

Alaska Housing Finance Corporation Alaska-Specific Amendments to IECC 2012

June 18, 2014

This document is a list of Alaska-specific amendments to the International Energy Code 2012, First Printing, May, 2011 (IECC 2012) adopted by the Alaska Housing Finance Corporation (AHFC) on Wednesday, June 18, 2014. It is meant to be read in conjunction with the IECC 2012 and ASHRAE 62.2 2010 which may be purchased at local bookstores or online. These amendments comprise both the Commercial and Residential Building Energy Efficiency Standards (BEES) for AHFC-funded residential mortgage loans and energy rebates, and energy retrofits of public buildings. These amendments supplant the BEES amendments to IECC 2009 for commercial and residential projects as adopted on June 17, 2009 and together with the IECC 2012 and other referenced standards therein constitute the “Alaska BEES.” These amendments are numbered and organized by the chapter and section numbers found in the IECC 2012 and follow immediately:

Chapter 1 [CE] – Scope and Administration.

C101.1 Title. Replace this subsection with:
This code shall be known as the Alaska Building Energy Efficiency Standard (Alaska BEES) for commercial projects financed by the Alaska Housing Finance Corporation (AHFC) and shall be cited as such. It is referred to herein as “this code.”

C101.4.2 Delete this subsection
Buildings wishing to participate in the Alaska Energy Efficiency Revolving Loan Program need to meet this standard, regardless of historic status.

C103 - C104 & C107 – C109 Delete these subsections.
AHFC’s administration requirements for the Alaska Energy Efficiency Revolving Loan Program can be found online
at http://www.ahfc.us/files/8713/5483/8974/aeerlp_guides_101612.pdf

Chapter 2 [CE] – Definitions.

CODE OFFICIAL. Replace this term throughout all chapters with “duly appointed representative of the Alaska Housing Finance Corporation (AHFC Representative)”

CHAPTER 3 [CE]- Climate Zones

C301.1 General. Replace this subsection with “Climate zones from Figure A301.1 or Table A301.1(1) below shall be used in determining the applicable requirements from Chapter 4 [CE]. Table A301.1(2) is provided for historical reference.”

C301.2 & C301.3. Delete these subsections.

