ADOPTION OF THE PROPOSED 2020 TIERED NATIONAL BUILDING CODE OF CANADA IN ONTARIO
PART 9.36

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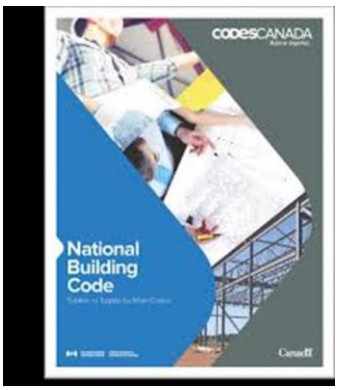
WHAT IS NBC 9.36 2020 ???

Think of it as the same as SB-12

Options for Compliance:

1. ~~Prescriptive Minimums:~~
   - ~~Building envelope, HVAC, Water heating~~
   - ~~Different packages for HRV or not~~
   - ~~Different packages for Climate Zones 3-8~~
2. Tiered Prescriptive – must achieve 'ECM' points (like EnergyStar BOP's)
3. Tiered Performance:
   - Proposed vs. reference house approach using simulation software such as HOT2000 or other software that is compliant with 9.36.5
   - EnerGuide Option – Use Hot2000 to confirm compliance (Code Compliance Tab)



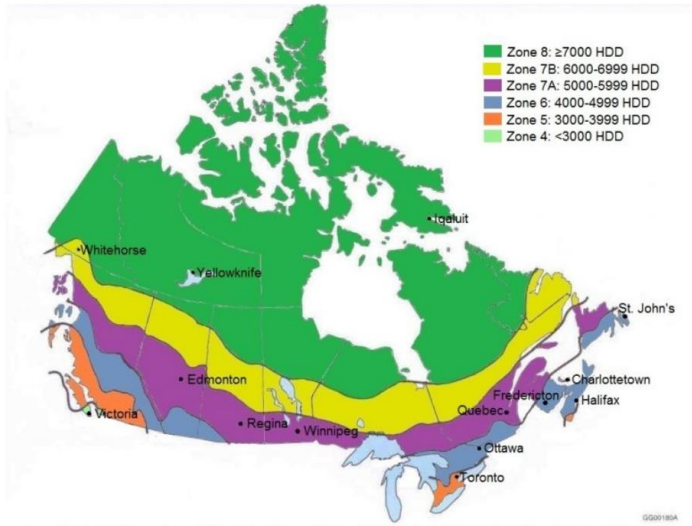
Overview of Proposed Adoption of NBC 9.36 in Ontario

1. Tiered **Prescriptive** Path
   - Must meet Tier 3 = **20** Energy Conservation Points (think ENERGYSTAR BOP)
2. Tiered **Performance** Path
   - Must meet Tier 3 = **20%** Lower Energy, **10%** Lower Heat Loss, and same or lower design heat loss
3. Tiered **Performance** w/ERS
   - Alignment with EnerGuide for Performance Modelling = Check target in Hot2000

- *Airtightness Testing as option in Performance and Prescriptive*
- *Tier 4 and Tier 5 are not mentioned!*
- *HRV/ERV's are not mandatory*
- *Drainwater heat recovery is not mandatory*

Climate Zones

- Reference minimums change with Climate Zone
- ECM Points change too
- See Division B - Appendix C – Table C-2 "Climatic Design Data for Selected Locations in Canada" for most cities in Canada



OPTION #1: Tiered Prescriptive Path 9.36.7 : point based picklist

Wall ECM Points

- Approach uses energy conservation measures which have energy conservation points.
- Similar to the ENERGY STAR for New Homes prescriptive BOPs, builders choose sufficient measures such that sum of points meets the Tier target.
- Approach enables flexibility and is easy to extend by including new measures in the future.
- HRVs are mandatory in this path, all other measures are optional

Energy Conservation Measures for Above-Ground Walls – Minimum Effective RSI Values, $(m^2 \cdot K)/W$	Heating Degree-Days of *Building* 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					
2.97	2.0	–	–	–	–	–
3.08	3.2	1.4	1.6	2.1	–	–
3.69	7.4	5.4	6.2	6.7	5.4	5.2
3.85	8.2	6.0	6.9	7.4	6.2	6.0
3.96	8.9	6.8	7.7	8.2	7.0	6.8
4.29	10.2	8.1	9.2	9.7	8.6	8.4
4.40	10.8	8.7	9.9	10.3	9.3	9.1
4.57	11.4	9.3	10.6	11.1	10.1	9.9
4.73	11.9	9.7	11.1	11.5	10.6	10.4
4.84	12.3	10.2	11.6	12.1	11.2	10.9
5.01	12.9	10.7	12.2	12.7	11.8	11.6
5.45	14.0	11.9	13.6	14.0	13.3	13.1

