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## **Changes to the BC Energy Step Code for Part 3 and Part 9 Buildings British Columbia Building Code 2018 Revision 2**

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The purpose of this bulletin is to provide information about Revision 2 changes to the British Columbia Building Code 2018 (BC Code) related to the BC Energy Step Code (which forms part of the BC Code). The changes are effective December 12, 2019 and apply to projects for which a permit is applied for on or after this date within participating jurisdictions.

### **Background**

As explained below, the changes include:

- Part 3, Division B – Large and Complex Buildings:
  - To better reflect colder climate conditions throughout the province, the BC Energy Step Code now has requirements for Thermal Energy Demand Intensity (TEDI) and Total Energy Use Intensity (TEUI) based on climate zones for Group C (residential), Group D (business and personal services), and Group E (mercantile) occupancies outside of climate zone 4. Requirements for these occupancies within climate zone 4 remain unchanged from previous requirements set in BC Code Revision 1.
  - Previously, the BC Energy Step Code contained requirements limited to the three occupancies listed above. With Revision 2, there are now Step 1 requirements for certain Group A and B occupancies, which includes some buildings referred to as public sector buildings such as schools, libraries, colleges, recreation centres, hospitals and care centres.
- Part 9, Division B – Housing and Small Buildings:
  - TEDI requirements remain the same as the BC Code Revision 1, with 2 new compliance options:
    - To account for climate variability within each climate zone, there is now the option of using an adjusted TEDI value based on the project location and the corresponding Degree Days Below 18°C, also referred to as Heating Degree Days (HDD), as opposed to using a single TEDI requirement for a given climate zone.
    - There is one other additional compliance option with regards to the performance of the building envelope, which includes demonstrating an improvement in the annual heating demand expressed as a percentage over the EnerGuide Reference House.

### **Changes to Part 3**

#### **1. Revised TEDI/TEUI Requirements**

Previously, the BC Energy Step Code provided both TEDI and TEUI requirements for Group C, D, and E occupancy types; however, only one set of TEDI and TEUI requirements was established province wide for each occupancy type, with no differentiation for the different climate zones across the province.

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To better reflect conditions in colder climates, new TEDI and TEUI requirements have been established based on occupancy type and apply based on HDDs for the location of the building. This means that buildings built in the colder climates, generally, now have less stringent TEDI/TEUI requirements. In locations with HDD less than 3000, the TEDI and TEUI requirements previously established for Group C, D, and E occupancies remain unchanged.

The revised TEDI and TEUI requirements are found in Tables 10.2.3.3.-G to 10.2.3.3.-J as follows:

- Table 10.2.3.3.-G: Energy Performance Requirements for Hotels and Motels
- Table 10.2.3.3.-H: Energy Performance Requirements for Other Residential Occupancies
- Table 10.2.3.3.-I: Energy Performance Requirements for Offices
- Table 10.2.3.3.-J: Energy Performance Requirements for Other Business and Personal Service or Mercantile Occupancies

## **2. Step 1 Requirements for Certain Group A and B Occupancies**

For certain Group A and B occupancy types (noted below), Step 1 requirements have now been established. Step 1 requires conformance with Part 8 of the National Energy Code for Buildings 2015 (National Energy Code). Energy modelling and air leakage testing for these occupancy types are required as per Division B, Article 10.2.3.4. and Article 10.2.3.5., respectively.

The occupancies with Step 1 requirements include:

- a. Group A – Assembly
  - i. Schools (other than colleges)
  - ii. Libraries
  - iii. Colleges
  - iv. Recreation Centres
- b. Group B – Divisions 2 and 3 – Treatment and Care
  - i. Hospitals
  - ii. Care Centres

Recreation Centres refer to buildings which include arenas, swimming pools, and rinks. Care Centres refer to Care Facilities as defined in the BC Building Code. Refer to Division B, Note A-3.1.2.1.(1) Major Occupancy Classification.

No specific performance TEDI or TEUI requirements for these Group A and B occupancies have been established at this time (meaning, Steps 2 and higher are not yet available for these occupancies).

For mixed-used buildings, energy-efficiency requirements for occupancies not included within the BC Energy Step Code are to be as per ANSI/ASHRAE/IES 90.1 or the National Energy Code as outlined in Article 10.2.2.1.(2).

## Changes to Part 9

Changes to the BC Energy Step Code for Part 9 residential buildings include the option for adjusted TEDI requirements based on location-specific HDD, along with the inclusion of an optional compliance path demonstrating an improvement in the annual heating demand, expressed as a percent improvement over the EnerGuide Reference House.

As listed in Subsection 9.36.6 in Tables 9.36.6.3.-A to 9.36.6.3.-F, there are now three compliance options for Part 9 residential buildings for building-envelope performance:

- less than or equal to the TEDI requirement as listed in each respective table;
- less than or equal to the calculated TEDI requirement ( $TEDI_{adjusted}$ ) based on the HDD value for any given project location, and
- not less than the performance improvement percentage requirement compared to the EnerGuide Reference House in relation to the annual heating demand.

