ground above frost line	1.96 (11.1)
Heated floors on ground	2.32 (13.2)
Slabs-on-grade with an integral footing	1.96 (11.1)
Fenestration ²	ENERGY STAR Zone 2

Space heating	▪ Electric resistance heater with line voltage thermostat³, ▪ Electric furnace or boiler, ▪ 85% AFUE <i>ENERGY STAR certified</i> oil-fired furnace or boiler, ▪ 75% thermal efficiency <i>solid fuel</i>, ▪ 90% AFUE fuel-fired furnace or boiler, ▪ Air-source heat pump, or ▪ Ground-source heat pump
Domestic water heating ⁴	Electric: ▪ 50 L – 270 L, bottom inlet, max. SL ≤ 66 W ▪ 50 L - 270 L, top inlet, max. SL ≤ 61 W ▪ > 270 L – 454 L, bottom inlet, max. SL ≤ 89 W + heat trap (on outlet only) and pipe insulation (3 m with RSI 0.70 (R 4) or 1.2 m with RSI 1.41 (R 8)) ▪ > 270 L - 454 L, top inlet, max. SL ≤ 84 W + heat trap (on both inlet and outlet) and pipe insulation (3 m with RSI 0.70 (R 4) or 1.2 m with RSI 1.41 (R 8)) Fuel-fired: EF or UEF 0.67
Ventilation ⁵	60% SRE at 0°C; 55% SRE at -25°C
Electrical savings ⁶	75% ENERGY STAR lighting
BOP points required ⁷	4.8

NOTES:

- 1) Thermal resistance requirements are listed in effective RSI (R) values.
- 2) Includes skylights and door systems. Climate zones for ENERGY STAR fenestration products are defined in "Climate Zones – ENERGY STAR," refer to: <http://www.nrcan.gc.ca/energy/products/for-participants/specifications/13720>.
- 3) Line voltage thermostat shall be certified to C828-13 "Performance requirements for thermostats used with individual room electric space heating devices".
- 4) Cannot be used in combined space and water heating configurations.
- 5) Refer to **section 4.7.1.2 (b)** for how to determine the SRE at 0 °C.
- 6) This applies to all lighting in the house, including decorative, stair and exterior lighting. Lighting must be *ENERGY STAR certified fixtures* or light bulbs.
- 7) Select options from **Table 24** such that the points assigned total not less than the amount of points indicated in this table for the applicable climate zone.

Table 24¹ - Nova Scotia BOP Options
Forming part of **section 6.7.3**

Category		Item	ESNH NS Zone 1
Ceilings ²	Ceilings Below Attic (100%)	R 60 (nominal)	0.1
		R 52 (nominal) at heel w/ R 60 (nominal)	0.2
	Cathedral Ceilings and Flat Roofs (100%)	R 40 (nominal)	0.1
	Ceilings Below Attic and Cathedral Ceilings/Flat Roofs ³	Attic–R 60 (nominal); flat/cathedral–R 40 (nominal)	0.1
		R 52 (nominal) at heel w/ R 60 (nominal) in attic; flat/cathedral–R 40 (nominal)	0.2
Walls Above Grade		RSI 3.41 (R 19.4)	0.6
		RSI 3.59 (R 20.4)	0.7
		RSI 3.78 (R 21.5)	1.0
		RSI 3.90 (R 22.1)	1.1
		RSI 4.03 (R 22.9)	1.2
		RSI 4.48 (R 25.4)	1.5
		RSI 4.79 (R 27.2)	1.8
Foundation Walls		RSI 3.67 (R 20.8)	0.3
		RSI 3.94 (R 22.4)	0.5
		RSI 4.19 (R 23.8)	0.6
Unheated Floors Below Frost Line ⁴		RSI 0.88 (R 5.0) full slab	0.1
		RSI 1.76 (R 10.0) full slab	0.2
Fenestration ⁵		ENERGY STAR Zone 2	0.1
		ENERGY STAR Zone 3	0.3
Airtightness ⁶		Level 2	0.5
		Level 3	1.0
		Level 4	1.4
Airtightness + HRV/ERV ^{6,7,9}		Level 4 + ≥ 84% SRE at 0 °C	1.7
Airtightness + HRV/ERV– MURBs ^{6,7,8,9}		Level 4 + minimum 2 units with HRV/ERV ≥ 84% SRE at 0 °C	max. 1.7
Heat Recovery Ventilator / Energy Recovery Ventilator (HRV/ERV) ⁷		≥ 75 to < 84% SRE at 0 °C	0.1
		≥ 84% SRE at 0 °C	0.2
HRV/ERV – MURBs ^{7,8}		≥ 75 to < 84% SRE at 0 °C	max. 0.1
		≥ 84% SRE at 0 °C	max. 0.2
HRV/ERV fan efficacy ¹⁰		SRE ≥ 75% at 0 °C, ≥ 0.57 L/s/W	0.1
Domestic Water Heating		Heat trap and pipe insulation (3 m with RSI 0.70 (R 4) or 1.2 m with RSI 1.41 (R 8) ¹¹	0.1

Category	Item	ESNH NS Zone 1
SDHW	Single dwelling: ≥ 6000 MJ/yr	1.0
	MURBs: ≥ 3000 MJ/yr/unit ¹²	1.0
Drain Water Heat Recovery (DWHR)¹³	$\geq 30\%$ to $< 42\%$ - one shower	0.2
	$\geq 30\%$ to $< 42\%$ - two showers	0.3
	$\geq 42\%$ to $< 54\%$ - one shower	0.2
	$\geq 42\%$ to $< 54\%$ - two showers	0.3
	$\geq 54\%$ to $< 62\%$ - one shower	0.2
	$\geq 54\%$ to $< 62\%$ - two showers	0.4
	$\geq 62\%$ to $< 70\%$ - one shower	0.3
	$\geq 62\%$ to $< 70\%$ - two showers	0.5
	$\geq 70\%$ - one shower	0.3
	$\geq 70\%$ - two showers	0.5
DWHR – MURBs^{13,14}	$\geq 30\%$ to $< 42\%$ - one shower	max. 0.2
	$\geq 30\%$ to $< 42\%$ - two showers	max. 0.3
	$\geq 42\%$ to $< 54\%$ - one shower	max. 0.2
	$\geq 42\%$ to $< 54\%$ - two showers	max. 0.3
	$\geq 54\%$ to $< 62\%$ - one shower	max. 0.2
	$\geq 54\%$ to $< 62\%$ - two showers	max. 0.4
	$\geq 62\%$ to $< 70\%$ - one shower	max. 0.3
	$\geq 62\%$ to $< 70\%$ - two showers	max. 0.5
	$\geq 70\%$ - one shower	max. 0.3
	$\geq 70\%$ - two showers	max. 0.5
ENERGY STAR Certified Appliances¹⁵	Minimum of 3 types of <i>ENERGY STAR certified</i> appliances installed	0.1
Electrical Savings	100% ENERGY STAR lighting ¹⁶	0.1

