Recent Changes to Ontario’s 2012 Building Code

Energy Efficiency Requirements

Canada Green Building Council - Greater Toronto Chapter

April 29, 2014
Notice:

This presentation is intended for general information purposes only. It only highlights certain provisions of the 2012 Building Code. Code users are advised to consult the official source documents, including:

- The Building Code Act, 1992; and
- The 2012 Building Code (O. Reg. 332/12)

These documents are available from:

- e-Laws (official versions of the Act and Code)
- Publications Ontario sells a compendium (Act, Code and additional materials)
Energy Efficiency and the Building Code

Division A,
Parts 1, 2 & 3
Compliance,
Objectives and Functional Statements

Part 12:
Resource Conservation and
Environmental Integrity

Part 12 Requirements
for Housing

Part 12 Requirements
for all other buildings

Housing
Supplementary
Standards SB-12

Prescriptive
Requirements
Specific Options

Performance
Requirements
Alternative Methods

All Other Buildings
Supplementary
Standards SB-10

Prescriptive
Requirements
Specific Options

Performance
Requirements
Alternative Methods

Prescriptive
Requirements
Specific Options

Performance
Requirements
Alternative Methods
Conservation Objectives
2012 Building Code – Division A

Resource Conservation

• Resource Capacity
  • Limit the consumption of water
  • Limit the consumption of energy
• Infrastructure Capacity
  • Limit excessive demand on resource infrastructure

Environmental Integrity

• Air Quality
  • Limit emissions of greenhouse gases into air
  • Limit release of contaminants into air
• Water and Soil Quality
  • Limit release of contaminants into water or soil
Overview

Division B: Part 12

RESOURCE CONSERVATION AND ENVIRONMENTAL INTEGRITY
## Division B, Part 12

### Resource Conservation and Environmental Integrity

<table>
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<th>Section 12.1.</th>
<th>General</th>
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<td>Section 12.2.</td>
<td>• Energy Efficiency, Carbon Dioxide Equivalents and Peak Electric Demand</td>
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<td>Section 12.3.</td>
<td>• Energy Efficiency for Buildings of Residential Occupancy within the Scope of Part 9</td>
</tr>
<tr>
<td>Section 12.4.</td>
<td>• Water Efficiency</td>
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</tbody>
</table>
Division B
Section 12.2.

Section 12.2. Energy Efficiency, Carbon Dioxide Equivalents and Peak Electric Demand

12.2.1. Energy Efficiency Design
12.2.2. Carbon Dioxide Equivalents
12.2.3. Peak Electric Demand
12.2.4. Motion Sensors
Division B
Section 12.2.

Section 12.2. Energy Efficiency, Carbon Dioxide Equivalents and Peak Electric Demand

12.2.1. Energy Efficiency Design
12.2.2. Carbon Dioxide Equivalents
12.2.3. Peak Electric Demand
12.2.4. Motion Sensors
Section 12.2. Energy Efficiency, Carbon Dioxide Equivalents and Peak Electric Demand

12.2.1. Energy Efficiency Design

<table>
<thead>
<tr>
<th>Year</th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>2013</td>
<td>2014</td>
</tr>
<tr>
<td>2014</td>
<td>2015</td>
<td>2016</td>
</tr>
<tr>
<td>2015</td>
<td></td>
<td>2017</td>
</tr>
<tr>
<td>2016</td>
<td></td>
<td>2018</td>
</tr>
</tbody>
</table>
Energy Efficiency Design Before January 1, 2017

Article 12.2.1.1.

Sentence (1)
Indicates that this Article applies to construction for which a permit has been applied for before 2017.

Sentence (2) (Buildings other than Part 9 Residential)
Revised to incorporate by reference requirements set out in Division 1 and Division 2 or 4 of SB-10

Clause (3)(b) (Part 9 Residential Buildings)
Revised to incorporate by reference the requirements set out in Chapters 1 and 2 of SB-12
Supplementary Standard SB-10 to the 2012 Building Code contains NECB-2011 as an additional compliance path.
All Buildings Other than Part 9 Residential Buildings

Article 12.2.1.2.
Energy Efficiency Design After December 31, 2016

Sentence (2) (Buildings other than Part 9 residential)

(a) 2012 requirements + 13%, or
(b) Prescriptive requirements of Supplementary Standard SB-10, (Division 1 and Division 3 or 5)
Division B
Section 12.2.