### 1. TEDI Requirement in Table vs Calculated TEDI

The TEDI requirements as listed in Tables 9.36.6.3.-A to 9.36.6.3.-F have not changed with BC Code 2018 Revision 2. However, builders now have the option of using a 'sliding scale' to calculate TEDI requirements if they choose to do so. This change was made to reflect the climate variability within each climate zone and to allow the designer to calculate the TEDI requirement based on climate data specific to the building location. As a result, the BC Energy Step Code now includes an alternate compliance option allowing the TEDI metric to be calculated based on the actual HDD for the project location.

The HDD is to be based on the values provided by the authority having jurisdiction (AHJ), or should this information not be available from the AHJ, then per the appropriate climate values found in Division B, Appendix C of the BC Code.

The adjusted TEDI requirement must be calculated using the equation found in Article 9.36.6.3.(4). Rounding of the adjusted TEDI requirement is per standard rounding conventions to the closest whole number (less than or equal to 0.4 – round down; greater than or equal to 0.5 – round up).

Refer to Table A-9.36.6.3.(4) for pre-calculated TEDI requirements based on increments of 100 Degree Days Below 18°C.

### 2. Percent Better than EnerGuide Reference House – Annual Heating Demand

Meeting the TEDI requirements can be a challenge for projects located on sites that cannot take advantage of solar heat gains during the winter months, which can affect heating demand despite making significant efforts to improve energy performance. As well, some common residential design features (such as cathedral ceilings) can also pose challenges for meeting the TEDI requirements.

To address this issue and to align with the approach being proposed for the National Building Code, an optional compliance path has now been added that permits a builder to demonstrate a percent improvement over the EnerGuide Reference House for the performance requirement of the building

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envelope. For this metric, the performance improvement over the EnerGuide Reference House shall be calculated by computing the annual heating demand for both the reference house and the proposed house and expressing the difference as a percentage. Given that this methodology uses the annual heating demand to calculate the percent improvement, this differs from the definitions as provided in Article 9.36.5.2. and Article 9.36.6.2.(2).

Within this compliance path, there is still the option of demonstrating compliance via Subsection 9.36.5.

A revised version of the *Instruction Manual: BC Energy Compliance Reports for Part 9 Residential Buildings* and compliance calculator will be issued with instructions to reflect these recent changes to the BC Code and will provide clarity regarding default settings within the EnerGuide Rating System for the mechanical/electrical systems.

Note that the BC Code language for this change refers to the terms annual heating demand, annual space heating energy, and space heating energy, which are used interchangeably and all reference the annual heating demand.

## Summary

The following summarizes the changes that came into effect December 12, 2019, and the resulting BC Energy Step Code requirements available for Part 3 and Part 9 buildings.

### Part 3 Buildings

- HDD below 3000
  - No change to the existing TEDI or TEUI requirements for Group C, D, and E occupancies.
- HDD greater than or equal to 3000
  - New distinct TEDI and TEUI requirements based on HDD for Group C, D, and E occupancies.
- All locations
  - The introduction of Step 1 for certain Group A and B occupancies, with no TEDI or TEUI requirements yet.
  - Requirements available for these occupancies only:
    - Group A – Assembly – Step 1 only for schools (other than colleges), libraries, colleges, and recreation centres.
    - Group B – Care/Treatment – Step 1 only for hospitals and care centres.
    - Group C – Residential – with separate requirements for hotels/motels that generally reflect the heavier energy loads of these Group C occupancies.
    - Group D – Business and Personal Services – with separate requirements for offices that generally reflect the lighter energy loads of these Group D occupancies.
    - Group E – Mercantile.

## Part 9 Buildings

- Requirements remain available for all HDDs for Part 9 residential occupancies.
- No change to the original TEDI requirements established in BC Code Revision 1; however, two additional compliance options are now available for the building envelope performance:
  - the allowance of an adjusted TEDI requirement based on the HDD for any specific building location, or
  - the option of demonstrating percent better than the EnerGuide Reference House for annual heating demand.

## More Information

### BC Codes are Now Available Free Online

Free online access to the [BC Building Code](#) and the [BC Fire Code](#) is available on the BC Publications [website](#).

Revision 2 content changes are available on the Building and Safety Standards Branch [website](#).

## Links

- BC Energy Step Code website: <https://energystepcode.ca/>
- Codes Canada: (volunteer & attend) [https://www.nrc-cnrc.gc.ca/eng/solutions/advisory/codes\\_centre\\_index.html](https://www.nrc-cnrc.gc.ca/eng/solutions/advisory/codes_centre_index.html)
- National Code Change Request: [https://www.nrc-cnrc.gc.ca/eng/solutions/advisory/codes\\_centre/code\\_change\\_request.html](https://www.nrc-cnrc.gc.ca/eng/solutions/advisory/codes_centre/code_change_request.html)

## Contact the Building and Safety Standards Branch

- **General** inquiries can be sent to [building.safety@gov.bc.ca](mailto:building.safety@gov.bc.ca)
- **Technical** code inquiries can be sent to [codequestion@gov.bc.ca](mailto:codequestion@gov.bc.ca)

The Building and Safety Standards Branch does not enforce compliance with the BC Code. Local authorities are authorized to enforce the BC Code through the Local Government Act and the Community Charter.