



Ministry of Municipal Affairs and Housing
Ministère des Affaires municipales et du Logement

Energy Conservation Amendments to the Ontario Building Code

OBOA
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By:
Cengiz (Jengis) Kahramanoglu, P. Eng.,
Building & Development Branch

Energy Efficiency Changes

- Background
- Changes made to Part 12
- New Supplementary Standard SB-12
“Energy Efficiency For Housing”

Notice:

- This presentation is intended for general information purposes only. It only **highlights** certain provisions of the Building Code. Code users are strongly advised to consult the official records for specific legislative and regulatory requirements, including:
 - The *Building Code Act, 1992*, as amended; and
 - The Building Code,

- Copies of these documents are available from Publications Ontario at 1-800-668-9938 or eLaws at www.e-laws.gov.on.ca

Background

- Significant changes related to energy efficiency requirements included in the 2006 Building Code:
 - More stringent insulation values took effect on December 31, 2006, and
 - Near-full height basement insulation requirement came into force On December 31, 2008,
 - other changes will be implemented on December 31, 2011

Next Step

- 2006 Building Code Part 9 Residential Buildings
 - shall meet the performance level that is equal to a rating of 80 or more when evaluated in accordance with NRCan, “EnerGuide for New Houses: Administrative and Technical Procedures”.
- This performance path would have become the only way to meet energy efficiency compliance for Part 9 buildings
- Concerns were raised with respect to the implementation of EnerGuide 80
- It was agreed that a prescriptive alternative compliance option was needed

Part 12 Revisions

Section 12.2. Energy Efficiency

12.2.1. General

12.2.1.1. Energy Efficiency Design

.....

(3) The energy efficiency of a *building* or part of a *building* of *residential occupancy* that is within the scope of Part 9 and is intended for *occupancy* on a continuing basis during the winter months shall,

(a) conform to the thermal insulation requirements of Subsection 12.3.2.,

(b) conform to the thermal design requirements of Subsection 12.3.3.,

(c) provide a rating of 80 or more when evaluated in accordance with NRCan “EnerGuide for New Houses: Administrative and Technical Procedures”, **or**

(d) conform to Supplementary Standard SB-12.

Part 12 Revisions

12.2.1.2. Energy Efficiency Design After December 31, 2011

- Revised Sentence 12.2.1.2.(3)

(3) The energy efficiency of a *building* or part of a *building* of *residential occupancy* that is within the scope of Part 9 and is intended for *occupancy* on a continuing basis during the winter months shall,

- (a) meet the performance level that is equal to a rating of 80 or more when evaluated in accordance with NRCan, “EnerGuide for New Houses: Administrative and Technical Procedures”, **or**
- **(b) conform to Supplementary Standard SB-12.**
- Subsections 12.3.1., 12.3.2. and 12.3.3. will be revoked

Energy Efficiency Changes

- **New Supplementary Standard SB-12
“Energy Efficiency For Housing”**

Development of SB-12

- Ontario Archetype House
 - Review of 100 sample houses
 - Blower door tests
 - Determination of Average dimensions and air leakage rates
- Annual Energy Use Calculations
 - HOT2000 (with Version 9.34c) Simulations
- Achieving EnerGuide 80 level in general similar to Energy Star

