TECHNICAL BULLETIN
No.32 - 060612

CHANGES TO CANADIAN ENERGY CODES 2012 - COMMERCIAL & RESIDENTIAL

Updated Codes Expected Release Dates:

- *NBCC 2010*
  Available now. Check with your local jurisdictions for planned adoption date.
- *NBCC 2010, Part 9, Energy Efficiency Requirements (residential)*
  Late 2012
- *MNECB 2011 (commercial)*
  Available now. Check with your local jurisdictions for planned adoption date.

Many changes have been made to the new energy code requirements. Among them the demand for better building envelope designs that require more air tight structures with a continuous air barrier, and greater thermal insulation values.

The new energy code requirements are a natural fit for buildings constructed with LOGIX. However, other wall systems, such as CMU and framed walls, are looking at more labor and material costs, to meet the new air leakage and greater insulation requirements.

This document summarizes the new energy code requirements related to wall systems, in particular thermal insulation and air leakage requirements, in both the new Part 9, Energy Efficiency Requirements, and the National Energy Code for Buildings 2011 (NECB 2011)

The new energy requirements for houses and small buildings, that will be part of the NBCC 2010, will replace the MNECH 1997. No further updates to MNECH 1997 will apply.

Energy requirements for buildings outside the scope of Part 9 of the NBCC (commercial buildings) will be based on NECB 2011.

CHANGES TO THE MODEL NATIONAL ENERGY CODE FOR HOUSES 1997 (Residential)

The Model Energy Code for Houses 1997 (MNECH 1997) will no longer be updated once the new Energy Efficiency requirements are published (expected to be released in late 2012). For the first time the Energy Efficiency requirements will be published as a new section in Part 9 of the National Building Code of Canada 2010.

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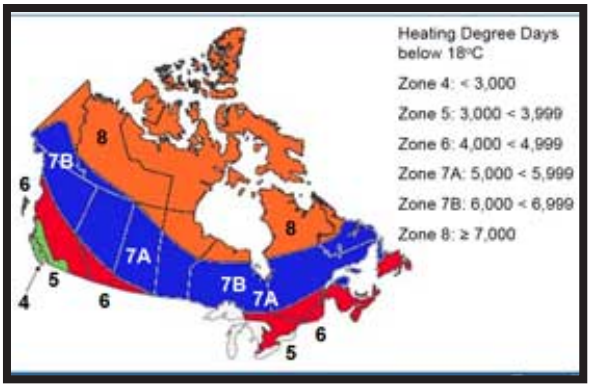

Although the Part 9, Energy Efficiency Requirements, are still in development, it is anticipated the prescriptive requirements will be equivalent to an energy target level of EnerGuide 80. (The code itself will not directly reference EnerGuide 80 or other specific rating systems.)

Energuide 80 is a standard measure used to indicate the energy efficiency of a home based on a scale of zero to 100.

An Energuide Rating of zero means a home has no insulation , major air leakage, and high energy consumption.

An Energuide Rating of 100 means a home is well insulated, air tight, well ventilated, and requires no purchased energy.

Higher Insulation Values

The expected Part 9 insulation values for above- and below-grade wall assemblies are noted below.

Climate Zones	Wall WITHOUT Heat Recovery Ventilators		Wall WITH Heat Recovery Ventilators	
	Above-grade, RSI(R) [1, 2]	Below-grade, RSI(R)[1, 2]	Above-grade, RSI(R)[1, 2]	Below-grade, RSI(R)[1, 2]
Zone 4 (<3000 HDD[3])	2.93 (R16.6)	2.05 (R11.6)	2.93 (R16.6)	2.05 (R11.6)
Zone 5 (3000 to 3999 HDD[3])	3.27 (R18.6)	3.17 (R18.0)	3.16 (R17.9)	3.17 (R18.0)
Zone 6 (4000 to 4999 HDD[3])	↓	↓	↓	↓
Zone 7a (5000 to 5999 HDD[3])	↓	3.57 (R20.3)	↓	↓
Zone 7b (6000 to 6999 HDD[3])	4.13 (R23.5)	↓	3.27 (R18.6)	↓
Zone 8 (≥ 7000 HDD[3])	↓	4.17 (R23.7)	↓	↓