NOTES:

- 1) Thermal resistance requirements are listed in effective values, unless otherwise indicated with (nominal) for nominal value.
- 2) Only one of the three sub-categories under Ceilings may be chosen.
- 3) Where both ceilings below attics and cathedral ceilings or flat roofs are present, both options must be applied.
- 4) Full slab thermal resistance values do not apply to slab on grade foundations.
- 5) Includes skylights and door systems. Climate zones for ENERGY STAR fenestration products are defined in "Climate Zones – ENERGY STAR," refer to: <http://www.nrcan.gc.ca/energy/products/for-participants/specifications/13720>.
- 6) See **Appendix A: Airtightness metrics** for ACH, NLA and NLR values for each level.
- 7) Refer to **section 4.7.1.2 (b)** for how to determine the SRE at 0 °C.
- 8) BOP points are calculated as follows: First calculate the number of points per *unit* using:
Points per *unit* = max points / #MURB *units* in building, rounding to the nearest 0.1.
Then calculate the BOP points as follows: BOP points = points per *unit* * #MURB *units* connected to a HRV/ERV, without exceeding max. points.
- 9) Only one of Airtightness or Airtightness + HRV/ERV option may be chosen.
- 10) HRV/ERV fan efficacy option can be chosen with HRV/ERV option.
- 11) Applies only to 50-270 L electric tanks. Heat trap required on both inlet and outlet for top inlet types, and outlet only for bottom inlet types.
- 12) The minimum of 3000 MJ/yr/*unit* must be met for all *units* in the building.

- 13) This option is based on the number of shower stacks from which heat is being recovered, not the number of DWHR units, with one exception: houses with a total of one shower may claim the points for two showers since the DWHR unit is recovering heat from all the showers in the house. The maximum allowable amount is two showers.
- 14) BOP points are calculated as follows: First calculate the number of points per *unit* using:
$$\text{Points per unit} = \text{max points} / \# \text{MURB units in building, rounding to the nearest 0.1.}$$

Then calculate the BOP points as follows: BOP points = points per *unit* * # MURB *units* (recovering heat from at least one shower stack) connected to a DWHR, without exceeding max. points.
- 15) Three *ENERGY STAR certified* appliances must be chosen out of the following appliance types: dishwasher, clothes washer, clothes dryer and refrigerator. Each type of appliance can only be selected once.
- 16) This applies to all lighting in the house, including decorative, stair and exterior lighting. Lighting must be *ENERGY STAR certified fixtures* or light bulbs. One non-*ENERGY STAR certified fixture* per house is allowed.

6.8 Nunavut

6.8.1 Climate zone for Nunavut

The climate zone for **section 6.8.3** is defined by **Table 25**, where the *heating degree days* are determined as per **section 1.2.2.1**.

Table 25 - ESNH Climate Zone for Nunavut
Forming part of **section 6.8.1**

Climate Zone	<i>Heating Degree Days</i>
ESNH NU Zone 1	≥ 7000

6.8.2 Performance targets for Nunavut

For ENERGY STAR certification using the performance approach, the percentage difference between the house rating and the EnerGuide Rating System *reference house* rating shall be:

- (a) At least 20.0% lower than the EnerGuide Rating System *reference house* (% LTRH) for houses, MURB whole building and *MURB single units*, or
- (b) At least 10.0% LTRH and maximum 60 GJ/year, excluding *MURB single units*.

NOTE: *On-site* electricity production shall be excluded from the ERS Rating for the purpose of compliance with the performance target.

6.8.3 Builder option packages for Nunavut

Apply all BOP elements for the applicable climate zone, per **Table 26**.

Table 26 - Nunavut Core BOP
Forming part of **section 6.8.3**

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Table 27 - Nunavut BOP Options
Forming part of **section 6.8.3**

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6.9 Ontario

Ontario ENERGY STAR requirements will be effective as of September 1, 2020.

6.9.1 Climate zones for Ontario

The climate zones for **section 6.9.3** are defined by **Table 28**, where the *heating degree days* are determined as per **section 1.2.2.1**.

Table 28 - ESNH Climate Zones for Ontario
Forming part of **section 6.9.1**

Climate Zone	Heating Degree Days
ESNH ON Zone 1	< 5000
ESNH ON Zone 2	≥ 5000

6.9.2 Performance targets for Ontario

For ENERGY STAR certification using the performance approach, the percentage difference between the house rating and the EnerGuide Rating System Ontario *reference house* rating shall be:

- (a) At least 15.0% lower than the EnerGuide Rating System Ontario *reference house* (% LTRH) for houses, MURB whole building and *MURB single units*, or
- (b) At least 10.0% LTRH and maximum 60 GJ/year, excluding *MURB single units*.

NOTE: *On-site* electricity production shall be excluded from the ERS Rating for the purpose of compliance with the performance target.

6.9.3 Builder option packages for Ontario

Apply all BOP elements for the applicable climate zone, per **Table 29**.

Table 29 - Ontario Core BOP
Forming part of **section 6.9.3**

Item	ESNH ON Zone 1	ESNH ON Zone 2
	RSI (R)	RSI (R)
Ceilings below attics (Ceiling with attic space)	10.43 (59.2)	10.43 (59.2)
Cathedral ceilings and flat roofs (Ceiling without attic space)	4.87 (27.7)	5.02 (28.5)
Walls above grade	3.08 (17.5)	4.46 (25.3)
Floors over unheated spaces (Exposed Floor)	5.25 (29.8)	5.64 (32.0)