Supplementary Standard SB-12

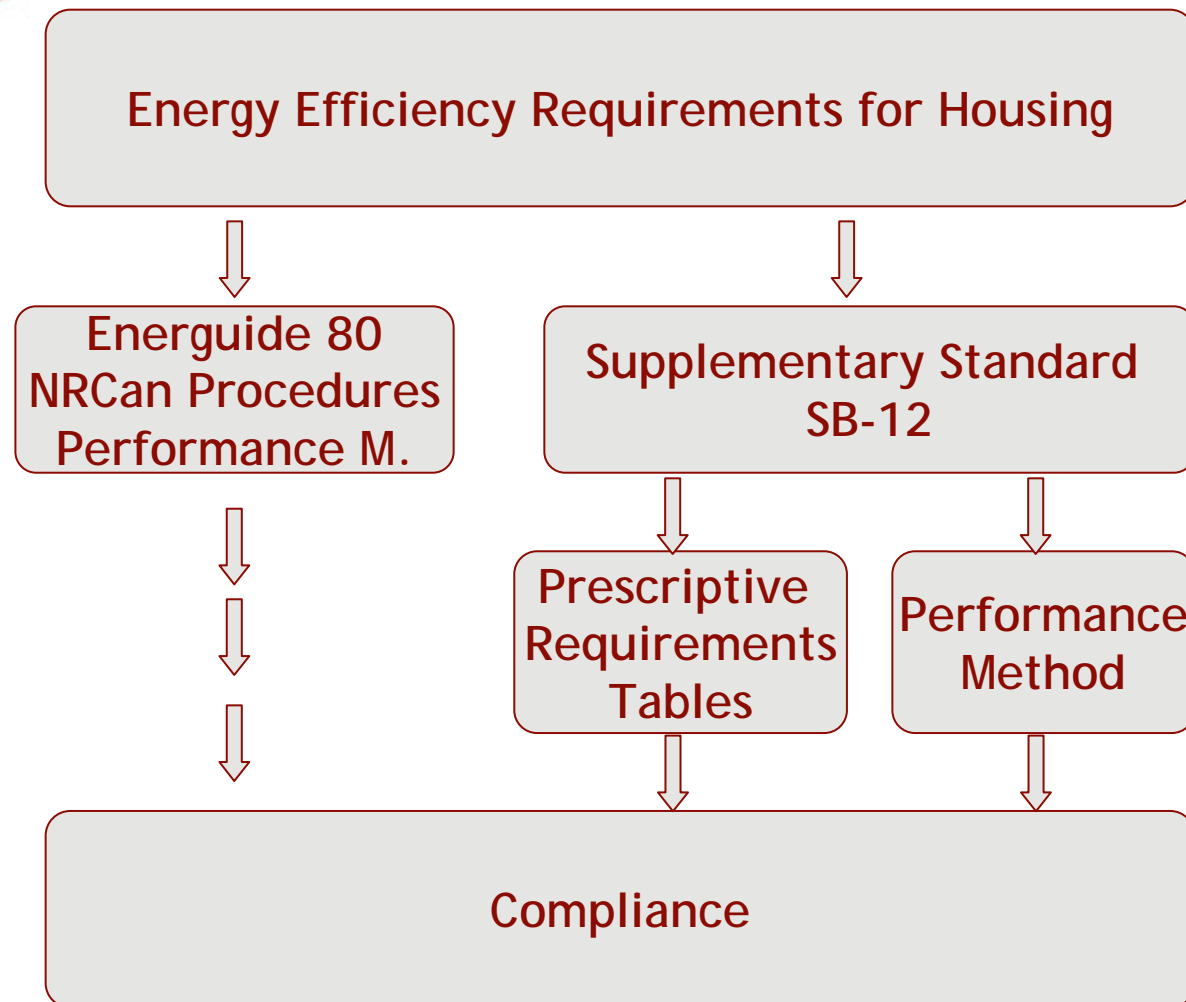
Supplementary Standard SB-12

“Energy Efficiency for Houses”

Outlines Energy efficiency requirements for Part 9
Residential Buildings

- Chapter 1 General
- Chapter 2 Acceptable Solutions for Energy Efficiency Compliance
 - Prescriptive Compliance Packages
 - Performance Method
- Chapter 3 Measure to Control Air Infiltration
 - Air leakages rate for Exterior Windows
 - Air Barrier Systems (enhanced 9.25.3.)

