

# 2012 IECC with Washington State Amendments

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Produced with funding from:



# WSU Energy Program

Provides energy services, products, education and information for:

- Businesses
- Utilities, public and private
- Governments, state and local
- Tribes
- Federal agencies
- Manufacturing plants
- Educational facilities
- National laboratories



# WSU Energy Program Building Science Team

Staff provides building science expertise for:



- Residential energy code technical assistance
- Voluntary programs, Northwest ENERGYSTAR Homes
- Research and development, Building America
- Community-based upgrade programs
- Industry training and certifications; HERS, BPI, ENERGY STAR, PTCS

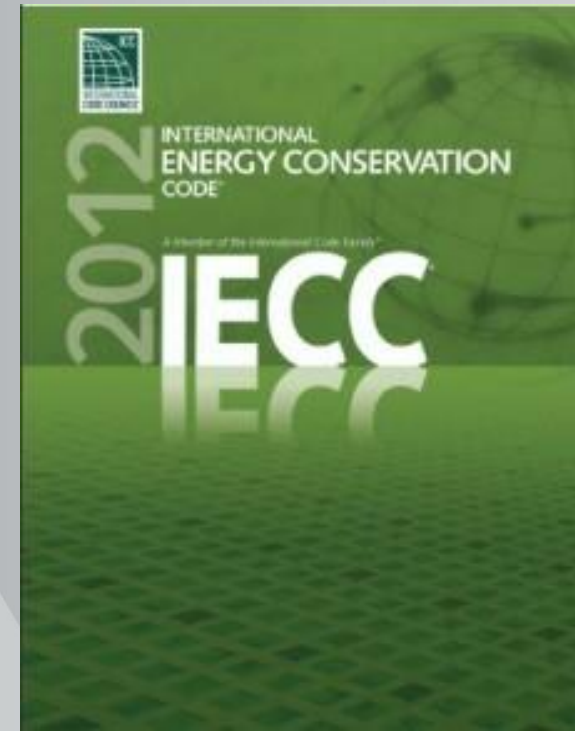
# WSU Energy Program Energy Code Support

Technical support provided in WA:

- Training offered throughout WA State
- Phone and email inquiry hotline support
- Energy code compliance tools
- Website
- Technical Advisory Groups (TAGs)

WASHINGTON STATE  
ENERGY CODE  
2009 EDITION

CHAPTER 51-11 WAC



# Energy Code Support in WA State

## Residential

- Washington State University Energy Program
- 360-956-2042
- [energycode@energy.wsu.edu](mailto:energycode@energy.wsu.edu)
- [www.energy.wsu.edu/code](http://www.energy.wsu.edu/code)
- Gary Nordeen, Luke Howard, Emily Salzberg, Tanya Beavers

## Non-residential

- Northwest Energy Efficiency Council
- Lisa Rosenow
- 206-624-0283
- [Lisa@putnamprice.com](mailto:Lisa@putnamprice.com)
- [www.neec.net](http://www.neec.net)

# Class Participants Will Gain an Understanding of:

- Resources available through WSU Energy Program
- Benefits of energy conservation
- Organization of energy code requirements and where to find them
- Changes from 2009 WSEC
- Compliance options and resources available for documentation
- Building science behind energy code requirements

# Code Development Process

**Agency** – State Building Code Council

**Cycle** – every three years

**Energy Code Technical Advisory Group**

**(TAG)** – 26 individuals who represent the various stakeholders in the construction industry

- *SBCC approved transition to 2012 IECC with WA State amendments on Nov 30, 2012.*
- *Still needs to sit through current legislative session before finalized.*

<https://fortress.wa.gov/ga/apps/sbcc/Page.aspx?nid=116>

# How Did We Get Here?

- 1978 – First Washington State Energy Code
- 1980 – Creation of Northwest Power Planning Council by Congress
- 1983 – First regional Power Plan by NWPPC
  - Plan included *Model Conservation Standards* (MCS)
- 1986 – Washington updates Energy Code
  - Halfway to full MCS requirements
- 1991 – Washington State Legislature mandates Energy Code requirements be raised to full MCS levels

# What did we get? 1980 to 2008

- From 1980 to 2008 energy efficiency has:
  - Saved more than 4,000 average megawatts
- How much is 4,000 average megawatts?
  - Enough energy to power all of Idaho and Western Montana and a city the size of Eugene (pop. 156,000)



# What did we get? 1980 to 2008

- $\frac{1}{2}$  the growth in electricity demand is from conservation
- 8–10 coal or gas fired generation plants did not have to be built
- 15 million tons less CO<sub>2</sub> in 2008 alone
- In 2008 consumers paid \$1.8 billion less for electricity—even



# 2011

- Saved 211 average megawatts
  - Enough electricity for 188,000 homes
  - Saved consumers \$3.1 billion in energy costs in 2011 alone
- From 1980 to 2011 conservation has saved 5,000 average megawatts
  - Enough electricity to power ALL of Montana and Idaho
- 50% of the savings come from Washington
- 20% of the savings come from energy codes



# Code Layout

## **2009 WSEC**

### Chapters 1-10

SF, Duplex, Townhouses

### Chapters 11-15

Commercial  
Multi-Family

Ch. 10 Default U-Factors  
Ch. 3 Design Temperatures  
Chapter 9 Energy Credits

## **2012 WSEC**

### Chapters 1-4 (RE)

SF, Duplex, Townhouses, R-2, R-3,  
R-4 buildings  $\leq 3$  stories in height\*

### Chapters 1-4 (CE)

Commercial: Townhouses, R-2, R-3,  
R-4 buildings  $> 3$  stories in height\*

Appendix A  
Appendix B  
Table 406.2

\*Refer to the International Building Code

# R101.2 Scope

## Residential buildings and their:

- sites
- associated systems
- equipment



*This code shall be the maximum and minimum energy code for residential construction in each town, city and county.*

*This addition was added to the IECC to comply with state law – RCW 19.27A.*

## R101.4.2 Historic Buildings

No change from WSEC – allows building official to allow alternate requirements that result in reasonable degree of efficiency for buildings of historical significance.



