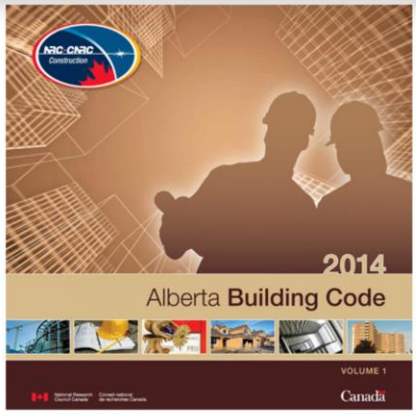
Overview of 9.36 & NECB



Joan Maisonneuve

Alberta
One Voice – One Industry

Canadian
Home Builders'
Association

This presentation contains very little in regard to the National Energy code for Building (NECB) However the NECB can be useful for dwellings with large glass areas or that would like to take credit for advanced lighting or innovative heating systems.

Transition Period

- 9.36: May 1 2016 to November 1, 2016
- NECB: November 1, 2015 to Nov. 1 2016
  - Clarifications in STANDATA "Application of Energy Efficiency Requirements and Enforcement Date" April 16, 2016
- Building permit ***application*** is the point that determine which code to comply to

The date for compliance to the NECB was pushed back from May 1, 2016 to November 1, 2016.

From the STANDATA:

"Where an ***application for a building permit*** for a site-constructed building is ***received*** by the authority having jurisdiction ***before November 1***, 2016, the design of the building is not required to comply with the requirements of Section 9.36. ABC 2014 or the NECB 2011 as appropriate."

NECB and 9.36

NECB- Separate Document

- Building Envelope
- HVAC
- Service water
- Lighting
- Electrical Distribution & motors
- Building Operation
- Performance Only

9.36 – Included in the ABC

- Building Envelope
- HVAC efficiencies
- Service hot water
- HOT 200O software
- Prescriptive & Performance paths

The NECB may provide an advantage in large homes with glass

The area that will see the greatest amount of change is the section on building envelope.

Scope of Part 9.36 For EE

- Buildings of residential occupancy to which Part 9 applies (9.1.1.1)
  - building area not exceeding 600 m^2
  - 3 storeys or less in height (dwellings)
- Businesses whose combined total floor area does not exceed 300 m^2
- Applies to secondary suites

The Scope is set in 9.1.1.1 Application that references Division A Subsection 1.3.3 Application of Parts 9, 10 and 11

1) Part 9 of Division B applies to all *buildings* described in Article 1.1.1.1. of 3 *storeys* or less in *building height*, having a *building area* not exceeding 600 m2, and used for *major occupancies* classified as

a) Group C, *residential occupancies* (see Appendix Note A-9.1.1.1.(1) of Division B),

b) Group D, *business and personal services occupancies*,

c) Group E, *mercantile occupancies*, or

d) Group F, Divisions 2 and 3, *medium*- and *low-hazard industrial occupancies*.

- Area excludes parking garages that serve residential occupancies

Buildings containing non residential occupancies where the non-residential spaces are more than 300m^2 floor area

Scope Continued

- Common spaces required to be conditioned spaces
- 9.36.2.1. 8) garage walls (common and exterior)
- Does not include:
  - Storage and parking garages (large)
  - Small service rooms
  - Unconditioned spaces
  - Log wall assemblies

For the purpose of this Section "common space" means all spaces intended to be conditioned to the requirements of the Code not within a *suite and walls serving suites except crawl spaces, vertical service shafts, and elevator shafts.*

There is an Alberta clause related to garages in the scope and application section - 9.36.2.1 8 related to garages:

> 8) The requirements of this Subsection also apply to components of a *building* envelope assembly that separate a heated or unheated attached garage from unconditioned space or the exterior air, where
>
> a) not more than one *dwelling unit*, or
>
> b) a house with a *secondary suite*.

From M.A. - That ABC-specific provision was a result of the Alberta-specific provisions we have under Section 9.35. of the ABC, for the HIRF-based interior finishing/thermal insulation requirement for garages.

Log homes must still meet the other bldg. envelope requirements, such as those for windows and door. This is an Alberta-specific rule.

Alberta also exempts walls, floor and ceiling assemblies of Part 10 Relocatable Industrial Accommodation

Modeling a house in the NECB will get you performance gain from efficient lighting, can accommodate different mechanical systems.

The FDWR calculations are in the 2011 NECB. There is an article that lists the max FDWR for our region (7A)at 32%.

9.36 was designed to have average window areas of 17-22%

Three Compliance Paths

- Prescriptive path
  - No specific ENERGUIDE target
  - No air leakage targets
  - Implied wdw/wall ratios
- Trade-off option
- Performance Path – Energy Modeling
  - Comparison against a "reference house"
  - Energy target = annual energy consumption of reference house
  - Air change rate of 3.2 or 2.5 or tested

From the code:

"The reference house is a hypothetical replica of the proposed house using using the same energy source for the same function and having the same environmental requirements, *occupancy, climate data and operations schedules, but made to comply with all applicable prescriptive requirements of the Code. "*

"house energy target" shall mean the annual energy consumption of the reference house.