Compliance Options



Supplementary Standard SB-12

Chapter 2 - Acceptable Solutions

Application:

- Prescriptive Compliance Packages
 - Rules and limitations
- Alternative Performance Compliance
 - No limitations

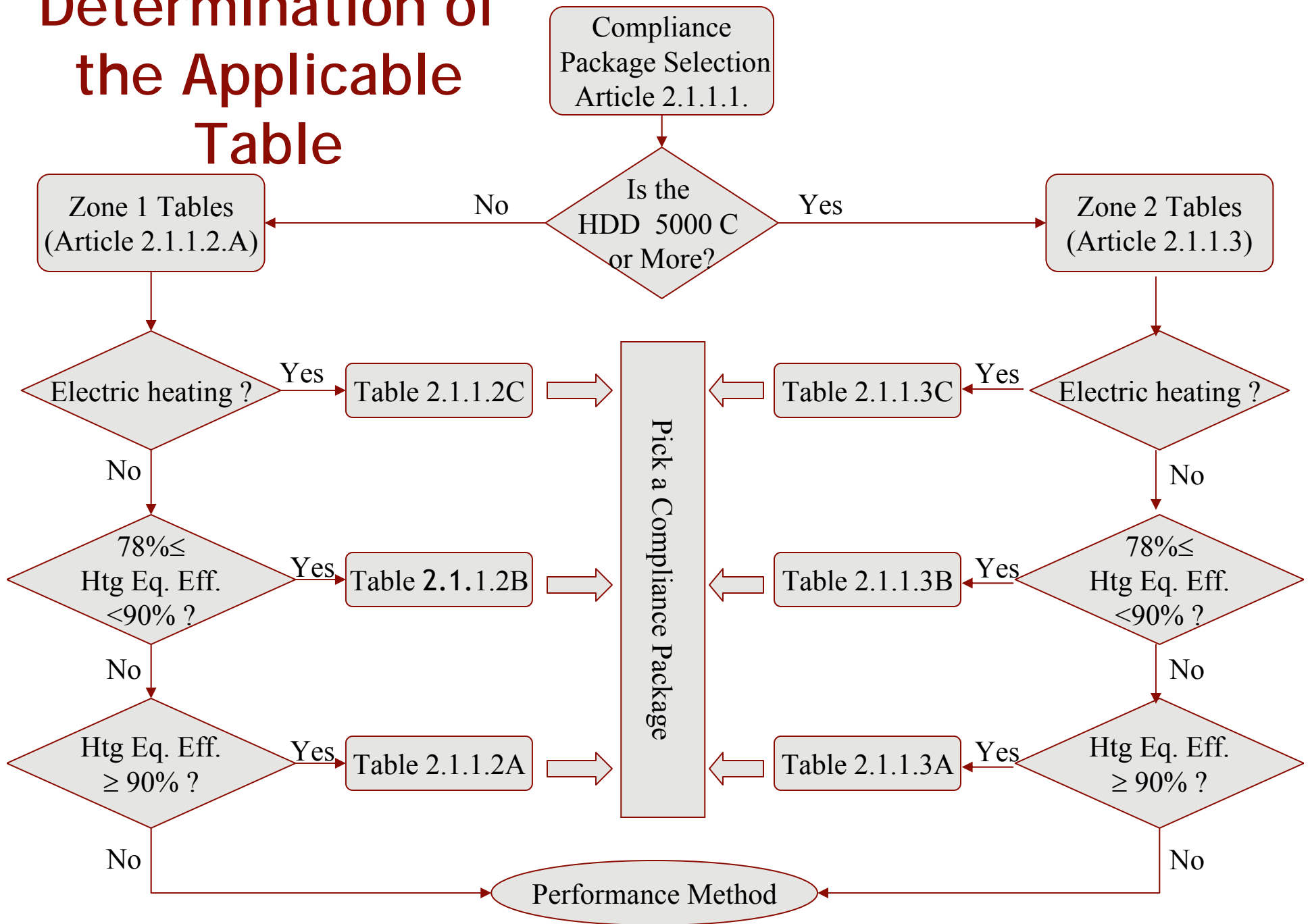
Chapter 2 Acceptable Solutions Compliance Packages

