Sustainable Buildings Canada

2025

NATIONAL BUILDING ENERGY CODE COMPLIANCE GUIDE

Part 9 Division B

SASKATCHEWAN REGION

With the support of Natural Resources Canada

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Introduction

Building Code Officials in Saskatchewan play a crucial role in ensuring that building construction projects comply with the National Building Code Saskatchewan Edition, safeguarding public safety and maintaining the integrity of the built environment. With funding support from Natural Resources Canada, Sustainable Buildings Canada (SBC) is developing a series of “Practical Codes Compliance Guides” for Building Code Officials across Canada. These guides are part of a package of materials in support of Natural Resources Canada’s “Codes Acceleration Fund” program.

The guide herein is focused on the Saskatchewan region and outlines best practices for energy code compliance and verification within NBC 2020 Part 9 Division B Houses and Small Buildings. The guide highlights common deficiencies found in building permit applications and explores design stage opportunities to streamline the review process through improved communications, detailing and reference materials, and to support field inspections with verification resources and reference websites.

N.B. This guide is provided as reference material for Building Officials at Sustainable Buildings Canada's Codes Acceleration Workshops and is not meant to replace regulatory or legislative building codes.

How to Use this Guide

This guide is made up of two sections. The first part of the guide is intended to provide building code officials with general advice to help officials do their jobs more effectively given the emerging energy code landscape. It covers best practices for code compliance, common deficiencies in building permit applications, and design opportunities to ensure timely review. The second section of the guide presents supporting resources in the form of verification tools and resource websites for building officials, which are compiled to facilitate understanding of select topics and promote ease of use.

This guide is not meant to replace the building code, it is a resource for reference material to assist in verifying and validating submission information in an increasingly complex code environment. Information contained within the guide is subject to change with referenced codes and standards updates.

Best Practices for Code Compliance

Understanding of the applicable Building Code (NBC)

Building code officials must possess an in-depth understanding of the NBC and Saskatchewan revisions including Ministerial Interpretations and referenced standards. Regular training and continuous education on code updates, amendments, and interpretations are vital. Staying current with legislative changes enables officials to apply the code accurately and consistently.

Effective Communication

Clear, concise communication with applicants, designers, and contractors is essential. Providing detailed feedback on submission deficiencies and required corrections helps applicants understand expectations, reducing the likelihood of clarification requests or resubmissions. Establishing standardized communication protocols, including pre-submission consultations and facilitated, integrated design collaboration, harmonized reference standards and common drawing details can enhance consistency and improve efficiency.

Use of Technology

Leveraging technology can significantly improve the permit review process. Utilizing digital plan submissions, automated code compliance software, offsite online inspection and online tracking systems allows for faster, more accurate reviews. Implementing a centralized database for document management can help ensure easy access to project information.

Collaboration and Coordination

Collaborating with other municipal departments and agencies involved in the permit approval process is critical. Establishing inter-departmental communication channels and coordinating reviews can help identify potential issues early, reducing delays and ensuring comprehensive compliance checks.

Standardized Procedures

Developing and adhering to standardized review procedures and checklists helps ensure consistency and thoroughness. These procedures should cover all aspects of the NBC, including structural integrity, fire safety, accessibility, and energy and environmental sustainability. Regularly updating checklists to reflect code changes is crucial.

Common Deficiencies in Building Permit Applications

Incomplete or Inaccurate Documentation

One of the most common deficiencies is the submission of incomplete or inaccurate documentation. Missing information, incorrect details, or non-compliance with code requirements can lead to delays and additional reviews. Ensuring that all required documents and information are provided upfront can expedite the review process. Understanding both energy modelling inputs and outputs will become increasingly important as tiered energy codes are implemented. Consistency in professional practices requires oversight and verification.

Environmental and Energy Efficiency Compliance

With growing emphasis on sustainability, non-compliance with environmental and energy efficiency standards is increasingly scrutinized. Common deficiencies include:

- Incorrect or inconsistent area and volume calculations including Fenestration and Door to Wall Ratio (FDWR) floor area and volume.

- Inadequate or incorrectly calculated insulation (including the effect of thermal bridging)
- Window performance that does not meet specifications for U-value and Solar Heat Gain Coefficient (SHGC), or that is not tested to the applicable standard (National Fenestration Rating Council (NFRC) 100 & 200)
- HVAC systems efficiencies and matched certifications (P-9.11, Domestic Hot Water (DHW) uniform energy factor (UEF))
    - When combined space heating and domestic hot water heating systems are used; package A1 is employed. Package A4 is required with continuous wall insulation.
- Ventilation air assumptions and air tightness testing
- Incorrect or insufficient energy modelling
- Inappropriate standard operating conditions
- Misunderstanding of and non-compliance with changing energy codes and standards
- Incorrect air tightness testing procedures and standards
- Inappropriate or unqualified modelling software

Incorporating all these elements in sufficient detail into the design and submission documents from the outset is essential for a smooth review process.

Design Opportunities to Ensure Timely Review

Early Engagement with Design Professionals and Code Officials

Engaging with code users and building code officials early in the design process can identify potential compliance issues before they become problematic. Pre-application meetings with Builder and specifiers, and preliminary reviews can provide valuable feedback and guidance, reducing the likelihood of requiring significant revisions later.

Integrated Design Approach

Adopting an integrated design approach, where architects, engineers, and other stakeholders collaborate from project inception, and throughout the planning stages, can ensure that all aspects of the building code are considered. This holistic approach can streamline the review process and enhance overall compliance.

Quality Control and Peer Review

Implementing a rigorous quality control process and conducting peer reviews of plans can help identify deficiencies before submission. This proactive approach ensures that applications are complete, accurate, and compliant with the NBC, minimizing the need for revisions.

Clear and Detailed Documentation

Providing clear and detailed documentation is essential for a timely review. Builders should be encouraged to include all necessary information through checklists, best practice guides and reference resources. Alongside site layouts, structural details, fire safety measures, and accessibility features, energy simulation modelling and summary reports are required for determining compliance with tiered energy codes. Ensuring that documentation is standardized, well-organized and easy to navigate can expedite the review process.

Responsive and Collaborative Attitude

Fostering a responsive and collaborative attitude among all parties involved can significantly impact the review timeline. Promptly addressing review comments, maintaining open lines of communication, and being willing to make necessary adjustments can expedite the approval process.