9.36.5.10 9)
For the purpose of calculations in the performance path, the proposed house air tightness value shall be one of the following:

a) 3.2 air changes per hour at 50 Pa pressure difference where the construction complies with Subsection 9.25.,
b) 2.5 air changes per hour at 50 Pa pressure difference, where it can be shown that the *air barrier system was constructed* according to Subsection 9.25.3. and Articles 9.36.2.9 and 9.
c) c) where tested in accordance with 9.36.5.5.(11), the measured values
i) air changes per hour at 50 Pa pressure difference, and
ii) Equivalent air leakage area

Conventions for Units

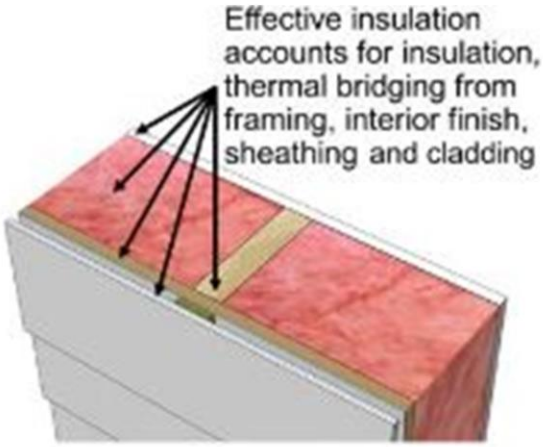
- *Effective* RSI values for building assemblies
  - "effective thermal *resistance*"
  - i.e. transmission through framing combined with insulated areas (9.36.1.2(3))

  RSI to R = RSI x 5.678
- U-value for windows and doors
  - Overall thermal *transmittance* (9.36.1.2(2))
  - Overall window value by A440.2

- Effective versus nominal; taking into account the varying insulation abilities of different materials in an assembly; a blended thermal resistance value;
-Tables given for framing percentages with and without framing in common assemblies;
-Tables given for RSI values of common materials
- Simple calculation for calculating the overall (effective) thermal resistance of an assembly'
-Calculations given for calculating and overall RSI for an assembly

- A440 procedure calculates U-values for overall windows, taking into account centre of glass, edge of glass and frame.

Effective Insulation



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PAUSE - GOT That?

Option 1: Prescriptive Path

- Prescriptive path
  - No air leakage targets
  - No window/wall ratios
- Use tables and charts in 9.36.2.6 and the appendix notes to find:
  - RSI values
  - How to calculate assemblies

Step 1: List the Assemblies Used in the Building

- Roof
- Above grade wall
- Below grade wall
- Floors over unheated spaces
- Rims, headers etc.
- Areas built differently
  - *Garage walls*
  - *Tall walls*
  - *Areas with <u>significant</u> different finishes*

Above Grade Framed Wall

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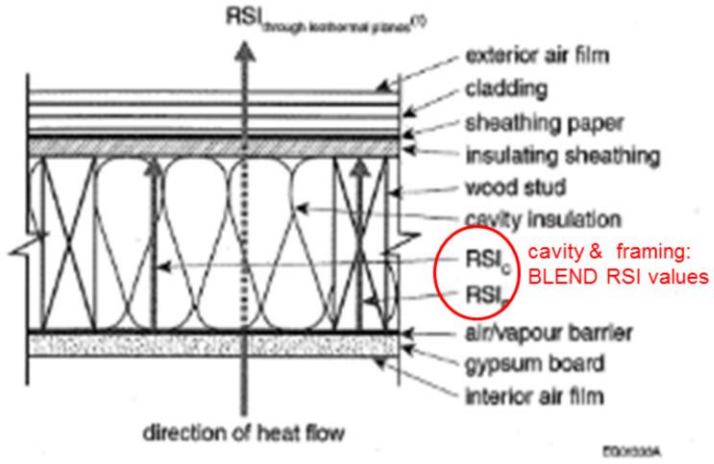
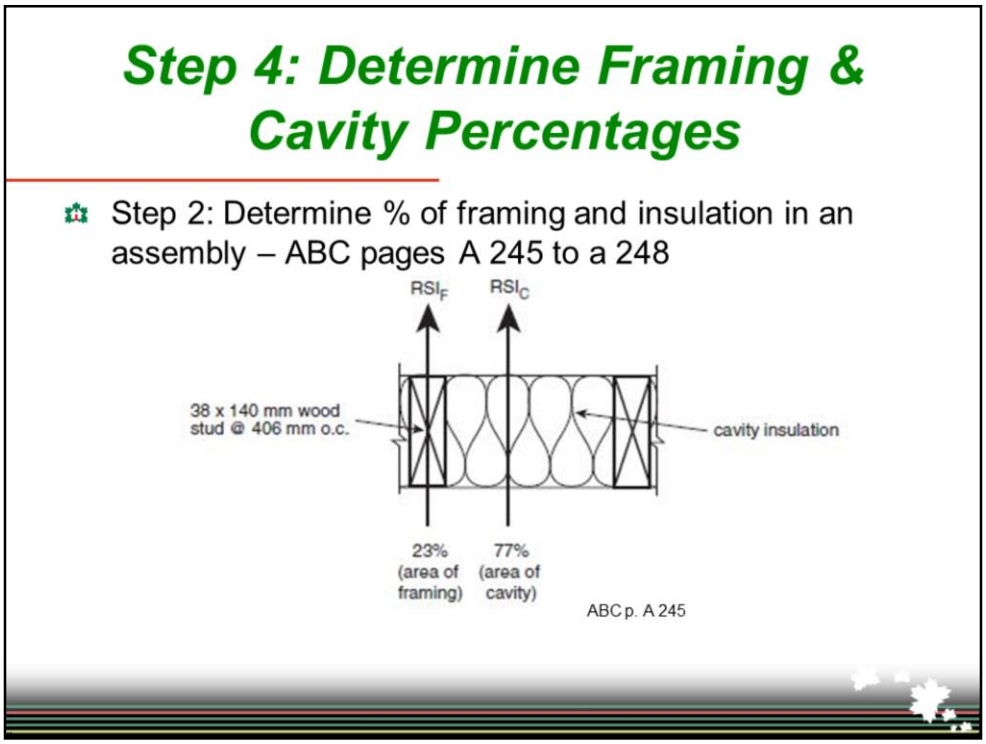
Step 2: List the Materials that Make Up the Assembly



Step 3: Determine the RSI of Materials:

- See Tables in ABC 2014 pages A-253 to A-259

Sheathing Materials	Thickness of Material	Thermal Resistance (RSI), ($m^2 \cdot K/W$ per mm	Thermal Resistance (RSI), ($m^2 \cdot K/W$ for thickness listed
Gypsum sheathing	12.7 mm	0.0063	0.08
Insulating fibreboard	—	0.016	—
Particleboard:			
low density (593 kg/m^3)	—	0.0098	—
medium density (800 kg/m^3)	—	0.0077	—
high density (993 kg/m^3)	—	0.0059	—
Plywood – generic softwood	9.5 mm	0.0087	0.083
	11 mm		0.096
	12.5 mm		0.109
	15.5 mm		0.135
	18.5 mm		0.161



If you are going to use the prescriptive path for compliance, you need to understand how to calculate areas of various assemblies

9.36.2.3 - Fenestration means more than windows. It is any building envelope assembly that transmits visible light such as skylights, glass block, translucent panels, transoms, skylights, tubular light pipes etc.

