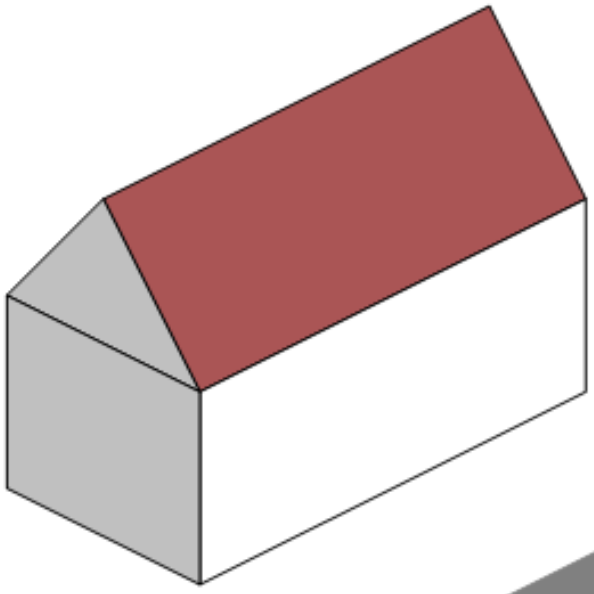
National Building Code 2023 (Alberta Edition) 9.36 Overview



Prepared by

CACEA Canadian Association of Consulting Energy Advisors

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Overview of the National Building Code (NBC) and Its Relationship to Energy Efficiency and Section 9.36 and the National Energy Code of Canada for Buildings (NECB)

The National Building Code (NBC) of Canada is a set of regulations and standards that govern the construction, renovation, and occupancy of buildings across Canada. It provides minimum requirements for safety, health, accessibility, and environmental protection. Energy efficiency is a significant aspect of the building code as it addresses the energy consumption of buildings and aims to reduce greenhouse gas emissions and overall environmental impact.

Image produced by AI

The National Energy Code of Canada for Buildings (NECB) works with the National Building Code (NBC) to provide more detailed and specific energy efficiency requirements. It sets the standards for the design and construction of new buildings, and renovations to existing buildings. It also improves energy efficiency and contributes to reducing energy consumption.

Section 9.36 of the NBC addresses the energy efficiency requirements for low-rise, small buildings (Part 9). It outlines the minimum energy performance standards that buildings must meet, including requirements for building envelope insulation; heating, ventilation, air conditioning (HVAC) systems; and domestic hot water.

The NBC 2020 edition, which is the latest version at the time of this overview document, includes updated requirements and improvements over previous editions to enhance energy efficiency in buildings. It addresses various aspects of what is required of a building including building envelope performance, HVAC systems efficiency, lighting design, and renewable energy utilization.

In summary, together, NBC, particularly Section 9.36 and the NECB determine the energy efficiency standards and requirements for buildings in Canada and focus on reducing energy consumption, lowering greenhouse gas emissions, and promoting sustainable construction practices.

Pathways for Compliance with 9.36

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Understanding the different paths to energy code compliance can be a daunting task. This document simplifies the process of navigating the different pathways outlined in the National Building Code: 2023 Alberta Edition (NBC(AE)) Section 9.36,

Section 9.36 of the NBC(AE) 2023 focuses on energy efficiency requirements for buildings. While officially adopting Tier Code (9.36.7) and making Tier 1 a minimum standard for building energy efficiency, this interpretation clarified that the Prescriptive Path (9.36.2-4) and the Performance Path (9.36.5) are all equal, making Tier 1 "backward" compatible in Alberta. To meet these requirements, there are several compliance paths available, each catering to different building types and construction methods. This document will provide a comprehensive overview of these paths, highlighting their key features and the specific criteria that must be met.

In addition, the overview document includes examples of typical compliance forms, guides, and checklists. These resources are designed to provide a consistent approach to help ensure projects meet the necessary energy efficiency standards, streamline the compliance process, and avoid common pitfalls.

While this document is for building officials, it is also a useful reference for builders, designers, and homeowners. It will serve as a valuable reference to help you understand and achieve compliance with the Energy Codes. By following the guidance provided, you can be confident that your project adheres to the highest standards of energy efficiency, contributing to a more sustainable and energy-conscious built environment.

Description Of the Pathways for Compliance for 9.36

In the NBC(AE) 2023, Section 9.36 outlines energy efficiency requirements specific to Alberta. The NBC(AE) 2023 and NECB 2020 also introduced new tiered energy performance levels, set by the Provincial government. Effective May 1, 2024, applicants in Alberta must meet Tier 1 standards. While each path is considered equivalent, the requirements for and the need for testing and energy modeling do change. Builders should review which pathway is right for their business and projects.

Figure 1 highlights the three main options or pathways to demonstrate compliance with 9.36: Prescriptive; Performance; and Trade-Off. Once additional Tiers are introduced, there will be additional pathways for the Prescriptive and Performance options as referenced below.

