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Proposed Change 1835

Code Reference(s):	NBC20 Div.B 9.36.8.10. (first printing)
Subject:	Prescriptive Trade-off Path
Title:	Drain-Water Heat Recovery
Description:	This proposed change introduces Sentences 9.36.8.10.(4) and (5), and Table 9.36.8.10.-B to assign energy conservation points to drain-water heat-recovery units.

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 type="checkbox"/> Building Envelope | <input checked="" type="checkbox"/> Energy Efficiency |
| <input type="checkbox"/> Heating, Ventilating and Air Conditioning | <input checked="" type="checkbox"/> Plumbing |
| | <input type="checkbox"/> Construction and Demolition Sites |

Problem

Drain-water heat-recovery (DWHR) units capture lost heat from hot water as it drains. The energy performance path in Section 9.36. of Division B of the NBC permits Code users to account for the contribution of DWHR units to overall energy performance. However, the Code does not currently assign energy conservation points to DWHR units for compliance with the prescriptive trade-off path.

DWHR units are popular due to their ability to save energy and are mandatory in some jurisdictions.

Failure to assign energy conservation points to DWHR units would prevent the Code users who choose to install them from accumulating the associated energy savings when complying with the prescriptive trade-off path. In order to accumulate energy conservation points for higher performance tiers, more options in terms of energy conservation measures are required than are currently provided in the Code.

Justification

This proposed change assigns energy conservation to DWHR units. Code users would benefit from additional options for achieving the minimum energy conservation points for compliance with the energy performance tiers if DWHR units were added to the list of eligible energy conservation measures in Subsection 9.36.8.

Additionally, this proposed change adds granularity for energy conservation points provided in tabulated form for DWHR units by allowing interpolation. If this proposed change did not permit interpolation, Code users would only be able to claim the lower of two point values when the minimum performance of the chosen DWHR unit falls between two values listed in proposed Table 9.6.8.10.-B.

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

PROPOSED CHANGE

NBC20 Div.B 9.36.8.10. (first printing)

[9.36.8.10.] 9.36.8.10. Energy Conservation Measures for Service Water Heating Equipment

- [1] 1)** Service water heating equipment and components shall be designed and constructed in accordance with Subsection 9.36.4. and this Article.
- [2] 2)** Where service water heating equipment or techniques other than those described in Subsection 9.36.4. and this Article are used, the *building* shall be designed and constructed in accordance with the NECB.
- [3] 3)** Service water heating equipment that complies with one of the energy conservation measures prescribed in Table 9.36.8.10. shall be credited with the corresponding energy conservation points stipulated therein.

**Table [9.36.8.10.-A] 9.36.8.10.
Energy Conservation Measures and Points for Service Water Heating Equipment
Forming Part of Sentence [9.36.8.10.] 9.36.8.10.([3] 3)**

Type of Equipment	Energy Conservation Measures for Service Water Heating Equipment – Energy Efficiency, EF or UEF (1) (2)	Performance Testing Standard	Heating Degree-Days of <i>Building</i> Location, 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					
Gas- or oil-fired tankless condensing water heater	EF ≥ 0.95 or UEF ≥ 0.92	CAN/CSA-P.3	8.9	5.4	4.9	3.1	3.1	3.1
Gas- or oil-fired residential <i>storage-type service water heater</i>	EF ≥ 0.80 or UEF ≥ 0.83		8.9	5.4	4.9	3.1	3.1	3.1
Gas- or oil-fired residential-duty commercial <i>storage-type service water heater</i>	UEF ≥ 0.79		4.6	2.7	2.4	1.5	1.5	1.5
	UEF ≥ 0.85		6.0	3.6	3.2	2.0	2.0	2.0
Heat pump water heater	EF ≥ 2.35	CAN/CSA-C745	6.4	3.9	3.8	3.0	3.0	3.0

Notes to Table [9.36.8.10.-A] 9.36.8.10.:

- (1) EF = energy factor
UEF = uniform energy factor
- (2) Applies to *storage-type service water heaters* that heat potable water, including *storage-type service water heaters* used to generate heat in combined space- and water-heating systems.

- [4] --)** Where a drain-water heat-recovery unit is used, it shall
- [a] --) be installed in accordance with the manufacturer’s instructions, and
 - [b] --) recover heat from
 - [i] --) all above-ground showers, where there are one or two such showers, or
 - [ii] --) at least two above-ground showers, where there are more than two such showers.
- [5] --)** Drain-water heat-recovery units that comply with one of the energy conservation measures prescribed in Table 9.36.8.10.-B shall be credited with the corresponding energy conservation points stipulated therein.