-If the trade-off options is used, calculation of envelope areas and window areas may be necessary.

-There is a credit for adjoining unconditioned spaces of 0.16 RSI (R-1)

- Areas that may need to be calculated separately could be tall wall areas.

Framing Cavity Percentages in ABC

Table A-9.36.2.4.(1)A.
Framing and Cavity Percentages for Typical Wood-frame Assemblies(1)

Wood-frame Assemblies		Frame Spacing, mm o.c.									
		304		406		488		610		1220	
		% Area Framing	% Area Cavity	% Area Framing	% Area Cavity	% Area Framing	% Area Cavity	% Area Framing	% Area Cavity	% Area Framing	% Area Cavity
Floors	lumber joists	–	–	13	87	11.5	88.5	10	90	–	–
	I-joists and truss	–	–	9	91	7.5	92.5	6	94	–	–
Roofs/ Ceilings	ceilings with typical trusses	–	–	14	86	12.5	87.5	11	89	–	–
	ceilings with raised heel trusses	–	–	10	90	8.5	91.5	7	93	–	–
	roofs with lumber rafters and ceilings with lumber joists	–	–	13	87	11.5	88.5	10	90	–	–
	roofs with I-joist rafters and ceilings with I-joists	–	–	9	91	7.5	92.5	6	94	–	–
	roofs with structural insulated panels (SIPs)	–	–	–	–	–	–	–	–	9	91
Walls	typical wood-frame	24.5	75.5	23	77	21.5	78.5	20	80	–	–
	advanced wood-frame with double top plate(2)	–	–	19	81	17.5	82.5	16	84	–	–
	SIPs	–	–	–	–	–	–	–	–	14	86
	basement wood-frame inside concrete foundation wall	–	–	16	84	14.5	85.5	13	87	–	–

From the 2014 Alberta Building Code

Step 5:Determine Blended RSI for Assemblies

Example: 2x6 framing, 24 " o.c. R-22 glass fiber batt

$$\frac{100}{\frac{\%\ \text{area framing (20)}}{\text{RSI}_{\text{FRAMING}}\ (1.19)} + \frac{\%\ \text{area Insulation(80)}}{\text{RSI}_{\text{INSULATION}}(3.87)}}$$

RSI 2.67

Revised example May 25, 2016

Step 6:Add RSI's for Each Material

Example: 2x6, 24 o.c. R22 Batt vinyl clad

Outside air film	0.03
Vinyl siding	0.11
Sheathing paper	--
3/8" (9.5 mm) osb sheathing	0.093
2x6 framing, 24 " oc. RSI 2.45	
R22 fiberglass batt RSI 3.87	2.67 (Blended RSI)
Polyethylene sheet	--
½" (gypsum	0.08
Interior air film	0.12
	RSI 3.10

REVISED to reflect change to slide 17 may 25, 2016

Highlight how cladding can change the RSI.

Also how walls built in different ways need to be modeled differently.

Look at percentage of windows.

Step 7: Compare Calculated RSI to Required RSI

- Varies by Climatic Zones
  - Arbitrary divisions of degree days
  - Climatic tables in Division B, Appendix C
  - Assembly requirements
    - Division B 9.36.2.6 and 9.36.2.8
- RSI values depend on HRV or NO HRV

Climatic data shows most regions are warmer.

Division B, Appendix C C-12 –C15

Climatic Zones

Division B, Appendix C

Climate Zone, Heating Degree Days °C					
Zone 4	Zone 5	Zone 6	Zone 7a	Zone 7B	Zone 8
≤ 3000	3000 to 3999	4000 to 4999	5000 to 5999	6000 to 6999	≥ 7000
		Lethbridge Medicine Hat	Edmonton Red Deer Calgary Grande Prairie Cold lake	Ft. McMurray Athabasca Bonnyville Peace River	

Minimum ASSEMBLY RSI/R

	Zone 6 Lethbridge Medicine Hat		Zone 7A Grande Prairie Edmonton Red Deer Calgary	
	Without HRV	With HRV	Without HRV	With HRV
Ceiling below attics	8.67 (R49)	8.67 (R 49)	10.73 (R 61)	8.67 (R 49)
Cathedral ceilings and flat roofs	4.67(R26.5)	4.67 (R 26.5)	5.02 (R 28.5)	5.02 (R 28.5)
Walls	3.08 (R 17.5)	2.97 (R 16.8)	3.08 (R 17.5)	2.97 (R16.8)
Floors over unheated spaces	4.67 (R 26.5)	4.67 (R 26.5)	5.02 (R 28.5)	5.02 (R28.5)
Rim joists	3.08 (R 17.5)	2.97 (R 16.8)	3.08 (R 17.5)	2.97 (R16.8)
Foundation Wall	2.98 (R 16.9)	2.98 (R 16.9)	3.46 (R 19.6)	2.98 (R 16.9)
Unheated floors below frost line	uninsulated	uninsulated	uninsulated	Uninsulated
Unheated Floors above frost line	1.96 (R11.1)	1.96 (R11.1)	1.96 (R 11.1)	1.96 (R 11.1)
Heated floors	2.32 (13.2)	2.32 (R 13.2)	2.84 (R 16.1)	2.84 (R 16.1)

-Unheated floors does not apply to floors above crawlspaces (or attached garages?)