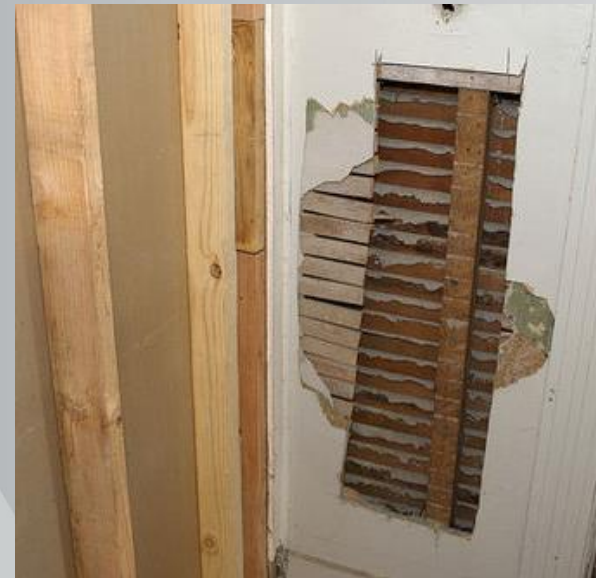
*WSEC language added for flexibility*

## R101.4.3 Additions, Alterations, Renovations or Repairs

Existing ceiling, wall or floor cavities exposed during construction provided that these cavities are filled with insulation.

- 2x4 framed walls insulated to R-15
- 2x6 framed walls insulated to R-21

*WSEC language added for clarification*



## R101.4.3 Additions, Alterations, Renovations or Repairs

The building official can allow for less than full compliance if physically impossible and/or economically impractical and:

1. The alteration or repair improves the energy efficiency of the building; or
2. The alteration or repair is energy efficient and is necessary for the health, safety, and welfare of the general public.

*No change from WSEC*

## R101.4.3.1 Mechanical Systems

WSEC language regarding duct testing in existing houses added in its entirety.

- Testing required but sealing is not
- Test results must be recorded on affidavit and presented to homeowner and building department

*No change from WSEC*



# Duct Testing for Existing Construction

- Testing must be completed by certified technician
- Results provided to homeowner and building official on affidavit
- Exceptions:
  - Less than 40 lineal feet of ductwork outside conditioned space (combined supply and return)
  - Ducts containing asbestos
  - Ducts that have previously been tested
  - Ducts in additions less than 750sf (2012)

**Duct Leakage Test Results (Existing Construction)**

Permit #: \_\_\_\_\_

House address or lot number: \_\_\_\_\_

City: \_\_\_\_\_ Zip: \_\_\_\_\_

Cond. Floor Area (ft<sup>2</sup>): \_\_\_\_\_

☐ Duct tightness testing is not required for this residence per exceptions listed at the end of this document

Test Result: \_\_\_\_\_ CFM@25Pa

Ring (circle one):            Open            1            2            3

Duct Tester Location: \_\_\_\_\_

Pressure Tap Location: \_\_\_\_\_

**I certify that these duct leakage rates are accurate and determined using standard duct testing protocol**

Company Name: \_\_\_\_\_

Duct Testing Technician: \_\_\_\_\_

Technician Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Phone Number: \_\_\_\_\_

**Washington State Energy Code Reference:**

**R101.4.3.1 Mechanical Systems:** When a space-conditioning system is altered by the installation or replacement of space-conditioning equipment (including replacement of the air handler, outdoor condensing unit of a split system air conditioner or heat pump, cooling or heating coil, or the furnace heat exchanger), the duct system that is connected to the new or replacement space-conditioning equipment shall be tested as specified in RS-33. The test results shall be provided to the building official and the homeowner.

**Exceptions:**

1. Duct systems that are documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in RS-33.
2. Ducts with less than 40 linear feet in unconditioned spaces.
3. Existing duct systems constructed, insulated or sealed with asbestos.
4. Additions of less than 750 square feet.

# R101.4.4 Change in Occupancy or Use

Change of use needs to be brought into full compliance.



*No change from WSEC*

# Additions to Existing Buildings\*

## Exception

- Additions under 750 sf that do not fully comply with the code can make improvements to the existing occupancy that equate to or exceed the envelope deficiencies found in the addition
- Compliance must be demonstrated through component performance or systems analysis calculations

\*Not allowed in 2012 WSEC

## R102.1.1 Above Code Programs

- ~~• The *Code Official* or other authority having jurisdiction shall be permitted to deem a national, state or local energy efficiency program to exceed the energy efficiency required by this code.~~
- This section of IECC deleted because of minimum–maximum code conflict.

