

Bulletin: BCBC Energy Efficiency Requirements

For Part 9 Residential Buildings



Bulletin # 18-03
Updated: July 17, 2018
 Created: Apr 23, 2018

This bulletin is for informational purposes only. Please be sure to consult the relevant City of Kelowna bylaw.

If any contradiction between this guide and the relevant Municipal Bylaws and/or applicable codes is found, such bylaw and/or codes shall be the legal authority.

Purpose

To inform staff, building contractors and the general public of the Energy Efficiency requirements found in the British Columbia Building Code (BCBC) pertaining to Part 9 buildings.

Background

There are four (4) compliance options – 2 prescriptive pathways and 2 performance pathways - that can be used to attain the necessary compliance of 9.36 Energy Efficiency (see Figure 1). Applicants can follow:

Prescriptive Pathway:

1. Section 9.36;
2. Section 9.36 with simple tradeoffs as outlined in Article 9.36.2.11; or

Performance Pathway:

3. Section 9.36.5
4. Section 9.36.6 (Energy Step Code)*

* Beginning April 1, 2019, all Part 9 buildings in the City of Kelowna will have to follow the BC Energy Step Code performance pathway.

Reporting Requirements Checklist

The following table provides a summary of the documentation required for each of the compliance options.

AT TIME OF BUILDING PERMIT APPLICATION

9.36 Compliance (Pathways 1-2)	<input type="checkbox"/>	Detailed wall/ceiling/floor assemblies indicating the Effective Insulation Values for all components.
	<input type="checkbox"/>	Location and type of air barrier/vapour control system
	<input type="checkbox"/>	Proposed heating/cooling systems
	<input type="checkbox"/>	Building ventilation as per 9.32 (is a heat recovery ventilator (HRV) being used)
9.36.5 Compliance (Pathway 3)	<input type="checkbox"/>	Drawing(s) include a statement indicating that 'performance pathway' pursued (include note to see attached Pre-Built Compliance Report for building characteristics summary)
	<input type="checkbox"/>	City of Kelowna Compliance Report (Pre-Build)
	<input type="checkbox"/>	Energy model summary for the reference house AND pre-build (aka 'as-designed') house
9.36.6 Compliance (Pathway 4)	<input type="checkbox"/>	Drawing(s) include a statement indicating the Step pursued
	<input type="checkbox"/>	City of Kelowna Compliance Report (Pre-Build)
	<input type="checkbox"/>	Energy model summary for the reference house AND pre-build (aka 'as-designed') house

PRIOR TO ISSUANCE OF OCCUPANCY PERMIT

9.36.5 Compliance (Pathway 3)	<input type="checkbox"/>	City of Kelowna Compliance Report (As-Built) Attached
	<input type="checkbox"/>	Energy model summary for the reference house AND as-built house attached
9.36.6 Compliance (Pathway 4)	<input type="checkbox"/>	City of Kelowna Compliance Report (As-Built) Attached
	<input type="checkbox"/>	EnerGuide Homeowner Information Sheet Attached (if using the EnerGuide Rating System)
	<input type="checkbox"/>	Energy model summary for the reference house AND as-built house attached