- 9.36.2.7 (2) The effective thermal resistance of *rim joists* shall be not less than that required for above-ground walls in Table 9.36.2.6.A. or 9.36.2.6.B., as applicable.

REVIEW: Steps to Assembly RSI For the PRESCRIPTIVE Path

1. List the different assemblies used in the building
2. List the materials that make up the assembly
3. Assign RSI values for each material in an assembly
4. Determine framing and cavity percentages of the assembly
5. Adjust the framing and insulation RSI's to arrive at a blended RSI value for cavities and framing areas
6. Add the RSI values of each layer of the assembly to determine overall assembly RSI
7. Compare with the required RSI for your zone for each assembly

Examples of Assemblies

- Appendix has tables with examples of assembles and the *RSI-value* in various zones

Trade offs may be required for Tall wall areas with heavy framing

Pause – Over the Worst Part!

Breath, think calm thoughts, its not that bad!

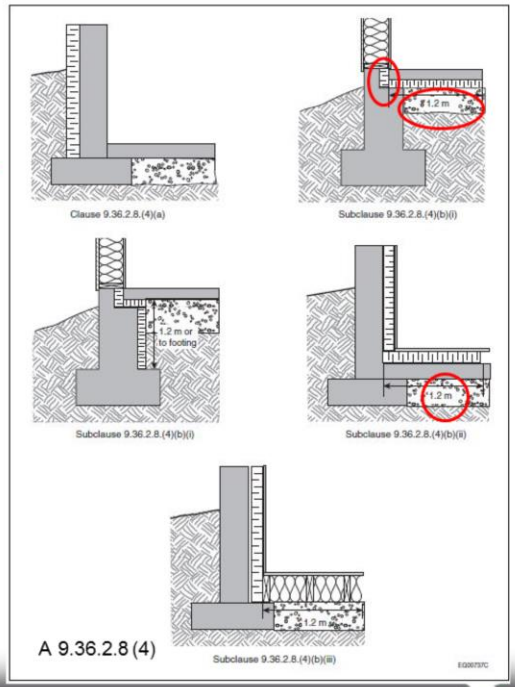
Considerations for Foundations and Floor Slabs - 9.36.2.8

- Where and to what level to insulate a floor slab depends on:
  - Whether the slab is above or below frost line
  - Top of foundation and height of ground cover
  - Where the insulation is placed
  - Whether the floor is heated

However there are some specific wrinkles….

Insulating Slabs Above Frost Line

- Walk-out basements
- Bi-level homes
- Must work with soil gas control



4a – on the exterior

4bi – interior beneath slab for 1.2 m with thermal break at edge of slab, with 50% of RSI required

4bii – on top of slab 1.2 m from perimeter

4biii –within sleepers on the slab

Step 4: Consider Structural Penetrations

- Structural penetrations should not exceed:
  - a ***total*** area of greater than 2% of the ***gross*** wall area
- If so, the effect of these penetrations must be taken into account
- Examples:
  - Cantilevered balconies; beams, columns

Code reference 9.36.2.4

A 9.36.2.4.(3)The 2% exemption is based on gross wall area, but applies to penetrations through any envelope assembly

No Need to Calculate

- Minor penetrations 9.36.2.5 (2)
  - pipes, ducts, though-wall vents, shelf angles, ties, fasteners
- Areas not intended to be heated
  - Uninsulated crawl spaces

9.36.2.4(4) Protected Assemblies

- IF a component of the *building* envelope is protected, the required effective thermal resistance of the *building* envelope component between the *building* and the unconditioned enclosure is permitted to be reduced by 0.16 (m2·K)/W
- Examples: wall between attached garage and house
- Does NOT apply to vented spaces (an attic space)

9.36.2.5.4 4) EXAMPLES :conditioned space, such as a sun porch, enclosed veranda, vestibule or attached garage (See Appendix A.)

_intent is to provide a simple credit

Allowable Reduction In Attic

- Minimum nominal RSI 3.52 (R20) at exterior of wall
- Maximum 1200 mm from interior/ exterior of wall

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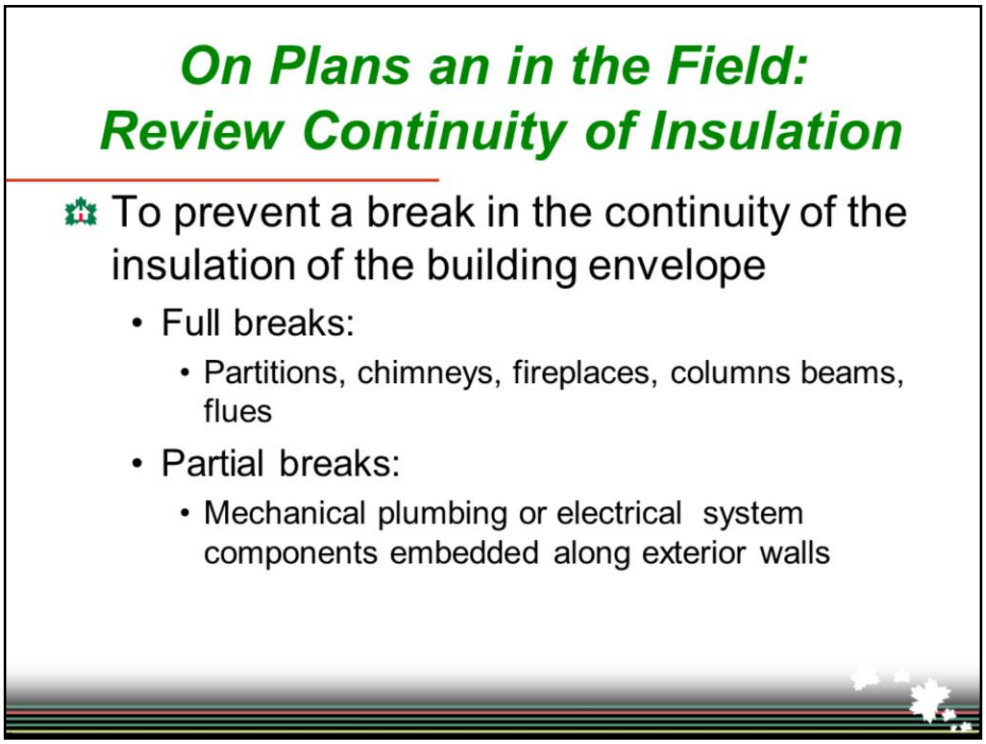
A reduction is permitted provided the insultion is constrained only by the roof slope and venting requirements. The minimum RSI over the wall must be maintained at R-20