Foundation walls below or in contact with the ground (Basement walls) ²	3.72 (21.1)	3.72 (21.1)
Unheated floors below frost line (Below-grade slab entire surface > 600 mm below-grade)	n/a	n/a
Unheated floors on ground above frost line (Slab ≤ 600 mm below-grade)	1.96 (11.1)	1.96 (11.1)
Heated or unheated floors on ground on permafrost ³	n/a	4.44 (25.2)
Heated floors on ground (Heated slab)	2.32 (13.2)	2.85 (16.2)
Slabs-on-grade with an integral footing (Slab ≤ 600 mm below-grade)	1.96 (11.1)	3.72 (21.1)
Edge of below-grade slab ≤ 600 mm below-grade	1.76 (10.0)	1.76 (10.0)
Fenestration ⁴ (Windows and sliding glass doors)	ENERGY STAR Zone 2	
Airtightness ⁵	Level 1	
Space heating	96% AFUE ENERGY STAR fuel-fired furnace⁶ or boiler, - Air source heat pump, or - Ground source heat pump	
Domestic water heating ⁷	Instantaneous min. EF or UEF 0.80 Tank EF or UEF 0.80 (direct vent (sealed))	
Combined space and water heating	TPF 0.93	
Combined space and water heating – attached houses and MURBs ⁸	TPF 0.86	
Ventilation ⁹	65% SRE at 0°C; 55% SRE at -25°C	70% SRE at 0°C; 55% SRE at -25°C
Electrical savings ¹⁰	75% ENERGY STAR lighting	
BOP points required ¹¹	1.8	1.5

NOTES:

- 1) Thermal resistance requirements are listed in effective RSI (R) values. Text not in brackets aligns with Table 2; text in brackets aligns with SB-12.
- 2) In the case of basement wall assemblies, where RSI 3.72 is required RSI 2.11 + 1.76 continuous insulation is permitted to be used.
- 3) Applies to ≥6000 HDD only, per Table 2.
- 4) Includes skylights and door systems. Climate zones for ENERGY STAR fenestration products are defined in "Climate Zones – ENERGY STAR," refer to: <http://www.nrcan.gc.ca/energy/products/for-participants/specifications/13720>.
- 5) See Appendix A for ACH, NLA and NLR values for this level.
- 6) Furnaces shall have an AFUE ≥ 96% and be ENERGY STAR certified, or have an AFUE ≥ 96% and an electronically commutated fan motor (ECM).
- 7) Cannot be used in combined space and water heating configurations.
- 8) Excluding semi-detached houses.
- 9) Refer to **section 4.7.1.2 (b)** for how to determine the SRE at 0 °C.
- 10) This applies to all lighting in the house, including decorative, stair and exterior lighting. Lighting must be *ENERGY STAR certified fixtures* or light bulbs.
- 11) Select options from **Table 30** such that the points assigned total not less than the amount of points indicated in this table for the applicable climate zone.

Table 30 - Ontario BOP Options
Forming part of **section 6.9.3**

Category		Item	ESNH ON Zone 1	ESNH ON Zone 2
Ceilings ²	Ceilings Below Attic (100%)	R 70 (nominal)	0.1	0.1
	Cathedral Ceilings and Flat Roofs (100%)	Flat/cathedral—R 40 (nominal)	0.3	0.3
	Ceilings Below Attic and Cathedral Ceilings/Flat Roofs ³	Attic—R 70 (nominal); flat/cathedral—R 40 (nominal)	0.1	0.1
Walls Above Grade		RSI 3.72 (R 21.1)	0.7	n/a
		RSI 3.91 (R 22.2)	0.8	n/a
		RSI 4.03 (R 22.9)	1.0	n/a
		RSI 4.35 (R 24.7)	1.2	n/a
		RSI 4.79 (R 27.2)	1.5	0.2
		RSI 5.09 (R 28.9)	1.6	0.4
Foundation Walls		RSI 4.19 (R 23.8)	0.1	0.2
		RSI 4.45 (R 25.0)	0.2	0.2
		RSI 5.13 (R 29.1)	0.3	0.4
Unheated Floors Below Frost Line ⁴		Edge of slab [600 mm (2 ft.)] RSI 1.76 (R 10) w/ thermal break	0.1	0.1
		Edge of slab [600 mm (2 ft.)] RSI 2.64 (R 15) w/ thermal break	0.1	0.1
		RSI 0.88 (R 5.0) full slab	0.1	0.1
		RSI 1.76 (R 10.0) full slab	0.2	0.2
		RSI 2.64 (R 15.0) full slab	0.2	0.3
Fenestration ⁵		ENERGY STAR Zone 3	0.5	0.6
Airtightness ⁶		Level 2	0.4	0.5
		Level 3	0.9	1.2
		Level 4	1.3	1.7
Airtightness + HRV/ERV ^{6,7,9}		Level 4 + ≥ 80% SRE at 0 °C	1.7	2.5
Airtightness + HRV/ERV— MURBs ^{6,7,8,9}		Level 4 + minimum 2 units with HRV/ERV ≥ 80% SRE at 0 °C	max. 1.7	max. 2.5

Category	Item	ESNH ON Zone 1	ESNH ON Zone 2
Heat Recovery Ventilator / Energy Recovery Ventilator (HRV/ERV)⁷	≥ 70% SRE at 0 °C	0.1	n/a
	≥ 75% SRE at 0 °C	0.2	0.2
	≥ 80% SRE at 0 °C	0.4	0.3
HRV/ERV – MURBs^{7,8}	≥ 70% SRE at 0 °C	max. 0.1	n/a
	≥ 75% SRE at 0 °C	max. 0.2	max. 0.2
	≥ 80% SRE at 0 °C	max. 0.4	max. 0.3
HRV/ERV fan efficacy¹⁰	SRE ≥ 75% at 0 °C, ≥ 0.57 L/s/W	0.1	0.1
Domestic Water Heating¹¹	<i>Instantaneous</i> condensing min. EF 0.90	0.3	0.2
	<i>Instantaneous</i> condensing min. EF 0.95	0.3	0.3
	<i>Instantaneous</i> condensing min. UEF 0.90	0.3	0.3
	<i>Instantaneous</i> condensing min. UEF 0.95	0.4	0.4
	Tank condensing min. EF 0.80	0.2	0.2
	Tank condensing min. TE 90%	0.1	0.1
	Tank condensing min. TE 94%	0.2	0.2
	Tank condensing min. UEF 0.75	0.1	0.1
	Tank condensing min. UEF 0.80	0.2	0.2
Combined Space and Water Heating¹²	TPF 0.94	0.1	0.1
	TPF 0.95	0.2	0.2
	TPF 0.96	0.3	0.4
	TPF 0.98	0.5	0.6
Combined Space and Water Heating – Attached houses and MURBs¹³	TPF 0.87	n/a	0.1
	TPF 0.88	0.1	0.2
	TPF 0.89	0.3	0.4
	TPF 0.90	0.4	0.5
	TPF 0.91	0.5	0.6
	TPF 0.92	0.6	0.7
	TPF 0.93	0.7	0.7
	TPF 0.94	0.7	0.8
	TPF 0.95	0.9	0.8
	TPF 0.96	0.9	1.0
Drain Water Heat Recovery (DWHR)¹⁴	≥ 30% to < 42% - one shower	0.1	0.1
	≥ 30% to < 42% - two showers	0.2	0.2
	≥ 42% to < 54% - one shower	0.2	0.2
	≥ 42% to < 54% - two showers	0.3	0.3
	≥ 54% to < 62% - one shower	0.2	0.2
	≥ 54% to < 62% - two showers	0.4	0.4