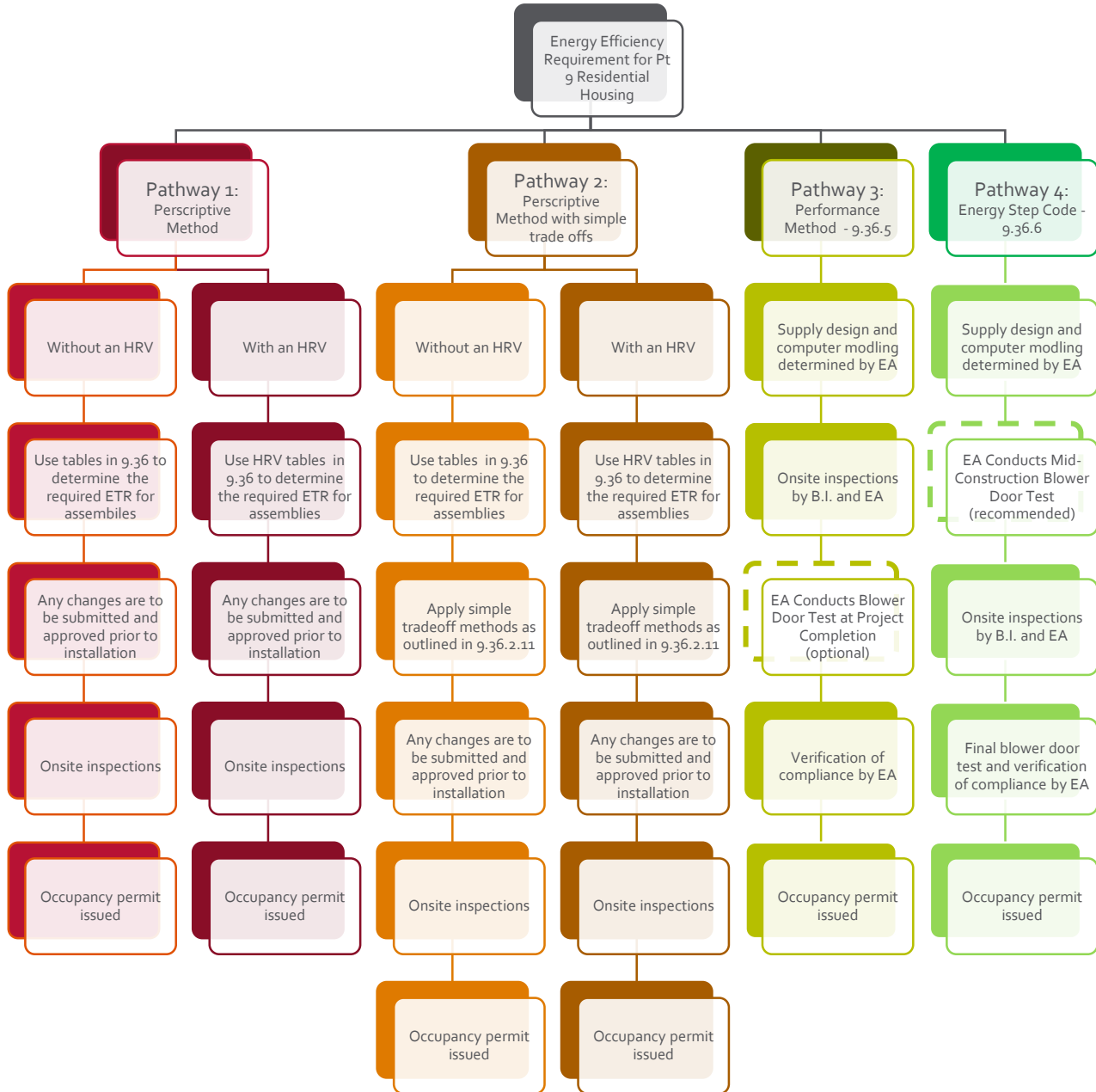


FIGURE 1: PROJECT FLOW FOR EACH OF THE AVAILABLE PATHWAYS.

Prescriptive Pathway

Previously the BCBC has relied on nominal insulation values when considering building insulation. Section 9.36 changed this requirement to Effective Thermal Resistance (ETR), which is the cumulative value of the thermal resistance for all materials within an assembly, whether a wall, ceiling or floor.

The City of Kelowna has developed the following tables to aid designers, builders, owners and other parties with achieving compliance with the new Energy Efficiency requirements. These tables are not intended to address all possible construction assemblies. It is intended to act as a guideline and it is the owner’s responsibility to ensure full compliance with all BCBC requirements. Additional information can be obtained from the Canadian Wood Council or by clicking here.

The required ETR ratings from the BCBC for Zone 5 which includes the City of Kelowna and surrounding areas are as follows:

Buildings <u>without</u> a Heat-recovery Ventilator			Buildings <u>with</u> a Heat-recovery Ventilator		
Assembly	RSI	R	Assembly	RSI	R
Ceilings below attics	8.67	49.23	Ceilings below attics	6.91	39.23
Cathedral ceilings and flat roofs	4.67	26.52	Cathedral ceilings and flat roofs	4.67	26.52
Walls	3.08	17.49	Walls	2.97	16.86
Floors over unheated spaces	4.67	26.52	Floors over unheated spaces	4.67	26.52
Foundation walls*	2.98	16.92	Foundation walls	2.98	16.92
Unheated floors**			Unheated floors		
below frost line	Uninsulated	Uninsulated	below frost line	Uninsulated	Uninsulated
above frost line	1.96	11.13	above frost line	1.96	11.13
Heated floors	2.32	13.17	Heated floors	2.32	13.17
Slabs-on-grade with an integral footing	1.96	11.13	Slabs-on-grade with an integral footing	1.96	11.13

*This is a substantial increase from current foundation insulation requirements. Also, installation of foundation insulation has also changed. (see City of Kelowna document 2014 British Columbia Building Code Changes)

**Where an unheated floor assembly falls into both categories the entire floor shall be insulated as required for above frost line.

Performance Pathway – 9.36.5 & 9.36.6

Currently, there are two possible performance pathways that can be followed - 9.36.5 or 9.36.6 (“Energy Step Code”). Both involve the services of an energy advisor (EA) or energy modeler to review plans, model energy consumption, conduct air tightness testing and to verify the plans and as-built home for compliance with the energy performance requirements of a given step of the BC Energy Step Code.