# R104.2.1. Wall Insulation Inspection



Wall insulation inspection after all wall insulation, air barrier and vapor retarder materials are in place, but before any wall covering is placed.

*WSEC language added because it is required by RCW 19.27A*

# R303.1 Insulation Certification

Insulation installers shall provide a certification listing:

- Type
- Manufacturer
- R-value of insulation installed in each element of the building thermal envelope.

## **R303.1 Insulation Certification**

For blown or sprayed insulation (fiberglass and cellulose), the initial installed thickness, settled thickness, settled R-value, installed density, coverage area and number of bags installed shall be listed on the certification.

# **R303.1 Insulation Certification**

For sprayed polyurethane foam (SPF) insulation, the installed thickness of the areas covered and R-value of installed thickness shall be listed on the certification.

# **R303.1 Insulation Certification**

**The insulation installer shall sign, date and post the certification in a conspicuous location on the job site.**

# Definition: NOMINAL R-VALUE:

The thermal resistance of insulation alone as determined in accordance with the U.S. Federal Trade Commission R-value rule.



[www.ftc.gov/bcp/rulemaking/rvalue/index.shtml](http://www.ftc.gov/bcp/rulemaking/rvalue/index.shtml)

# R302.2 Exterior Design Conditions

- The heating or cooling outdoor design temperatures shall be selected from Appendix B

*No change from WSEC.*

*Table 3-1 added as Appendix B.*

TABLE 3-1  
OUTDOOR DESIGN TEMPERATURES

<u>Location</u>	<u>Outdoor Design Temp. (in °F) (heating)</u>	<u>Outdoor Design Temp. (in °F) (cooling)</u>
<u>Aberdeen 20 NNE</u>	<u>25.0</u>	<u>83</u>
<u>Anacortes</u>	<u>24.0</u>	<u>72</u>
<u>Anatone</u>	<u>-4.0</u>	<u>89</u>
<u>Auburn</u>	<u>25.0</u>	<u>84</u>
<u>Battleground</u>	<u>19.0</u>	<u>91</u>
<u>Bellevue</u>	<u>24.0</u>	<u>83</u>
<u>Bellingham 2 N</u>	<u>19.0</u>	<u>78</u>
<u>Blaine</u>	<u>17.0</u>	<u>73</u>
<u>Bremerton</u>	<u>29.0</u>	<u>83</u>
<u>Burlington</u>	<u>19.0</u>	<u>77</u>
<u>Chehalis</u>	<u>21.0</u>	<u>87</u>

# R303.1.3 Fenestration Product Rating

## Exception:

Units without NFRC ratings produced by a small business\* may be assigned default U-factors from Table R303.1.3(4) for vertical fenestration.



\*See definition of “small business” in Chapter 2 [RE].

## R401.2 Compliance

Projects shall comply with Sections identified as “mandatory” and with either:

- Prescriptive
- U-Factor Alternative
- Performance Approach

*In addition, projects shall comply with Section R406 (2009 WSEC Chapter 9).*

## R401.2 Tools for Compliance

- Prescriptive – WSU form
- U-Factor Alternative – REScheck or other *approved* method
- Performance Approach – as required in R405

*Check WSU's Energy Code webpage for compliance tool information as it becomes available: [www.energy.wsu.edu/code](http://www.energy.wsu.edu/code)*

# R401.3 Certificate

- Posted within 3' of electrical panel
  - Insulation
  - Windows
  - HVAC efficiency
  - Duct leakage
  - Air leakage
- Certificate will be updated and posted at:  
[www.energy.wsu.edu/code](http://www.energy.wsu.edu/code)

**2009 WSEC Residential Energy Compliance Certificate**

Property Address: \_\_\_\_\_

Conditioned Floor Area \_\_\_\_\_ Date \_\_\_\_ / \_\_\_\_ / \_\_\_\_

Builder or registered design professional : \_\_\_\_\_

Signature: \_\_\_\_\_

**R-Values**

Ceiling: Vaulted R-\_\_\_\_ Floors Over unconditioned space R-\_\_\_\_  
 Attic R-\_\_\_\_ Slab on grade floor R-\_\_\_\_

Walls: Above grade R-\_\_\_\_ Doors \_\_\_\_\_ R-\_\_\_\_  
 Below, int. R-\_\_\_\_ R-\_\_\_\_  
 Below, ext. R-\_\_\_\_ R-\_\_\_\_

**U-Factors and SHGC**

NRFC rating (or) Windows U-\_\_\_\_ SHGC-\_\_\_\_  
 Default rating (Chapter 10 WSEC 2009) Skylights U-\_\_\_\_ SHGC-\_\_\_\_

Chapter 9 Option(s) \_\_\_\_\_ Total Chpt. 9 Credits \_\_\_\_\_

**Heating, Cooling & Domestic Hot Water**

System	Type	Efficiency
Heating		
Cooling		
DHW		

**Duct & Building Air Leakage**

All ducts & HVAC in conditioned space ( yes / no ) Insulation R-\_\_\_\_

Test Method: \_\_\_\_ Total leakage \_\_\_\_ Leakage to exterior \_\_\_\_ Air handler present