- The Prescriptive Compliance packages
 - Provide options and
 - are prepared based on
 - Climate,
 - space heating equipment, and
 - Space heating fuel/Energy type.
- A compliance package includes requirements for:
 - Building Envelope (walls, glazing, ceiling, floor, etc.)
 - Space Heating Equipment (min efficiency)
 - Domestic Hot Water Heating Equipment (min efficiency)
 - May also include Ventilation Equipment (HRV) (min efficiency)

Supplementary Standard SB-12 Compliance Packages

- Zone 1 Tables are for locations up to 5000 DDH
 - Space heating Equipment AFUE 90% or more
 - 78% \geq Space heating Equipment AFUE <90% or more
 - Electric space heating
- Zone 2 Tables are for locations 5000 DDH or more
 - Space heating Equipment AFUE 90% or more
 - 78% \geq Space heating Equipment AFUE <90% or more
 - Electric space heating

Determination of the Applicable Table



Exposed Floor Minimum RSI (R)-Value ⁽¹⁾	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)
Walls Above Grade Minimum RSI (R)-Value ⁽¹⁾	4.23 (R24)	4.75 (R27)	4.75 (R27)	4.23 (R24)	4.23 (R24)	4.23 (R24)	4.23 (R24)	4.23 (R24)	3.87 (R22)	3.87 (R22)	3.87 (R22)	4.23 (R24)	4.23 (R24)
<i>Basement</i> Walls Minimum RSI (R)-Value ⁽¹⁾	3.52 (R20)	3.52 (R20)	3.52 (R20)	3.52 (R20)	3.52 (R20)	2.11 (R12)	2.11 (R12)	2.11 (R12)	3.52 (R20)	2.11 (R12)	3.87 (R22)	3.87 (R22)	3.52 (R20)
Below Grade Slab Entire surface > 600 mm below grade Minimum RSI (R)-Value ⁽¹⁾	0.88 (R5)	-	-	-	-	-	-	-	-	-	-	-	-
Edge of Below Grade Slab ≤ 600 mm Below Grade Minimum RSI (R)-Value ⁽¹⁾	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)
Heated Slab or Slab ≤ 600 mm below grade Minimum RSI (R)-Value ⁽¹⁾	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)
Windows and Sliding Glass Doors Maximum U-Value ⁽²⁾	1.6	1.6	1.8	1.8	1.8	1.8	1.8	2	1.8	1.8	1.8	1.8	1.8
Skylights Maximum U-Value ⁽²⁾	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Space Heating Equipment Minimum AFUE	90%	90%	94%	94%	90%	94%	92%	94%	92%	94%	90%	94%	90%
HRV Minimum Efficiency	-	-	-	-	55%	60%	60%	70%	55%	60%	-	-	-
Domestic Hot Water Heater Minimum EF	0.57 ⁽³⁾	0.57 ⁽³⁾	0.62	0.67	0.57 ⁽³⁾	0.57 ⁽³⁾	0.62	0.67	0.62	0.67	0.57 ⁽³⁾	0.57 ⁽³⁾	0.80
Column 1	2	3	4	5	6	7	8	9	10	11	12	13	14