1. Insulation values shown are the effective insulation values of the complete wall assembly (includes insulation of each wall component including air films).
2. Thermal insulation values are in metric, or RSI units. For reference, the converted imperial, or R-values, are in parenthesis.
3. HDD stands for Heating Degree Days. In basic terms, HDD is a measure of the amount of heat energy required to maintain a constant indoor air temperature, typically at 18°C, as outdoor temperatures fluctuate. HDD increases in colder climates since more heat energy is required to maintain a constant temperature.

The above table shows that even in the colder climate zones, wall assemblies built with LOGIX 4" Standard Pro forms can meet the thermal insulation value of R23.7[1].

The new insulation values also take into account thermal bridging effects found in stud walls. As a result stud framed walls will require a combination of both continuous insulation and higher cavity insulation R-values.

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ACH (air changes per hour) is a measure of the volume of air that is replaced every hour in a defined space at a given air pressure. The lower the ACH the more airtight the building.

Air Leakage Requirements

The concrete core of LOGIX provides an air tight wall assembly that typically provides Blower Door test results less than 1 ACH (air changes per hour) at 50 Pa for buildings built with LOGIX.

Although, LOGIX is considered an air barrier, and therefore, does not require a Blower Door test, it is worth noting that other wall systems that do not meet the prescriptive air barrier requirements will require a Blower Door test.

The minimum passing requirement is expected to be less than or equal to 2.5 ACH (air changes per hour) per hour at 50 Pa.

CHANGES TO THE NATIONAL ENERGY CODE FOR BUILDINGS 2011 (Commercial)

Released in November 2011, the NECB 2011 applies to buildings that fall outside of Part 9 of the NBCC 2010 (buildings exceeding 600 m^2 in building area, or exceeding 3 storeys in building height).

The overall intent of the update to the NECB 2011 is to set energy target levels that will make buildings a minimum of 25% more energy efficient than buildings complying with the NECB 1997.

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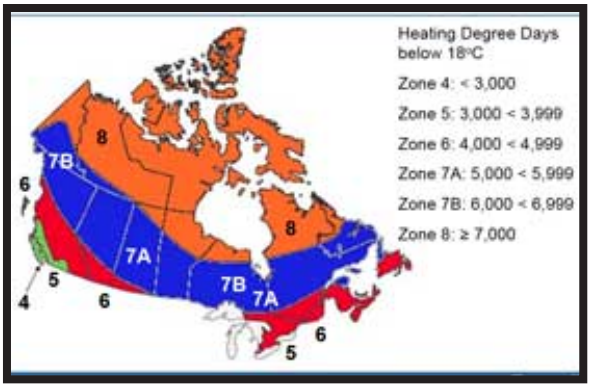

To compare the prescriptive R-value requirements against LOGIX R-values, a table showing the R-values of vairous LOGIX wall assemblies have been prepared. The table can be found on page 6 of Technical Bulletin 30, Total R-value of LOGIX Wall Assemblies.

Higher Insulation Values

Under the NECB 2011, the minimum required insulation values are higher than what is expected under Part 9 for Energy Efficiency.

Climate Zones	Walls Above-grade, U-value (RSI, R-value)[1, 2]	Walls Below-grade, U-value (RSI, R-value)[1, 2]
Zone 4 (<3000 HDD[3])	0.315 (RSI-3.17, R18.0)	0.568 (RSI-1.76, R10.0)
Zone 5 (3000 to 3999 HDD[3])	0.278 (RSI-3.60, R20.4)	0.379 (RSI-2.64, R15.0)
Zone 6 (4000 to 4999 HDD[3])	0.247 (RSI-4.05, R23.0)	0.284 (RSI-3.52, R20.0)
Zone 7a (5000 to 5999 HDD[3])	0.210 (RSI-4.76, R27.0)	↓
Zone 7b (6000 to 6999 HDD[3])	↓	↓
Zone 8 (≥ 7000 HDD[3])	0.183 (RSI-5.46, R31.0)	0.210 (RSI-4.76, R27.0)