Conclusion

By adhering to best practices for energy code compliance, addressing common deficiencies, understanding energy performance modelling, and leveraging design opportunities, building code officials in Saskatchewan can help

ensure a timely and efficient review of building permit applications. This approach not only enhances the safety and quality of construction projects but also fosters positive relationships between officials, designers, and applicants. Through continuous improvement and collaboration, the building permit review process can become a model of efficiency and excellence.

Resources

This resource collection for Saskatchewan has been identified, curated and produced as a result of the consultation work of the Codes Acceleration Fund Building Officials Workshop Project by Sustainable Buildings Canada, in partnership with Natural Resources Canada and Building Officials Association Members and Staff.

Workshop participants and the SBC CAF Technical Advisory Committee have identified the current gaps in knowledge required to effectively review and approve the next iteration of energy and resource efficiency compliance requirements. Participating Industry Subject Matter experts reviewed these observations and developed the following interim, Saskatchewan-specific set of best practice guides.

As workshops continue to be delivered and additional gaps or barriers are identified, additional material will be developed and curated into a final best practice compendium. The compendium will include codes resources relevant to other regions based on similar compliance guides developed over the project period.

The information provided in these guides is subject to change with codes and standards updates. Please always refer to the sources referenced.

1) Modelling Considerations

NRCan Reporting Tool Summary

The NRCan reporting tool is an energy audit tool that extracts and presents summary information from a HOT2000 house energy modelling file. It replaces the Full House Report generated by HOT2000. The following in a breakdown of core sections of the EnerGuide Rating System (ERS) reporting tool.

National Building Code, Section 9.36 - Performance Modeling Report

V1.2

PROJECT INFORMATION			
Building Permit # / Project Name:		Building Type:	Apartment Row
Identifier:	Example - Happy Builder	Number of Units:	10
Builder:	Happy Builder	Conditioned Floor Area (m^2)	114.5
Project Address:	1 3	Heating Degree Days (HDD):	6010
Municipality:	Prince Albert	Number of Storeys:	Three storeys
Postal Code:	S0K 0 0	House Volume (m^3)	334.28
SIMULATION TOOL			
Name:	HOT2000	Version:	11.13
Adaptations (if applicable) :	N A	Weather Location:	PRINCE ALBERT
Ruleset	EnerGuide Rating System 2020 N C	Climatic Data:	Wth2020.dir
ADMINISTRATIVE DETAILS			
Energy Modeler:	Energy Modeller	Contact information:	
Company:	Awesome Company	NRCan Registration Number:	
I certify that this report was produced using an EnerGuide file modeled in accordance with clause 9.36.5.3. 1) b) of the 2020 NBC and submitted to NRCan	No Batch Number:	Date: Signature:	

PERFORMANCE METRICS		
Metrics	**Proposed House**	**Reference House (EUM Budget)**
NBC Annual Energy Consumption	**43.17 GJ**	**50.76 GJ (68.07 GJ)**
Annual Gross Space Heat Loss	**47.98 GJ**	**54.08 GJ (63.26 GJ)**
Design Heating Load	**5721.28 W**	**6432.16 W**
Design Cooling Load	**1587.07 W**	**1824.31 W (1725 W)**
ACH @ 50 Pa	**2.5 ACH**	**2.5 ACH**
NLA (cm^2/m^2)	**1.59**	
NLR ($L/s/m^2$)	**0**	
GHG (t/year)	**5.6**	**3.13**

Thermal Energy Demand Intensity (TEDI) - kWh/(m^2•year) :	68	Overall Percent Improvement:	14.96 (36.58)
Mechanical End-Use Intensity (MEUI) - kWh/(m^2•year):	105	Percent Heat Loss Reduction:	11.28 (24.15)
Greenhouse Gas Intensity (GHGI) - kg of CO_2/(m^2•year) :	23	Openable Window Area (%)	0 -
Renewable Energy Generation – GJ :	0.0		

If a project is to be labelled with an EnerGuide label, this section will say “Yes”.

Note the volume <300m^3 or >300m^3 for Tiered.

Registered Energy Advisors will provide their qualifications here.

Peak Cooling Load (Proposed must be less than the Reference House).

Please note the air-leakage rate in the Proposed House and whether an air-tightness test will be required. *Using this tool requires air-leakage testing through the ERS Pathway.

Please note these outputs and cross reference it to your jurisdictions’ Tiered Energy Code req’s. Disregard number in the parenthesis (this is in relation in to *NBC2025*).

NRCan Reporting Tool Summary Cont.

BUILDING ENVELOPE

Above-Ground Opaque Assemblies

Assembly	Description	Effective RSI (m^2·K)/W	Area (m^2)
Overall Walls		3.06	64.11
Main	2x6/R20B/24"OC/Vinyl	3.06	64.11
Overall Headers		3.76	7.68
Rim Joist	R20B/Vin	3.76	7.68
Overall Floors		0	0
Overall Ceilings		65535	0

Below-Grade Opaque Assemblies

Assembly	Description	Effective RSI (m^2·K)/W	Area (m^2)
Overall Foundation Walls		3.35	79.23
Foundation	Exterior: User specified; Interior: 2x4/2"/R20B/24"OC	Exterior: 0; Interior: 3.19	79.23
Overall Slab		1.76	58.69
Foundation	Unheated slab below frost line	1.76	58.69

Fenestration and Doors

Component	Type	U-value W/(m^2·K)	SHGC	Area (m^2)
Main	Wall	-	-	
Kitchen	1 x Reference	0.62	0.2	1.49
Kitchen 2	2 x Reference	0.62	0.16	0.56
Main Floor Living	1 x Reference	0.62	0.22	3.9
Powder	1 x Reference	0.62	0.16	0.56
Front Door	User specified	1.37	-	2.03
Lite	1 x Reference	0.62	0.08	0.19
Rear	User specified	0.93	-	2.03
Lite	1 x Reference	0.62	0.08	0.19
Foundation	Wall	-	-	-
Bsmnt	1 x Reference	0.62	0.19	1.24
Bsmnt 2	1 x Reference	0.62	0.19	1.24
			FDWR	17%

