British Columbia’s commitment to reduce greenhouse gases related to buildings and construction has prompted building code requirements for energy efficiency since 2008. Effective December 19, 2014, substantial new energy efficiency and ventilation requirements in the BC Building Code apply to all Part 9 buildings. Effective April 7, 2017, the Energy Step Code has been introduced as an amendment to the 2012 BC Building Code. The Energy Step Code is a voluntary compliance path within the BC Building Code (via new Subsection 9.36.6 of Division B) that establishes progressive performance targets to support transformation from the current energy efficiency requirements in the BC Building Code to net zero energy–ready buildings by 2032. This bulletin has been prepared to summarize the relevant code changes and clarify building permit drawing submissions for single and two family dwellings.

General Information

The BC Building Code contains the acceptable solutions, objectives, and functional statements attributed to energy efficiency and ventilation. It is strongly recommended that designers and builders incorporate energy efficiency and ventilation considerations early in the design process, as well as collaborate with the various trades throughout the construction process, in order to achieve the greatest degree of flexibility and compliance. Building permits for single and two family dwellings, applied on or after December 19, 2014, must comply with the new requirements.

Energy Efficiency Requirements (Section 9.36)

The new energy efficiency provisions treat the building as an interconnected system and provide four compliance pathways for buildings within the scope of this bulletin. Compliance can be achieved through the:

1. Prescriptive path,
2. Performance path,
3. Energy Step Code path, or
Most single and two family dwellings will likely utilize the prescriptive path. Climatic zones have been established in order to set the applicable requirements, and Surrey is located in Climate Zone 4 for all compliance paths. Part 3 single family dwellings must comply with ASHRAE 90.1-2010, NECB 2011, or the Energy Step Code of 10.2.3, although alternative solution proposals may be considered.

1. Prescriptive Path (Subsections 9.36.2 to 9.36.4)

The prescriptive requirements address building envelope assemblies in terms of effective thermal resistance and air leakage, and address heating, ventilating, and air-conditioning (HVAC) equipment and service water heating in terms of energy use efficiency. There are also trade-off options within each applicable Subsection. In order to apply these requirements appropriately within the building, the envelope assemblies have been grouped into three categories:

- Above-ground opaque assemblies,
- Fenestration and door assemblies, and
- Below-grade or in contact with the ground assemblies.

Attached garages are considered as unconditioned space even if insulated and heated. The use of a heat recovery ventilator (HRV) can be another factor in determining the requirements, although this does not affect Climate Zone 4.

For the building envelope requirements in Subsection 9.36.2, the minimum effective insulation requirements for various building elements are highlighted below. It is important to note that these are calculated values based on the thermal attributes of the assembly components, not nominal insulation values.
The air barrier considerations at various building locations are highlighted below. The air barrier must be continuous across joints, between assemblies, and around penetrations.

For more information and details on the above figures, refer to HPO Illustrated Guide: Energy Efficiency Requirements for Houses in British Columbia (Climate Zone 4).

The HVAC requirements in Subsection 9.36.3 are concerned with energy use efficiency by systems and equipment used for heating, ventilating, and air-conditioning. The major thrust of these requirements is improved energy efficiency through improved performance targets and standards, temperature control, heat recovery from ventilation systems, and heat recovery from dehumidification systems for spaces with indoor pools and hot tubs. Unless required to be located outside, HVAC equipment must be located inside the plane of insulation.

Similarly, the service water heating requirements in Subsection 9.36.4 are concerned with energy use efficiency by systems used to heat service water for household use and for indoor pools and hot tubs. The major thrust of these requirements is improved energy efficiency through improved performance targets and standards, and control of the equipment.

2. Performance Path (Subsection 9.36.5)

For the performance compliance path, energy model calculations are required to demonstrate that the proposed building’s energy consumption does not exceed that of a reference building, under the same conditions. The reference building is one that exactly complies with the prescriptive requirements.

3. Energy Step Code Path (Subsection 9.36.6)

The Energy Step Code is a provincial standard that provides an incremental and consistent approach to achieving more energy efficient buildings that go beyond the base requirements of the BC Building Code by establishing a series of measurable, performance-based energy efficiency targets to be met. In the City of Surrey, the Energy Step Code is currently an optional compliance path to meet the applicable BC Building Code energy efficiency requirements.
4. NECB Path

NECB is a Canadian standard for energy efficiency in buildings, providing minimum requirements for building envelope, lighting, HVAC, service water heating, and electric power distribution. Compliance options within NECB also include prescriptive requirements, trade-offs, and energy-usage based modelling.

Ventilation Requirements (Section 9.32)

Significant refinements to the existing requirements for mechanical ventilation systems have been introduced in this Section for dwelling units. Dwelling units require a mechanical ventilation system that includes:

- A principal ventilation system that provides supply air and includes an exhaust fan,
- Kitchen and bathroom exhaust fans and
- If the building has a heated crawl space, components to integrate ventilation of the crawl space and the space above or beside it.

Some of the new concepts are the requirements for heat-recovery systems and ducted central-recirculation ventilation systems in which air is supplied to or exhausted from each bedroom in the building. For more information, refer to Information Bulletin No. B14-05 issued by the Building and Safety Standards Branch, which also includes examples of code compliant ventilation systems.

Building Permit Application

In general, the building permit drawings should include sufficient information and details to demonstrate energy efficiency and ventilation compliance, including:

- Energy efficiency compliance path used, including any trade-offs.
- Wall and floor section details, including effective insulation value calculations, for all applicable building assemblies.
- Window and door section details, including overall U-value calculations, for all fenestration, doors, and skylights.
- Assembly details to indicate location of air barrier in walls, floors, and roofs.
- Details of critical assembly junctions to demonstrate the continuity of insulation and air barrier.
- Locations of HRV (if provided), space-heating equipment, and service water heating equipment.
- Performance rating and energy source for all space-heating, space-cooling, and service water heating systems.
- If trade-offs are utilized within the prescriptive path, applicable documentation to be provided.
- If the performance path is utilized, documentation outlined in Subsection 2.2.8 (Division C of BCBC 2012) to be provided, including a house performance compliance calculation report.
• If the Energy Step Code Path is utilized, in addition to the documentation outlined in Subsection 2.2.8 (Division C of BCBC 2012), the following must be provided:
  ➢ Documentation required at building permit application:
    ▪ Completed BC Energy Compliance Report - Pre-Construction for Part 9 Buildings
    ▪ Energy model report (Example: HOT2000 detailed report)
    ▪ Energy model files (Example: HOT2000 model file)
  ➢ Documentation required prior to final inspection:
    ▪ Completed BC Energy Compliance Report – As-Built for Part 9 Buildings
    ▪ Final energy model report
    ▪ Final energy model files
    ▪ Final air tightness test report
• If the NECB path is utilized, documentation outlined in Article 2.2.2.8 (Division C of NECB 2011) to be provided, including a building performance compliance calculation report.

Please refer to the attached sample drawings and calculations for the minimum required information to be shown on building permit drawings.

Additional Information

Portions of buildings not required to be conditioned space may not need to comply with the full requirements of Section 9.36. Additions and alterations to existing buildings, depending on the scope of work, may not need to comply with the full requirements of Sections 9.36 and 9.32. Requests for interpretations and exemptions will be evaluated on a case by case basis.