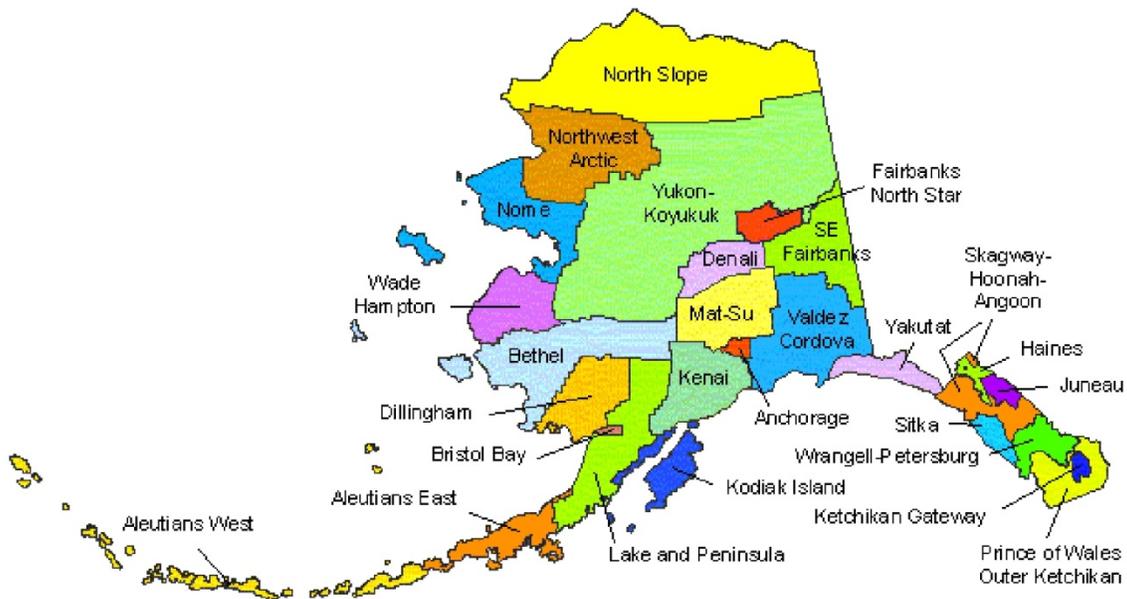


Figure A301.1 Alaska Census Areas

Table A301.1(1) Climate Zones for Alaska by Census Area			
Zone 6	Zone 7	Zone 8	Zone 9
Juneau	Aleutians East	Bethel	North Slope
Ketchikan Gateway	Aleutians West	Denali	
Prince of Wales	Anchorage	Fairbanks North Star	
Sitka	Bristol Bay	Nome	
Skagway-Hoonah-Angoon	Dillingham	Northwest Arctic	
Wrangell-Petersburg	Kenai Peninsula	Southeast Fairbanks	
Yakutat	Kodiak Island	Wade Hampton	
Haines	Lake and Peninsula	Yukon-Koyukuk	
	Matanuska-Susitna		
	Valdez-Cordova		

Table A301.1(2) - Climate Zones for Alaska by HDD^a			
IECC zones for Alaska	HDD^a Range (IECC)	Old BEES Climate Regions	HDD^a Range (Old BEES)
Zone 6	7200 - 9000	Region 1 - Southeast	7000-10,700
Zone 7	9000 -12,600	Region 2 - Southcentral	8600-13,500
Zone 8	12,600 -16,800	Region 3&4 - Interior & Western	11,300-17,700
Zone 9	16,800 -21,000	Region 5 – Arctic Slope	16,900-20,300

a. HDD = Heating Degree Day (based on 65 degrees Fahrenheit)

C303.2.2 Compliance with Manufacturers’ Requirements (New Subsection). Insulation materials shall be installed in accordance with manufacturers’ recommendations and in such a manner as to achieve rated R-value of insulation.

CHAPTER 4 [CE] - Commercial Energy Efficiency

C401.2 Application. Replace subsection 1 with “The requirements of ANSI/ASHRAE/IESNA 90.1 as amended in Appendix A of this document.”

C401.2.1 Application to existing buildings. At the end of subsection 2, add “as amended in Appendix A of this document.”

C402.1 General (Prescriptive). Throughout this section IECC 2012 Tables C402.1.2, C402.2(1), and C402.3 shall be replaced with Tables C-A402.1.2, C-A402.2(1), and C-A402.3 respectively, below.

Table C-A402.1.2 Opaque Thermal Element Assembly Requirements^a

Climate Zone	6		7		8		9	
	All Other	Group R						
Roofs								
Insulation entirely above deck	U-0.032	U-0.032	U-0.028	U-0.028	U-0.028	U-0.028	U-0.025	U-0.025
Metal Buildings	U-0.031	U-0.031	U-0.029	U-0.029	U-0.029	U-0.029	U-0.025	U-0.025
Attic and other	U-0.021	U-0.021	U-0.021	U-0.021	U-0.020	U-0.020	U-0.017	U-0.017
Walls, Above Grade								
Mass	U-0.066	U-0.066	U-0.050	U-0.050	U-0.040	U-0.040	U-0.033	U-0.033
Metal building	U-0.052	U-0.052	U-0.048	U-0.039	U-0.042	U-0.039	U-0.034	U-0.034
Metal framed	U-0.057	U-0.057	U-0.048	U-0.048	U-0.037	U-0.037	U-0.032	U-0.032
Wood framed and other	U-0.051	U-0.051	U-0.050	U-0.050	U-0.036	U-0.036	U-0.030	U-0.030
Walls, Below Grade								
Below grade wall ^b	C-0.100	C-0.100	C-0.079	C-0.079	C-0.067	C-0.067	C-0.050	C-0.050
Floors								
Mass	U-0.060	U-0.057	U-0.055	U-0.051	U-0.051	U-0.051	U-0.048	U-0.048
Joist/Framing	U-0.033	U-0.033	U-0.033	U-0.033	U-0.026	U-0.026	U-0.023	U-0.023
Slab-on-Grade Floors								
Unheated slabs	F-0.54	F-0.52	F-0.40	F-0.40	F-0.40	F-0.40	NR	NR
Heated slabs	F-0.58	F-0.58	F-0.55	F-0.55	F-0.55	F-0.55	NR	NR

- a. When heated slabs are placed below-grade, walls must meet the *F*-factor requirements for perimeter insulation according to the heated slab-on-grade construction.