Minimum height at outside surface of exterior of wall depends on:

- Minimum 1” vent clearance
- Roof slope and location of top-bottom chord junction

Issue for scissor trusses?



- Insulation levels are generally the same as the assembly it penetrates,

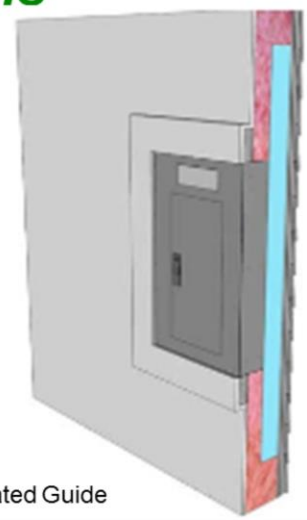
9.36.2.5

6) Where mechanical, plumbing or electrical system components, such as pipes, conduits, cabinets, chases, panels or recessed heaters, are placed within and parallel to a wall assembly required to be insulated, the effective thermal resistance of that wall at the projected area of the system component shall be not less than that required by (the) Tables

(check this) It is unclear at this time if it applies at the junction between a rim joist and the foundation wall.

Continuity at Partial Penetrations in Walls

- Interior components must not break the continuity of insulation or decrease the effective thermal resistance to less than that of the assembly



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A

Continuity at Floors and Ceilings

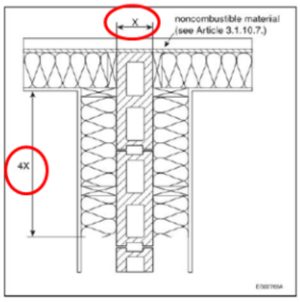
- Pipe ducts etc. placed within the insulated portion of floor or ceiling
  - RSI at the area of the assembly can be reduced to RSI 2.78 (9.36.2.6(7)
- Rim joists
  - Not less than walls

9.36.2.5 (2) Full Penetrations of an Assembly

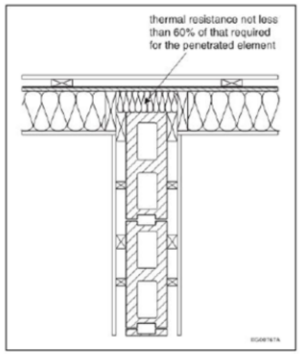
- Example: Firewall
- Insulate it:
  - Inward and outward 4X or
  - ≥ 60% of that required in the wall
  - Within itself to the amount needed for the element

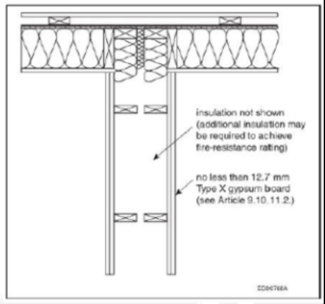
Applies to major penetrations such as foundation walls, party walls, firewalls or structural element

Insulation of Full Penetrations



60% of assembly value

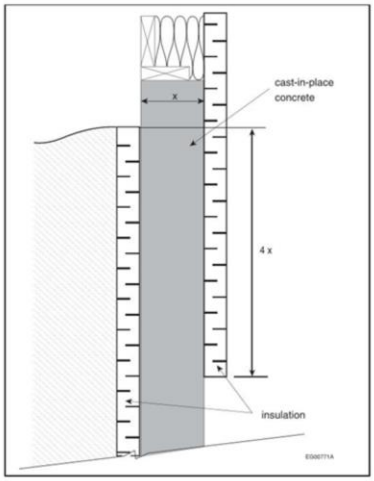




ABC p. A262

Continuity of Insulation
9.36.2.5

- Where insulation is ***not continuous*** insulation must extend 4X inside and outside
- Applies to shafts for skylights



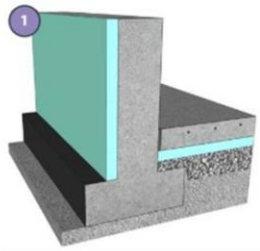
A-9.36.2.5(5)-A

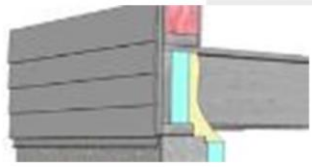
An example to which this sentence DOES NOT apply is that of a foundation wall that is insulated on the inside and the insulation continues through the joist cavity and into the wall assembly.

If the insulation ‘kisses” the rim insulation, no over lap is required. Check Murray’s info.