Category	Item	ESNH ON Zone 1	ESNH ON Zone 2
	≥ 62% to < 70% - one shower	0.2	0.3
	≥ 62% to < 70% - two showers	0.4	0.5
	≥ 70% - one shower	0.2	0.3
	≥ 70% - two showers	0.4	0.5
DWHR – MURBs ^{14,15}	≥ 30% to < 42% - one shower	max. 0.1	max. 0.1
	≥ 30% to < 42% - two showers	max. 0.2	max. 0.2
	≥ 42% to < 54% - one shower	max. 0.2	max. 0.2
	≥ 42% to < 54% - two showers	max. 0.3	max. 0.3
	≥ 54% to < 62% - one shower	max. 0.2	max. 0.2
	≥ 54% to < 62% - two showers	max. 0.4	max. 0.4
	≥ 62% to < 70% - one shower	max. 0.2	max. 0.3
	≥ 62% to < 70% - two showers	max. 0.4	max. 0.5
	≥ 70% - one shower	max. 0.2	max. 0.3
	≥ 70% - two showers	max. 0.4	max. 0.5
ENERGY STAR Certified Appliances¹⁶	Minimum of 3 types of <i>ENERGY STAR certified</i> appliances installed	0.1	0.1
Electrical Savings	100% ENERGY STAR lighting ¹⁷	0.1	0.1

NOTES:

- 1) Thermal resistance requirements are listed in effective values, unless otherwise indicated with (nominal) for nominal value. An 'n/a' indicates that an option is not possible, likely due to a higher core BOP requirement.
- 2) Only one of the three sub-categories under Ceilings may be chosen.
- 3) Where both ceilings below attics and cathedral ceilings or flat roofs are present, both options must be applied.
- 4) Full slab thermal resistance values do not apply to slab on grade foundations.
- 5) Includes skylights and door systems.
- 6) See **Appendix A: Airtightness metrics** for ACH, NLA and NLR values for each level.
- 7) Refer to **section 4.7.1.2 (b)** for how to determine the SRE at 0 °C.
- 8) BOP points are calculated as follows: First calculate the number of points per *unit* using:
 $\text{Points per unit} = \text{max points} / \text{\#MURB units in building}$, rounding to the nearest 0.1.
 Then calculate the BOP points as follows: $\text{BOP points} = \text{points per unit} * \text{\#MURB units connected to a HRV/ERV}$, without exceeding max. points.
- 9) Only one of Airtightness or Airtightness + HRV/ERV option may be chosen.
- 10) HRV/ERV fan efficacy option can be chosen with HRV/ERV option
- 11) This option applies only to stand-alone *water heaters* and not those that form part of a *combined space and water heating system*.
- 12) This option can not be used in conjunction with domestic water heating options.
- 13) Excludes *semi-detached* houses.
- 14) This option is based on the number of shower stacks from which heat is being recovered, not the number of DWHR units, with one exception: houses with a total of one shower may claim the points for two showers since the DWHR unit is recovering heat from all the showers in the house. The maximum allowable amount is two showers.
- 15) BOP points are calculated as follows: First calculate the number of points per *unit* using:
 $\text{Points per unit} = \text{max points} / \text{\#MURB units in building}$, rounding to the nearest 0.1.
 Then calculate the BOP points as follows: $\text{BOP points} = \text{points per unit} * \text{\# MURB units (recovering heat from at least one shower stack) connected to a DWHR}$, without exceeding max. points.
- 16) Three *ENERGY STAR certified* appliances must be chosen out of the following appliance types: dishwasher, clothes washer, clothes dryer and refrigerator. Each type of appliance can only be selected once.
- 17) This applies to all lighting in the house, including decorative, stair and exterior lighting. Lighting must be *ENERGY STAR certified fixtures* or light bulbs. One non-*ENERGY STAR certified fixture* per house is allowed.

6.10 Prince Edward Island

6.10.1 Climate zone for Prince Edward Island

The climate zone for **section 6.10.3** is defined by **Table 31**, where the *heating degree days* are determined as per **section 1.2.2.1**.

Table 31 - ESNH Climate Zone for Prince Edward Island
Forming part of **section 6.10.1**

Climate Zone	Heating Degree Days
ESNH PE Zone 1	< 5000

6.10.2 Performance targets for Prince Edward Island

For ENERGY STAR certification using the performance approach, the percentage difference between the house rating and the EnerGuide Rating System *reference house* rating shall be:

- (a) At least 20.0% lower than the EnerGuide Rating System *reference house* (% LTRH) for houses, MURB whole building and *MURB single units*, or
- (b) At least 10.0% LTRH and maximum 60 GJ/year, excluding *MURB single units*.

NOTE: *On-site* electricity production shall be excluded from the ERS Rating for the purpose of compliance with the performance target.

6.10.3 Builder option packages for Prince Edward Island

Apply all BOP elements for the applicable climate zone, per **Table 32**.