Test Target \_\_\_\_\_ CFM@25Pa Test Result \_\_\_\_\_ CFM@25Pa

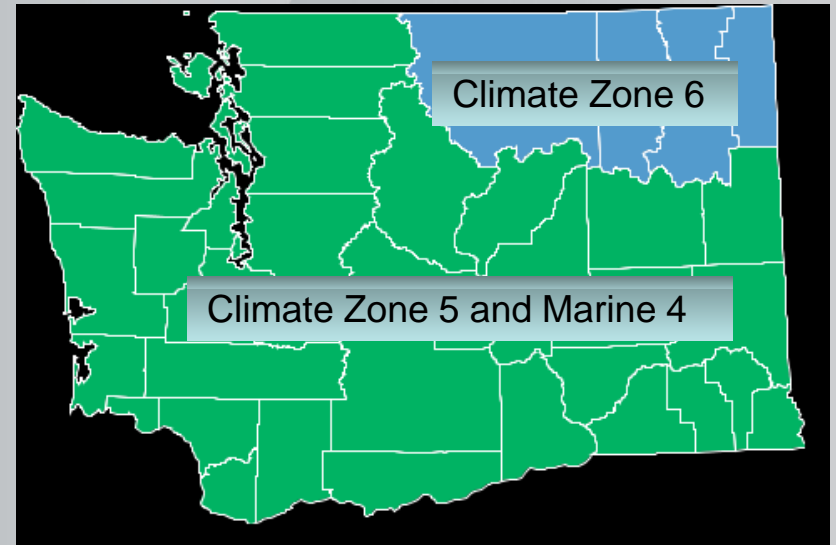
Building air leakage target: SLA<0.00030 - Tested leakage: SLA= \_\_\_\_\_

**Onsite Renewable Energy Electric Power System**

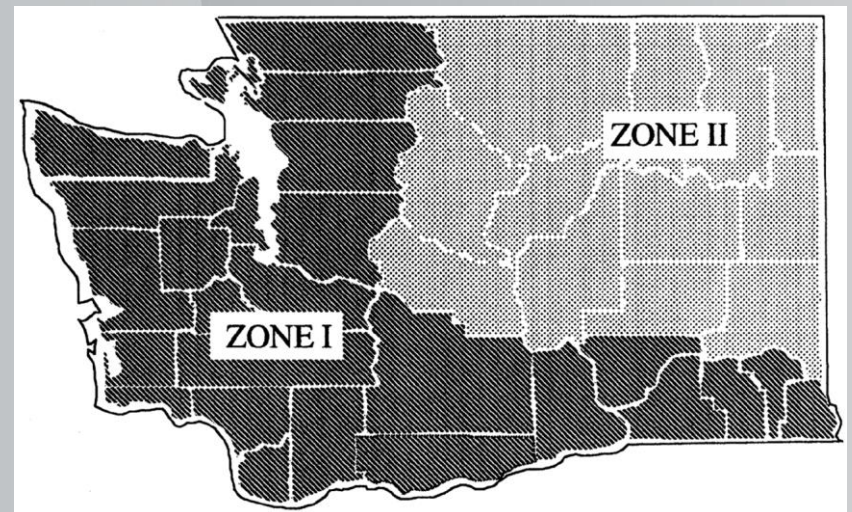
System type: \_\_\_\_\_ Rated annual generation \_\_\_\_\_ Kwh

# Climate Zone Changes

2012 WSEC



2009 WSEC



# R402.1.1 Prescriptive Requirements

## Climate Zone 5 and Marine 4

FENESTRATION U-FACTOR	SKYLIGHT <sup>b</sup> U-FACTOR	GLAZED FENESTRATION SHGC <sup>b, c</sup>	CEILING R-VALUE	WOOD FRAME WALL <sup>g, k, l</sup> R-VALUE	MASS WALL R-VALUE <sup>i</sup>	FLOOR R- VALUE	BELOW GRADE WALL R-VALUE	SLAB <sup>d</sup> R-VALUE & DEPTH	CRAWL SPACE <sup>e</sup> WALL R-VALUE
0.30	0.50	NR	49	21 int	21/ 21 <sup>h</sup>	30 <sup>g</sup>	10/15  21int+ TB	10, 2 ft	15/19

## Climate Zone 6

FENESTRATION U-FACTOR	SKYLIGHT <sup>b</sup> U-FACTOR	GLAZED FENESTRATION SHGC <sup>b, c</sup>	CEILING R-VALUE	WOOD FRAME WALL <sup>g, k, l</sup> R-VALUE	MASS WALL R-VALUE <sup>i</sup>	FLOOR R- VALUE	BELOW GRADE WALL R-VALUE	SLAB <sup>d</sup> R-VALUE & DEPTH	CRAWL SPACE <sup>e</sup> WALL R-VALUE
0.30	0.50	NR	49	21 +5 ci	21/ 21 <sup>h</sup>	30	10/15  21int+T B	10, 4 ft	15/19

# R402.1 Footnotes

Climate Zone 5 and Marine 4  
Also applies to Zone 6

FENESTRATION U-FACTOR	SKYLIGHT <sup>b</sup> U-FACTOR	GLAZED FENESTRATION SHGC <sup>b, e</sup>	CEILING R-VALUE	WOOD FRAME WALL <sup>g, h</sup> R-VALUE	MASS WALL R-VALUE <sup>i</sup>	FLOOR R- VALUE	BELOW GRADE WALL R-VALUE	SLAB <sup>d</sup> R-VALUE & DEPTH	CRAWL SPACE <sup>e</sup> WALL R-VALUE
0.30	0.50	NR	49	21 int	21/ 21 <sup>h</sup>	30 <sup>g</sup>	10/15 21int+TB	10, 2 ft	15/49

Insulating crawl space walls instead of installing floor insulation is not prescriptively permitted.

