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9.36. Project Summary

Compliance Submission Report

Requirements for ABC 2104 Division B 9.36. Compliance

Project Name:		Building Permit Number (Completed Internally)
Project Address:		
Applicant:		
Applicant Address:		

Please Indicate Compliance Path (Select one only)

PRESCRIPTIVE ☐	TRADE-OFF ☐	PERFORMANCE COMPLIANCE ☐
(Complete Part A below)	**(Complete Parts A & B below)**	**(Complete Parts A & C below or Appendix A)**

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

Climate Zone :	4/5/6/7A/7B/8	Building Area (m²):	
Heating equipment type and fuel:		Efficiency of heating equipment (%)	
Heat-Recovery Ventilator included:	☐ **Yes** ☐ **No**	(if included) Efficiency of HRV equipment (%)	
Domestic hot water eqpt. type and fuel:		Efficiency of domestic hot water equipment:	
Hot water recirculation pump included:	☐ **Yes** ☐ **No**	Primary air barrier system:	☐ **poly** ☐ **other**

In addition to the above, the accompanying drawings shall include:

☐ Identify location and extent of all wall and floor assemblies containing heating pipes, or electrical heating cables/membranes.

☐ Indicate effective RSI values for all building envelope opaque assemblies above and below ground, e.g. walls, floors, roofs, windows and doors.

☐ Provide the calculations used to determine these values; these may be hand calculations or from a software program.

Provide the following architectural details in the project drawings indicating continuity of insulation and air barrier:

☐ Attic hatch

☐ Eaves/top of wall transition

☐ Upper floor rim joist

☐ Top of basement wall/main floor rim joist

☐ Slab/footing junction

☐ Cantilevered floors

☐ Bonus room over attached garage (including ducts and insulation coverage of ducts)

☐ Typical electrical junction box detail

☐ Typical window/door jamb and sill detail

And if applicable,

☐ Party wall meeting outside wall, Electric meter/vent pipe/duct in insulated wall, Skylight shaft walls, Slab edges in walkouts & 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 via hatch or dimensional note.

Part C - Performance Compliance Path (residential occupancies)

Information provided below sets input parameters used in the energy simulation used to demonstrate compliance with the ABC 2014 Division B 9.36.5. Performance Compliance path.

Which direction does the front of the house face as modelled (N, NE, E, SE, S, SW, W, NW):	

Note 1: For purposes of modeling, information for secondary heating and service hot water efficiencies only apply in the event that the proposed building has included these systems

Note 2: Location, quantity, and orientation of fenestration must match the proposed drawing information of submitted drawings

Reference Model		**Proposed Model**	
Airtightness (ACH@50Pa):	**2.5**	Airtightness (ACH@50Pa) **3.2** / **2.5** / **other:**	
Solar Heat Gain Coefficient - Glazing (SHGC):	**0.26**	Solar Heat Gain Coefficient - Glazing (SHGC):	
Solar Absorbance:	**0.4**	Solar Absorbance:	
Thermal mass (MJ/m²°C):	**0.06**	Thermal mass (MJ/m²°C):	
Ventilation Rate (l/s):		Ventilation Rate (l/s):	
Secondary HVAC System Efficiency:		Secondary HVAC System Efficiency:	
Secondary Service Water Heater Efficiency:		Secondary Service Water Heater Efficiency:	
Space Cooling Equipment Efficiency:		Space Cooling Equipment Efficiency:	
FDWR - Reference(%) **17** / **22** / **other:**		FDWR - Proposed (%):	
Window and Door Area Summary - Reference		**Window and Door Area Summary - Proposed**	
North Elevation (m²):		North Elevation (m²):	
South Elevation (m²):		South Elevation (m²):	
East Elevation (m²):		East Elevation (m²):	
West Elevation (m²):		West Elevation (m²):	
Total Area of windows and doors - Reference:		Total Area of windows and doors - Proposed:	

Note: If the ACH rate entered above for the Proposed House above is less than **2.5 ACH** a blower door test will be required

Performance Data Summary

Target Energy Use (reference)	Calculated Energy Use (proposed)

Software

Software Title:	Version:
Software Adaptations Made:	

Declaration - only applicable to Performance Compliance path

Please indicate the person responsible for preparing the calculations used to show compliance with ABC 2014 9.36.5.

Name:				
Representing Firm:				
Contact Information:	email:		tel:	
Address:				

Please attach the full modelling report generated by an ANSI/ASHRAE 140 compliant software package to this form: ☐

I hereby certify that the calculations submitted were prepared in full accordance with Subsection 9.36.5. of ABC 2014 and the operating procedures of the software	Signature

Nothing in this form or the attached calculations shall preclude the Safety Codes Officer reviewing this file form requesting an appropriate professional to stamp and sign the submission.