EAs conduct performance evaluations on behalf of a Natural Resources Canada (NRCan) licensed service organization and are licensed to deliver NRCan’s EnerGuide Rating System (ERS), ENERGY STAR for New Homes and R-2000 programs. Energy modelers, on the other hand, do similar work but may not be affiliated with a Service organization. All EAs are energy modelers, but not all energy modelers are EAs.

Finding an Energy Advisor or Energy Modeler for your project:

The easiest way to find an Energy Advisor is to contact a licensed Service Organization. A list of NRCan licensed Service Organizations active in British Columbia can be found at energystepcode.ca.

Additionally, a list of member Energy Advisors can be found at the Canadian Association of Consulting Energy Advisors webpage: www.cacea.ca

While 9.36.5 was introduced in the 2014 BCBC as an option for satisfying the energy efficiency requirements of the components and systems using computer modelling (a blower door test is optional as per BCBC 9.36.5.10.(9)), the Energy Step Code (9.36.6) was brought in by the Province in April 2017 as a means of transitioning the market from the current energy-efficiency requirements in the BC Building Code to the Provincial requirement for net zero energy ready buildings by 2032. Each of the five ‘Steps’ associate with the Energy Step Code represent a progressive improvement over the base-BCBC (see Figure 2).

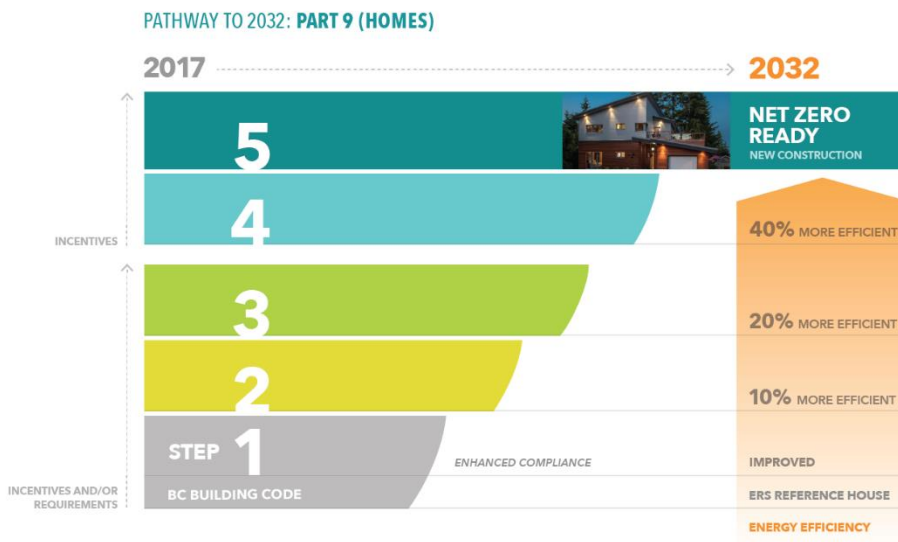


FIGURE 2: THE FIVE PERFORMANCE STEPS OF THE BC ENERGY STEP CODE

Like 9.36.5, the requirements set out in **Step 1** only need to satisfy the performance of the base BCBC. By comparison, Steps 2 to 4 represent an improvement of 10%, 20% and 40%, respectively, above the base-BCBC. The final step - Step 5 - establishes the net zero energy ready target (roughly an 80% improvement in energy efficiency over the base-BCBC). All 'Steps' within 9.36.6 require at least one blower door test at project completion, though a mid-construction (pre-drywall) blower door test is recommended to facilitate the correction of air barrier deficiencies when it is still easy to reach, and fix them. The specific performance targets associated with each step are outlined in Figure 3 below.

Part 9 Step Code Performance Requirements - Climate Zone 5									
Step	Energy Modelling	Airtightness Requirements		Performance Requirement of Building Equipment and Systems			Performance Requirement of Building Envelope		
		Blower Door Test	ACH ₅₀	Reference House: % better than ERS v15 ref. house	OR	Mechanical Energy Use Intensity (MEUI) kWh/m ² year	Thermal Energy Demand Intensity kWh/m ² year	OR	Peak Thermal Load (PTL) W/m ²
1	✓	✓	No Target	Meet	OR	Comply with BCB 9.36.5; report TEDI & PTL			
2	✓	✓	3	10	OR	≤90	≤60	OR	≤55
3	✓	✓	2.5	20	OR	≤75	≤50	OR	≤45
4	✓	✓	1.5	40	OR	≤45	≤40	OR	≤40
5	✓	✓	1			≤25	≤15	OR	≤10

FIGURE 3: ENERGY STEP CODE PERFORMANCE REQUIREMENTS FOR EACH 'STEP'

Further details on the Energy Step Code can be found at www.kelowna.ca/citybuild (click 'BC Energy Step Code for New Buildings') or by visiting energystepcode.ca.