Footnote “D” requires continuous slab insulation under heated slabs.

Footnote “J” allows the reduction from R-49 to R-38 for vaulted ceilings.

# R402.1 Footnotes

## Climate Zone 6

FENESTRATION U-FACTOR	SKYLIGHT <sup>b</sup> U-FACTOR	GLAZED FENESTRATION SHGC <sup>b, e</sup>	CEILING R-VALUE	WOOD FRAME WALL <sup>g,k,l</sup> R-VALUE	MASS WALL R-VALUE <sup>i</sup>	FLOOR R- VALUE	BELOW GRADE WALL R-VALUE	SLAB <sup>d</sup> R-VALUE & DEPTH	CRAWL-SPACE <sup>e</sup> WALL R-VALUE
0.30	0.50	NR	49	21+5 ci	21/ 21 <sup>h</sup>	30	10/15 21int+TB	10, 4 ft	15/19

Some R-values and U-factors have been changed to reflect the current requirements of the 2009 WSEC. Note that areas in Climate Zone 6 require foam sheathed walls and 4 feet of slab insulation.

CLIMATE ZONE	FENESTRATION U-FACTOR	SKYLIGHT U-FACTOR	CEILING U-FACTOR	FRAME WALL U-FACTOR	MASS WALL U-FACTOR <sup>b</sup>	FLOOR U-FACTOR	<u>BASEMENT BELOW- GRADE WALL</u> U-FACTOR	<u>CRAWL SPACE WALL U- FACTOR</u>
1	0.50	0.75	0.035	0.082	0.197	0.064	0.360	0.477
2	0.40	0.65	0.030	0.082	0.165	0.064	0.360	0.477
3	0.35	0.55	0.030	0.057	0.098	0.047	0.091 <sup>c</sup>	0.136
4 except Marine	0.35	0.55	0.026	0.057	0.098	0.047	0.059	0.065
5 and Marine 4	0.30	0.50	0.026	0.056	0.056	0.029	0.042	0.055 0.042 (2')
6	0.30	0.50	0.026	0.044	0.044	0.029	0.042	0.055 0.042 (2')
7 and 8	0.32	0.55	0.026	0.048	0.057	0.028	0.050	0.055

U-factors in Table 402.1.3 have been modified to reflect the R-values in Table 402.1.1.

## R402.1.4 Total UA Alternative

- UA Alternative is formerly known as Component Performance.
- The U-factors for typical construction assemblies are included in Appendix A. Appendix A contains default U-factors from 2009 WSEC Chapter 10.
- Language was added with a 15% maximum glazing area for the target house when using the “Total UA Alternative” (Component Performance). 15% is the glazing percentage in RCW 19.27A.

# UA Alternative

## Building Envelope Trade-Off

F40    4											
	A	B	C	D	E	F	G	H	I	J	K
15	Component Performance, R-3 occupancies		Code Target Values		Proposed Design Values						
16				Area	UA					Area	UA
17		Vertical Glazing U = 0.300		330	99.0					362	108.6
18		Overhead Glazing U = 0.500		0	0.0					0	0.0
19		Doors U = 0.200		42	8.4					42	8.4
20		Flat/Vaulted Ceilings U = 0.027		1100	29.7					1100	29.7
21		Wall (above grade) U = 0.056		2032	113.8					2000	102.0
22		Floors U = 0.029		1100	31.9					1100	31.9
23		Slab on Grade F = 0.360		0	0.0					0	0.0
24		Below Grade									
25		2' depth, wall U = 0.042		0	0.0					0	0.0
26		2' depth, slab F = 0.590		0	0.0					0	0.0
27		3.5' depth, wall U = 0.041		0	0.0					0	0.0
28		3.5' depth, slab F = 0.640		0	0.0					0	0.0
29		7' depth, wall U = 0.037		0	0.0					0	0.0
30		7' depth, slab F = 0.570		0	0.0					0	0.0
31											
32			Target UA Total	282.8						Proposed UA Total	280.6
33			Target Credits from Chpt. 9	1.0						Proposed Credits from Chpt. 9	1.0
Qualifies											
If the Proposed UA ≤ the Target UA, and the Proposed Credits From Chpt. 9 are ≥ 1 than the home meets the 2009 WSEC.											
Instructions    Group R-3    Chapter 9    Vertical Glazing    Overhead Glazing    Doors    Ceilings, Attic    Ceilings, Vault    W											
Ready											

# R402.2.1.1 Loose Insulation in Attics

## Loose insulation in attic spaces–

Open-blown or poured loose fill insulation may be used in attic spaces where the slope of the ceiling is not more than 3 feet in 12 and there is at least 30 inches of clear distance from the top of the bottom chord of the truss or ceiling joist to the underside of the sheathing at the roof ridge.