Table C-A402.2 Opaque Thermal Element Requirements ^a

Climate Zone	6		7		8		9	
	All Other	Group R	All Other	Group R	All Other	Group R	All Other	Group R
Roofs								
Insulation entirely above deck	R-30ci	R-30ci	R-35ci	R-35ci	R-35ci	R-35ci	R-40ci	R-40ci
Metal buildings (with R-5 thermal blocks) ^{a, b}	R-25 + R-11LS	R-25 + R-11LS	R-30 + R-11LS	R-30 + R-11LS	R-30 + R-11LS	R-30 + R-11LS	R-19 + R-21LS	R-19 + R-21LS
Attic and other	R-49	R-49	R-49	R-49	R-49	R-49	R-60	R-60
Walls, Above Grade								
Mass	R-15.2ci	R-15.2ci	R-20ci	R-20ci	R-25ci	R-25ci	R-30ci	R-30ci
Metal building	R-13 + R-13ci	R-13 + R-13ci	R-19 + R-10ci	R-19 + R-10ci	R-21 + R-10ci	R-21 + R-10ci	R-21 + R-15ci	R-21 + R-15ci
Metal framed	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-11.4ci	R-13 + R-15.6	R-13 + R-17.5ci	R-13 + R-17.5ci	R-13 + R-20.1ci	R-13 + R-20.1ci
Wood framed and other	R-11 + R-10.4ci	R-11 + R-10.4ci	R-11 + R-11.4ci	R-11 + R-11.4ci	R-13 + R-15.6ci	R-13 + R-15.6ci	R-13 + R-22.8ci	R-13 + R-22.8ci
Walls, Below Grade								
Below grade wall ^c	R-10ci	R-10ci	R-12.5ci	R-12.5ci	R-15ci	R-15ci	R-20ci	R-20ci
Floors								
Mass	R-14.6ci	R-14.6ci	R-16.7ci	R-16.7ci	R-18.8ci	R-18.8ci	R-20.9ci	R-20.9ci
Joist/framing ^d	R-30/38	R-30/38	R-30/38	R-30/38	R-38/43	R-38/43	R-43/50	R-43/50
Slab-on-Grade Floors								
Unheated slabs	R-15 for 24" below	R-15 for 48" below	R-15 for 48" below	NR ^e	NR ^e			
Heated slabs ^c	R-20 for 48" below	NR ^e	NR ^e					
Opaque Doors								
Swinging	U-0.37	U-0.37	U-0.37	U-0.37	U-0.37	U-0.37	U-0.37	U-0.37
Roll-up or sliding	R-4.75	R-4.75	R-4.75	R-4.75	R-4.75	R-4.75	R-4.75	R-4.75

For SI: 1 inch = 25.4 mm. ci = Continuous insulation. NR = No requirement.

LS = Liner System – A continuous membrane installed below the purlins and uninterrupted by framing members.

Uncompressed, unfaced insulation rests on top of the membrane between the purlins.

- a. Assembly descriptions can be found in ANSI/ASHRAE/IESNA 90.1 Appendix A.
- b. Where using R-value compliance method, a thermal spacer block shall be provided, otherwise use the U-factor compliance method in Table C-A402.1.2.
- c. Where heated slabs are below grade, below-grade walls shall comply with the exterior insulation requirements for heated slabs.
- d. Steel floor joist systems shall be insulated to the larger value; wood systems to the smaller value.
- e. No general recommendation. Slab-on-grade foundations in this zone will have to be engineered in order to not melt the underlying permafrost and still support the structure. A vapor retarder may be installed within the thermal insulation so long as the R-value of the thermal insulation on the warm side of the vapor retarder does not exceed one third of the total R-value. [Note that "one third" is a general statewide maximum and more restrictive values may be needed in the colder climate zones.

Table C-A402.3 Building Envelope Requirements: Fenestration

Climate Zone	6	7	8	9
Vertical fenestration				
U-factors				
<i>Fixed / Operable fenestration</i>	0.33	0.286	0.25	0.20
Entrance doors	.77	.77	0.77	0.77
SHGC ≤				
SHGC: PF < 0.25	0.40	0.40	0.45	0.45
Skylights (3% maximum)				
U-factor	0.35	0.33	0.286	0.25
SHGC	0.40	NR	NR	NR

NR = No requirement.