Continuity Were Insulation Does not Join

- Foundation:
  - If it is insulated on the exterior to the footing OR
  - The insulation "kisses"





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9.36.2.7 Windows (Fenestration)

- No prescriptive area limits
- U-values or energy rating related to zone
  - U-value for doors and windows = 1.6
  - Energy Rating values doors and wdws = 25
  - U-value skylights = 2.7
  - Area Includes frames and sashes
  - Includes glass block, sidelights and glass inserts in doors
  - Must meet 9.7 as well
- 17% to 22% FDWR used as references in building envelope trade-off option 3
  - Used in performance compliance path

-9.36.1.2 (4) defines fenestration as all building envelope, assemblies, including their frames, that transfer visible light, such aa windows, clerestories, skylights, translucent wall panels, glass block, transom sidelights, sliding overhead or swinging glass door, and glass inserts in doors
-These numbers are for zones 6 and 7A
- ER is harder to reach as it has an air tightness requirement; difficult for sliding windows and sliding patio doors
-Could be an issue with some basement windows; Some door manufacturers.
- site-built windows do not need to comply to U-values but must still meet airtightness
-There is more information on compliance options for site-built windows and doors and glass block in section 9.36.2.7

- 9.36 assumes an maximum window area of 22 % compared to 33% for the NECB but the maximum is not stated in the body of 9.36

Doors & Windows
Table 9.36.2.7A

- Most doors U 1.6; One door = U 2.6
- Vehicular access doors = RSI 1.1
- Access hatches = RSI 2.6
- Storm door and windows do not need to meet these
- *Gaps between frame and window/door must be insulated at least to the same level as the door or window

- Separating conditioned from unconditioned or the exterior

- Appendix note A-9.36.2.5(8) recognizes that it might not always be acceptable or necessary to insulate this gap, especially if doing so compromises drainage

Trade-Off Option
9.36.2.11

- *Trade like for like
  - Windows – Windows
  - Walls to walls, floors or ceiling; above ground only
  - Limitations in amounts of reduction
  - Areas must be the same
- Useful for small areas
  - Tall walls or bonus room floors
    - Thicker studs, closer spacing
- ***Trade off bonus room floor with common garage Wall?***
- ***New terminology:***
  - ***"opaque area"***

– Above-ground opaque

Decreased insulation in a wall area compensated by increased insulation in an equal area of ceiling or another wall

- Limits placed on maximum permitted reduction in performance
- Ceiling/floor with window reduction

- residential tall walls are considered to be walls in residential buildings that are constructed under Part 9 of the ABC 2006 and are greater in height than currently permitted under Part 9 of the Code (Table 9.23.10.1) which is 3.6m (11.9 feet). The walls may be load-bearing and/or wind bearing.

Air Tightness 9.36.2.9
Construction of Air Barrier 9.36.2.10

- Prescriptive details
  - Materials, properties, joints, penetrations
  - NO testing required in *prescriptive* path
  - Testing may be used in performance path
  - Links to 9.25.3 (Air Barrier Systems)
- Structural support is required!

- Air leakage characteristics of materials (not new)
-Compatible with adjoining materials
-Continuous (junctions, penetrations, expansion joints, windows, doors, overhangs, interior walls, chimneys)
- lapping and sealing
- Structural support

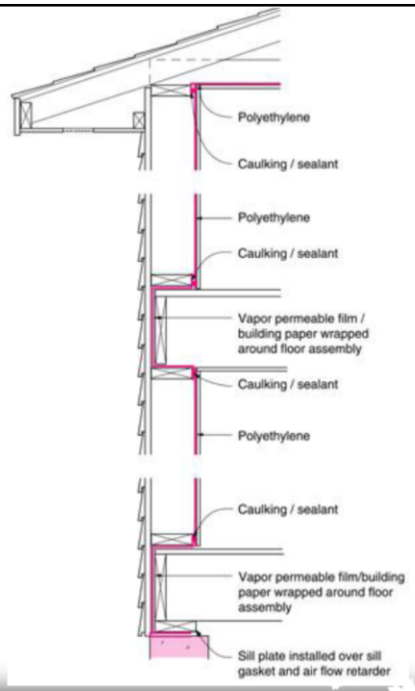
There are 3 methods of meeting airtightness:
- 936.2.10
- 9.25 plus a tested assembly
- Blower door test

Air Tightness Details 9.36.2.10

- Properties specified for materials intended to provide air tightness
- Comments on sealing of rigid and flexible air barriers
  - Air barrier (flexible) - lapped 50 mm (2”), sealed, structurally supported.
  - Continuous
- Construction details described for joints and junctions and penetration in the airtight plane
  - Details for sealing ducts, wiring, rim joist, foundation, cantilevers, interior walls, stacks, chimneys, party walls

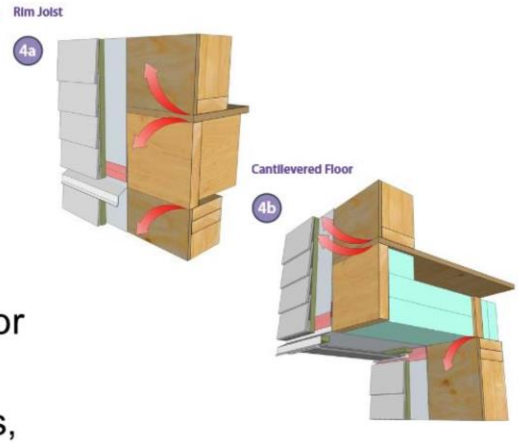
Exterior Air Barriers

- A material itself is not an air barrier
- It is a system of materials, sealant and solid materials across the whole assembly



Airtightness – Key Areas

- Rim joist area
- Cantilevered floors
- Rough openings to windows/doors
- Interior walls that meet exterior walls or ceilings
- Attic hatches, stacks, chimneys



Easy Stuff Ahead!

HVAC Equipment and Ducts
9.36.3.2

- Equipment sized to Can/CSA F-280 – 12 (***NEW STD)***
- HVAC Ducts
  - Sizing to good practice
- Ducts ***outside the plane of insulation***
  - Sealed joints
  - Insulated to same level as required for above-grade walls
- Ducts – under insulated floors over unheated spaces
  - Sealed
  - Insulated to wall RSI
  - Sides can be insulated to compensate for reduction on top & bottom
  - Round ducts?