*Language from WSEC added for clarity when blowing in attic insulation.*

## R402.2.7 Floors

**R402.2.7 Floors.** Floor insulation shall be installed to maintain permanent contact with the underside of the subfloor decking.



photo by Bill Warren, Advanced Energy

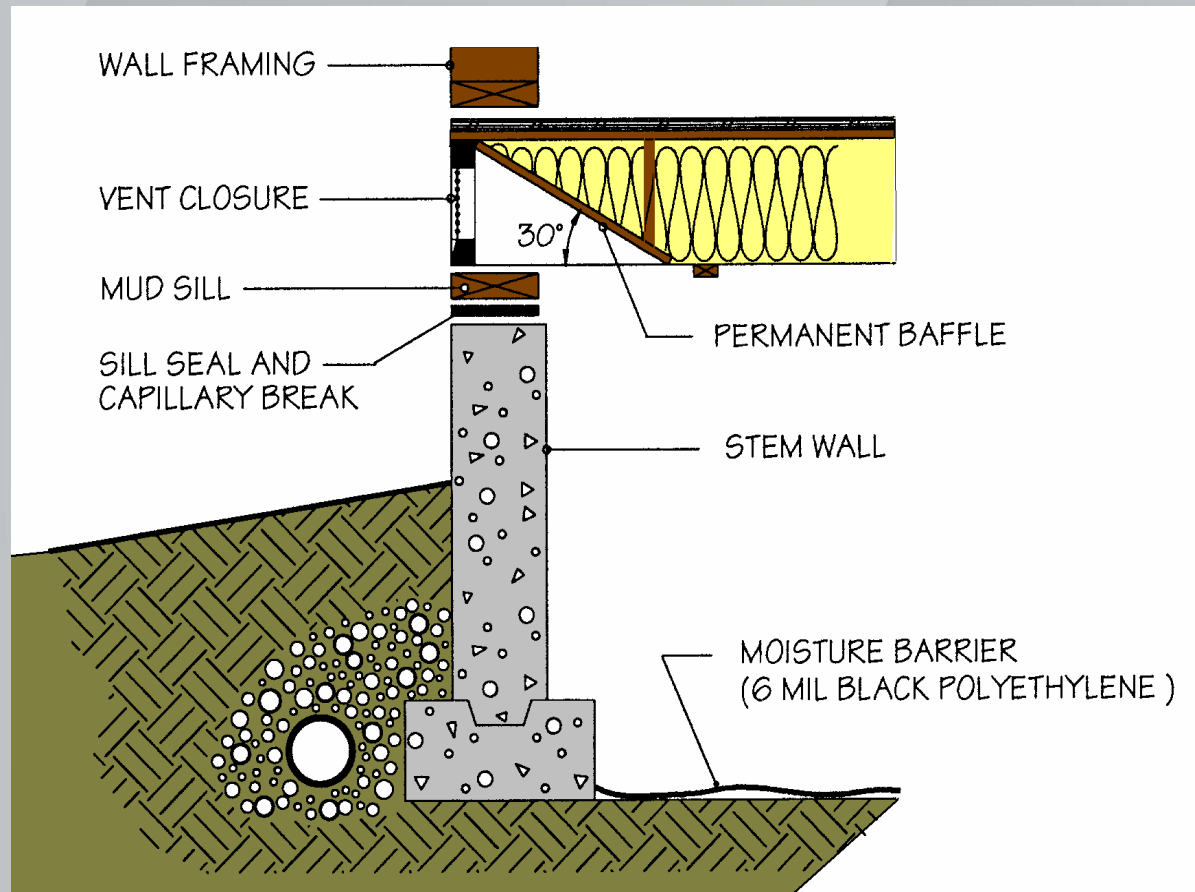
## R402.2.7 Floors

**R402.2.7 Floors.** Insulation supports shall be installed so spacing is no more than 24 inches on center. Foundation vents shall be placed so that the top of the vent is below the lower surface of the floor insulation.