1. Insulation values shown are the effective insulation values of the complete wall assembly (includes insulation of each wall component including air films).
2. Under NECB 2011, insulation values are presented as U-values, or thermal transmittance values. U-values are the inverse of R-values (U = 1/R). For reference, the converted thermal resistance values in metric and imperial, are shown in parenthesis.
3. HDD stands for Heating Degree Days. In basic terms, HDD is a measure of the amount of heat energy required to maintain a constant indoor air temperature, typically at 18°C, as outdoor temperatures fluctuate. HDD increases in colder climates since more heat energy is required to maintain a constant temperature.

The above table shows that for below-grade walls, LOGIX can meet the insulation requirements of R20 with LOGIX 4" Standard Pro Forms for Climate Zones 4 to 7b[1]. This is also the case for above-grade walls from Zones 4 to 6 where the minimum insulation requirement is as high as R23[1].

For Zone 8 , walls built with LOGIX 4" Platinum can meet the insulation requirement of R27 for below-grade walls, and Zones 7a and 7b for above-grade walls[2].

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Where R-values measure resistance to heat flow, U-values measure how well a material allows heat to flow through (thermal conductance).

The higher the U-value the better the material is at allowing heat to pass. The more heat that passes through a material then the less effective it acts as insulation – the lower the R-value.

In other words, as the U-value decreases the R-value increases, and vice versa (U-value is the inverse of the R-value). To determine the U-value, simply divide 1 by the R-value.

Window and door manufacturers often use both R- and U-values to grade their products. For windows and doors, the lower the U-value the better it is at keeping out heat and cold.

Metals and expanded polystyrene (EPS) are good examples of materials that conduct and resist heat well. Most metals conduct heat, therefore, are bad insulators (high-U value, low R-value); EPS does not conduct heat well, therefore, are good insulators (low U-value, high R-value).

LOGIX XRV panels can meet the R31 insulation value requirement for above-grade walls in Zone 8[3].

Similar to the upcoming Energy Efficiency Requirements of Part 9, the new insulation values also take into account thermal bridging effects found in stud walls. As a result stud framed walls will require a combination of both continuous insulation and higher cavity insulation R-values.

Air Leakage Requirements

Under the NECB 2011, a Blower Door test is required under the performance path method.

The required minimum passing value is less than or equal to 0.25 L/(s-m^2) @ 50Pa. However, wall systems that are considered an air barrier, such as LOGIX, do not require the Blower Door test.

Adoption of NECB 2011

There was strong support to update the NECB 1997 from many jurisdictions in Canada. The following Provinces and territories have either adopted or are considering adopting the NECB 2011, and tailoring it to suit their own policy needs.

- Yukon, Alberta, Manitoba, Ontario, Quebec, Prince Edward Island, and Nova Scotia.

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A complete list of total R-values for LOGIX form products is available in Section 8.5 of the LOGIX Design Manual.

Proper design of the exterior walls of a building play a significant role in complying with the new energy requirements. Because LOGIX creates air-tight structures that naturally create a continuous air barrier and excellent insulation values the new energy targets will be easy to achieve for buildings using LOGIX. However, framed wall and CMU construction will be more expensive to build with as it struggles to meet the new energy requirements.

For further information contact your local LOGIX representative or e-mail info@logixicf.com.

Related Articles:

1. Technical Bulletin 23, Thermal Performance: The ICF Effect
2. Technical Bulletin 27, Changes to the Canadian Building Codes
3. Technical Bulletin 28, Changes to the US Building Codes 2012
4. Technical Bulletin 30, Total R-value of LOGIX Wall Assemblies
5. Technical Bulletin 33, Changes to the US Energy Codes 2012 - Commercial & Residential
6. Technical Bulletin 34, Ontario Energy Codes 2012 - Commercial & Residential

1. Intertek Test Report, Thermal Resistance of LOGIX ICF Wall System
2. Intertek Test Report, Thermal Resistance of LOGIX ICF Wall System Project #100050754COQ-001.