Window ECM Points

Energy Conservation Measures for Fenestration and Doors (1)		Heating Degree-Days of *Building* Location, in Celsius Degree-Days					
~~Energy Conservation Measures for Fenestration and Doors (2) –~~ Maximum U-values, $W/(m^2 \cdot K)$	Minimum Energy Ratings (3)	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					
1.6~~10~~	25	1.9	1.8	–	–	–	–
1.4~~40~~	29	3.8	3.6	1.6	1.8	–	–
1.2~~20~~	34	6.9	7.0	4.6	5.5	3.2	3.4

Below Grade Wall ECM Points

Energy Conservation Measures for *Foundation* Walls – Minimum Effective RSI Values, (m^2·K)/W	Heating Degree-Days of *Building* 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					
2.98	1.7	–	–	–	–	–
3.09	1.8	0.2	0.2	0.2	0.2	–
3.46	2.2	0.6	0.8	0.6	0.7	–
3.90	2.6	1.2	1.4	1.1	1.3	–

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Airtightness ECM Points

- 9.36.6.3-**A**
- 9.36.6.3-**B**

Energy Conservation Measures for Airtightness – Airtightness Levels (1)	Heating Degree-Days of *Building* 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					
Airtightness Levels from Table 9.36.6.~~4~~3.-A (PCF 1610)						
AL-1A	–	–	–	–	–	–
AL-2A	2.0	3.4	3.5	4.6	6.1	6.1
AL-3A	4.0	6.7	7.0	9.3	12.1	12.11
AL-4A	5.9	10.1	10.5	13.9	18.0	18.0
AL-5A	7.6	13.0	13.4	17.8	22.7	22.7
Airtightness Levels from Table 9.36.6.~~4~~3.-B (PCF 1610)						
AL-1B	–	–	–	–	–	–
AL-2B	–	–	–	–	–	–
AL-3B	2.2	3.0	3.5	4.6	4.1	4.6
AL-4B	4.0	6.0	6.9	9.1	8.2	9.3
AL-5B	6.0	9.1	10.4	13.6	12.3	14.2
AL-6B	7.7	11.6	13.3	17.4	15.6	18.2

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Air Tightness Targets

Table [9.36.6.4.-A]
~~Air Leakage Rates~~Airtightness Levels for Single Zones ~~Tested Using the Guarded or~~and ~~Unguarded Parameter and for~~ Attached Zones ~~Tested~~Determined Using the Guarded ~~Parameter~~Method
Forming Part of Sentences 9.36.6.~~3~~4.(1) and (3) ~~and (5)~~

Airtightness Levels	ACH_{50}	Airtightness Metrics			
		NLA_{10}, cm^2/m^2		NLR_{50}, $L/s \times m^2$	
		~~cm^2/m^2~~	~~$in.^2/100\ ft.^2$~~	~~$L/s \cdot m^2$~~	~~$cfm_{50}/ft.^2$~~
		~~Air Leakage Rates~~Maximum Airtightness Values			
AL-1A	2.5	1.20	~~1.73~~	0.89	~~0.17~~
AL-2A	2.0	0.96	~~1.38~~	0.71	~~0.14~~
AL-3A	1.5	0.72	~~1.04~~	0.53	~~0.10~~
AL-4A	1.0	0.48	~~0.69~~	0.35	~~0.070~~
AL-5A	0.6	0.29	~~0.42~~	0.21	~~0.042~~

Table [9.36.6.4.-B]
~~Air Leakage Rates~~Airtightness Levels for Attached Zones ~~Tested~~Determined Using the Unguarded ~~Parameter~~Method
Forming Part of Sentences 9.36.6.~~3~~4.(1) and (~~3~~4) ~~and (6)~~