Table 32¹ - Prince Edward Island Core BOP
Forming part of **section 6.10.3**

Item	ESNH PE Zone 1
	RSI (R)
Ceilings below attics	8.67 (49.2)
Cathedral ceilings and flat roofs	4.67 (26.5)
Walls above grade	3.08 (17.5)
Floors over unheated spaces	4.67 (26.5)
Foundation walls below or in contact with the ground	2.98 (16.9)
Unheated floors on ground above frost line	1.96 (11.1)
Heated floors on ground	2.32 (13.2)
Slabs-on-grade with an integral footing	1.96 (11.1)

Fenestration ²		ENERGY STAR Zone 2
Space heating	• Electric resistance heater with line voltage thermostat³, • Electric furnace or boiler, • 85% AFUE <i>ENERGY STAR certified</i> oil-fired furnace or boiler, • 75% thermal efficiency <i>solid fuel</i>, • Air-source heat pump (ASHP), • Ground-source heat pump (GSHP), • Dual system: Electric resistance with 75% thermal efficiency <i>solid fuel</i>, • Dual system: Electric resistance with ASHP or GSHP, or • 90% AFUE fuel-fired furnace or boiler	
Domestic water heating ⁴	Electric: • 50 L – 270 L, bottom inlet, max. SL ≤ 66 W • 50 L – 270 L, top inlet, max. SL ≤ 61 W • > 270 L – 454 L, bottom inlet, max. SL ≤ 89 W + heat trap (on outlet only) and pipe insulation (3 m with RSI 0.70 (R 4) or 1.2 m with RSI 1.41 (R 8)) • > 270 L – 454 L, top inlet, max. SL ≤ 84 W + heat trap (on both inlet and outlet) and pipe insulation (3 m with RSI 0.70 (R 4) or 1.2 m with RSI 1.41 (R 8)) Fuel-fired: EF or UEF 0.67	
Ventilation ⁵		60% SRE at 0°C; 55% SRE at -25°C
Electrical savings ⁶		75% ENERGY STAR lighting
BOP points required ⁷		2.5

NOTES:

- 1) Thermal resistance requirements are listed in effective RSI (R) values.
- 2) Includes skylights and door systems. Climate zones for ENERGY STAR fenestration products are defined in “Climate Zones – ENERGY STAR,” refer to: <http://www.nrcan.gc.ca/energy/products/for-participants/specifications/13720>.
- 3) Line voltage thermostat shall be certified to C828-13 “Performance requirements for thermostats used with individual room electric space heating devices”.
- 4) Cannot be used in combined space and water heating configurations.
- 5) Refer to **section 4.7.1.2 (b)** for how to determine the SRE at 0 °C.
- 6) This applies to all lighting in the house, including decorative, stair and exterior lighting. Lighting must be *ENERGY STAR certified fixtures* or light bulbs.
- 7) Select options from **Table 33** such that the points assigned total not less than the amount of points indicated in this table for the applicable climate zone.

Table 33¹ - Prince Edward Island BOP Options
Forming part of **section 6.10.3**

Category		Item	ESNH PE Zone 1
Ceilings ²	Ceilings Below Attic (100%)	R 60 (nominal)	0.1
		R 52 (nominal) at heel w/ R 60 (nominal)	0.2
	Cathedral Ceilings and Flat Roofs (100%)	R 40 (nominal)	0.1
	Ceilings Below Attic and Cathedral Ceilings/Flat Roofs ³	Attic–R 60 (nominal); flat/cathedral–R 40 (nominal)	0.1
		R 52 (nominal) at heel w/ R 60 (nominal) in attic; flat/cathedral–R 40 (nominal)	0.2
Walls Above Grade		RSI 3.41 (R 19.4)	0.6
		RSI 3.59 (R 20.4)	0.8
		RSI 3.78 (R 21.5)	1.0
		RSI 3.90 (R 22.1)	1.1
		RSI 4.03 (R 22.9)	1.2
		RSI 4.48 (R 25.4)	1.5
		RSI 4.79 (R 27.2)	1.8
Foundation Walls		RSI 3.67 (R 20.8)	0.3
		RSI 3.94 (R 22.4)	0.5
		RSI 4.19 (R 23.8)	0.6
Unheated Floors Below Frost Line ⁴		RSI 0.88 (R 5.0) full slab	0.1
		RSI 1.76 (R 10.0) full slab	0.2
Fenestration ⁵		ENERGY STAR Zone 2	0.2
		ENERGY STAR Zone 3	0.4
Airtightness ⁶		Level 2	0.5
		Level 3	1.0
		Level 4	1.4
Airtightness + HRV/ERV ^{6,7,9}		Level 4 + ≥ 84% SRE at 0 °C	1.7
Airtightness + HRV/ERV– MURBs ^{6,7,8,9}		Level 4 + minimum 2 units with HRV/ERV ≥ 84% SRE at 0 °C	max. 1.7
Heat Recovery Ventilator / Energy Recovery Ventilator (HRV/ERV) ⁷		≥ 75 to < 84% SRE at 0 °C	0.1
		≥ 84% SRE at 0 °C	0.2
HRV/ERV – MURBs ^{7,8}		≥ 75 to < 84% SRE at 0 °C	max. 0.1
		≥ 84% SRE at 0 °C	max. 0.2
HRV/ERV fan efficacy ¹⁰		SRE ≥ 75% at 0 °C, ≥ 0.57 L/s/W	0.1
Domestic Water Heating ¹²		Heat trap and pipe insulation (3 m with RSI 0.70 (R 4) or 1.2 m with RSI 1.41 (R 8)) ¹¹	0.1

Category	Item	ESNH PE Zone 1
	<i>Instantaneous</i> min. EF 0.82	0.6
	<i>Instantaneous</i> min. UEF 0.82	0.5
	<i>Instantaneous</i> condensing min. EF 0.90	0.8
	<i>Instantaneous</i> condensing min. EF 0.95	0.8
	<i>Instantaneous</i> condensing min. UEF 0.90	1.0
	<i>Instantaneous</i> condensing min. UEF 0.95	1.1
	Tank condensing min. TE 90%	0.7
	Tank condensing min. TE 94%	0.8
	Tank condensing min. UEF 0.75	0.8
	Tank condensing min. UEF 0.82	0.9
SDHW	Single dwelling: ≥ 6000 MJ/yr	1.1
	MURBs: ≥ 3000 MJ/yr/unit ¹³	1.1
Drain Water Heat Recovery (DWHR)¹⁴	$\geq 30\%$ to $< 42\%$ - one shower	0.2
	$\geq 30\%$ to $< 42\%$ - two showers	0.3
	$\geq 42\%$ to $< 54\%$ - one shower	0.2
	$\geq 42\%$ to $< 54\%$ - two showers	0.3
	$\geq 54\%$ to $< 62\%$ - one shower	0.2
	$\geq 54\%$ to $< 62\%$ - two showers	0.4
	$\geq 62\%$ to $< 70\%$ - one shower	0.3
	$\geq 62\%$ to $< 70\%$ - two showers	0.5
	$\geq 70\%$ - one shower	0.3
	$\geq 70\%$ - two showers	0.5
DWHR – MURBs^{14,15}	$\geq 30\%$ to $< 42\%$ - one shower	max. 0.2
	$\geq 30\%$ to $< 42\%$ - two showers	max. 0.3
	$\geq 42\%$ to $< 54\%$ - one shower	max. 0.2
	$\geq 42\%$ to $< 54\%$ - two showers	max. 0.3
	$\geq 54\%$ to $< 62\%$ - one shower	max. 0.2
	$\geq 54\%$ to $< 62\%$ - two showers	max. 0.4
	$\geq 62\%$ to $< 70\%$ - one shower	max. 0.3
	$\geq 62\%$ to $< 70\%$ - two showers	max. 0.5
	$\geq 70\%$ - one shower	max. 0.3
	$\geq 70\%$ - two showers	max. 0.5
ENERGY STAR Certified Appliances¹⁶	Minimum of 3 types of <i>ENERGY STAR certified</i> appliances installed	0.1
Electrical Savings	100% ENERGY STAR lighting ¹⁷	0.1