Note, that each option is referenced by colour to identify their requirements. The numbers after 9.36 (e.g. 9.36.2) refer to the specific Sub-sections of the NBC(AE) 2023.

Pathways to Compliance

- Prescriptive (9.36.2 to 9.36.4)
- Tiered Prescriptive (9.36.8)
- Prescriptive with Trade-Off (9.36.2 to 9.36.4)
- Performance (9.36.5)
- Tiered Performance (9.36.7)
- EnerGuide (ERS) Standard

Figure 1 Paths to Compliance Courtesy of CACEA

Option 1: Prescriptive Compliance Details

Figure 2 highlights the Prescriptive compliance options.

1. Prescriptive Compliance:

The Prescriptive pathway provides specific requirements for building components and systems; for example, it specifies and lists minimum insulation levels, window performance ratings, or efficiency standards for HVAC systems tailored to Alberta's climate zones and building practices. Compliance requires following these prescribed/prescriptive requirements to ensure the building meets the designated energy performance targets.

2. Tiered Prescriptive Compliance:

The tiered Prescriptive approach involves a 'point-based' system where the minimum requirements serve as the baseline requirements. To achieve higher tiers, the builder must improve the performance of different building components. Each upgraded component earns a specific number of points. The total number of points determines compliance with the tiered codes.

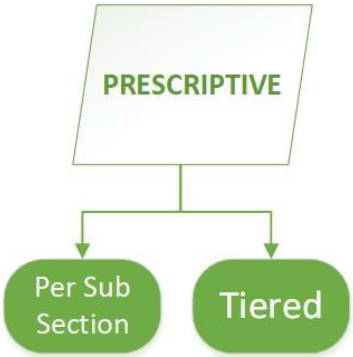

Figure 2 Prescriptive Options Courtesy of CACEA

Option 2: Trade-Off Compliance Details

1. Prescriptive with Trade-Off Compliance:

Like the NBC, the Alberta Edition allows for Trade-Offs between different building components and systems. (Refer to Figure 3 for the Sections, or NBC(AE) 9.36.2.11). Modelling is not required when using Trade-Off. Instead, applicants calculate the component area to thermal value using a method similar to the example provided in Appendix D.

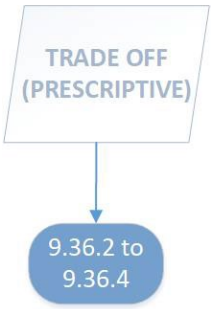

Figure 3 Perspective with Trade-offs
Courtesy of CACEA

The applicant signs a form attesting it has been completed correctly, and the code reviewer/planner is responsible for confirming its accuracy. In this case, designers and builders can deviate from strict adherence to all prescriptive requirements if the overall implementation of the building meets or exceeds the prescribed targets. This flexibility optimizes building design while also achieving energy efficiency goals.

Option 3: Performance Compliance Details

Figure 4 highlights multiple options considered for Performance code compliance.

1. Performance Compliance:

The Performance compliance pathway focuses on demonstrating the building's overall energy performance. This pathway can be used for houses with or without a secondary suite and buildings containing only dwelling units with common spaces less than or equal to 20% of the total floor area (Refer to A-9.36.1.3).

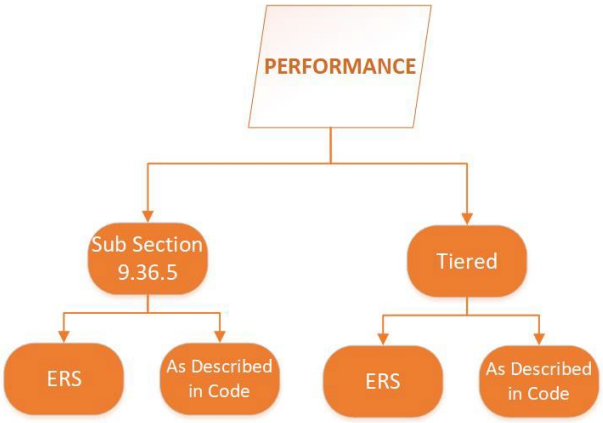

Figure 4 Performance Compliance
Courtesy of CACEA

Energy consultants or Registered Energy Advisors (REA) use energy modeling software to simulate the energy consumption of a building under various operating conditions. The modeled energy performance must meet or exceed the performance targets specified in NBC(AE). This pathway encourages innovation and allows using advanced energy-efficient technologies to achieve compliance.

2. Tiered Performance Compliance:

This compliance path adds to "Performance Compliance". It requires overall energy consumption to be better than the reference house and uses percentage targets for overall energy consumption as well as added metrics of building envelope and cooling load comparisons. All metrics for each Tier, specific to the climate zone, must be met to comply with the different Tiers.

3. EnerGuide Rating System:

The EnerGuide Rating System (ERS) is a standardized home energy performance rating tool developed and overseen by Natural Resources Canada (NRCan) to measure and rate the energy efficiency of homes. It provides homeowners with an EnerGuide label indicating their home's energy performance. The ERS assessment involves a detailed analysis of a home's energy consumption, identifying areas for improvement to enhance energy efficiency and reduce utility costs. The ERS route has mandatory occupancy air leakage testing. The builder receives a third-party label, and the homeowner may qualify for financial rebates.