ZONE 1 Compliance Packages for Space Heating Equipment with 90% AFUE or higher

Component (minimum efficiency)	2006 Code	Compliance Package									
		A	B	C	D	E	F	G	H	I	J
Ceiling (Imperial Units)	R40	R50									
Ceiling Below Attic (Imperial Units)	R28	R31									
Walls Above Grade (Imperial Units)	R19	R24	R27	R27	R24	R24	R24	R24	R24	R22	R22
Windows/Sliding Doors (max U-W/m ² • K)	2.0	1.6	1.6	1.8	1.8	1.8	1.8	1.8	2.0	1.8	1.8
Skylights (max U-W/m ² • K)	-	2.8									
Basement Walls (Imperial Units)	R12	R20	R20	R20	R20	R20	R12	R12	R12	R20	R12
Exposed Floor (Imperial Units)	R25	R31									
Slab >600mm B/G- entire surface (Imp.U)	-	R5	-	-	-	-	-	-	-	-	-
Edge of the slab =<600mm B/G (Imp.U)	R8	R10									
Heated Slab-at-G/ B/G- entire surf. (Im.U)	R10	R10									
Equipment (min AFUE)	90	90	90	94	94	90	94	92	94	92	94
Minimum HRV Efficiency (%)	-	-	-	-	-	55	60	60	70	55	60
Domestic Hot Water (min EF)	0.57	0.57	0.57	0.62	0.67	0.57	0.57	0.62	0.67	0.62	0.67

Supplementary Standard SB-12 Compliance Packages

Rules & Limitations:

- Where the space heating is supplied by a earth energy systems or solid fuel burning appliance, the building is permitted to comply with appropriate compliance package in Table 2.1.1.2A or 2.1.1.3.A
- Where glass block is used in a wall, thermal performance of the building envelope shall be maintained
- There is a limitation on window to wall ratio (WWR)
 - $17\% < WWR \leq 22$ Windows are required to be updated
 - Over 22% WWR must comply with performance methods.
- Skylights included but glass portions of the main entrance door is exempt.

Supplementary Standard SB-12 Compliance Packages

Rules & Limitations:

- Windows must comply with either U value or ER (Table 2.1.1.8)

Table 2.1.1.8.
Energy Ratings (ER) for Windows, Skylights and Sliding Glass Doors
 Forming Part of Sentence 2.1.1.8.(1)

	Maximum U-Values		Minimum Energy Rating (ER) Values		Energy Star Zone
	U-Value (W/m ² •K)	U-Value (Btu/h•ft. ² •°F)	Operable	Fixed	
Skylights	2.8	0.5	-	-	
Windows and Sliding Glass Door Types	2	0.35	17	27	A
	1.8	0.32	21	31	B
	1.6	0.28	25	35	C
	1.4	0.25	29	39	D

Supplementary Standard SB-12 Compliance Packages

Limitations:

Sentence 2.1.1.1.

- (8) Except as permitted in Sentences (9) and 2.1.1.10.(4), where the ratio of the gross area of windows, sidelights, skylights, glazing in doors and sliding glass doors to the gross area of peripheral walls measured from grade to the top of the upper most ceiling is more than 17% but not more than 22%, the *building* shall comply with a compliance package selected from Tables 2.1.1.2.A, 2.1.1.2.B and 2.1.1.2.C and Tables 2.1.1.3.A, 2.1.1.3.B and 2.1.1.3.C, and the overall coefficient of heat transfer of the glazing shall be upgraded to
- (a) 1.8 where the selected compliance package requires 2.0,
 - (b) 1.6 where the selected compliance package requires 1.8, and
 - (c) 1.4 where the selected compliance package requires 1.6.

Supplementary Standard SB-12 Compliance Packages

Additional Requirements:

- Where a dwelling unit has a walkout basement,
 - exterior basement walls shall have the thermal performance equal to the performance of the above grade walls.
 - Slab edge shall be insulated R10 min for 600mm
- Where a house is slab on grade construction (within 600mm to grade), entire slab shall be insulated with R10.
- Where a slab contains heating elements, heated portions shall be insulated with R10.
- The un-insulated gap at the bottom of a basement wall is reduced to 200mm from 380mm.

Supplementary Standard SB-12

Additions to Existing Buildings

Additions to Existing Buildings:

- Shall comply with a compliance package that is selected on the basis of
 - appropriate climate zone and energy source
 - Contains thermal insulation having minimum
 - R24 for walls and
 - R20 for basement walls
 - But need not meet the efficiency requirements of furnace, HWT and HRV
- Compliance packages that do not meet above insulation requirements may be selected provided that house meet all components of the package (meets mechanical requirements)
- Sunrooms are exempt but still required to use one step better windows.