MECHANICAL SYSTEMS

Component	Type	Energy Source	Performance Rating	Capacity of Equipment
Space Heating System 1	Furnace - Condensing	Natural gas	96 (Efficiency)	7 kW
Space Heating System 2	-	-	-	-
Air Conditioning	Central split system	Electric	14.5 (SEER)	-
Domestic Hot Water	Direct vent (sealed)	Natural gas	0.7 (UEF)	189.3 L
DWHR	-	-	-	-
Ventilation	Utility	Electric	22.65 L/s (Exhaust Flow Rate)	

Appendix A - Code Details

Wall		
2x6/R20B/24"OC/Vinyl		
	Structure Type	Wood frame
	Component Type Size	38x140 mm (2x6 in)
	Spacing	600 mm (24 in)
	Insulation Layer1	RSI 3.52 @ 152 mm (R 20 @ 6.0'') batt
	Insulation Layer2	None
	Interior	12 mm (0.5 in) gypsum board

Window specifications modelled must match the window/door specifications provided and intended to be installed by the builder.

The assembly configurations can be requested by the Building Official to be cross - referenced with the drawing if “User Specified”.

Mechanical system types & specifications must match "as-constructed" conditions.

Breakdown of codes used in modelling.

2) Envelope Considerations

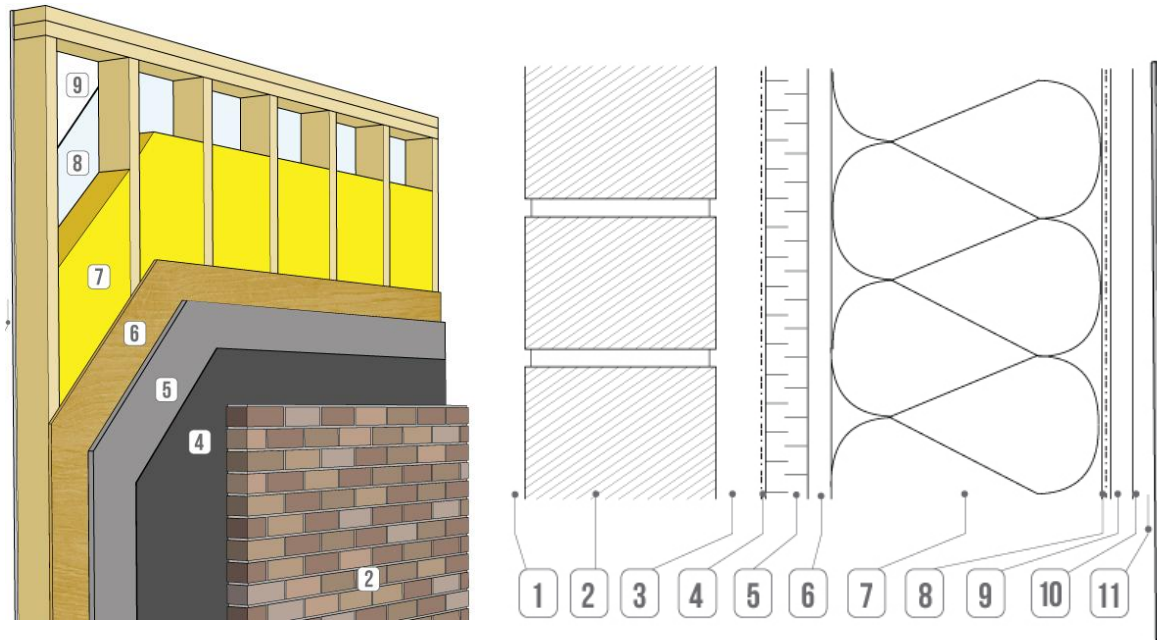
Thermal Performance – Calculation

To calculate the thermal performance building officials will want to set up a calculation table with all assembly components. Components with no thermal contribution, such as air or vapour retarders, can be ignored. It is important not to forget to include the air films. The Canadian Wood Council provides an R-Value Assembly Calculator with additional guidance and inputs: https://cwc.ca/design-tools/tool/effectiver/calculator/search-go-to-the-calculator.php

Above Grade Wall Assembly			
Component	Thickness (mm)	RSI/mm	RSI eff
Exterior Air Film			
Vinyl Siding			
ZIP R9 Sheathing			
2x6 Stud 16" OC w R22 Batt*			
1/2" Drywall			
Interior Air Film			
Assembly RSI eff			0.00

Calculating Effective R and RSI Wall Thermal Values incl. Advanced Framing

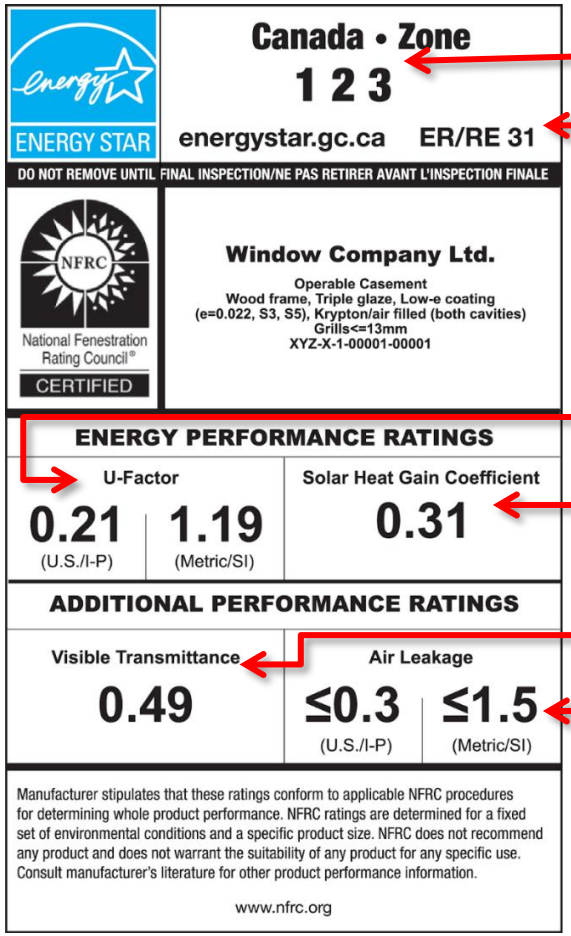
This section provides guidance on calculating effective R and RSI vales for wall assemblies. The [Canadian Wood Council Effective R Calculator] can also be used to get to the correct value.