## Exceptions:

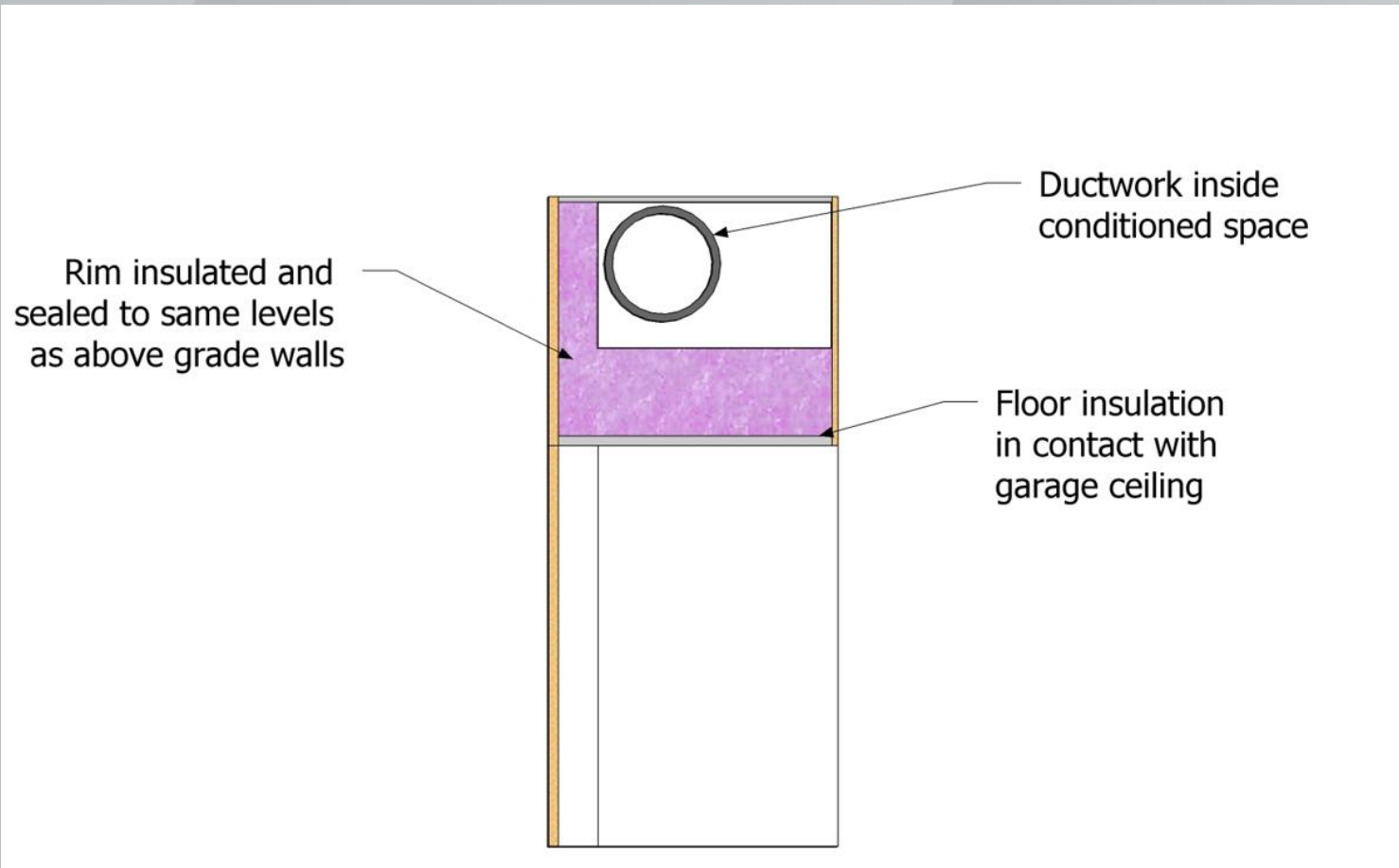
When foundation vents are not placed so that the top of the vent is below the lower surface of the floor insulation, a permanently attached baffle shall be installed at an angle of 30° from horizontal, to divert air flow below the lower surface of the floor insulation.



*WSEC language added for insulation support requirements.*

## Exceptions:

Substantial contact with the surface being insulated is not required in enclosed floor/ceiling assemblies containing ducts where full depth insulation is installed between the duct and the exterior surface.



## R402.2.8 Basement walls

- Exterior Insulation
  - R-10 Continuous
- Interior Insulation
  - R-15 Continuous



R-21 Cavity  
(allowed but no  
recommended)



# R402.2.8 Basement walls



R-13 Batt

R-5 Foam

Vapor retarders below grade are not recommended



**R702.7 Vapor retarders.** Class I or II vapor retarders are required on the interior side of frame walls in Climate Zones 5, 6, 7, 8 and Marine 4.

**Exceptions:**

1. Basement walls.
2. Below grade portion of any wall.
3. Construction where moisture or its freezing will not damage the materials.

# Vapor Retarders Defined

**R702.7.1 Class III vapor retarders.** Class III vapor retarders shall be permitted where any one of the conditions in Table R702.7.1 is met.

**TABLE R702.7.1  
CLASS III VAPOR RETARDERS**

CLIMATE ZONE	CLASS III VAPOR RETARDERS PERMITTED FOR:*
Marine 4	Vented cladding over wood structural panels.
	Vented cladding over fiberboard.
	Vented cladding over gypsum.
	Insulated sheathing with $R$ -value $\geq 2.5$ over $2 \times 4$ wall.
	Insulated sheathing with $R$ -value $\geq 3.75$ over $2 \times 6$ wall.
5	Vented cladding over wood structural panels.
	Vented cladding over fiberboard.
	Vented cladding over gypsum.
	Insulated sheathing with $R$ -value $\geq 5$ over $2 \times 4$ wall.
	Insulated sheathing with $R$ -value $\geq 7.5$ over $2 \times 6$ wall.
6	Vented cladding over fiberboard.
	Vented cladding over gypsum.
	Insulated sheathing with $R$ -value $\geq 7.5$ over $2 \times 4$ wall.
	Insulated sheathing with $R$ -value $\geq 11.25$ over $2 \times 6$ wall.
7 and 8	Insulated sheathing with $R$ -value $\geq 10$ over $2 \times 4$ wall.
	Insulated sheathing with $R$ -value $\geq 15$ over $2 \times 6$ wall.

For SI: 1 pound per cubic foot = 16 kg/m<sup>3</sup>.

a. Spray foam with a minimum density of 2 lb/ft<sup>3</sup> applied to the interior cavity side of wood structural panels, fiberboard, insulating sheathing or gypsum is deemed to meet the insulating sheathing requirement where the spray foam  $R$ -value meets or exceeds the specified insulating sheathing  $R$ -value.