The following chart provides a comparison of the different compliance pathways.

DIFFERENCES BETWEEN COMPLIANCE PATHS			
Prescriptive Compliance	**Trade-Off Compliance**	**Performance Compliance**	**ERS**
Definition: Compliance by following specific rules and guidelines	**Definition:** Compliance by balancing different factors to achieve an overall result	**Definition:** Compliance by meeting performance criteria rather than following specific prescriptions	**Definition:** Compliance by demonstrating that the proposed systems perform comparably to standard reference systems
Characteristics: • Strict adherence to predefined requirements • Typically, easier to implement and verify • Less flexibility in design choice	**Characteristics:** • Allows for flexibility by trading off one aspect against another in the building envelope components • Requires careful analysis • Often involves optimization	**Characteristics:** • Focuses on achieving specific outcomes or performance levels • Provides the most design flexibility • Requires thorough validation through detailed computerized modelling	**Characteristics:** • Focuses on demonstrating equivalency in energy performance between the proposed and reference home models • Requires thorough testing and validation
Example: Following a building code that specifies exact materials and methods	**Example:** Adjusting insulation levels and window types to meet the code requirements	**Example:** Demonstrating that a building design meets energy efficiency targets through simulations	**Example:** Demonstrating that a building design meets energy efficiency targets through simulations and on-site testing

What Path to Use?

Image produced by AI

Prescriptive and Trade-Off Compliance

This applies to the following types of buildings:

- Buildings of residential occupancy where Part 9 applies.
- Buildings containing business and personal services, mercantile, or low-hazard industrial occupancies where Part 9 applies, and whose combined total floor area does not exceed 300 m^2, excluding parking garages that serve residential occupancies.
- Buildings containing a mix of the residential and non-residential occupancies described in the items noted above.
- Houses with or without a secondary suite.
- Buildings containing only dwelling units and common spaces, where the total floor area of the common spaces does not exceed 20% of the total floor area of the building.
- Buildings containing non-residential occupancies whose combined total floor area exceeds 300 m^2, or medium-hazard industrial occupancies, shall comply with the NECB.

NOTE: Buildings or portions of buildings that are not required to be conditioned spaces are exempt from the requirements of Section 9.36. (refer to A-9.36.1.3(5).

Performance Compliance

This applies to the following types of buildings:

- Buildings of residential occupancy to which Part 9 applies.
- Buildings containing non-residential occupancies, whose combined total floor area exceeds 300 m^2, or medium-hazard industrial occupancies, shall comply with the NECB.

NOTE: Buildings or portions of buildings that are not required to be conditioned spaces are exempt from the requirements of Section 9.36. (refer to A-9.36.1.3(5).

Who is Responsible for Completing the Documentation, Energy Modeling, and Blower Door Testing?

As per the Part 9 section of the referenced code, professional involvement is not mandatory or a code requirement. Therefore, it is at the discretion of the Authority Having Jurisdiction (AHJ) to request professional involvement to completing documentation, energy modelling, and blower door testing. Potential items include tall walls, envelope for unvented roofs and any building larger than 600m^2. The professional is not the one that must do the energy modelling, but rather the project must be overseen by the professional.

Individuals who typically complete the compliance requirements for Prescriptive, Performance, or Trade-Offs are:

- The builder and their internal design team.
- Home designers including architectural technologists, registered architects, and engineers.
- Energy or independent consulting firms, often operated by REAs, engineers, or architects.

NOTE: If the ERS is used for code compliance, an REA must complete it, per the Natural Resources Canada (NRCan) guidelines. It is ideal to consider using CACEA members for these services as they are held to a higher standard than non-members and recognized for the quality of their work. (See below for details.)

What is a Registered Energy Advisor (REA)?

- REAs are efficiency professionals. They provide third-party verification and perform inspections, testing, and energy modelling for code compliance and home labelling programs.
- They are at the hub of the building sector (Refer to Figure 5); trained to use diagnostic (e.g., blower door air leakage test) and modelling tools, and focused on the house-as-a-system and construction practices for low-rise buildings.
- REAs are trained to use HOT2000 software for their daily work. As such, the compliance reports they generate are reliable.