WALL ASSEMBLY COMPONENTS[1]		RSI	R
1	exterior air film	0.03	0.17
2	fired clay brick 4" (102 mm)[2]	0.07	0.40
3	more than 3/4" (20mm +) air space	0.18	1.02
4	spun bonded polyolefin (house wrap)	0.00	0.00
5	1" (25.4mm) extruded polystyrene type 3/4	0.89	5.05
6	3/8" (9.5 mm) OSB sheathing	0.09	0.53
7	2x6 framing filled with R22 batt @ 16" o.c.	2.55	14.48
8	polyethylene	0.00	0.00
9	1/2" (12.7mm) gypsum board	0.08	0.45
10	finish: 1 coat latex primer and latex paint	0.00	0.00
11	interior air film	0.12	0.68
Effective RSI / R Value of Entire Assembly		4.01	22.78
Centre of Cavity RSI / R Value		5.33	30.30
Installed Insulation RSI / R Value(nominal)		4.76	27.05
Effective RSI / R Value of Assembly with Advanced Framing (advanced framing as defined by NBC9.36.2.4.(1))		4.17	23.69

Fenestration Compliance Labels

The ENERGY STAR fenestration compliance label is a voluntary program that tests, certifies, and labels windows and doors based on their energy performance. The following is a high-level explanation on key parts of the ENERGY STAR label. This label is used to verify information found in Section D of the EEDS Form. Energy Star compliance shown below is *if* the product meets Energy Star requirements. The label connects to the A440S1-17 standard, which is the Canadian supplement to the NAFS-17 (North American Fenestration Standard), harmonized between the U.S. and Canada in 2014.



Homes requiring an Energy Star-certified product (compliance shown relative to Climate Zones (Energy Star)

ER Compliance Path (High Solar Gain Products): Higher Number provides more solar heat gain to augment heating loads

Whole window U-value in BTU/hr/s.f or W/ m2 K

Solar Heat Gain Coefficient (< 0.30 = low solar gain, 0.30-0.40 mid solar gain, 0.40-0.53 high solar gain(ER))

VLT = Visible Light Transmittance (whole window value)

Window Air Leakage - does not take into account quality of installation re: air and water tightness

CSA-A440 Equivalencies =

Air tightness ratings are A1, A2, A3. The tests measure the maximum air leakage rate.

Maximum air leakage rate per lenght of crack

	m³/h/m	cu.ft./hr/ft
A1	2.79	30.03
A2	1.65	17.76
A3	0.55	5.92

Airtightness Levels/Test Methodologies & Points (NBC)

This set of tables aligns with Table 3.1.1.4A (page 11 of this document) and translates the various metrics used to discuss whole-building air-tightness. Testing to these levels of performance allows the Constructor to access points (NBC 9.36) for better-than-code air tightness performance. Air-tightness levels align with ASHRAE Climate Zones (Zones 4 through 8) to allocate points towards achieving better-than-code performance. Note that to apply these points, a whole-building blower door test must be performed by a certified Energy Advisor, with results submitted to the municipality.

Prescriptive Tiers – Airtightness Testing
(ENERGY STAR Table A-2)

AIRTIGHTNESS LEVEL DETACHED	ACH50	NLA CM/ M²	NLA IN² /100FT²	NLR L/ S.M²	CFM 50/ FT²
1	3.0	2.12	3.05	1.32	0.26
2	2.5	1.26	1.81	0.93	0.18
3	2.0	0.96	1.38	0.71	0.14
4	1.5	0.72	1.04	0.53	0.10
5	1.0	0.48	0.69	0.35	0.070

Note: Airtightness level can be achieved by meeting any one of these airtightness metrics

AIRTIGHTNESS LEVEL (TABLE 9.36.6.4-A)	ECP ZONE 4	ECP ZONE 5	ECP ZONE 6	ECP ZONE 7A	ECP ZONE 7B	ECP ZONE 8
1	-	-	-	-	-	-
2	2.0	3.4	3.5	4.6	6.1	6.1
3	4.0	6.7	7.0	9.3	12.1	12.11
4	5.9	10.1	10.5	13.9	18.0	18.0
5	7.6	13.0	13.4	17.8	22.7	22.7