C402.2.1 Roof assembly. Replace *Exception 1* with the following:

Exception 1. Continuously insulated tapered roof assemblies with an average R-value of not less than that specified in Table C-A402.2 and having not less than R-12.5 at each roof drain location.

C402.2.1.2 Baffles. (New Subsection). When eave vents are installed, baffling of the vent openings shall be provided to deflect the incoming air above the surface of the insulation.

C402.2.4 Thermal resistance of below-grade walls. Replace with: “The minimum thermal resistance (R-value) of the insulating material shall be as specified in Table C-A402.2 and shall be installed on the exterior side of the wall. This insulation shall extend to a depth of 10 feet (3048 mm) below the outside finished ground level, or to the level of the floor, whichever is less.”

C402.4.1.2.2 Assemblies. Add at end of subsection:

Curtain wall and store front systems shall incorporate exterior openings for ventilation and drainage of the assembly.

C402.4.3 Air leakage of fenestration. Add exception at end of subsection:

3. This does not include required moisture channels and exterior openings for ventilation and drainage in curtain wall and store front systems. These shall be maintained open and functional.

C402.4.7 Vestibules. Replace exception 4 with “Doors that open directly from a space that is less than 3,000 ft² in area and is separate from the building entrance.

C402.5 Moisture control (mandatory).

The building design shall incorporate both interior and exterior moisture control strategies to prevent the accumulation of moisture within insulated assemblies. Exterior moisture control shall comply with the IBC. Interior moisture control shall comply with section C402.5.1. Should insulated assemblies become wet, or start out wet, the design strategy shall allow the assembly to dry to either the exterior or the interior. Materials shall be allowed to dry prior to enclosure.

C402.5.1 Interior moisture control (New subsection).

Methods to control moisture accumulation within insulated assemblies from the building interior shall address both vapor diffusion and air leakage. Vapor diffusion shall be controlled by the installation of a class I or II vapor retarder on the warm-in-winter side of the insulation. The vapor retarder shall be continuous and seams shall be lapped 6 inches minimum. Penetrations and seams shall be sealed with approved tape or sealant to control air leakage. Where duct work is located in dropped ceilings adjacent to attics and exterior walls, the vapor retarder continuity shall be maintained above the dropped ceiling.

Exceptions:

1. A vapor retarder is not required in construction where moisture or its freezing will not damage materials.
2. A vapor retarder is not required on basement and crawlspace walls designed to dry to the interior.
3. A vapor retarder is not required at cantilevered floor assemblies where the floor decking consists of nominal $\frac{3}{4}$ inch OSB or other approved material having a perm rating of less than one. Joints shall be sealed in an approved manner. Joint sealing is not required where the deck is covered with concrete or a gypsum based floor topping.
4. The rim joist does not require a vapor retarder when insulated to a minimum value of R-21 with spray foam having a minimum density of 2 pounds per cubic foot.
5. A class 3 vapor retarder may be used on walls insulated to a minimum value of R-21 with spray foam having a minimum density of 2 pounds per cubic foot.
6. Up to one-third of the total installed insulation R-value may be installed on the warm side of the vapor retarder.
7. Factory manufactured insulated panels consisting of a metal skin encapsulating and bonded to a foam plastic core do not require a vapor retarder.

C403.2.2 Equipment and system sizing. Add exception number 3:
 3. The total heating system may include a safety factor of up to 20%.

C403.2.4.4 Shutoff damper controls. Add exception number 4:
 4. Motorized dampers shall not be required for exhaust systems where grease, lint, and similar particulates may accumulate on the damper and create a fire hazard.

C403.2.6 Energy recovery ventilation systems. Add exception number 10:
 10. Where the system does not operate continuously and is controlled only to operate under a safety operation such as carbon monoxide exhaust systems in garages.

C403.2.7.1.3 High-pressure duct systems. Delete last sentence which reads:
 "Documentation shall be furnished by the designer demonstrating..."

C403.2.8 Piping insulation. Add exceptions number 7 & 8:
 7. Piping within baseboard radiation assemblies and piping that is intended to serve as a terminal heating device.
 8. If approved by the *AHFC Representative*, Table C-A403.2.8 may replace Table C403.2.8, provided that the conductivity of the pipe insulation is less than or equal to 0.27 Btu per inch/h·ft²·°F.