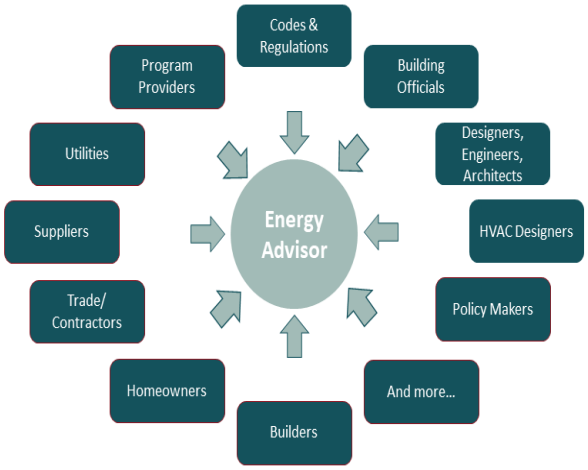

Figure 5 Courtesy of CACEA

- To qualify as an REA and licensed by NRCan, the REA must meet specific criteria:
  - Pass NRCan's Foundation exam – testing building science, and construction practices, materials, and equipment.
  - Pass NRCan's Energy Advisor (House) exam – assessing an understanding of ERS, the HOT2000 modelling software, and EA requirements.
  - For a defined probationary period, demonstrate proficiency in HOT2000 modelling, air tightness testing, and ERS requirements.
  - Registered with at least one NRCan licensed Service Organization (SO).
  - Write a requalification exam every three years.
- Maintain general liability insurance.
- Abide by NRCan's code of ethics and guidelines.

What is a Licensed Service Organization (SO)?

- A service organization (SO) is an independent entity licensed by NRCan to use their official marks and HOT2000 software and deliver NRCan's home labeling initiatives such as the EnerGuide Rating System (ERS) and ENERGY STAR® for New Homes (ESNH).
- The SO is the primary contact between REAs and Natural Resources Canada.
- REAs must be affiliated with at least one SO (Can work with more than one SO) which manages the REA licensing and oversees file management and quality assurance for ERS files and labels.
- SOs may not be involved in code compliance work unless a home label is required.

Who typically completes a blower door test?

- A blower door test must be conducted by independent third party, and it is ideal for the person doing the test to be specifically trained on conducting it following the required Canadian General Standards Board (CGSB) standard.
- REAs are specifically trained and qualified to complete blower door testing and typically own the required equipment.
- If an EnerGuide Rating System label is required, an REA must complete the blower door test.

NOTE: NRCan maintains a current database of all licensed REAs and SOs.

What is CACEA and What Role Does It Play?

- The Canadian Association of Consulting Energy Advisors (CACEA) is a national organization, representing, promoting, and supporting a sustainable and recognized profession of valued and credible REAs across Canada.
- CACEA holds its members to a higher standard and ensures its members provide credible services, are in good standing with an SO; comply with a code of ethics as well as carry Errors and Omissions insurance and maintain ongoing education and skills improvement through an annual continuing education requirement (neither of which are required by NRCan).
- CACEA has a Master Energy Advisor (MEA) designation. This is an elite group. They demonstrate a high level of expertise and are recognized as trusted industry partners and advisors.
- CACEA focuses on elevating the professionalism of its members, leveraging growth opportunities, and fostering collaborative relationships with building and energy stakeholders. Its robust member structure contributes to diverse engagement and national representation.
- CACEA members actively participate in multiple programs and engage with codes and standards groups at federal, provincial/territorial, and municipal levels.
- CACEA provides a centralized point of contact for stakeholders such as municipalities, utility providers, building officials, builders and developers, and homeowners who rely on REA for guidance, knowledge, and professional services.
- Use this QR Code to find a CACEA member.

CACEA

Additional Information

The following appendices contain checklists and forms that can be useful when reviewing information provided by the builders:

Appendix A – Checklist of Required Permitting Documentation

- Use this high-level checklist to ensure the minimum documentation is provided, depending on the route chosen by the builder.

Appendix B – Project Summary Sample Compliance Submission Report

- A builder can use this sample report when submitting their code compliance application. This report has different sections depending on the selected path.

Appendix C – NBC 2020, Subsection 9.36 Submittal Form

- A builder can use this sample submittal form/report when submitting their code compliance application. It provides all the required information for the application, depending on the chosen path.

Appendix D – Trade-Off Calculation Helper

- This form is designed as a guide when the Trade-Off option has been selected. The tables provided will assist with confirming compliance on this path.

Appendix E - References

- This includes the reference materials used to produce this document.

Appendix A – Checklist of Required Permitting Documentation

Checklist of Required Permitting Documentation	
Prescriptive Compliance (9.36.2-9.36.4)	
Climate Zone (Heating Degree Days (HDD))	
Calculations showing RSI for all assemblies	
Window U-Value OR Energy Rating (ER)	
Mechanical Systems	
Domestic Water Heating	
Trade Off Calculations (If used)	
Tiered Prescriptive Compliance (9.36.8) (must also include Prescriptive Compliance (9.36.2-4)	
Energy Conservation Measures (ECM) and How They Were Awarded	
Supporting Documentation and Calculations	
Performance Compliance (9.36.5)	
Climate Zone (Heating Degree Days (HDD))	
Construction Assemblies Effective RSI Values	
Facing Direction	
Proposed Windows	
Proposed Mechanical Systems	
Proposed Domestic Water Heating	
Air Tightness (Air Changes per Hour (ACH)) Modeled	
Fenestration Door Wall Ratio (FDWR)	
Energy Consumption Comparison	
Proposed and Reference house reports (full house report from HOT2000 Ver.11.11+ software)	
***OR* EnerGuide Rating System (ERS)**	
EnerGuide Label & EnerGuide Homeowner Information Sheet	
Letter of Engagement from Registered Energy Advisor	
Tiered Performance Compliance (9.36.7) (must also include Performance Compliance (9.36.5)	
Building Envelope Improvement	
Peak Cooling Load Comparison	
***OR* EnerGuide Rating System (ERS)**	
EnerGuide Label & EnerGuide Homeowner Information Sheet	
Proposed and Reference house reports (full house report from HOT2000 Ver.11.11+ software)	
Letter of Engagement from Registered Energy Advisor	