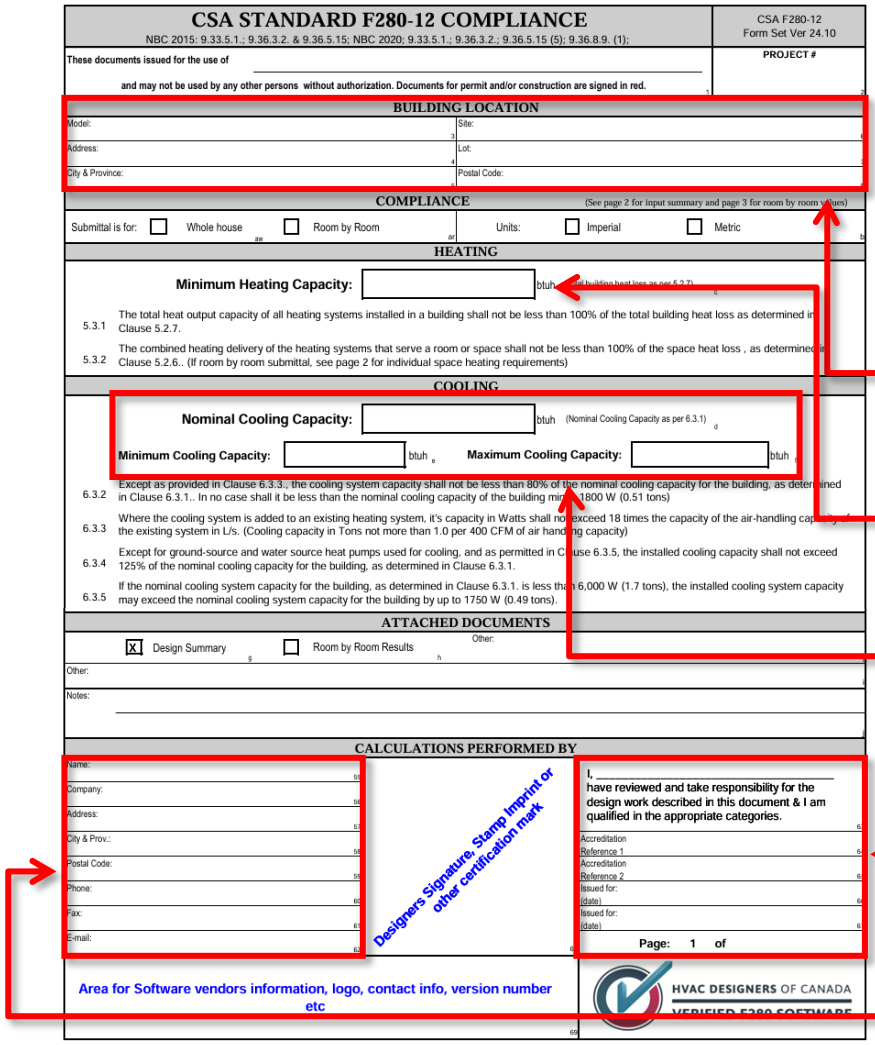
Table 9.36.8.8

- **2.5 ACH (level 2) = 3.4 pts**
- **2.0 ACH (level 3) = 6.7 pts**
- **1.5 ACH (Level 4) = 10.1 pts**

3) Mechanical Considerations

CSA Standard F280-12 Compliance Form

This form provides guidelines for contractors and installers on heating and cooling system capacity for appliances used in Part 9 homes to ensure the output capacity of these systems creates a safe and comfortable living environment. The form does not detail design and installation of space heating and cooling systems, but is based on best engineering practices described in building codes and standards. The F280-12 compliance form is compatible to be used in conjunction with C22.2 NO. 280-13 Electric Vehicle Supply Equipment.



Includes builder and home location summary.

Minimum heating capacity of the system.

Cooling equipment sizing minimum and maximum.

Designer accreditation and HRAI/TECA certification numbers.

Designer information.

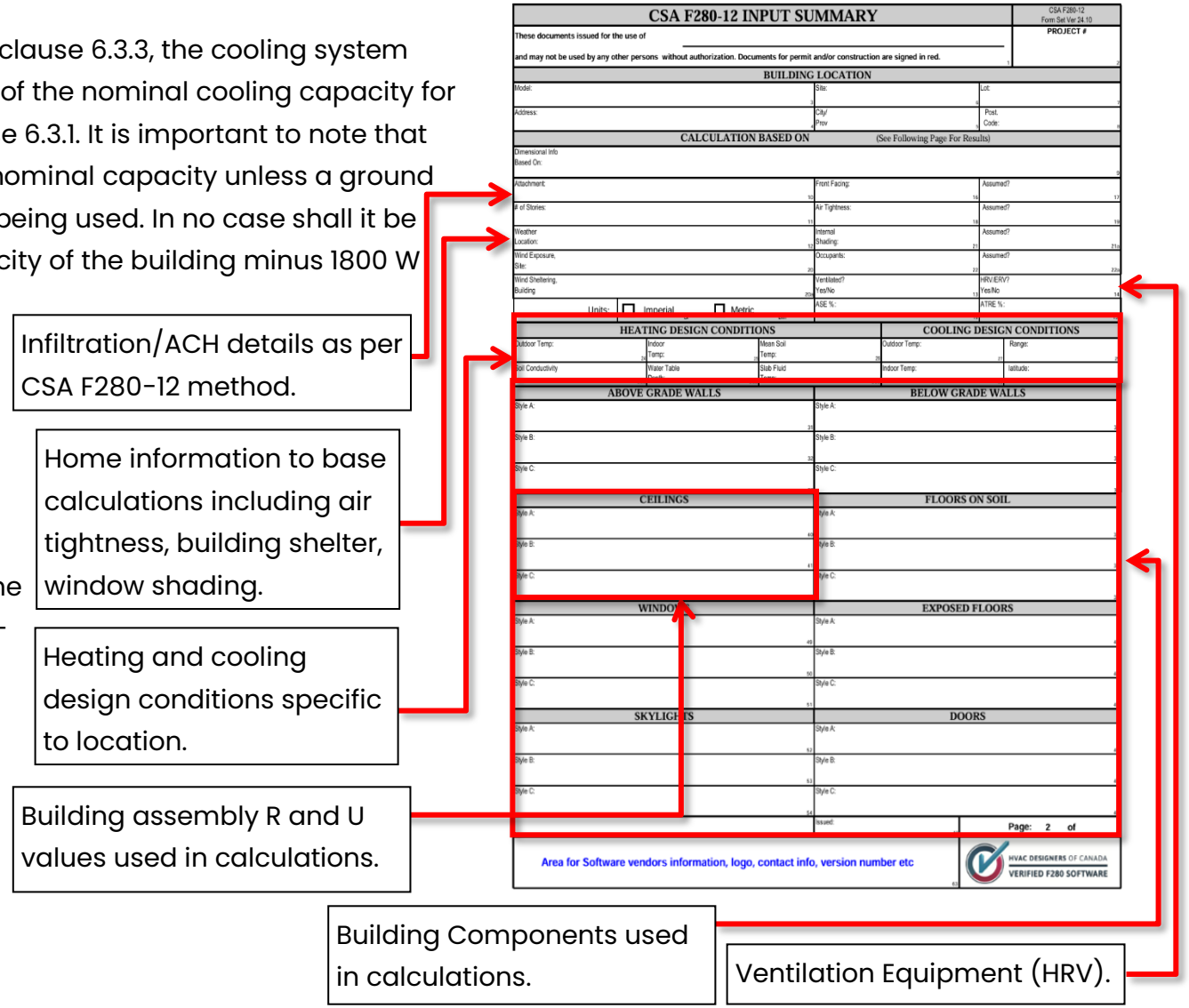
Important Clauses

Heating: 5.3.1 The total heat output capacity of all heating systems installed in a building shall not be less than 100% of the total building heat loss as determined in Clause 5.2.7.

Cooling 6.3.2: Except as provided in clause 6.3.3, the cooling system capacity shall not be less than 80% of the nominal cooling capacity for the building, as determined in clause 6.3.1. It is important to note that the system cannot exceed 125% or nominal capacity unless a ground source/water source heat pump is being used. In no case shall it be less than the nominal cooling capacity of the building minus 1800 W (0.51 tons).