APPENDIX A- Performance Path Project Summary 9.36.5. (Alternative)

ABC 2014 Subsection 9.36.5. PERFORMANCE Compliance Summary				
Project Address:			Climatic Zone :	4 / 5 / 6 / 7A / 7B / 8
Builder:			Job Number:	
Total building area all floors including basement (m²)=			Orientation:	
		REFERENCE	**PROPOSED**	
Thermal mass (MJ/m²·°C)		0.06		
Solar Absorptance		0.4		
Airtightness		2.5 ACH@50Pa		
Submit Blower Door Test Report?		N/A		
		REFERENCE ETR	**PROPOSED ETR**	**PROPOSED ASSEMBLY incl. insulation R-value**
ROOF	Ceiling below attic			
	Vault/flat roof			
ABOVE-GROUND WALLS	Exterior walls			
	Tall walls			
	House to garage			
	Other:			
	Other:			
	Other:			
RIM JOISTS All levels	Parallel (pony wall)			
	Perpendicular			
ABOVE-GROUND FLOOR	Cantilever/over exterior			
	Over garage			
BELOW-GRADE WALLS	Basement frostwall			
	Basement walkout wall			
SLAB on GRADE	Under, at edge & skirt			
BASEMENT FLOOR	Walkout-unheated floor			
FLOOR	Heated, in ground-contact			
FDWR: see 9.36.5.14.(10)				
WINDOWS/DOORS (U-value: W/ (m² * K))		**U-value**	**U-value**	
	Picture			
	Casement			
	Slider			
	Patio slider			
	Doors			
	Awning/hopper			
	Other			
Solar Heat Gain Coefficient		0.26		
Heat-Recovery Ventilator proposed?		None		
HRV Efficiency		N/A		
Space-Heating Equipment Efficiency				
Space-Heating Equipment Efficiency				
Ventilation Rate				
Space Cooling Equipment Efficiency				
Service Water Heater Efficiency				
Service Water Heater Efficiency				
Service Water recirculation pump included?				
House energy target vs annual energy consumption (GJ):				
Software Name/Version/Adaptations or workarounds:				
DECLARATION by person responsible for preparing the calculations used to demonstrate compliance with ABC 2014 Division B Section 9.36. Submit complete (proposed and reference) modelling report generated by ANSI/ASHRAE 140-compliant software to this Summary				
Energy Advisor Firm:				
Address:				
Contact Email and Tel:				
Type Name to Sign:			*Date:*	

SAMPLE TRADE-OFF SHEET

SECTION 9.36. TRADE-OFF CALCULATION HELPER for construction in accordance with ABC 2014: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 A (sq.m.)	ETR RSI Reference Rr	A / Rr	ETR RSI Proposed Rp	Proposed A / Rp
1	*eg:floor over unconditioned 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 'A' (sq. m.)	U	ETR RSI Reference Rr	Reference A / Rr	U	ETR RSI Proposed Rp	Proposed 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

Project Address: Prepared by (Print Name): Sign: Date:

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ABC 2014 Division B Section 9.36.
User Guide and Compliance Checklist

User Guide and Compliance Checklists are not required to be submitted to the local Authority.

ABC 2014 Section 9.36.

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Introduction

Scope:
Calculating the energy requirements of a building normally includes aspects such as heat loss through the building envelope, duct work, and storage tanks, as well as the energy used by service equipment, and the building's ventilation equipment. In the context of this Section, however, the calculation does not take into account the energy generated on site through renewable energy sources (i.e. solar, wind power, geothermal, etc.) and does not include requirements for energy-efficient selection of lighting sources or electrically-powered equipment.

Compliance:
ABC 2014 Section 9.36. describes the compliance options (prescriptive, performance and compliance with the NECB) available depending on the size of the building, and proposed occupancy.