Supplementary Standard SB-12

Performance Compliance

This is an Alternative to Energuide System:

- The performance level is measured based on annual energy use
- Steps to follow:
 - Simulate annual energy use of the house as design
 - Pick an appropriate compliance package
 - Simulate annual energy use for the same house as if it was built in accordance with compliance package selected.
 - If the energy use of the proposed design is equal or less than the case calculated accordance with selected package
- For the purpose of calculations the same
 - climate data and
 - Air change rate 3.1 ACH, DHW load, Electrical load shall be used
- However, if the lower insulation values are used, the reduction in overall envelope performance shall not be more than 25%.

Supplementary Standard SB-12

Chapter 3 - Measures to Control Air Infiltration

Improved Air Barrier Requirements

- Separate inspection for air barrier system is required under “Prescribed Notices” (Div. C, Part 1, Article 1.3.5.1.)

- A2 level windows are required
 - Part 9 Article 9.7.1.7. requires Level A1
 - SB-12, Chapter 3 requires level A2

Supplementary Standard SB-12

Chapter 3 - Measures to Control Air Infiltration

9.25.3.1. Required Barrier to Air Leakage

- (1) Thermally insulated wall, ceiling and floor assemblies shall be constructed so as to include an *air barrier system* that will provide a continuous barrier to air leakage . . .