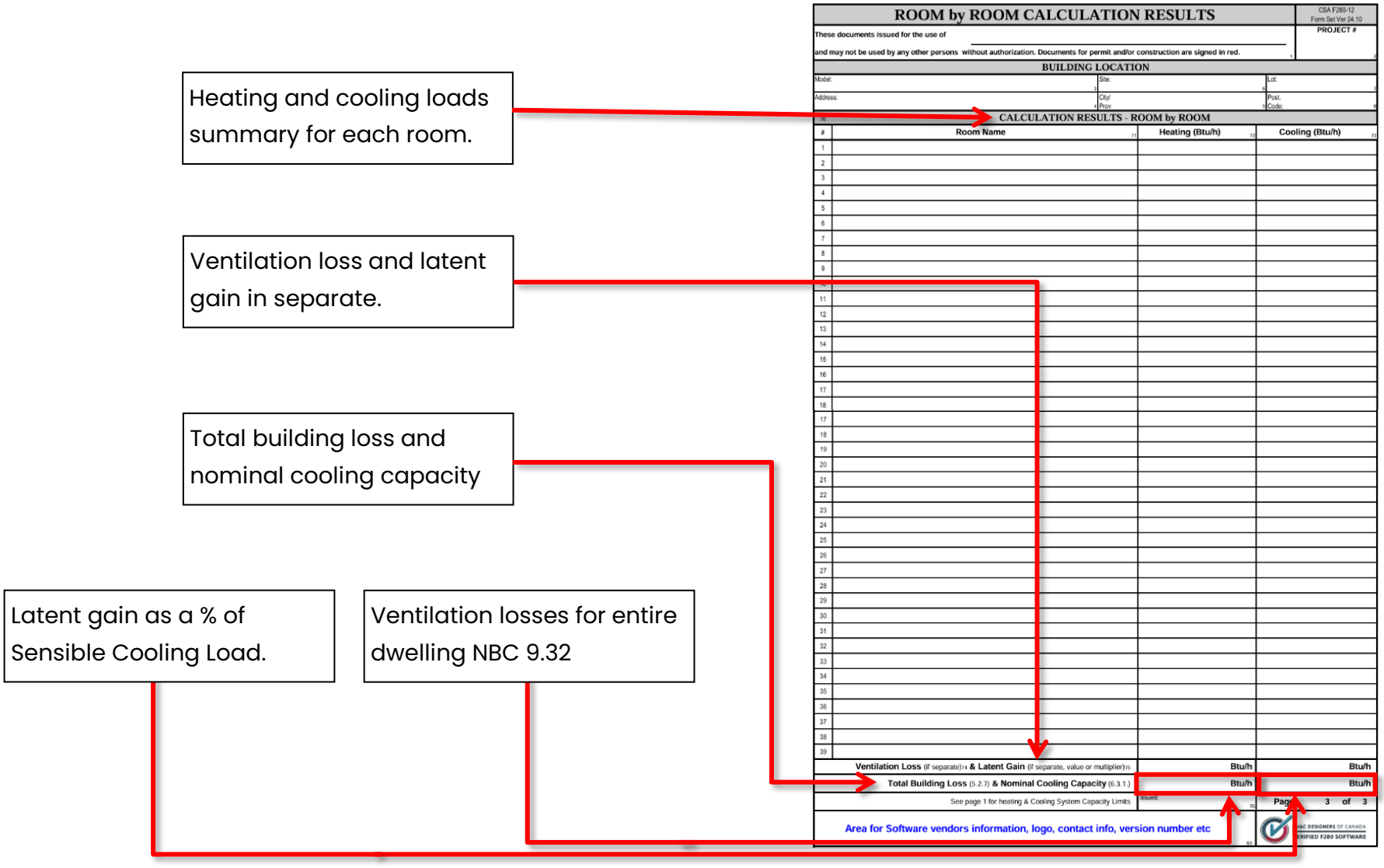
F280-12 Input Summary

The input summary is intended to allow contractors and installers to note all the details of the building that will be used to calculate he heating and cooling capacity. For the calculation results, we list the room-by-room loss and gain. The lower section has spaces for ventilation and latent gains when added separately. Adding the room totals, ventilation and latent will give the whole home loss and gain to help size the appliances.



F280-12 Calculation Results

The room-by-room calculation results list each room along with their heating and cooling capacity. These are used to calculate the heal and cooling ventilation loss, latent gain, total building loss and Nominal Cooling Capacity.



Furnace Annual Fuel Utilization Efficiency AFUE

The equipment selection is often the most difficult part of HVAC design. The image here is a typical natural gas 96% annual fuel utilization efficiency (AFUE) furnace specifications. They are available online. It is important to note that there is a range of output and that will be matched by a range of airflows, both for heating and to support the cooling. The furnace must handle the air for both applications.

Sometimes, models have an AFUE that is slightly higher or lower that the stated AFUE for the make and model. Factors such as the orientation of the cabinet, or a change in fuel from NG to Propane could affect the rating. For MURB units very small furnaces is required, which may allow consideration of other options, like combo systems or heat pumps that have incorporated modulating outputs.

SPECIFICATIONS

		Model No.	ML296UH045XV36B	ML296UH070XV36B
Gas Heating Performance		[1] AFUE	96%	96%
	High Fire	Input - Btuh	44,000	66,000
		Output - Btuh	42,000	62,000
		Temperature rise range - °F	35 - 65	50 - 80
		Gas Manifold Pressure (in. w.g.) Nat. Gas / LPG/Propane	3.5 / 10.0	3.5 / 10.0
	Low Fire	Input - Btuh	29,000	43,000
		Output - Btuh	28,000	41,000
		Temperature rise range - °F	20 - 50	25 - 55
		Gas Manifold Pressure (in. w.g.) Nat. Gas / LPG/Propane	1.7 / 4.5	1.7 / 4.5
High static - in. w.g.		Heating	0.8	0.8
		Cooling	1.0	1.0
Connections in.		Intake / Exhaust Pipe (PVC)	2 / 2	2 / 2
		Gas pipe size IPS	1/2	1/2
		Condensate Drain Trap (PVC pipe) - i.d.	3/4	3/4
		with furnished 90° street elbow	3/4 slip x 3/4 Mipt	3/4 slip x 3/4 Mipt
		with field supplied (PVC coupling) - o.d.	3/4 slip x 3/4 MPT	3/4 slip x 3/4 MPT
Indoor Blower		Wheel nominal diameter x width - in.	10 x 9	10 x 9
		Motor output - hp	1/2	1/2
		Tons of add-on cooling	2 - 3	2 - 3
		Air Volume Range - cfm	485 - 1370	500 - 1365
Electrical Data		Voltage	120 volts - 60 hertz - 1 phase	
		Blower motor full load amps	7.7	7.7
		Maximum overcurrent protection	15	15
Shipping Data		lbs. - 1 package	130	138

NOTE - Filters and provisions for mounting are not furnished and must be field provided.