Appendix B – Project Summary Sample Compliance Submission Report

9.36 Project Summary

Compliance Submission Report

NBC 2023 Alberta Edition B Section 9.36 Compliance		
Project Name:		Building permit number (competed internally)
Project Address:		
Applicant:		
Applicant Address:		

Please indicate compliance with path (select only one)

☐ Prescriptive (complete Part A) ☐ Trade Off (complete Parts A and B) ☐ Performance (complete Parts A and C) ☐ Performance w/ERS v.15 (complete Parts A and C + ERS docs)

Part A: Basic Building Information (required for ALL compliance paths)

Climate Zone (HDD):		Building Area (m²):	
Primary Heating Equipment (type and fuel):		Efficiency of primary heating equipment (%):	
(If included) Secondary heating equipment (type and fuel):		Efficiency of secondary heating equipment (%):	
Heat Recovery Ventilator (HRV) included:		(if included) Efficiency of HRV equipment (%):	
Primary hot water equipment (type and fuel):		Efficiency of primary hot water equipment (%):	
(If included) Secondary hot water equipment (type and fuel):		Efficiency of secondary hot water equipment (%):	
(If included) Space cooling (type and capacity):		(if included) Efficiency of space cooling equipment (%):	
Hot water recirculation pump included:		Primary air barrier system:	

In addition to the above, the accompanying drawings must also include the following information:

❑ Identify location and extent of all wall and floor assemblies containing heating pipes or electric heating cables and membranes.

Notes / location of system (optional):

❑ Indicate effective RSI values for building envelope assemblies above and below grade (e.g. walls, floors, roofs, windows and doors).

Notes / location of system (optional):

❑ Provide the calculations used to determine these values. May be hand calculation or from a software program.

❑ Provide the following architectual details in the project drawing set illustrating insulation and air barrier:

Notes / location of system (optional):

- ❑ Attic hatch
- ❑ Eaves to top of wall transition
- ❑ Upper floor rim joist
- ❑ Top of basement wall/main floor rim joist
- ❑ Slab / footing junction
- ❑ Cantilever floors
- ❑ Bonus room / living space over attched garage (including ducts and insulation coverage of ducts)
- ❑ Typical electrical junction box detail
- ❑ Typical window / door jamb and sill detail
- ❑ If applicable: Party wall meeting outside wall, electric meter/vent pipe/duct in insulated wall, skylight shaft walls, slab edges in walkouts and heated slabs, masonry chimneys and fireplaces.

Part B: Trade-off Compliance Path

In addition to the information required in Part A, a trade-off calculation must be submitted to demonstrate compliance with 9.36.2.11.

The 9.36. Trade-Off Calculator Form is recommended.

The location and extent of assemblies used in the calculation shall be clearly identified on the drawings by a hatch or dimensional note.

Part C: Performance Compliance Path (residential occupancies)			
Information provided below sets input parameters for the energy simulation used to demostrate compliance with NBC 2023 Alberta Edition B Section 9.36 performance compliance path.			
Which direction does the front elevation of the house face as modelled (N, NE, E, SE, S, SW, W, NW):			
Reference Model		**Proposed Model**	
Airtightness (ACH @ 50Pa):	2.5	Airtightness (ACH @ 50Pa):	
Solar Heat Gain Co-efficient Glazing (SHGC):	0.26	Solar Heat Gain Co-efficient Glazing (SHGC):	
Solar absorbance:	0.4	Solar absorbance:	
Thermal mass (MJ/m^{2}C)	0.06	Thermal mass (MJ/m^{2}C)	
Ventilation rate (l/s):		Ventilation rate (l/s):	
FDWR - Reference (%):		FDWR - Proposed (%):	
Window and Door Area Summary - Reference Model		**Window and Door Area Summary - Proposed Model**	
Front elevation (m^2):		Front elevation (m^2):	
Left elevation (m^2):		Left elevation (m^2):	
Right elevation (m^2):		Right elevation (m^2):	
Rear elevation (m^2):		Rear elevation (m^2):	
Total area of windows (m^2)		Total area of windows (m^2)	
Total area of opaque doors (m^2)		Total area of opaque doors (m^2)	
Total area of windows and doors (m^2)		Total area of windows and doors (m^2)	
NOTE: If the ACH rate entered above for the proposed model is less than 2.5ACH, a blower test will be required.			
Performance Data Summary			
Target Energy Use - Reference Model (in gigajoules)		Calculated Energy Use - Proposed Model (in gigajoules)	
Software (only required for performance path)			
Software Title:		Version:	
Software Adaptations Made:			
☒ Attach the full modelling report, generated by an ANSI/ASHRAE 140 compliant software package, to this form.			
Declaration (only required for performance path)			
Please indicate the person responsible for preparing the calculations used to show compliance with NBC 2023 Alberta Edition B Section 9.36			
Name:			
Representing Firm:			
Contact Information:	email:	tel:	
Address:			
I hereby certify that the calculations submitted were prepared in full accordance with Division B 9.36 of ABC 2023 and the operating procdures of the software		Signature	
NOTE: Nothing in this form, or the attached calculations, shall preclude the Safety Codes Officer from reviewing the file and requesting an appropriate professional to stamp and sign the submission.			