Section 12.2. Energy Efficiency, Carbon Dioxide Equivalents and Peak Electric Demand

12.2.1. Energy Efficiency Design
12.2.2. Carbon Dioxide Equivalents
12.2.3. Peak Electric Demand
12.2.4. Motion Sensors
Limitation to Greenhouse Gas Emissions Carbon Dioxide Equivalents (CO$_2$e)

Article 12.2.2.1.

Carbon Dioxide Equivalents

Sentence (1)

Refers to requirements set out in MMAH Supplementary Standard SB-10, “Energy Efficiency Requirements”.

Sentence (2)

Exception:

Exceptions that apply for energy requirements and Part 9 Residential occupancies
Article 1.1.2.2. of SB-10 addresses limitations to annual CO$_2$e emissions

- Compliance criterion is set based on prescriptive requirements of ASHRAE 90.1 (as amended by SB-10)
- Provides emission factors for calculations

<table>
<thead>
<tr>
<th>Energy Efficiency Compliance Methods</th>
<th>CO$_2$e emission limitations compliance Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASHRAE 90.1+ SB-10 or NECB Prescriptive</td>
<td>Deemed to be in compliance</td>
</tr>
<tr>
<td>ASHRAE 90.1+ SB-10 or NECB Performance</td>
<td>CO$_2$e (Reference) $\geq$ CO$_2$e (Proposed)</td>
</tr>
<tr>
<td>ASHRAE 90.1 + 5 %</td>
<td>Emissions 5% reduced from ASHRAE level</td>
</tr>
<tr>
<td>mNECB + 25 %</td>
<td>Emissions 25% reduced from mNECB level</td>
</tr>
</tbody>
</table>
Emission (CO$_2$e) Factors

Article 1.1.2.2. of SB-10 provides emission factors for calculations

<table>
<thead>
<tr>
<th>Building Energy Sources</th>
<th>CO$_2$e, (kg/kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid Delivered Electricity (marginal - based on natural gas)</td>
<td>0.400</td>
</tr>
<tr>
<td>LPG or Propane</td>
<td>0.274</td>
</tr>
<tr>
<td>Fuel Oil</td>
<td>0.312</td>
</tr>
<tr>
<td>Gasoline</td>
<td>0.309</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>0.191</td>
</tr>
</tbody>
</table>
Section 12.2. Energy Efficiency, Carbon Dioxide Equivalents and Peak Electric Demand

12.2.1. Energy Efficiency Design

12.2.2. Carbon Dioxide Equivalents

12.2.3. Peak Electric Demand

12.2.4. Motion Sensors
Limitation to Peak Electric Demand

Article 12.2.3.1.

Peak Electric Demand

Sentence (1)

Refers to requirements set out in MMAH Supplementary Standard SB-10, “Energy Efficiency Requirements”.

Sentence (2)

Exception:

Exceptions that apply for energy requirements and Part 9 Residential occupancies
Article 1.1.2.3. addresses the peak electric demand restrictions

- Compliance criterion is set based on prescriptive requirements of ASHRAE 90.1 (as amended by SB-10)

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<th>Peak Electric Demand Compliance Method</th>
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<td>ASHRAE 90.1+ SB-10 or NECB Prescriptive</td>
<td>Deemed to be in compliance</td>
</tr>
<tr>
<td>ASHRAE 90.1+ SB-10 or NECB Performance</td>
<td>Peak (Reference) ≥ Peak (Proposed), or</td>
</tr>
<tr>
<td>ASHRAE 90.1 + 5 %</td>
<td>Prescriptive requirements of ASHRAE 90.1 for efficiency of cooling equipment, fan power limitations and interior power lighting densities must be met.</td>
</tr>
<tr>
<td>mNECB + 25 %</td>
<td></td>
</tr>
</tbody>
</table>
Ontario’s 2012 Building Code
Revisions to SB-10
Supplementary Standard SB-10 to the 2012 Ontario Building Code

SB-10 includes prescriptive requirements to achieve 2017 level (2012 level + 13%). Effective January 1, 2014, SB-10 contains 5 Divisions

**Division 1** General

**Division 2** Design Before January 1, 2017 (All Buildings)

**Division 3** Design After December 31, 2016 (All Buildings)

**Division 4** Design Before January 1, 2017 (Part 9 Non-residential Buildings)

**Division 5** Design After December 31, 2016 (Part 9 Non-residential Buildings)
Supplementary Standard SB-10 to the 2012 Building Code contains NECB-2011 as an additional compliance path.
Supplementary Standard SB-10 to the 2012 Ontario Building Code

