

[Submit a comment](#)

## Proposed Change 1888

---

<b>Code Reference(s):</b>	<b>NBC20 Div.B 9.36.8.8. (first printing)</b>
Subject:	Prescriptive Trade-off Path
Title:	Updates to Energy Conservation Points for Airtightness Levels
Description:	This proposed change updates energy conservation points for airtightness levels in Subsection 9.36.8.

This change could potentially affect the following topic areas:

- |  |   |
|--|---|
| <input type="checkbox"/> Division A                                | <input checked="" type="checkbox"/> Division B              |
| <input type="checkbox"/> Division C                                | <input checked="" type="checkbox"/> Design and Construction |
| <input type="checkbox"/> Building operations                       | <input checked="" type="checkbox"/> Housing                 |
| <input type="checkbox"/> Small Buildings                           | <input type="checkbox"/> Large Buildings                    |
| <input type="checkbox"/> Fire Protection                           | <input type="checkbox"/> Occupant safety in use             |
| <input type="checkbox"/> Accessibility                             | <input type="checkbox"/> Structural Requirements            |
| <input checked="" type="checkbox"/> Building Envelope              | <input checked="" type="checkbox"/> Energy Efficiency       |
| <input type="checkbox"/> Heating, Ventilating and Air Conditioning | <input type="checkbox"/> Plumbing                           |
| <input type="checkbox"/> Construction and Demolition Sites         |   |

---

### Problem

---

A review of the assigned energy conservation points for airtightness levels in the prescriptive trade-off path of the 2020 edition of the National Building Code of Canada (NBC) revealed an error. The energy conservation points in Table 9.36.8.8. were exchanged, meaning incorrect points were assigned for airtightness requirements using the guarded and unguarded methods.

Furthermore, the modeling approach used to calculate the points for different energy conservation measures was updated. The new approach models 240 archetypes in all climate zones to determine the appropriate energy conservation points and does not model a heat-recovery ventilator in the reference house (in accordance with Sentence 9.36.5.15.(3)). As a result, the existing energy conservation points for airtightness levels in Table 9.36.8.8. need to be updated.

Failure to update the existing energy conservation points would not only retain the erroneous assignment of energy conservation points for airtightness, but it would also create a discrepancy since the modeling rules used to determine the existing points differ from the rules used to assign points to new energy conservation measures.

This would prevent Code users from benefitting from obtaining the appropriate energy conservation points for the purpose of demonstrating compliance with the prescriptive trade-off path. In order to accumulate the energy conservation points needed to comply with higher tiers, more options in terms of energy conservation measures are required than are currently provided in the Code.

---

### Justification

---

This proposed change updates the energy conservation points for airtightness levels in Table 9.36.8.8., which corrects the erroneous assignment of energy conservation points for airtightness levels in the current edition of the Code. This proposed change also updates points by modeling a greater number of archetypes in all climate zones and aligns the modeling rules with the energy performance path in Subsection 9.36.5.

Code users who achieve better airtightness testing results than the minimum performance required to comply with Energy Performance Tier 1 would benefit from using updated energy conservation points to demonstrate compliance with a higher energy performance tier of the prescriptive trade-off path.

Failure to add additional energy conservation measures to the Code may prevent Code users from accumulating sufficient points to comply with higher tiers, as required by their respective jurisdictions.

## PROPOSED CHANGE

### NBC20 Div.B 9.36.8.8. (first printing)

#### **[9.36.8.8.] 9.36.8.8. Energy Conservation Measures Relating to Airtightness**

- [1] 1)** *Buildings* to which this Subsection applies shall be designed and constructed in accordance with
- [a] a) Articles 9.36.2.9. and 9.36.2.10., or
  - [b] b) Article 9.36.2.9. and Sentences 9.36.2.10.(1) to (7) and shall, where airtightness testing is carried out in accordance with Subsection 9.36.6., comply with an Airtightness Level listed in Table 9.36.6.4.-A or 9.36.6.4.-B.
- [2] 2)** *Buildings* that comply with an Airtightness Level determined in accordance with Clause (1)(b) shall be credited with the corresponding energy conservation points stipulated in Table 9.36.8.8.

**Table [9.36.8.8.] 9.36.8.8.  
Energy Conservation Measures and Points for Airtightness  
Forming Part of Sentence [9.36.8.8.] 9.36.8.8.([2] 2)**