Appendix C – NBC 2020, Subsection 9.36 Submittal Form

NBC 2020, Subsection 9.36
Submittal Form

Project Information

The (name of jurisdiction) Requirements for Division B 9.36 Compliance		
Project Name:		Building Permit Number (Completed Internally)
Project Address:		
Applicant Name:		
Applicant Address:		

Project Design Conditions

Climate Zone (based on heating degree days in Celsius Degree-Days, per AHJ or Appendix C Table C2)					
☒ Zone 4 (< 3000)	☐ Zone 5 (3000 to 3999)	☐ Zone 6 (4000 to 4999)	☐ Zone 7A (5000 to 5999)	☐ Zone 7B (6000 to 6999)	☐ Zone 8 (7000 to 7999)
Occupancy type		**Floor area**	**Fenestration and door area to gross wall ratio (FDWR)[1]**		
		_____ m^2	Fenestration & door area/ _____ m^2/	Gross wall area = _____ m^2 =	FDWR% _____ %

Compliance Option

Indicate Compliance Path	Energy Performance Tier	Building Envelope Trade-Off?	Forms to Complete		
			D1	D2	9.36 Submittal Calculator
☐ Prescriptive (Subsections 9.36.2-9.36.4, 9.36.8)	☐ 1	☐ No		√	
		☐ Yes		√	√ (BE Trade-off tab)
	☐ 2-5	-		√	√ (Prescriptive Tier tab)
☐ Performance (Subsection 9.36.5, 9.36.7)	☐ 1	-	√		
	☐ 2-5	-	√		√ (Performance Tier tab)

Additional Information to Be Submitted for Review

☐ Insulation and air barrier details in project drawing set, including:
- Attic hatch
- Eaves to top of wall transition
- Upper floor rim joist
- Slab/footing junction
- Cantilever floors
- Bonus room/living space over attached garage (including ducts and insulation coverage of ducts)
- Typical electrical junction box detail
- Typical window/door jamb and sill detail
- (if applicable) Party wall meeting outside wall, electric meter/vent pipe/duct in insulated wall, skylight shaft walls, slab edges in walkouts and heated slabs, masonry fireplaces

☐ Window & door schedule
☐ RSI assembly calculations
☐ Heat loss and heat gain calculations (CSA F280)
☐ Mechanical layout (i.e. duct design)
☐ Ventilation design (Subsection 9.32.3, or CSA F326)

[1] Per Article 9.36.2.3

Performance Compliance – Subsection 9.36.5

Input Parameters			Reference Model	Proposed Model
Opaque Assemblies			**Effective Thermal Resistance (RSI)**	
Above-ground	Ceilings below attics			
	Cathedral ceilings and flat roofs			
	Walls			
	Floors over unheated spaces			
Below-Grade or in Contact with Ground	Foundation walls			
	Unheated floors	below frost line		
		above frost line		
	Heated and unheated floors on permafrost			
	Heated floors			
	Slabs-on-grade with an integral footing			
Fenestration, Doors, Skylights			**U-factor, Energy Rating, RSI_{eff}**	
Front orientation of house (N, NE, E, SE, S, SW, W, NW):				
Windows	U-factor or ER			
	Solar Heat Gain Coefficient		0.26	
Skylights	U-factor or ER			
	Solar Heat Gain Coefficient		0.26	
Doors				
Fenestration & door area to gross wall ratio, FDWR (%)[2]				
Airtightness			**Air Changes per Hour (ACH @ 50 Pa)**	
☐ Construction complies with Section 9.25			2.5	3.2
☐ *Air barrier system* constructed to Subsection 9.25.3 and Articles 9.36.2.9. and 9.36.2.10.			2.5	2.5
☐ Airtightness tested (per Sentence 9.36.6.3.(1))			☐ 2.5 (detached house) ☐ 3.0 (attached house)	Max. test result target:

[2] For houses with 1 or 2 dwelling units, the Reference model's %FDWR shall be same as Proposed (if Proposed FDWR is 17-22%), or 17% (if Proposed FDWR is < 17%, or 22% (if Proposed FDWR is >22%).