The following enhancements have been added to NECB-2011:

- Its scope now includes Part 9 non-residential buildings
- Requirements for electric space heating were enhanced
- Solar Heat Gain Coefficients for fenestrations were added
- NECB users can benefit from energy efficiency measures recognized by SB-10

These changes can be found in Chapter 3, of Division 2.
Exceptions Listed in Supplementary Standard SB-10

Exceptions have been rearranged and harmonized with NECB and ASHRAE to a certain degree

- Exceptions are more based on equipment or process rather than buildings
- Buildings that are not heated, or heated up to 10°C are only exempt from envelope requirements
- Portable classroom construction is not exempt anymore but the table of exceptions has been kept
Climatic Zones

- SB-10 references 2012 Building Code Supplementary Standard SB-1 for climatic data
- The minor difference in climatic zones between ASHRAE and NECB has been eliminated.

### Climatic Zone Numbers for Ontario

<table>
<thead>
<tr>
<th>Climatic Zone Number</th>
<th>Thermal Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 5</td>
<td>HDD18 &lt; 4000°C</td>
</tr>
<tr>
<td>Zone 6</td>
<td>4000°C ≤ HDD18 &lt; 5000°C</td>
</tr>
<tr>
<td>Zone 7</td>
<td>5000°C ≤ HDD18</td>
</tr>
</tbody>
</table>
Clarifications and Revisions to existing Requirements of SB-10

Div. 1
• It was clarified that existing buildings are required to comply with Part 10 for change of use and Part 11 for renovation

Div. 2, Chapter 2 - Additional Requirements to ASHRAE 90.1

Building Envelope (South Orientation)
• Section 5.5.4.5. will only apply when the main entrance is located on the south orientation and the south facing wall area is larger than east and west
Clarifications and Revisions to existing Requirements of SB-10

Div. 2, Chapter 2 - Additional Requirements to ASHRAE 90.1

Lighting

- Automatic receptacle controls are not required in offices (8.4.2.)
- Section 9.4.1.3.(b) revised to require 30% overall lighting reduction in parking areas
- Lighting reduction required in 9.4.1.6.(g) for staircases does not apply to minimum lighting required by the OBC
- Uncovered parking areas are exempt from the requirements of 9.4.1.7.(c)
Clarifications and Revisions to Existing Requirements of SB-10

Div. 2, Chapter 2 - Additional Requirements to ASHRAE 90.1

Performance approach (ASHRAE+5%)
It was clarified that required increase is measured in terms of energy units.

Energy Cost Method

- Energy Simulation program is required to be hour by hour and a minimum of 8760 hours per year. (11.2.1.1.(a))
Clarifications and Revisions to Existing Requirements of SB-10

Div. 2, Chapter 2 - Additional Requirements to ASHRAE 90.1

Energy Cost Method
Modelling Ventilation

- Section 11.3.2.(d) has been revised: for modelling purposes, the minimum ventilation rates shall be used and credits can be claimed for demand controlled and dedicated ventilation systems.
Clarifications and Revisions to Existing Requirements of SB-10

Div. 2, Chapter 2 - Additional Requirements to ASHRAE 90.1

Energy Cost Method

Modelling Fans, Pumps, and Automatic Lighting Controls

- The following systems can be modelled in accordance with Appendix G of ASHRAE 90.1 and credits can be claimed for the systems that exceed prescriptive requirements
  - Fan power (Section 11.3.2.(h))
  - Water pumps (section 11.2.3.A)
  - Lighting Controls (Sections 9.4.1. and 11.3.2.)
Moving Forward

Committees:

- Building Code Conservation Advisory Council (BCCAC)
- Technical Advisory Committee on Part 12 (Energy) and Part 5 (Building Envelope)
- Working Groups on SB-10 and SB-12
Moving Forward

Get involved . . .
More Information

- [Ontario’s Building Code](#)
- Sign up for [Code News](#)
- Follow us on [Twitter](#)
- Buy the Building Code from [ServiceOntario Publications](#)
- Contact your [local municipality](#)
- Contact us at [codeinfo@ontario.ca](mailto:codeinfo@ontario.ca) or by dialling 416-585-6666, or
- 416-585-7041 or 1-866-220-2290 (toll free and for the hearing impaired)