-Equipment sizing – do our contractors know how to do this? This has been an issue in B.C.

-Duct sizing – Best practice according to HRAI, ASHRAE, SMCANA

-Under floors – Does this apply to bonus room floors? Does not consider round ducts.

- Dampers not needed where other regulations do not permit them or on equipment that is designed to operate continuously (furnaces?)

-Piping installed to the hydronic standard, B-214

-Alberta has an additional require clause 9.36.3.3 3) that provides and exemption for Part 10 buildings with fuel-fired warm-air furnaces

HVAC Control
9.36.3.6

- Air Intakes and Outlets Dampers (9.36.3.3)
- Thermostat activated ± 0.5 C from set point
- Eliminate conflicts with cooling
- Zone adjustment capability required
  - Automatic or manual
- Automatic humidity control required
- Heat recovery required when dehumidifying a pool, or hot tub area

- exceptions to dampers is where other regulations take effect or on appliances required to operate continuously
-Means shall be provided to adjust the heating of each zone by automatic devices or manually operated dampers, valves or switches as appropriate for the heating system used
- Exception if solid fuel for temperature control
- Lowering heating set point will not cause energy for cooling to be expended

HVAC Efficiencies
9.36.3.10

- Table of minimum efficiencies
  - Gas-fired boilers 90% AFUE
  - Gas-fired furnaces 92% AFUE
  - Gas-fired fireplaces
    - Direct vent, pilot on demand
  - Air conditioners, air cooled 14 or 14.5 SEER

Fireplaces efficiencies according to CSA P4 or Enerchoice

Issue with these being considered as heating appliances

Split and single packages

Ventilation
9.36.3.9

- HRV's optional
  - Reduced level of insulation may be installed in the building envelope
- Where used must have:
  - Sensible heat recovery efficiency of:
    - 60% at 0° C
    - 55 at -25° C

- No mention of installation type or requirements for installation – no standards, no reference for training etc.

- Sensible heat recovery percentage are for 2.5% January design temperature of les than -10 C

Service Water
9.36.4.2

- Service water = domestic water heating equipment
  - Gas-fired storage tanks(<22KW) EF≥ 0.67
  - Electric Et ≥ 98%
  - Gas-fired tankless ≤ 117kW EF ≥ 0.8
- Heat traps above water heaters NOT required
- Insulation of piping by inlet and outlet or 2 metres – 12 mm thickness; recirculation systems
- Applies to pool heaters

-Such as boilers, pool heaters and storage tanks

- water heater tank efficiency is after standby losses

Performance Path

- No EnerGuide target
- Comparison between "Reference House" and Proposed House
  - Energy use must be equal or less than reference house
- Reference house = prescriptive requirements
- Supply good blueprints and specs
- Employ NRCan certified energy advisor

"house energy target" shall mean the annual energy consumption of the reference house. This is roughly equivalent to an EnerGuide 78.

Insert in from STANDATA and Code on "professionals"

9.36.1.3 Subsection 9.36.5. applies only to

a) houses with or without a *secondary suite*, and

b) *buildings* containing only *dwelling units* and common spaces whose total *floor area* does not exceed 20% of the total *floor area* of the *building*.

Anticipated Impacts

- Choose to go with or without HRV
- Choose prescriptive or performance path
- Framing practices may change
  - 16" to 24" o.c. or EE framing
- Above grade and below grade insulation may change
- Garages may need more insulation
- Windows may be affected especially in doors etc.
- Door U-values need to be checked to ensure values include the frame and sashes.

Strategy

•Emphasize the sizable improvements that builders have made over the years while maintaining housing affordability. When these initiatives are driven by a response to consumer demand, rather than by regulatory decree, they are introduced at the proper pace and cost.

•Continue to participate in the energy codes process, emphasizing that changes must be attainable, supportable and economically sustainable.

•Improve the statistical capabilities of the Association to better show the improvements that builders have been making and what products are in demand

Put it On the Drawings!

- Which path you are using to comply
- Assembly RSI values
  - Where assemblies differ
  - Areas where insulation levels could be reduced
- Detail areas where continuity of insulation is an issue
- Include critical air barrier details
  - Ex: rim joist, attic hatch, pot lights, supported poly hats
- Equipment efficiencies

Compliance – Prescriptive Path

- Prescriptive
  - Consider creating separate spec sheet of items that meet code
    - See HPO Illustrated Guides for checklist
    - City of Calgary NECB checklist
  - Train site supers on key areas
    - Air sealing
- WORK WITH YOUR AHJ's!

Compliance - Performance

- Identify a energy advisor you can work with
- Ensure they are certified by NRCan
- Do detailed drawings for plans
- Train site supers on key areas
- Concentrate on areas that make a differance
  - Air sealing
- WORK ***WITH*** YOUR AHJ's!

Compliance

- AHJ's are still working on this
- Training just rolling out on 9.36

Calgary

Part 3: Building Envelope
Trade-off Compliance Report
(2016/02)

Statement of Compliance - National Energy Code of Canada for Buildings 2011
Worksheet to NECB Part 3 - Simple Trade-Off

Project Name:	
Project Address:	
Applicant Name:	
Applicant Address:	

Building Permit Number (Completed Internally)

Simple Trade-off Calculations for Above-ground Building Envelop Assemblies (1)

Description or Identification of Building Envelope Assembly	Vertical Portions			Horizontal Portions			Maximum Allowable Thermal Transmittance of Assembly in Reference Building (prescriptive values): U_r W/(m²•K)	Thermal Transmittance of Assembly in Proposed Building: U_p W/(m²•K)	Area of Assembly in Reference Building: A_r, (m²)	Area of Assembly in Proposed Building: A_p, (m²)	U_r x A_r (W/K)	U_p x A_p (W/K)
	Wall	Fenestration	Door	Roof	Floor	Skylight						
											0	0
											0	0
											0	0
											0	0
											0	0
											0	0
											0	0
											0	0
											0	0
TOTALS:									0	0	0	0