[1] Annual Fuel Utilization Efficiency based on DOE test procedures and according to FTC labeling regulations. Isolated combustion system rating for non-weatherized furnaces.

Verified CSA F280-12 Software

The following is a list of all software currently verified. Some are commercially available for purchase and use, others are used within design firms by approved users only. Verified software logos are provided in the software outputs.

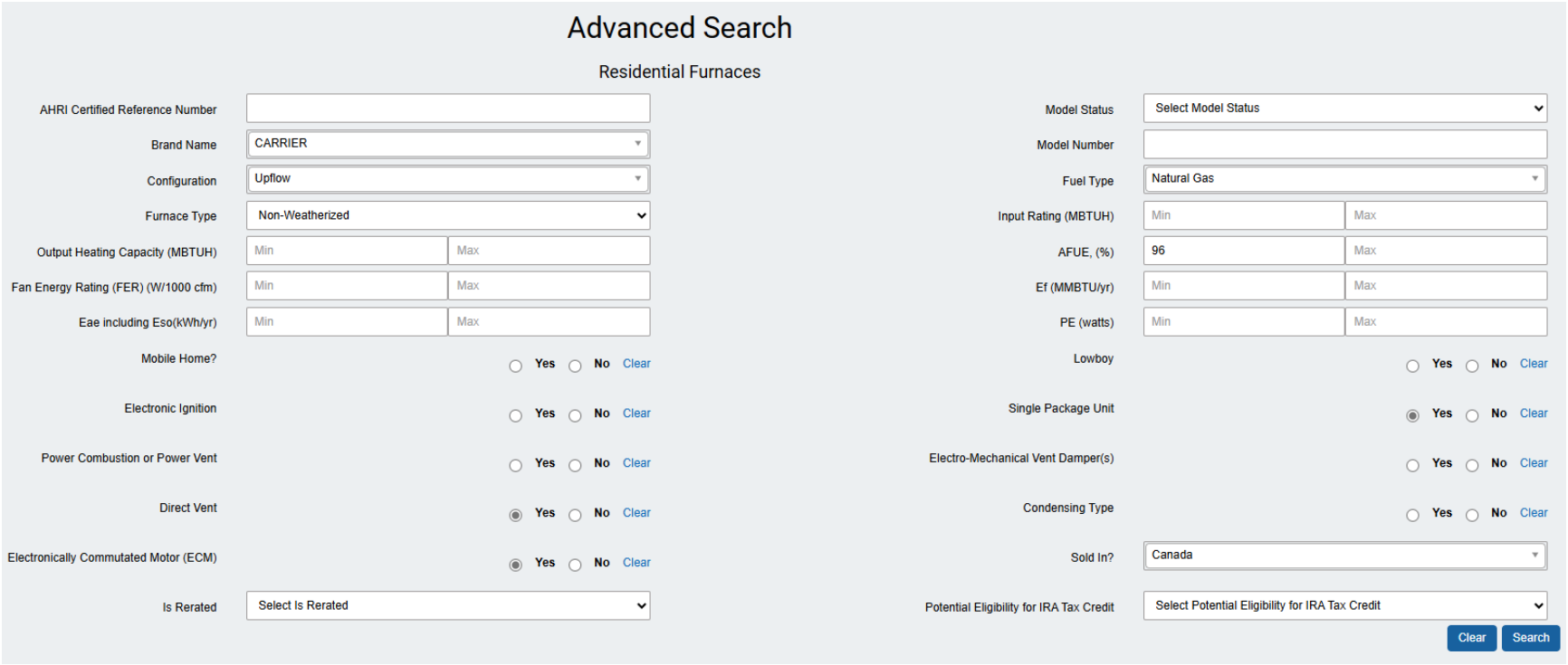
F280-12 Software Verified according to the procedure set out in F280-12, Section 8.

COMPANY NAME	SOFTWARE NAME	ROOM BY ROOM	WHOLE HOUSE	CONDITIONS	WEBSITE
Building Technology Services	Building Tech F280	✓	✓	Click Here	BuildingTech
Avenir Software Inc	HeatCAD/LoopCAD	✓	✓	Click Here	HeatCAD LoopCAD
Thermal Environmental Comfort Association	Teca Heat Loss & Heat Gain Calculator	✓	✓	Click Here	teca
Volta Research Inc	Volta Snap		✓	Click Here	volta SNAP
MiTek Inc	Right-Suite Universal	✓	✓	Click Here	www.wrightsoft.com
Sustainable HVAC Design Inc	Sustainable HVAC F280	✓	✓	Click Here	
McCallum HVAC Design Inc	Mecha F280	✓	✓	Click Here	MCCALLUM HVAC DESIGN INC design excellence with on time delivery

https://hvacdc.ca/f280-12software/

Furnace Annual Fuel Utilization Efficiency AFUE

Instead of looking up a manual, the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) directory is available for searching AFUE. It can also be useful when another brand is being substituted, and verification is required. This database can be used to search by model type or various other entries. A list of products with their AFUE will show to verify based on search criteria.



https://www.ahridirectory.org/NewSearch?programId=64&searchTypeId=1

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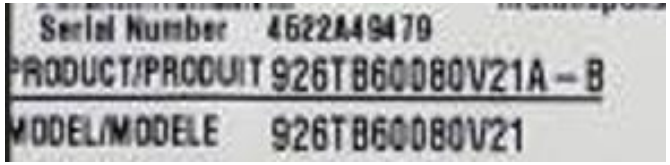
Installed furnaces will have an AFUE rating on the nameplate. The nameplate is typically found on the inside of the cabinet once the front panel has been removed. It may be necessary to lookup the furnace information to confirm the AFUE. Some appliances will have the EnerGuide rating sticker to make confirmation easier but this is a voluntary label.