Energy Efficiency Compliance Options for Part 9 Buildings

Building Types and Sizes	Energy Efficiency Compliance Options		
	ABC 9.36.2. to 9.36.4. (Prescriptive)	ABC 9.36.5. (Performance)	NECB
• houses with or without a secondary suite • buildings containing only dwelling units with common spaces ≤ 20% of building's total floor area	✓	✓	✓
• Group C occupancies • buildings containing Group D, E or F3 occupancies whose combined total floor area ≤ 300 m^2 (excluding parking garages that serve residential occupancies) • buildings with a mix of Group C and Group D, E or F3 occupancies where the non-residential portion's combined total floor area ≤ 300 m^2 (excluding parking garages that serve residential occupancies)	✓	✗	✓
• buildings containing Group D, E or F3 occupancies whose combined total floor area > 300m^2 • buildings containing F2 occupancies of any size	✗	✗	✓

Key Consideration:

• Follow the local authority's requirements for permit submissions and field inspections.
• Choose the compliance path: prescriptive (with or without trade-off) or performance.
• It is imperative that decisions about building assemblies, fenestration and doors, and mechanical equipment be made based on the choice of path, and that these decisions are communicated between the building designer, the permit applicant and the trades.
• Lack of coordination and reference to the drawings is the primary cause of energy-efficiency-related infractions at time of inspection.
• For performance path, it is additionally imperative that the energy advisor creating the energy model be advised of decisions being communicated. Lack of coordination and reference to the drawings is the primary cause of energy-efficiency-related delays at time of plans examination for permit issue.
• Drawings must include details for airtightness, continuity of insulation, effective thermal resistance of envelope assemblies (RSI), thermal transmittance of fenestration and Doors, necessary calculations, and so on.

Airtightness

9.36.2.9. Airtightness

Air leakage has a significant impact on the energy performance of housing and small buildings, and is a major source of heat loss. This Article provides the requirements that are intended to limit the unwanted air leakage from heated houses or buildings. These requirements apply in addition to the minimum requirements already addressed in ABC Section 9.25**.**

9.36.2.10. Construction of Air Barrier Details

This Article requires airtight construction of typical junctions, joints and penetrations that are known to cause air leakage.

These requirements are similar in nature to those in ABC Subsection 9.25.3., but are provided in this Article in more detail.

The difference between the requirements in ABC Subsection 9.25.3. and ABC Section 9.36. is that the minimum requirements in Subsection 9.25.3. are intended to ensure that buildings are healthy and safe, and that they are free from mold and protected from premature deterioration, which may result from a lack of airtightness.

The requirements that pertain to energy efficiency in ABC Articles 9.36.2.9. and 9.36.2.10. are intended to achieve a higher level of performance. More attention to detail is necessary to close all the joints, junctions and penetrations that can occur in a building.

There are a number of approaches to seal a building from air leakage. The requirements are worded to allow most, if not all approaches to be used. Sometimes a mix of approaches is necessary to succeed.

Compliance through Testing

Rather than following the prescriptive requirements in ABC Article 9.36.2.10., compliance can also be demonstrated by installing an air barrier assembly that qualifies under CAN/ULC-S742-ll, "Air Barrier Assemblies - Specification." Such an air barrier assembly would need to be connected with adjacent assemblies according to the manufacturer's instructions.

The test report for the air barrier assembly should be accompanied by specific instructions as to the construction of the joints and junctions between adjacent assemblies which make up the continuous air barrier system.

Another testing option exists through ASTM E 2357-11, "Determining Air Leakage of Air Barrier Assemblies." While this testing option also deals with assemblies, the primary air barrier material is not required to comply with CAN/ULC-S741-08, "Air Barrier Materials - Specification." This option was primarily intended for traditional constructions methods that are known to perform and be durable, such as a concrete block wall construction finished with two coats of paint.

Using this testing option with other constructions and assemblies should be reserved for cases where the resistance to deterioration of the air barrier material can be verified in some other way.

9.36.5.10. Modeling Building Envelope of Proposed House

An assumed airtightness value for the building may be used in the calculation procedure. A measured value, obtained through a fan depressurization (blower door) test, can also be used.

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Prescriptive Path Applicant Guide.