NOTES:

- 1) Thermal resistance requirements are listed in effective values, unless otherwise indicated with (nominal) for nominal value.
- 2) Only one of the three sub-categories under Ceilings may be chosen.
- 3) Where both ceilings below attics and cathedral ceilings or flat roofs are present, both options must be applied.

- 4) Full slab thermal resistance values do not apply to slab on grade foundations.
- 5) Includes skylights and door systems. Climate zones for ENERGY STAR fenestration products are defined in “Climate Zones – ENERGY STAR,” refer to: <http://www.nrcan.gc.ca/energy/products/for-participants/specifications/13720>.
- 6) See **Appendix A: Airtightness metrics** for ACH, NLA and NLR values for each level.
- 7) Refer to **section 4.7.1.2 (b)** for how to determine the SRE at 0 °C.
- 8) BOP points are calculated as follows: First calculate the number of points per *unit* using:
 $\text{Points per unit} = \text{max points} / \text{\#MURB units in building}$, rounding to the nearest 0.1.
Then calculate the BOP points as follows: BOP points = points per *unit* * #MURB units connected to a HRV/ERV, without exceeding max. points.
- 9) Only one of Airtightness or Airtightness + HRV/ERV option may be chosen.
- 10) HRV/ERV fan efficacy option can be chosen with HRV/ERV option.
- 11) Applies only to 50-270 L electric tanks. Heat trap required on both inlet and outlet for top inlet types, and outlet only for bottom inlet types.
- 12) This option applies only to stand-alone *water heaters* and not those that form part of a *combined space and water heating system*.
- 13) The minimum of 3000 MJ/yr/*unit* must be met for all *units* in the building.
- 14) This option is based on the number of shower stacks from which heat is being recovered, not the number of DWHR units, with one exception: houses with a total of one shower may claim the points for two showers since the DWHR unit is recovering heat from all the showers in the house. The maximum allowable amount is two showers.
- 15) BOP points are calculated as follows: First calculate the number of points per *unit* using:
 $\text{Points per unit} = \text{max points} / \text{\#MURB units in building}$, rounding to the nearest 0.1.
Then calculate the BOP points as follows: BOP points = points per *unit* * # MURB units (recovering heat from at least one shower stack) connected to a DWHR, without exceeding max. points.
- 16) Three *ENERGY STAR certified* appliances must be chosen out of the following appliance types: dishwasher, clothes washer, clothes dryer and refrigerator. Each type of appliance can only be selected once.
- 17) This applies to all lighting in the house, including decorative, stair and exterior lighting. Lighting must be *ENERGY STAR certified fixtures* or light bulbs. One non-*ENERGY STAR certified fixture* per house is allowed.

6.11 Saskatchewan

6.11.1 Climate zones for Saskatchewan

The climate zones for **section 6.11.3** are defined by **Table 34**, where the *heating degree days* are determined as per **section 1.2.2.1**.

Table 34 - ESNH Climate Zones for Saskatchewan

Forming part of **section 6.11.1**

Climate Zone	Heating Degree Days
ESNH SK Zone 1	< 6000
ESNH SK Zone 2	≥ 6000

6.11.2 Performance targets for Saskatchewan

For ENERGY STAR certification using the performance approach, the percentage difference between the house rating and the EnerGuide Rating System *reference house* rating shall be:

- (a) At least 20.0% lower than the EnerGuide Rating System *reference house* (% LTRH) for houses, MURB whole building and *MURB single units*, or
- (b) At least 10.0% LTRH and maximum 60 GJ/year, excluding *MURB single units*.

NOTE: *On-site* electricity production shall be excluded from the ERS Rating for the purpose of compliance with the performance target.

6.11.3 Builder option packages for Saskatchewan

Apply all core BOP elements for the applicable climate zone, per **Table 35**.

Table 35¹ - Saskatchewan Core BOP

Forming part of **section 6.11.3**

Item	ESNH SK Zone 1	ESNH SK Zone 2
	RSI (R)	RSI (R)
Ceilings below attics	10.43 (59.2)	10.43 (59.2)
Cathedral ceilings and flat roofs	5.02 (28.5)	5.02 (28.5)
Walls above grade	3.08 (17.5)	3.85 (21.9)
Floors over unheated spaces	5.02 (28.5)	5.02 (28.5)
Foundation walls below or in contact with the ground	3.46 (19.6)	3.46 (19.6)
Unheated floors on ground above frost line	1.96 (11.1)	1.96 (11.1)
Heated or unheated floors on ground on permafrost	n/a	4.44 (25.2)

Heated floors on ground	2.85 (16.2)	2.85 (16.2)
Slabs-on-grade with an integral footing	3.72 (21.1)	3.72 (21.1)
Fenestration ²	ENERGY STAR Zone 2	ENERGY STAR Zone 3
Space heating	• 95% AFUE ENERGY STAR fuel-fired furnace³ or boiler • Air-source heat pump, or • Ground-source heat pump	
Domestic water heating	EF or UEF 0.67 ^{4,5}	
Combined space and water heating	TPF 0.90	
Ventilation ⁶	60% SRE at 0 °C and 55% SRE at -25 °C	
Electrical savings ⁷	75% ENERGY STAR lighting	
BOP points required ⁸	2.1	2.0

NOTES:

- 1) Thermal resistance requirements are listed in effective RSI (R) values.
- 2) Includes skylights and door systems. Climate zones for ENERGY STAR fenestration products are defined in "Climate Zones – ENERGY STAR," refer to: <http://www.nrcan.gc.ca/energy/products/for-participants/specifications/13720>.
- 3) Furnaces shall be *ENERGY STAR certified*, or have an AFUE $\geq 95\%$ and an electronically commutated fan motor (ECM).
- 4) Cannot be used in combined space and water heating configurations.
- 5) An electric *water heater* may be used in lieu of the EF 0.67 *water heater* only when used in conjunction with the air source heat pump or ground source heat pump options.
- 6) Refer to **section 4.7.1.2 (b)** for how to determine the SRE at 0 °C.
- 7) This applies to all lighting in the house, including decorative, stair and exterior lighting. Lighting must be *ENERGY STAR certified fixtures* or light bulbs.
- 8) Select options from **Table 36** such that the points assigned total not less than the amount of points indicated in this table for the applicable climate zone.