HVAC, Service Hot Water			Fuel & Equipment Type, Efficiencies	
Heating System(s)				
Cooling System[3]	Capacity (kW)			
	SEER			
	☐ Air Source Heat Pump?	HSPF V		
		Cutoff Temperature		
Supplementary Heating System(s)[3]				
Ventilation System	Principal Ventilation Rate (L/s)[4]			
	Runtime (hrs/day)		8	
	Fan Power (W)	@ 0°C	2.32 W/L/s = ____ W	
		@ -25°C		
	Heat Recovery, % SRE	@ 0°C	none	
		@ -25°C		
Service Water Heating System(s)				
Drain Water Heat Recovery	Recovery efficiency, flow configuration		none	% ____ RE ☐equal flow ☐unequal flow
	# of showers connected (of total)			____ of ____

Performance Software Calculations			
Software Title:		Version:	
Is software HOT2000 V11.11+ or ANSI/ASHRAE 140 compliant?		☐ Yes ☐ No	
Annual Energy Consumption (GJ/yr):		Reference House: ____ >	Proposed House: ____
☐ Full house energy report (or equivalent) generated by approved software is attached ☐ Air tightness test report is attached (if applicable) ☐ (if pursuing Energy Tier ≥ 2) 9.36 Submittal Calculator attached, demonstrating Energy Tier of ____			

Performance Energy Modeling Professional			
Name:		Company:	
Phone:		Email:	
Accreditation or Evaluator/ Advisor/Rater License #:			

[3] If provided in the Proposed house

[4] In accordance with Article 9.32.3.3. based on the number of bedrooms in the proposed house

I hereby certify that the calculations submitted were prepared in full accordance with the operation and procedures of the software and: ☐ *Subsection 9.36.5 of NBC 2020* *OR* ☐ EnerGuide Rating System v15											
Date:			**Signature**:								
Designer(s) [name(s) & accreditation/licensing of person(s) providing information herein to substantiate that design meets building code]											
Name:			Accreditation or licensing #:								
Phone:			Email:								
Declaration of designer to have reviewed and take responsibility for the design work.											
Date:			**Signature**:								

Prescriptive Compliance

Effective Thermal Resistance of Opaque Assemblies (RSI)

Assembly			Climate Zone						Proposed (min. effective RSI)
			4	5	6	7A	7B	8	
Above-ground	Ceilings below attics	☐ w/out HRV	6.91	8.67		10.43			
		☐ w/ HRV	6.91		8.67		10.43		
	Cathedral ceilings, flat roofs		4.67			5.02			
	Walls	☐ w/out HRV	2.78	3.08			3.85		
		☐ w/ HRV	2.78	2.97			3.08		
	Floors over unheated spaces		4.67			5.02			
Below-Grade or in Contact with Ground	Foundation walls	☐ w/out HRV	1.99	2.98		3.46		3.97	
		☐ w/ HRV	1.99	2.98					
	Unheated floors	below frost line	Uninsulated						
		above frost line	1.96						
	Floors on permafrost		n/a				4.44		
	Heated floors		2.32			2.84			
	Slabs-on-grade w/ integr. footing	☐ w/out HRV	1.96			3.72		4.59	
		☐ w/ HRV	1.96			2.84		3.72	

Thermal Characteristics of Fenestration, Doors and Skylights (U-value, ER)

Assembly		Climate Zone						Proposed (max. U or min. ER)
		4	5	6	7A	7B	8	
	Max. U-value	1.84		1.61		1.44		

Fenestration & doors	Min. Energy Rating	21	25	29	
Skylights (Max. U-value)		2.92	2.75	2.41	
One door exception (Max. U-value)		2.6			
Access hatches (Min. RSI_{eff})		2.6			

HVAC Equipment Efficiency Requirements

Equipment		Capacity kW	Standard	Min. Efficiency		Proposed (fuel & equipment type, efficiency)
Furnace	Gas-fired	≤ 66	CSA P.2	AFUE ≥ 95%[5]		
	Oil-fired			AFUE ≥ 85%		
	Electric		-	See footnote [5]		
Boiler	Gas-fired	< 88	CSA P.2	AFUE ≥ 90%		
	Oil-fired			AFUE ≥ 86%		
	Electric		-	See footnote[6]		
Air source heat pump – split		< 19	CSA C656	HSPF V ≥ 7.1		
Combined space- and water-heating systems		≤ 87.9 (boiler), or ≤ 73.2 (service water heater)	CSA-P.9	TPF ≥ 0.80		
Heat Recovery Ventilation		-	CSA-C439	@0°C	60 %SRE	
				@-25°C	55 %SRE[7]	
(Other)						