AIRTIGHTNESS CHECKLIST				
The following are some important air sealing measures to be implemented in all projects, where applicable, as these form the basis of the prescriptive path (with or without trade-offs) requirements.				
'Exterior wall/ceiling' means insulated assembly separating conditioned space from unconditioned space in any direction, including from attached garage or other unheated spaces.				
Check each of the following for your project		Yes	No	N/A
If the air barrier system includes rigid-panel-type material, are all panel joints (edges and ends) sealed?				
If the air barrier system includes flexible sheet material (e.g. combined air/vapour barrier poly, OR Tyvek/Typar-type material), are all joints:				
AND	Structurally supported (e.g. falling on a stud, plate, blocking or sheathing)?			
	Lapped at least 2 inches (50 mm)?			
	Sealed (e.g. non-hardening sealant or compatible tape)?			
Are all joints/junctions between foundation wall and sill plate constructed airtight?				
For a project with ICF where the concrete acts as the air barrier, is the air barrier continuous where the concrete meets other air barrier materials (e.g. at window bucks, wall/ceiling interfaces, etc.)?				
Are all joints/junctions between embedded ladder-board/sill plate and rim joist constructed airtight?				
Are all joints/junctions between rim joist and the subfloor constructed airtight?				
Are all joints/junctions between interior partitions, including party walls, and plane of airtightness at exterior walls/ceilings constructed airtight?				
For cantilevered floors, floors over exterior and floors over unheated space:				
OR	Are all joints/junctions between structural components constructed airtight?			
	Does air barrier material cover structural components, with seal to adjacent air barrier material (e.g. non-hardening sealant or compatible tape)?			
For knee walls, often present with half-storeys:				
AND	Are joints between knee wall and adjacent assemblies sealed (i.e. knee wall to floor--over and under subfloor--and knee wall to sloped ceiling)?			
	Is knee wall air barrier continuous?			
Are you installing AAMA/WDMA/CSA 101/I.S.2/A440 NAFS-rated windows and doors (meeting air leakage limitations)?				
Are all connections/junctions between windows, doors and skylights and exterior walls/ceilings sealed using appropriate material (e.g. low-expansion foam sealant, backer rod, non-hardening sealant, compatible tape)?				
Are all electrical switch and outlet boxes in exterior walls/ceilings constructed airtight?				
Are all recessed light fixtures, bath fans, etc. in exterior walls/ceilings constructed airtight?				
Are all pipes, ducts and vents that penetrate the building envelope/air barrier sealed appropriately?				
Do all fireplaces have doors, or enclosures to prevent air movement through the chimney when not in use?				
For the entire project:				
AND	Is the air barrier continuous from basement floor to uppermost ceilings?			
	Are all air barrier materials free of holes and cracks?			

VENTILATION SYSTEM CHECKLIST

This section of the checklist is designed to help you verify your project's ventilation system performance against the performance required by the Code:

1. Determine the type of ventilation system you have (HRV, ERV, or ventilation system without heat recovery).
2. If your project includes a ventilation system that has heat recovery (either an HRV or ERV) verify the system's performance specifications against the Code requirements.

System Details

System Type	HRV		ERV		Ventilation Without Heat Recovery	
Manufacturer:						
Model:						

Heat/Energy Recovery System Performance Characteristics		Specification	Code Requirements	Code Compliant?
AND at	Sensible Heat-Recovery Efficiency 0°C?		60%	
	Sensible Heat-Recovery Efficiency at (-25°C)?		55%	

HEATING/COOLING SYSTEMS CHECKLIST

This section of the checklist is designed to help you verify your project's heating/cooling systems' performance against the performance required by the Code. The form has room for up to three systems.

Use the following approach:

1. Determine the number and type of systems (boiler, furnace, heat pump, etc.) you have in your project.
2. Write the system details on the form (type, manufacturer, model and size).
3. Determine the Code's performance requirements for each system (using the Guide) and write the requirements on the form.
4. Write your systems' performance specifications on the form and verify against the Code requirements.

1	System # 1 Details				
	System Type				
	Manufacturer:				
	Model:				
	Size:				
	System # 1 Performance Specifications				
	Rating (HSPF, SEER, COP, AFUE, etc.)		Specification	Code Requirement	Code Compliant?
2	System # 2 Details				
	System Type				
	Manufacturer:				
	Model:				
	Size:				
	System # 2 Performance Specifications				
	Rating (HSPF, SEER, COP, AFUE, etc.)		Specification	Code Requirement	Code Compliant?
3	System # 3 Details				
	System Type				
	Manufacturer:				
	Model:				
	Size:				
	System # 3 Performance Specifications				
	Rating (HSPF, SEER, COP, AFUE, etc.)		Specification	Code Requirement	Code Compliant?

HOT WATER SYSTEMS CHECKLIST

This section of the checklist is designed to help you verify your project's hot water systems' performance against the performance required by the Code.
The form has room for up to three systems.
Use the following approach:
1. Determine the number and type of systems (electric tank, electric boiler, heat pump, etc.) you have in your project.
2. Write the system details on the form (type, manufacturer, model and size).
3. Determine the Code's performance requirements for each system (using the Guide) and write the requirements on the form.
4. Write your systems' performance specifications on the form and verify against the Code requirements.