Nomenclature clues:

"926T" means 96% second generation and T = two stage!

926TB: Product Data

FURNACE SIZE	CASING DIMENSIONS (IN.)			RATED HEATING OUTPUT (BTUH)*		AFUE	
	H	D	W	High	Low	UPFLOW/HZ	DOWN -FLOW
30040V14	35	29.50	14.20	39,000	25,000	96.0%	95.0%
36040V17	35	29.50	17.50	39,000	25,000	96.0%	95.0%
36060V14	35	29.50	14.20	58,000	38,000	95.0%	95.0%
42060V17	35	29.50	17.50	58,000	38,000	96.3%	95.0%
48080V17	35	29.50	17.50	78,000	50,000	96.2%	95.0%
60080V21	35	29.50	21.00	78,000	51,000	96.5%	95.0%

Domestic Hot Water Heater

The self-contained Heat Pump (HP) water heater is a unit typically located in a mechanical or service room where process heat is available. As insulated ducts in heated mechanical rooms and even hot water piping insulation are limited in mechanical or service rooms, process heat can be captured and used for hot water heating. Although the heat pump water heater will leverage that heat, "bleed off" from the heating system can still occur so impact on home occupancy comfort should be considered on a case-by-case basis.

For MURBs , where a mechanical closet is in or adjacent to living space, the availability of process heat is minimal. There is often a much lower hot water energy demand and so a more practical condensing tankless can be arguably a better solution.

Condensing water heaters work the same way as a condensing furnace. These have secondary heat exchangers that can be used to obtain more heat out of flue gases and use it to heat the water. Condensing water heaters will always need a drain. Testing of DHW heaters is reported as EF (Energy Factor) or UEF (Uniform Energy Factor).

Condensing (secondary heat exchanger)

Tankless

UEF 0.95. Able to use heat from exhaust gas to squeeze as much out of the combustion process as possible. This water heater needs a drain.

Self-contained Heat Pump Water Heater – 50 Gallon

3.75 UEF

Application is for service rooms with some process heat that can be captures and leveraged for domestic hot water.

The energy factor (EF) may be found on submittal sheets and manuals for products, usually found on the manufacturer's website. The following example table showcases the listing for EF that denotes Canada, along with the UEF. There are no third party tests yet, so just make sure the EF or UEF meets the Tier target or model submitted for permit.

2.3 Specifications

The following table lists the specifications for the water heater. Additional specifications about water, gas, electric, and air supplies (venting) appear in the Installation section.

Item		NPE-150S	NPE-180(A)	NPE-180S	NPE-210(A)	NPE-210S	NPE-240(A)	NPE-240S
Heat Capacity (Input)	Natural Gas	18,000-120,000 BTU/H	15,000-150,000 BTU/H		19,900-180,000 BTU/H		19,900-199,900 BTU/H	
	Propane Gas		15,000-150,000 BTU/H		19,900-180,000 BTU/H		19,900-199,900 BTU/H	
Energy Factor	UEF (for NG & LP)	0.96	0.96	0.97	0.96	0.97	0.96	0.97
	EF (Canada) (for NG & LP)	0.97	0.97	0.99	0.97	0.99	0.97	0.99
Flow Rate (DHW)	35 °F (19 °C) Temp Rise	6.8 GPM (25.8 L/m)	8.4 GPM (32 L/m)		10.1 GPM (38 L/m)		11.2 GPM (42 L/m)	
	45 °F (25 °C) Temp Rise	5.3 GPM (20 L/m)	6.5 GPM (25 L/m)		7.8 GPM (30 L/m)		8.7 GPM (33 L/m)	
	67 °F (36 °C) Temp Rise	3.2 GPM (12 L/m)	4.3 GPM (16 L/m)	4.2 GPM (16 L/m)	5.0 GPM (19 L/m)	5.2 GPM (20 L/m)	5.6 GPM (21 L/m)	5.7 GPM (22 L/m)

4) Renewable Considerations

Solar Ready Key Highlights

Solar ready houses generally require very minimal changes to a standard design. The most important points of inspection are the upgraded roof trusses and conduit installation. There should be conduit installed within the envelope from the electrical room to the attic, visible above the insulation, and two pieces of conduit through the wall from the electrical room to the exterior adjacent to the utility meter. All conduit should be capped/sealed until future use. A Solar Ready PV Checklist may be provided by the builder and should be affixed to the wall of the electrical room for the home buyer.

Permit Submission

Roof

- Plan designates area for solar installation
- Truss design identifies Solar Ready trusses

Electrical

- Conduit (2-inch) within envelope to attic/roof
- 1m² wall space near electrical panel designated for Solar Equipment
- Two conduits (1 ¼-inch) terminating nearby the utility electrical meter

Inspection

Roof

- Top cords constructed with 2 x 6 lumber
- Top cords may be stamped SR

Electrical

- Conduit visible above attic insulation (sealed)
- 1m² (3' x 3') clear wall space near electrical panel
- Two utility connection conduits through exterior wall nearby the utility electrical meter (sealed)

PV Ready Checklist to be provided to Building Permit Office & Home Buyer

Links to Resources

Find an NRCan authorized Service Provider and Energy Auditor https://natural-resources.canada.ca/energy-efficiency/home-energy-efficiency/find-service-organizations-existing-homes

Canadian Wood Council Effective R Calculator: https://cwc.ca/design-tools/tool/effectiver/calculator/search-go-to-the-calculator.php

AHRI Furnace Directory https://www.ahridirectory.org/NewSearch?programId=64&searchTypeId=1

HVI Certified Products - https://www.hvi.org/hvi-certified-products-directory/

Energystar Appliance Directory - https://natural-resources.canada.ca/energy-efficiency/energy-star/products/list-certified-products

Verified CSA F280-12 Software: https://hvacdc.ca/f280-12software/

PV Ready Checklist: https://publications.gc.ca/collections/collection_2021/rncan-nrcan/M154-122-2019-eng.pdf