Service Water Heater Efficiency Requirements

Equipment		Capacity	Standard	Min. Efficiency	Proposed (fuel & equipment type, efficiency)
Tank Storage	Electric (≤ 12 kW)	50-270L	CSA-C191	SL ≤ 35+0.20V (top in.)	
				SL ≤ 40+0.20V (bottom in.)	
		270-454L		SL ≤ 0.472V-38.5 (top in.)	
				SL ≤ 0.472V-33.5 (bottom in.)	
	Gas-fired (≤ 22 kW)	1st hr <68 L	CSA-P.3	UEF ≥ 0.3456 – 0.00053V	
		1st hr 68-192 L		UEF ≥ 0.5982 – 0.00050V	

[5] Must be equipped with a high-efficiency constant torque or constant airflow fan motor
[6] Must be equipped with automatic water temperature control
[7] Only required for locations with a 2.5% January design temperature of less than -10°C

		1st hr 193-283 L		UEF ≥ 0.6483 – 0.00045V	
Tankless, gas-fired (≤ 58.6 kW)		< 6.4 L/min	CSA-P.3	UEF ≥ 0.86	
		≥ 6.4 L/min		UEF ≥ 0.87	
Heat pump water heaters		≤24 A and ≤250 V	CSA-C745	EF ≥ 2.1	
(Other)					

Tiered Energy Compliance – Prescriptive Path
(if pursuing Energy Tier ≥ 2) Energy Tier Achieved: _____ (from 9.36 Submittal Calculator – 9.36.8 tab)

Designer(s) [name(s) & accreditation/licensing of person(s) providing information herein to substantiate that design meets building code]			
Name:		Accreditation or licensing #:	
Phone:		Email:	
Declaration of designer to have reviewed and take responsibility for the design work.			
Date:		**Signature**:	

Appendix D – Trade-Off Calculation Helper

SAMPLE TRADE-OFF SHEET

SECTION 9.36. TRADE-OFF CALCULATION HELPER for construction in accordance with ABC 2023:B:9.36.2.11. TRADE-OFF COMPLIES WHEN SUM OF PROPOSED ' A / Rp ' VALUES IS NO GREATER THAN SUM OF REFERENCE ' A / Rr ' VALUES.

For ABOVE-GROUND OPAQUE ASSEMBLIES TRADE-OFF:

- *Locate the effective thermal resistance "ETR" (RSI) for the assembly in Table 9.36.2.6.A. (No HRV in building) or 9.36.2.6.B (with HRV).*
- *"ETR" reduction must result in any wall or joist-type roof assembly no less than 55% of RSI per 9.36.2.6.A. or B., if applicable.*
- *"ETR" reduction must result in floor over unheated space, or non-joist-type roof no less than 60% of RSI per 9.36.2.6.A. or B., if applicable.*
- *Assemblies with embedded heating cables, pipes or membranes may not be traded under 9.36.2.11.*

			REFERENCE ASSEMBLY		**PROPOSED ASSEMBLY**	
	Assembly type and location	Roof/wall/floor Area	ETR RSI Reference		ETR RSI Proposed	
		A (sq. m.)	Rr	A/Rr	Rp	A/Rp
1	*eg: floor over conditioned space*	30	4.86	6.17	4.60	6.52
2	*eg: attic*	60	10.43	5.75	11.05	5.43
3						
4						
	DOES TRADE OFF COMPLY?	No	SUM:	11.9255	SUM:	11.9516

For WINDOWS TRADE-OFF:

- *Locate the reference window overall thermal transmittance ("U"-value) in Table 9.36.2.7.A.*
- *Indicate orientation of proposed windows trade-off; MUST all be same direction.*
- *Effective RSI of reference window will be automatically calculated below.*

				REFERENCE ASSEMBLY			**PROPOSED ASSEMBLY**		
	Window name	Orientation	Area		ETR RSI Reference	Reference		ETR RSI Proposed	Proposed
			A (sq. m.)	U	Rr	A/Rr	U	Rp	A/Rp
1			2.00	1.60	0.63	3.20	1.45	0.69	2.90
2			2.44	1.60	0.63	3.90	1.71	0.58	4.17
3									
4									
	DOES TRADE OFF COMPLY?		Yes		SUM:	7.1040		SUM:	7.0724

Appendix E - References and Contributions

References and Contribution

Canadian Association of Consulting Energy Advisors (CACEA) https://cacea.ca/	CACEA
National Research Council of Canada (NRC) https://nrc.canada.ca/en	Canada NRC·CNRC
Alliance of Canadian Building Officials' Associations (ACBOA) https://acboa.ca/	ACBOA
Alberta Municipal Affairs https://www.alberta.ca/municipal-affairs	Alberta
Ecosynergy Inc. https://www.ecosynergy.ca/	ecosynergy
Advanced Energy Advisors https://advancedea.com/	ADVANCED ENERGY ADVISORS
4 Elements Integrated Design Ltd. https://www.4elements.eco/	4 Elements
Acacia Engineering Ltd. https://acaciaengineering.ca/	ACACIA ENGINEERING

CACEA would also like to recognize the following individuals for their time and effort in bringing together this overview document:

- Amelie Caron MEA, Ecosynergy Inc.
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