1	System # 1 Details				
	System Type				
	Manufacturer:				
	Model:				
	Size:				
	System # 1 Performance Specifications				
	Rating Type (EF, Standby Loss, etc.)		Specification	Code Requirement	Code Compliant?
2	System # 2 Details				
	System Type				
	Manufacturer:				
	Model:				
	Size:				
	System # 2 Performance Specifications				
	Rating Type (EF, Standby Loss, etc.)		Specification	Code Requirement	Code Compliant?
3	System # 3 Details				
	System Type				
	Manufacturer:				
	Model:				
	Size:				
	System # 3 Performance Specifications				
	Rating Type (EF, Standby Loss, etc.)		Specification	Code Requirement	Code Compliant?

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Performance Modeling Applicant Guide.

Sample-Applicant Use

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General details used for calculating 9.36. Performance Energy Model report		
Defaults		**Values**
Note: Energy Model Heat Loss calculations not to be used for HVAC Heating or cooling Calculations		
	Basement Temperature	19
	Floor Above Basement Temperature	21
	Cooling set point	25
	Service Water	225 W/L/S
	Ventilation Fan/HRV Wattage	As specified for proposed-HRV, Principal Ventilation Flow Rate x 2.32 For Reference
	Furnace fan Wattage	Proposed/Reference Output Capacities x 0.0251L/s/W x 2.30 W/L/s /2speed/208W (AUX)
	Ventilation amount	9.32.(per bedroom, more than 5 bedroom use F-326
	Ventilation Time	8hours- 480 mins/day
	Furnace allowable rise	5.5°C
	Multiple Furnace/DHW Fan Power	Combined as per 9.36.5.11.(13)
	HRV	Not used in Reference, Used in Proposed but only for sensible heat efficiency
	Appliances	
	DHW EF	≥ 67% - .0005/VEF for Natural Gas (or Tankless use .67)
	Furnace AFUE	92% AFUE for NG Reference
	Boiler	90% AFUE for NG
	A/C	14.5 SEER
	Airtightness	A2/A3 Reference
	Windows-Reference-SHGC	0.26
	Windows-Proposed-SHGC	As per manufacturer
	Exposed Floor	(RSI – 0.16) as per 9.36.2.4.(-Bonus rooms and common walls
	Floor header	R value for walls
	HOT2000 FDWR	Doesn't include doors in calculations. Percentage doesn't reflect actual.
	Climatic Data:	Climatic Data Natural Resources Canada CWEC (Canadian Weather Year for Energy Calculations) and CWEEDS (Canadian Weather Energy and Engineering Data Sets
	Orientation:	Orientation: 9.36.5.10 (8) states that orientation of the *foundation* of the proposed house as constructed shall be within 22.5° of the orientation used in the energy model calculations – we use all 8-actual direction facing for each wall face in the Hot 2000
	Reference House Electric Service Water ≤ 12 kW Note: 1KW = 3412 BTU/h	Standby Losses SL ≤ 35 + 0.20V (top inlet) SL ≤ 40 + 0.20V (bottom inlet) SL ≤ (0.472V) – 38.5 (top inlet) SL ≤ (0.472V) – 33.5 (bottom inlet)
	Slabs	≥ 24" below frost line count as uninsulated
	Slab to wall thermal bridge value:	50% of under slab value 9.36.2.8.(4)
	Walkout Foundations:	Calculated as 3 foundations incorporating (1) slab on grade, (2) foundation with slab above frost line with pony wall and (3) foundation with slab below frost line without pony wall.
	Rough In radiant heat tube	will be calculated as heated floor
	Radiant in floor Area	9.36.2.8.(5)(6)(7)
	Vent pipes	R-Value calculated 9.36.2.5.(6)

Template For Applicant Use

Alberta Municipal Affairs

General details used for calculating 9.36. Performance Energy Model report		
	Defaults	**Values**
Note: Energy Model Heat Loss Calculations not to be used for HVAC Heating or Cooling Calculations		
	Basement Temperature	
	Floor Above Basement Temperature	
	Cooling set point	
	Service Water	
	Ventilation Fan/HRV wattage	
	Furnace fan Wattage	
	Ventilation amount	
	Ventilation Time	
	Furnace allowable rise	
	Multiple Furnace/DHW	
	HRV	
	Appliances	
	DHW EF	
	Furnace AFUE	
	Boiler	
	A/C	
	Airtightness	
	Windows-Reference-SHGC	
	Windows-Proposed-SHGC	
	Exposed Floor	
	Floor header	
	HOT2000 FDWR	
	Climatic Data:	
	Orientation:	
	Reference House Electric Service Water ≤ 12 kW Note: 1KW = 3412 BTU/h	
	Slabs	
	Slab to wall thermal bridge value:	
	Walkout Foundations:	
	Rough In radiant heat tube	
	Radiant in floor Area	
	Vent pipes	