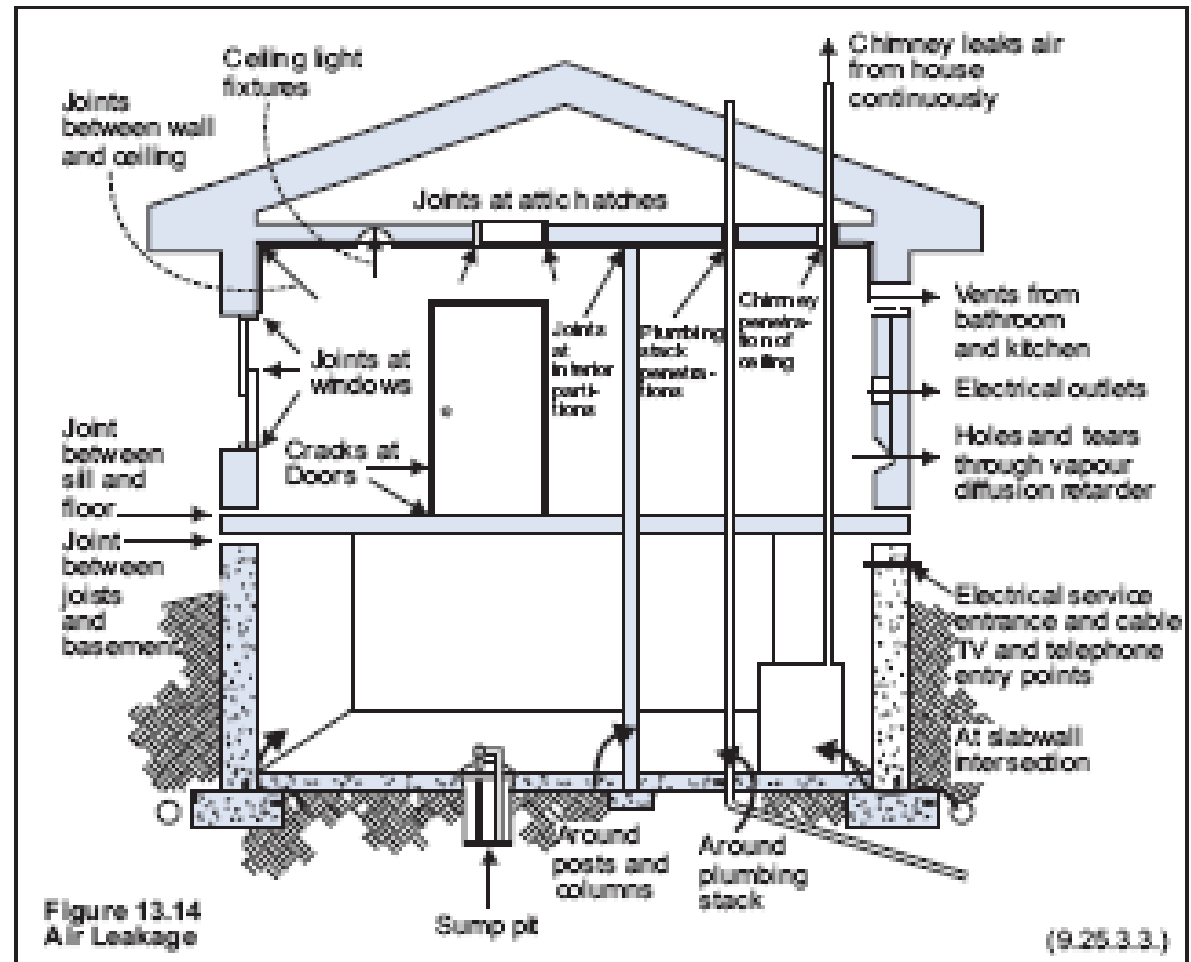
SB-12 Chapter 3

- (1) Wall, ceiling and floor assemblies that separate *conditioned spaces* from unconditioned spaces shall be constructed so as to include an *air barrier system* that will provide a continuous barrier to air leakage

Supplementary Standard SB-12

Chapter 3 - Measures to Control Air Infiltration

- Prescriptive air barrier requirements details where
 - a window/door,
 - Floor/balcony,
 - a vent/ chimney penetrates an air barrier system



9.25.3.1. Required Barrier to Air Leakage

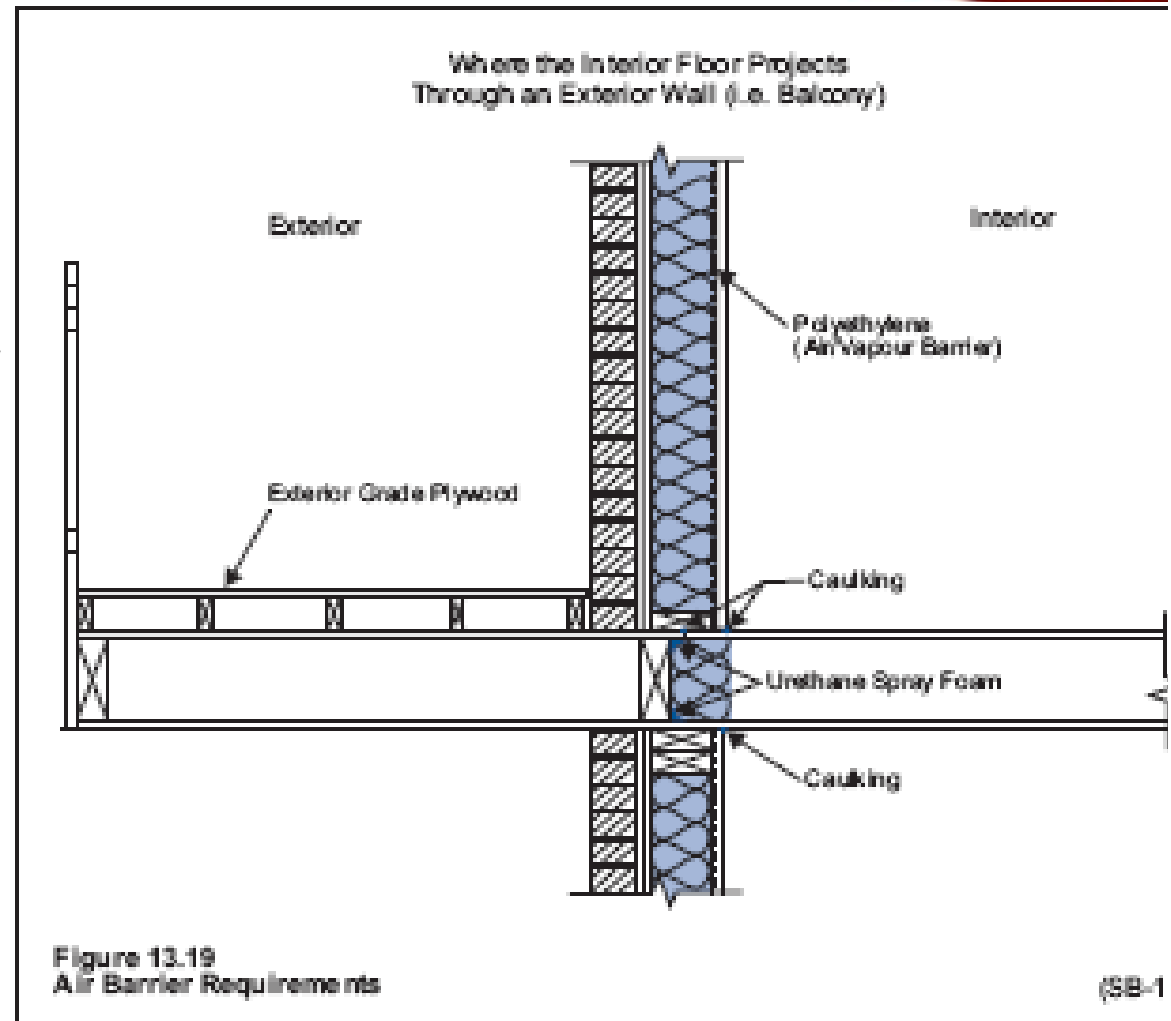
- Penetrations of the air barrier system are all in one sentence (Sentence (6))