Energy Conservation Measures for Airtightness – Airtightness Levels <sup>(1)</sup>	Heating Degree-Days of <i>Building Location</i> , in Celsius Degree-Days					
	Zone 4 < 3000	Zone 5 3000 to 3999	Zone 6 4000 to 4999	Zone 7A 5000 to 5999	Zone 7B 6000 to 6999	Zone 8 ≥ 7000
	Energy Conservation Points					
Airtightness Levels from Table 9.36.6.4.-A						
AL-1A	–	–	–	–	–	–
AL-2A	<del>2.0</del> 2.2	<del>3.4</del> 3.2	<del>3.5</del> 3.5	<del>4.6</del> 3.8	<del>6.1</del> 4.3	<del>6.1</del> 4.8
AL-3A	<del>4.0</del> 4.3	<del>6.7</del> 6.3	<del>7.0</del> 6.9	<del>9.3</del> 7.6	<del>12.1</del> 8.5	<del>12.1</del> 19.7
AL-4A	<del>5.9</del> 6.5	<del>10.1</del> 9.6	<del>10.5</del> 10.5	<del>13.9</del> 11.4	<del>18.0</del> 12.9	<del>18.0</del> 14.7
AL-5A	<del>7.6</del> 8.3	<del>13.0</del> 12.3	<del>13.4</del> 13.4	<del>17.8</del> 14.7	<del>22.7</del> 16.5	<del>22.7</del> 18.8
Airtightness Levels from Table 9.36.6.4.-B						
AL-1B	–	–	–	–	–	–
AL-2B	<del>-2.1</del>	<del>-3.2</del>	<del>-3.5</del>	<del>-3.8</del>	<del>-4.3</del>	<del>-4.8</del>
AL-3B	<del>2.2</del> 4.3	<del>3.0</del> 6.4	<del>3.5</del> 6.9	<del>4.6</del> 7.6	<del>4.1</del> 8.5	<del>4.6</del> 9.6
AL-4B	<del>4.0</del> 6.4	<del>6.0</del> 9.6	<del>6.9</del> 10.4	<del>9.1</del> 11.5	<del>8.2</del> 12.8	<del>9.3</del> 14.5
AL-5B	<del>6.0</del> 8.6	<del>9.1</del> 12.8	<del>10.4</del> 14.0	<del>13.6</del> 15.4	<del>12.3</del> 17.2	<del>14.2</del> 19.6
AL-6B	<del>7.7</del> 10.4	<del>11.6</del> 15.6	<del>13.3</del> 17.0	<del>17.4</del> 18.7	<del>15.6</del> 20.9	<del>18.2</del> 23.8

#### **Note to Table [9.36.8.8.] 9.36.8.8.:**

- (1) All *dwelling units* and common spaces in a *building*, or the whole *building*, must meet the Airtightness Level for which energy conservation points are being credited.

## Impact analysis

This proposed change is not expected to impose additional costs because the option to use airtightness energy conservation measures to demonstrate compliance with the prescriptive trade-off path is already provided by the Code. The costs associated with using energy conservation measures are generally comprised of the cost of conducting an airtightness test. This proposed change would revise the energy conservation points assigned to an airtightness level in the current edition of the Code.

It should be noted that the costs listed for the building envelope measures are estimates that depend on various factors. One major assumption made when conducting the analysis was the cost data, which was obtained for a specific region and adjusted for other regions using the location factors provided by RSMMeans. The following location factors were used for the cost estimation based on 2023 values.

Table 1: Location Factors by Region

Region	Location Factor
BC	0.98–1.05
AB	1.02–1.09
SK and MB	0.88–1.07
ON	1.01–1.15
QC	1.06–1.17
Atlantic Canada	0.88–1.05
Northern Canada	1.03–1.12

Table 2 provides an estimate of the incremental costs of achieving different airtightness performance levels for different regions.

Table 2: Incremental Costs of Airtightness Performance Levels by Region

Airtightness Levels	Energy Savings (%)	Incremental Costs of Airtightness (\$/m <sup>2</sup> )						
		BC	AB	SK and MB	ON	QC	Atlantic Canada	Northern Canada
AL-1A	0	0	0	0	0	0	0	0
AL-2A	2.2–4.8	485–520	505–540	435–530	500–570	525–579	435–520	510–555
AL-3A	4.3–9.7	945–1,012	983–1,051	848–1,031	973–1,108	1,022–1,128	848–1,012	993–1,079
AL-4A	6.5–14.7	1,803–1,932	1,877–1,969	1,619–1,969	1,858–2,116	1,950–2,153	1,619–1,932	1,895–2,061
AL-5A	8.3–18.8	3,521–3,772	3,664–3,916	3,161–3,844	3,628–4,131	3,808–4,203	3,161–3,772	3,700–4,023

To generate the cost estimates of achieving higher levels of airtightness performance, Housing Technology Assessment Platform costing was run for all 240 new construction archetypes at a pressure difference of 50 Pa. The incremental costs were then adjusted using a 15% inflation rate. The incremental costs are reported as the average incremental cost per building in the city of Vancouver, where the average was taken across all 240 archetypes. The incremental costs for other regions were generated by adjusting the incremental cost data from the city of Vancouver using the residential location factors provided by RSMMeans.

The energy conservation points assigned to the airtightness levels in Climate Zones 4 and 6 generally remain the same or increase. In Climate Zone 5, the energy conservation points are 0.2 to 0.7 points lower for each airtightness level. In Climate Zones 7A, 7B and 8, the energy conservation points are 0.8 to 6.2 points lower for each airtightness level.

This decrease in points means that a Code user would need to select another energy conservation measure to compensate for the decrease and still comply with a tier of the prescriptive trade-off path. It should be noted that this proposed change would increase the number of energy conservation measures when the prescriptive trade-off path is used. This would give Code users the opportunity to obtain more points to compensate for the decrease in points for airtightness in the Climate Zones mentioned above.

With this proposed change, Code users who choose to perform airtightness testing at higher levels would be credited between 2.2 and 18.8 energy conservation points, which represents an energy savings and would cost between \$435 and \$4,203.

---

## Enforcement implications

---

This proposed change could be enforced using the existing Code enforcement infrastructure.

---

## Who is affected

---

Designers, engineers, architects, builders and building officials.

---

## OBJECTIVE-BASED ANALYSIS OF NEW OR CHANGED PROVISIONS

---

NBC20 Div.B 9.36.8.8. (first printing)

[\[9.36.8.8.\]](#) 9.36.8.8. ([1] 1) no attributions

[\[9.36.8.8.\]](#) 9.36.8.8. ([2] 2) [F90-OE1.1]