**VAPOR RETARDER CLASS.** A measure of the ability of a material or assembly to limit the amount of moisture that passes through that material or assembly. Vapor retarder class shall be defined using the desiccant method with Procedure A of ASTM E 96 as follows:

Class I: 0.1 perm or less

Class II:  $0.1 < \text{perm} \leq 1.0$  perm

Class III:  $1.0 < \text{perm} \leq 10$  perm



**R702.7.2 Material vapor retarder class.** The vapor retarder class shall be based on the manufacturer's certified testing or a tested assembly.

The following shall be deemed to meet the class specified:

Class I: Sheet polyethylene, unperforated aluminum foil.

Class II: Kraft-faced fiberglass batts.

Class III: Latex or enamel paint.

Vapor retarder requirements no longer found in the Energy Code.  
Moisture control requirements are covered in the 2012 IRC

## R402.2.9.1 Radiant slabs (Mandatory)

The entire area of a radiant slab shall be thermally isolated from the soil with a minimum of R-10 insulation.



*WSEC insulation requirements for radiant slabs added.*

# R402.2.10 Crawl space walls

This section deleted in its entirety.



*Unvented crawl spaces are not prescriptively allowed.*



# R402.2.12 Sunroom insulation

## R402.3.5 Sunroom $U$ -factor

These sections deleted in their entirety.



*These sections deleted. Less stringent than the WSEC.*

## R402.4.1.2 Air Leakage Testing

Air leakage testing based on “air changes per hour” and not “specific leakage area”.

$$\text{SLA } .00030 = 5.9 \text{ ACH}_{50}$$

The IECC maximum leakage rate is 3  $\text{ACH}_{50}$ .

$$5.0 \text{ ACH}_{50} = \text{SLA } .00027$$

This was changed to 5  $\text{ACH}_{50}$  for WA.

# R402.4.1.2 Air Leakage Testing

- Blower door testing required for all new construction and additions over 750sf
- Results reported on certificate
- Home must not exceed maximum leakage rate

5.0 ACH<sub>50</sub>

$$5.0 \text{ ACH}_{50} = \text{SLA } .00027$$



## R402.4.1.2 Air Leakage Testing

- Test done in closed house condition
- Depressurize house to 50 Pascals
- Air flow through the fan = air flow through leaks in the building envelope
- Convert CFM to ACH50
- *Who can test?*



# How to Calculate ACH<sub>50</sub>

- Determine leakage rate of house with blower door (CFM @ 50 pascals)
- Calculate to volume of the house (ft<sup>3</sup>)

$$\text{ACH}_{50} = (\text{CFM} \times 60) \div \text{Volume}$$

## R403.1.2 Heat Pump Supplementary Heat (Mandatory)

All heat pumps installed under this section shall include the capability to lock out the supplementary heat based on outdoor temperature. This control shall have a maximum setting of 40° F. At final inspection, the lock out control shall be set to 35° F or less.



*WSEC language added for clarity. IECC does not cite outdoor temperatures.*

# 2012 Duct Insulation (Prescriptive)

- Ducts shall be insulated to a minimum of R-8

***Exception:** Ducts or portions thereof located completely inside the building thermal envelope. Ducts located in crawl spaces do not qualify for this exception.*



# R403.2.2 Duct Testing (Mandatory)

Duct testing required in all new construction

- Current 2009 targets are 6% and 8% depending on test method
- Targets will change to 4% leakage in 2012
- Same target for total leakage and leakage to exterior
- Testing done by certified technician
- Results documented on affidavit



# Ducts

- Installation of ducts in exterior walls, floor or ceilings cannot displace required insulation
- Building cavities cannot be used as ducts



## R403.4.2 Hot Water Pipe Insulation (Prescriptive)

This section deleted in its entirety.



*IECC language deleted to minimize confusion. All hot water pipes are required to be insulated to R-4.*

## 403.4.3 Electric Water Heater Insulation

All electric water heaters in unheated spaces or on concrete floors shall be placed on an incompressible, insulated surface with a minimum thermal resistance of R-10.



*WSEC language added for water heaters installed in unheated spaces or on slabs.*

# R404.1 Lighting Equipment (Mandatory)

A minimum of 75 percent of the lamps in permanently installed lighting fixtures shall be high-efficacy lamps.



## R404.2 Exterior Lighting

~~Luminaires providing outdoor lighting and permanently mounted to a residential building or to other buildings on the same lot shall be high efficacy luminaires.~~

### ~~EXCEPTIONS:~~

~~Permanently installed outdoor luminaires that are not high efficacy shall be allowed provided they are controlled by a motion sensor(s) with integral photocontrol photosensor.~~

~~Permanently installed luminaires in or around swimming pools, water features~~

# Table 406.2 Energy Credits

- WSEC Chapter 9 is now Table 406.2
- All new construction must develop credits from Table 406.2 based on size of dwelling unit.



# Table 406.2 Energy Credits

## Required Credits

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- |   |     |
|---|-----|
| – Houses $< 1500 \text{ ft}^2$ <ul style="list-style-type: none"><li>• 300 <math>\text{ft}^2</math> max. glazing</li><li>• Additions 750 <math>\text{ft}^2</math></li></ul> | 0.5 |
| – Houses $\geq 1500 \text{ ft}^2 - 5,000 \text{ ft}^2$  | 1.5 |
| – Houses $> 5,000 \text{ ft}^2$   | 2.5 |

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