Is building envelope compliant with simple trade-off path? (U_p x A_p ≤ total U_r x A_r and A_p = A_r)

Yes

Consultant Information:

Insert consultant contact information here

STAMP REQUIRED
for projects requiring
professional involvement
under the Alberta Building
Code

Medicine Hat Example

Performance Checklist

ENVIROMATICS GROUP LTD

9.36 Code Compliance Checklist (Performace Path) **without** HRV

Date: Feb 19,2016
EA: Rob Withrow
Company: Enviromatics Group Ltd

Builder: Mulder Builders Ltd
Job: 15003-05
Address: #424 Ranchview Rd
Legal: 123/13/091 0426

SOUTH FACING

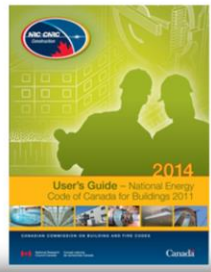
	Reference House	*Proposed Home*	*As Built*
ENVELOPE	(Effective RSI Values)	(Nominal R Value)	
Ceiling Insulation (Flat)	10.43	R40 Blown on 24" OC	
Ceiling Insulation (Vault)			
Exterior Wall	3.08	R20 Batt on 24" OC	
Additional Exterior Insulation			
Floor Headers	3.08	R20 Batt	
Cantilevers	5.02	R28 Batt	
Floors Over Garage	5.02	R28 Batt	
Frost Wall Insulation	3.46	R12 Batt on 24" OC	
Windows/Doors (Max U-Value/ Min ER)	Double Pane Argon Filled	Triple Pane Argon Filled	
Air Tightness (Air Change per Hour)	2.50 ACH	2.75 Maximum	
MECHANICALS			
Space Heating	92.0% AFUE	95% AFUE Natural Gas	
Domestic Hot Water (Direct Vent)	0.67% EF	0.67% EF Power Vent	
Domestic Hot Water (Tankless)			
Ventilation			
Other Mechanical Upgrades:			
RENEWABLES			
Photovoltaic Systems			
Geothermal Heat System			
Other			
MISCELLANEOUS			
LED/CFL Lighting			
Energy Star Appliances			
Other			
Overview			
Proposed Annual Energy Consumption	134.767 GJ	134.591 GJ	
Proposed Energuide Rating	77	77	
Compliance: Yes or No		YES	

Please Sign:

EA Representative: _____ Builder Representative: _____

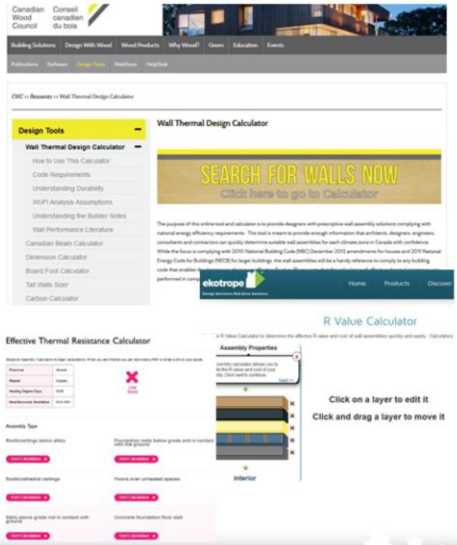
Resources On the Code

- Alberta Building Code
- Users Guide to the NECB
- HPO Illustrated Guides
  - By zone



WALL RSI/R Value Calculations

- Alberta Building Code
  - Page A-243
- Canadian Wood Council
  - www.cwc.ca/wtd
- Okotrope Design
  - http://www.ekotrope.com/products/r-value-calculator/
- Owens Corning
  - http://insulation.owenscorning.ca/builders/calculators/thermal-project-calculator/



Resources for Wall Construction Air Sealing

- CHBA Builders Guide

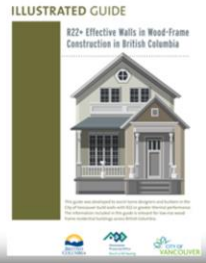
http://www.buildermanual.ca/

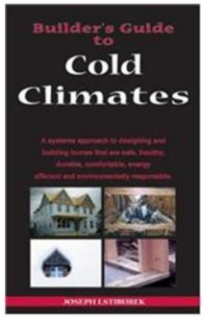
- Builder' Guide to Cold Climates

https://buildingscience.com/bookstore/books/builders-guide-cold-climates

- HPO R-22 Wall Guide

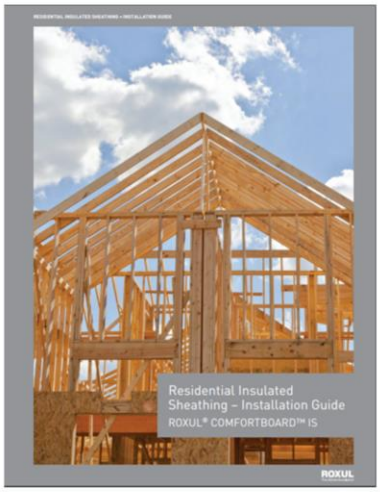
http://vancouver.ca/files/cov/guide-R22-effective-walls-wood-frame-construction.pdf





Resources for Wall Construction

- Residential Insulated Sheathing – Installation Guide
  - Roxul
  - http://www.roxul.com/files/RX-NA_EN/pdf/Technical%20Bulletins_Guides/Residential/13A76%20ROXUL%20COMFORTBOARD%20IS%20Installation%20Guide%20FINAL.pdf



A whole section on air sealing and insulation

- Air Sealing Attached Garage
- Building Science Introduction - Air Flow
- building Science Introduction - Heat Flow
- Cantilevered Floor
- Garage Rim/Band Joist Adjoining Conditioned Space
- Multifamily Party Walls

Other Issues of Interest?

Questions?