Airtightness Levels	ACH_{50}	Airtightness Metrics			
		NLA_{10}, cm^2/m^2		NLR_{50}, $L/s \cdot m^2$	
		~~cm^2/m^2~~	~~$in.^2/100\ ft.^2$~~	~~$L/s \cdot m^2$~~	~~$cfm_{50}/ft.^2$~~
		~~Air Leakage Rates~~Maximum Airtightness Values			
AL-1B	3.0 ~~(1)~~	1.92	~~2.76~~	1.17	~~0.23~~
AL-2B	2.5	1.6	~~2.3~~	0.98	~~0.19~~
AL-3B	2.0	1.28	~~1.84~~	0.78	~~0.15~~
AL-4B	1.5	0.96	~~1.38~~	0.59	~~0.12~~
AL-5B	1.0	0.64	~~0.92~~	0.39	~~0.077~~
AL-6B	0.6	0.38	~~0.55~~	0.23	~~0.046~~

- Guarded testing is not very common
- Consider Table –A for Detached testing and Table –B for Attached?

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Ventilation ECM Points

Energy Conservation Measures for Ventilation Systems – Sensible Heat-Recovery Efficiency, SRE (1)	Heating Degree-Days of *Building* 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					
60% ≤ SRE < 65%	0.7	0.7	0.7	0.6	0.8	0.4
65% ≤ SRE < 75%	2.1	2.1	2.2	1.7	2.3	1.2
75% ≤ SRE < 84%	3.4	3.2	3.5	2.7	3.7	1.8

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Water Heater ECM Points

- Also known as 'Service Water Heating'

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 *Building* 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	CSA P.3	1.38.9	0.95.4	0.84.9	0.73.1	0.73.1	0.73.1
Gas or oil-fired residential storage-type water heater	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 storage-type water heater	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

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Building Size (Volume) ECM Points

Table [9.36.6.11.] 9.36.6.11.
Energy Conservation Points for Building Volume
Forming Part of Sentence 9.36.6.11.(2)

Building Volume (V), m^3	Energy Conservation Points
380 < V ≤ 390	1
370 < V ≤ 380	2
360 < V ≤ 370	3
350 < V ≤ 360	4
340 < V ≤ 350	5
330 < V ≤ 340	6
320 < V ≤ 330	7
310 < V ≤ 320	8
300 < V ≤ 310	9
V ≤ 300	10

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Heating and Cooling System ECM Points??

- NO
- Minimums are in table 9.36.3.10 and are different than current SB12
- AC – SEER 14.5
- ASHP – HSPF 7.1
- Gas Boiler - 90% AFUE
- Gas Furnace - 95% with ECM
- Combo - TPF 0.8

Type of ~~Component or~~ Equipment	Heating or Cooling Capacity, kW	Performance Testing Standard	Minimum Performance (1)
Air-Cooled Unitary Air Conditioners and Heat Pumps – Electrically Operated			
Split system	~~≤~~< 19	CSA C656	SEER = 14.5
			EER = 11.5
			HSPF V = 7.1 ~~(region 5 in standard)~~
Single-package system	~~≤~~< 19	CSA C656 ~~(including General Instruction No. 2)~~	SEER = 14
			EER = 11
			HSPF V = 7.0 ~~(region 5 in standard)~~
~~All systems~~	~~> 19~~	~~CAN/CSA-C746~~	~~See Level 2 in standard~~
Heat pumps, split and single-package	≥ 19	See Table 5.2.12.1. of Division B of the NECB (PCF 1621)	
Gas-fired *boilers* (3)	~~≤88~~ < 88	CSA P.2	AFUE ≥ 90%
	~~> 88 and ≤ 117.23~~≥ 88 and < 733	~~AHRI BTS~~ANSI/AHRI 1500-2015 or DOE 10 CFR, Part 431, Subpart E, Appendix A	E_t ≥ 83%
Warm-Air Furnaces, Combination Warm-Air Furnace/Air-conditioning Units, Duct Furnaces and Unit Heaters			
Gas-fired warm-air *furnaces* (3)	≤ ~~65.9~~66 using single-phase electric current	CSA P.2 ~~CAN/CSA-P.8~~	AFUE ≥ ~~92%~~95% and must be equipped with a high-efficiency constant torque or constant airflow fan motor

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Let's look at some packages that meet:

Tiered Prescriptive Path 9.36.7 - Let's go find 20 ECM pts for Tier 3

Performance Path 9.36.5 – Proposed design must meet the 3 targets (Overall Energy Consumption, Envelope Heat Loss and Heat Gain)

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