Table 36¹ - Saskatchewan BOP Options
Forming part of **section 6.11.3**

Category	Item	ESNH SK Zone 1	ESNH SK Zone 2
Ceilings Below Attic (100%)	R52 (nominal) at heel	n/a	0.1
Walls Above Grade	RSI 3.41 (R 19.4)	0.7	n/a
	RSI 3.59 (R 20.4)	0.8	n/a
	RSI 3.78 (R 21.5)	1.1	n/a
	RSI 3.90 (R 22.1)	1.2	n/a
	RSI 4.03 (R 22.9)	1.3	n/a
	RSI 4.48 (R 25.4)	1.6	0.5
	RSI 4.79 (R 27.2)	1.9	0.7
Foundation Walls	RSI 4.19 (R 23.8)	0.1	0.1
Unheated Floors Below Frost Line²	RSI 0.88 (R 5.0) full slab	0.1	0.1
	RSI 1.76 (R 10.0) full slab	0.2	0.2
Fenestration³	ENERGY STAR Zone 2	0.1	n/a
	ENERGY STAR Zone 3	0.3	0.3
Airtightness⁴	Level 2	0.5	0.7
	Level 3	1.2	1.2
	Level 4	1.8	1.7
Airtightness+ HRV/ERV^{4,5,7}	Level 4 + $\geq 84\%$ SRE at 0 °C	2.6	2.7
Airtightness + HRV/ERV– MURBs^{4,5,6,7}	Level 4 + minimum 2 units with HRV/ERV $\geq 84\%$ SRE at 0 °C	max. 2.6	max. 2.7
Heat Recovery Ventilator / Energy Recovery Ventilator (HRV/ERV)⁵	65 to < 75% SRE at 0 °C	n/a	0.1
	≥ 75 to < 84% SRE at 0 °C	0.1	0.1
	$\geq 84\%$ SRE at 0 °C	0.2	0.2
HRV/ERV – MURBs^{5,6}	65 to < 75% SRE at 0 °C	n/a	max. 0.1
	≥ 75 to < 84% SRE at 0 °C	max. 0.1	max. 0.1
	$\geq 84\%$ SRE at 0 °C	max. 0.2	max. 0.2
HRV/ERV fan efficacy⁸	SRE $\geq 75\%$ at 0 °C, ≥ 0.57 L/s/W	0.1	0.1
Domestic Water Heating⁹	<i>Instantaneous</i> min. EF 0.82	0.6	0.6
	<i>Instantaneous</i> min. UEF 0.82	0.5	0.5
	<i>Instantaneous</i> condensing min. EF 0.90	0.8	0.8
	<i>Instantaneous</i> condensing min. EF 0.95	0.9	0.8
	<i>Instantaneous</i> condensing min. UEF 0.90	1.2	1.3
	<i>Instantaneous</i> condensing min. UEF 0.95	1.3	1.4

Category	Item	ESNH SK Zone 1	ESNH SK Zone 2
	Tank condensing min. EF 0.80	0.8	0.7
	Tank condensing min. TE 90%	0.7	0.7
	Tank condensing min. TE 94%	0.8	0.8
	Tank condensing min. UEF 0.75	1.0	1.1
	Tank condensing min. UEF 0.8	1.1	1.2
	Tank condensing min. UEF 0.82	1.2	1.2
Combined Space and Water Heating¹⁰	TPF 0.95	0.8	0.8
SDHW	Single dwelling: ≥ 6000 MJ/yr	0.9	0.8
	MURBs: ≥ 3000 MJ/yr/unit ¹¹	0.9	0.8
Drain Water Heat Recovery (DWHR)¹²	$\geq 30\%$ to $< 42\%$ - one shower	0.2	0.2
	$\geq 30\%$ to $< 42\%$ - two showers	0.3	0.3
	$\geq 42\%$ to $< 54\%$ - one shower	0.2	0.2
	$\geq 42\%$ to $< 54\%$ - two showers	0.4	0.4
	$\geq 54\%$ to $< 62\%$ - one shower	0.3	0.3
	$\geq 54\%$ to $< 62\%$ - two showers	0.5	0.5
	$\geq 62\%$ to $< 70\%$ - one shower	0.3	0.3
	$\geq 62\%$ to $< 70\%$ - two showers	0.5	0.6
	$\geq 70\%$ - one shower	0.3	0.3
	$\geq 70\%$ - two showers	0.6	0.6
DWHR – MURBs^{12,13}	$\geq 30\%$ to $< 42\%$ - one shower	max. 0.2	max. 0.2
	$\geq 30\%$ to $< 42\%$ - two showers	max. 0.3	max. 0.3
	$\geq 42\%$ to $< 54\%$ - one shower	max. 0.2	max. 0.2
	$\geq 42\%$ to $< 54\%$ - two showers	max. 0.4	max. 0.4
	$\geq 54\%$ to $< 62\%$ - one shower	max. 0.3	max. 0.3
	$\geq 54\%$ to $< 62\%$ - two showers	max. 0.5	max. 0.5
	$\geq 62\%$ to $< 70\%$ - one shower	max. 0.3	max. 0.3
	$\geq 62\%$ to $< 70\%$ - two showers	max. 0.5	max. 0.6
	$\geq 70\%$ - one shower	max. 0.3	max. 0.3
	$\geq 70\%$ - two showers	max. 0.6	max. 0.6
ENERGY STAR Certified Appliances¹⁴	Minimum of 3 types of <i>ENERGY STAR</i> certified appliances installed	0.1	0.1
Electrical Savings	100% ENERGY STAR lighting ¹⁵	0.1	0.1

NOTES:

- 1) Thermal resistance requirements are listed in effective values, unless otherwise indicated with (nominal) for nominal value. An 'n/a' indicates that an option is not possible, likely due to a higher core BOP requirement.
- 2) Full slab thermal resistance values do not apply to slab on grade foundations.
- 3) Includes skylights and door systems. Climate zones for ENERGY STAR fenestration products are defined in "Climate Zones – ENERGY STAR," refer to: <http://www.nrcan.gc.ca/energy/products/for-participants/specifications/13720>.