**Table [9.36.8.10.-B]
Energy Conservation Measures and Points for Drain-Water Heat-Recovery Units
Forming Part of Sentence [9.36.8.10.] -- ([5] --)**

<u>Energy Conservation Measures for Drain-Water Heat-Recovery Units – Heat-Recovery Efficiency</u> ⁽¹⁾ ⁽²⁾	<u>Heating Degree-Days of Building Location, in Celsius Degree-Days</u>					
	<u>Zone 4</u> <u>≤</u> <u>3000</u>	<u>Zone 5</u> <u>3000</u> <u>to</u> <u>3999</u>	<u>Zone 6</u> <u>4000</u> <u>to</u> <u>4999</u>	<u>Zone 7A</u> <u>5000</u> <u>to</u> <u>5999</u>	<u>Zone 7B</u> <u>6000</u> <u>to</u> <u>6999</u>	<u>Zone 8</u> <u>≥</u> <u>7000</u>
	<u>Energy Conservation Points</u>					
<u>30%</u>	<u>2.4</u>	<u>1.9</u>	<u>1.9</u>	<u>1.9</u>	<u>1.9</u>	<u>1.5</u>
<u>40%</u>	<u>3.1</u>	<u>2.4</u>	<u>2.4</u>	<u>2.4</u>	<u>2.4</u>	<u>2.0</u>
<u>50%</u>	<u>3.7</u>	<u>2.9</u>	<u>3.0</u>	<u>2.9</u>	<u>2.9</u>	<u>2.4</u>
<u>60%</u>	<u>4.4</u>	<u>3.4</u>	<u>3.5</u>	<u>3.5</u>	<u>3.4</u>	<u>2.8</u>
<u>70%</u>	<u>5.0</u>	<u>3.9</u>	<u>4.0</u>	<u>4.0</u>	<u>3.9</u>	<u>3.2</u>
<u>75%</u>	<u>5.4</u>	<u>4.1</u>	<u>4.3</u>	<u>4.2</u>	<u>4.2</u>	<u>3.4</u>

Notes to Table [9.36.8.10.-B] :

- (1) [Heat-recovery efficiency shall be determined in accordance with CSA B55.1, "Test method for measuring efficiency and pressure loss of drain water heat recovery units."](#)
- (2) [For intermediate values of minimum heat-recovery efficiency, linear interpolation of energy conservation points is permitted.](#)

Impact analysis

This proposed change would improve the affordability of complying with the energy performance tiers through the prescriptive trade-off path. By assigning energy conservation points to drain-water heat-recovery (DWHR) units, Code users can get credit for the energy savings associated with these units. DWHR may be less costly than other energy conservation measures. In some jurisdictions, DWHR is mandatory.

In Table 1., the DWHR units with a heat-recovery efficiency of 70% and 75% have a 4 in. drain compared to a 3 in. drain for other efficiencies, resulting in a higher cost. The costs listed in Table 1. were valid on May 11, 2023.

Code users who choose to install a DWHR unit would be credited with between 1.5 and 5.4 energy conservation points, which represents the percentage energy savings, and would incur a cost of between \$402 and \$1,674.

Table 1. Comparison of Costs and Energy Savings of Various DWHR Units by Region

Heat-Recovery Efficiency	Energy Savings (%)	Cost of DWHR Unit (\$)						
		BC	AB	SK and MB	ON	QC	Atlantic Canada	Northern Canada
30%*	1.5–2.4	402	402	402	402	402	402	402
40%**	2.0–3.1	499	499	499	499	499	499	499
50%**	2.4–3.7	539	539	539	539	539	539	539
60%**	2.8–4.4	699	699	699	699	699	699	699
70%***	3.2–5.0	1410	1410	1410	1410	1410	1410	1410
75%***	3.4–5.4	1674	1674	1674	1674	1674	1674	1674

Source: homedepot.ca and renewability.com; prices include retail markup and Canada-wide free shipping.

Notes to Table 1.:

* Powerpipe DWHR unit, 3 in. drain (for unit with 30% efficiency).

** ThermoDrain DWHR unit, 3 in. drain with PEX (for units with 40% to 60% efficiency).

*** Powerpipe DWHR unit, 4 in. drain (for units with 70% and 75% efficiency).

Enforcement implications

This proposed change could be easily enforced by the existing Code enforcement infrastructure because the percentage efficiency of the DWHR unit appears on the product sticker.

Who is affected

Designers, engineers, architects, builders and building officials.

OBJECTIVE-BASED ANALYSIS OF NEW OR CHANGED PROVISIONS

NBC20 Div.B 9.36.8.10. (first printing)

[9.36.8.10.] 9.36.8.10. ([1] 1) no attributions

[9.36.8.10.] 9.36.8.10. ([2] 2) no attributions

[9.36.8.10.] 9.36.8.10. ([3] 3) [F96-OE1.1]

[9.36.8.10.] -- ([4] --) [F96-OE1.1]

[9.36.8.10.] -- ([5] --) [F96-OE1.1]