SB-12 Chapter 3

- Fenestration and doors have been addressed in separate sentences (Sentence 10,11,12)
- Cases where interior air barrier
- Cases where exterior air barrier is used

Chapter 3 - Measures to Control Air Infiltration Floors and Balconies

- (6) Where an interior floor projects through an exterior wall or extends to become an exterior floor, continuity of the *air barrier system* shall be maintained from the abutting walls across the floor assembly.
- (7) Where an interior floor projects through an exterior wall to become an exterior floor,
- (a) the air barrier of the wall under the floor shall be continuous with or sealed to the subfloor or the air barrier on the underside of the floor,
 - (b) the air barrier of the wall above the floor shall be continuous with or sealed to the subfloor or the air barrier on the top of the floor, and
 - (c) the spaces between floor joists shall be blocked and sealed.
- (8) Where a header wrap is used as an air barrier, it shall be sealed or lapped to the wall air barrier above and below in accordance with Sentences (1) and (2).



NRC Activities on mNECB

mNECB is being updated

- Scope will cover only Part 3 Buildings
- Revised NECB is out for public consultation between October 4th and November 26th 2010
- The 9th Standing Committee meeting on Energy Efficiency in Buildings (SCEEB) will be held in January 2011
- Will be published in 2011

Part 9 Buildings

- A joint task group is preparing technical requirements
- 2nd Meeting is scheduled
- To be completed by 2012

ASHRAE90.1 is being updated

- is expected to be published end of October' 2010

Building Code Energy Advisory Council (BCEAC)

- Council was established under the Green Energy Green Economy Act. The members are from different stakeholders and appointed for one year.
- The Council's mandate is to provide strategic advice to the Minister on energy conservation issues related to the Building Code and the Building Code Act.
- Council held its first meeting in February' 2010 and meets regularly every month.
- Council has been discussing
 - some technical provisions,
 - short-term and long-term goals.

For More Information

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Questions ?