- 4) See **Appendix A: Airtightness metrics** for ACH, NLA and NLR values for each level.
- 5) Refer to **section 4.7.1.2 (b)** for how to determine the SRE at 0 °C.
- 6) BOP points are calculated as follows: First calculate the number of points per *unit* using:
 $\text{Points per unit} = \text{max points} / \text{\#MURB units in building}$, rounding to the nearest 0.1.
 Then calculate the BOP points as follows: BOP points = points per *unit* * *\#MURB units* connected to a HRV/ERV, without exceeding max. points.
- 7) Only one of Airtightness or Airtightness + HRV/ERV option may be chosen.
- 8) HRV/ERV fan efficacy option may be chosen with HRV/ERV option.
- 9) This option applies only to stand-alone *water heaters* and not those that form part of a *combined space and water heating system*.
- 10) These options cannot be used in conjunction with domestic *water heater* options.
- 11) The minimum of 3000 MJ/yr/*unit* must be met for all *units* in the building.
- 12) This option is based on the number of shower stacks from which heat is being recovered, not the number of DWHR units, with one exception: houses with a total of one shower may claim the points for two showers since the DWHR unit is recovering heat from all the showers in the house. The maximum allowable amount is two showers.
- 13) BOP points are calculated as follows: First calculate the number of points per *unit* using:
 $\text{Points per unit} = \text{max points} / \text{\#MURB units in building}$, rounding to the nearest 0.1.
 Then calculate the BOP points as follows: BOP points = points per *unit* * *\# MURB units* (recovering heat from at least one shower stack) connected to a DWHR, without exceeding max. points.
- 14) Three *ENERGY STAR certified* appliances must be chosen out of the following appliance types: dishwasher, clothes washer, clothes dryer and refrigerator. Each type of appliance can only be selected once.
- 15) This applies to all lighting in the house, including decorative, stair and exterior lighting. Lighting must be *ENERGY STAR certified fixtures* or light bulbs. One non-*ENERGY STAR certified fixture* per house is allowed.

6.12 Yukon

6.12.1 Climate zones for Yukon

The climate zone for **section 6.12.3** is defined by **Table 37**, where the *heating degree days* are determined as per **section 1.2.2.1**.

Table 37 - ESNH Climate Zone for Yukon
Forming part of **section 6.12.1**

Climate Zone	Heating Degree Days
ESNH YT Zone 1	≥ 7000

6.12.2 Performance target for Yukon

For ENERGY STAR certification using the performance approach, the percentage difference between the house rating and the EnerGuide Rating System *reference house* rating shall be:

At least 40.0% lower than the EnerGuide Rating System *reference house* (% LTRH) for houses, MURB whole building and *MURB single units*.

NOTE: *On-site* electricity production shall be excluded from the ERS Rating for the purpose of compliance with the performance target.

6.12.3 Builder option packages for Yukon

Apply all BOP elements for the applicable climate zone, per **Table 38**.

Table 38 - Yukon Core BOP
Forming part of **section 6.12.3**

<PLACEHOLDER>

Table 39 - Yukon BOP Options
Forming part of **section 6.12.3**

<PLACEHOLDER>

Appendix A: Airtightness metrics

Table A-1¹ - Airtightness Metrics for Attached Buildings

Level	ACH	NLA		NLR	
		cm ² /m ²	in ² /100 ft ²	L/s/m ²	cfm ₅₀ /ft ²
1 ^{2,3}	3.0	2.12	3.06	1.32	0.26
2	2.5	1.60	2.30	0.98	0.19
3	2.0	1.28	1.84	0.78	0.15
4	1.5	0.96	1.38	0.59	0.12
5	0.6	0.38	0.55	0.23	0.046

NOTE:

- 1) *MURB single units* must comply with attached airtightness requirement.
- 2) Level 1 represents the core BOP requirement.
- 3) Level 1 NLA and NLR values were not updated to ease the transition between *ENERGY STAR for New Homes—Standard—Version v12.8 and 17.0 Ontario* and version 17.1. The following Level 1 NLA and NLR values will be in effect as of January 1, 2021:
 NLA: 1.92 cm²/m²; 2.76 in²/100ft²
 NLR: 1.17 L/s/m²; 0.23 cfm₅₀/ft²

Table A-2 - Airtightness Metrics for Detached Buildings

Level	ACH	NLA		NLR	
		cm ² /m ²	in ² /100 ft ²	L/s/m ²	cfm ₅₀ /ft ²
1 ^{1,2}	2.5	1.26	1.81	0.93	0.18
2	2.0	0.96	1.38	0.71	0.14
3	1.5	0.72	1.04	0.53	0.10
4	1.0	0.48	0.69	0.35	0.070
5	0.6	0.29	0.42	0.21	0.042

NOTE:

- 1) Level 1 represents the core BOP requirement.
- 2) Level 1 NLA and NLR values were not updated to ease the transition between v17 and v17.1. The following Level 1 NLA and NLR values will be in effect as of January 1, 2021:
 NLA: 1.20 cm²/m²; 1.73 in²/100ft²
 NLR: 0.89 L/s/m²; 0.17 cfm₅₀/ft²

Table A-3¹ - Airtightness Metrics for Attached Buildings - Manitoba Only

Level	ACH	NLA		NLR	
		cm ² /m ²	in ² /100 ft ²	L/s/m ²	cfm ₅₀ /ft ²
1 ^{2,3}	2.5	1.66	2.39	1.02	0.20
2	2.0	1.28	1.84	0.78	0.15
3	1.5	0.96	1.38	0.59	0.12
4	1.0	0.64	0.92	0.39	0.077
5	0.6	0.38	0.55	0.23	0.046

NOTE:

- 1) *MURB single units* must comply with attached airtightness requirement.
- 2) Level 1 represents the core BOP requirement.
- 3) Level 1 NLA and NLR values were not updated to ease the transition between v17 and v17.1. The following Level 1 NLA and NLR values will be in effect as of January 1, 2021:
 NLA: 1.60 cm²/m²; 2.30 in²/100ft²
 NLR: 0.98 L/s/m²; 0.19 cfm₅₀/ft²