Table C-A403.2.8 Minimum Pipe Insulation (thickness in inches)

FLUID	NOMINAL PIPE DIAMETER	
	≤ 1.5" ^a	> 1.5"
Steam	1.5	3
Hot Water	1.5	2
Chilled water, brine or refrigerant	1.5	1.5

a. For piping smaller than 1.5 inch and located in partitions within *conditioned spaces*, reduction of these thicknesses by 0.5 inch shall be permitted.

C407.5.2 Thermal blocks. Add at end of subsection:
Exception: When modeling a simple building and using a software tool that does not use thermal blocks.

C407.6 Calculation software tools. Add at end of subsection:
Exception: The AHFC Representative may approve the use of a simpler software tool, such as AkWarm-R if the building is sufficiently simple to be modeled by the proposed software tool.

C408.2.4-C408.2.5.4

Delete these subsections.

As sole administrator of the Building Energy Efficiency Standard, AHFC will determine commissioning documentation requirements as necessary.

Appendix A: Amendments to ANSI/ASHRAE/IESNA 90.1

The following amendments refer to the *ANSI/ASHRAE/IESNA Standard 90.1-2010* and are numbered according to that standard.

5.5-1 – 5.5-8. Tables 5.5-1 through 5.5-8 in *ANSI/ASHRAE/IESNA Standard 90.1* describe the prescriptive method for compliance and establish minimum thermal envelope insulation and fenestration requirements for *non-residential* buildings. These tables shall be replaced with BEES tables C-A402.1.2, C-A402.2(1), and C-A402.3. In these replacement tables, found in Chapter 4 [CE] of this document, only the zones applicable to Alaska are given (i.e., 6-9). These zones are defined in Chapter 3[RE].

5.5.4.2.1 Vertical Fenestration Area. Replace with: The total *vertical fenestration area* shall be less than 30% of the above grade wall area.

5.8.1.2 Compliance with Manufacturers' Requirements. Delete the exception in this section.

11.2.1 Simulation Program. Add at end of section: "AkWarm-C may be approved by the Code Official as a qualified simulation program that may be used to meet the general requirements of the energy cost budget method, provided that the subject building is not too complex to be modeled by AkWarm-C."

Chapter 1[RE] – Administration

R101.1 Title. Modify this subsection to read:
This code shall be known as the Alaska Building Energy Efficiency Standard (Alaska BEES) for residential projects financed by the Alaska Housing Finance Corporation (AHFC) and shall be cited as such. It is referred to herein as “this code.”

R101.4.3 – R101.4.4 Delete these subsections.

R101.4.5 Change in space conditioning. Replace with: Any non-conditioned space that is altered to become *conditioned space* shall be required to be brought into full compliance with the version of BEES in place when the house was originally rated.

R101.5.3 BEES Certification (new subsection).
Certification that a building meets the thermal and ventilation requirements of the Alaska Building Energy Efficiency Standard (BEES) as adopted by 15 AAC 155.010 shall be accomplished by submission of a completed AHFC Form PUR-101 to the Alaska Housing Finance Corporation (AHFC).

R101.5.3.1 BEES Certification using the Energy Rating Compliance Path.
For AHFC PUR-101 certification under the energy rating (performance) path, the energy rater shall rely on inspection and documentation as specified by the AHFC Energy Rating Program provided for in Section R405.3 (Performance-based compliance).

R101.5.3.2 BEES Certification using the Prescriptive Compliance Path.
For AHFC PUR-101 certification under the prescriptive path, the certifier shall rely on inspections and documentation as specified by AHFC that the building meets the mandatory and prescriptive standards as described in subsection R401.2 (Compliance)

R102 – R104 and R107 – R109. Delete these sections.
This IECC chapter assumes that the energy standards in Chapter Four [RE] will be administered by a code official representing a state or municipal entity. As these amendments are adopted by AHFC for the purpose of establishing the Building Energy Efficiency Standards (BEES) for programs solely administered by AHFC, the administration of these standards is also an AHFC function and will be established by policies set out by AHFC.

Chapter 2[RE] – Definitions.

CODE OFFICIAL. Delete this term throughout all chapters and replace with “duly authorized representative of AHFC.”

CHAPTER 3[CE] - Climate Zones

R301.1 General. Replace this subsection with:
Climate zones from Figure A301.1 and Table A301.1 shall be used in determining the applicable requirement from Chapter 4[RE].

R301.2 & R301.3. Delete these subsections.

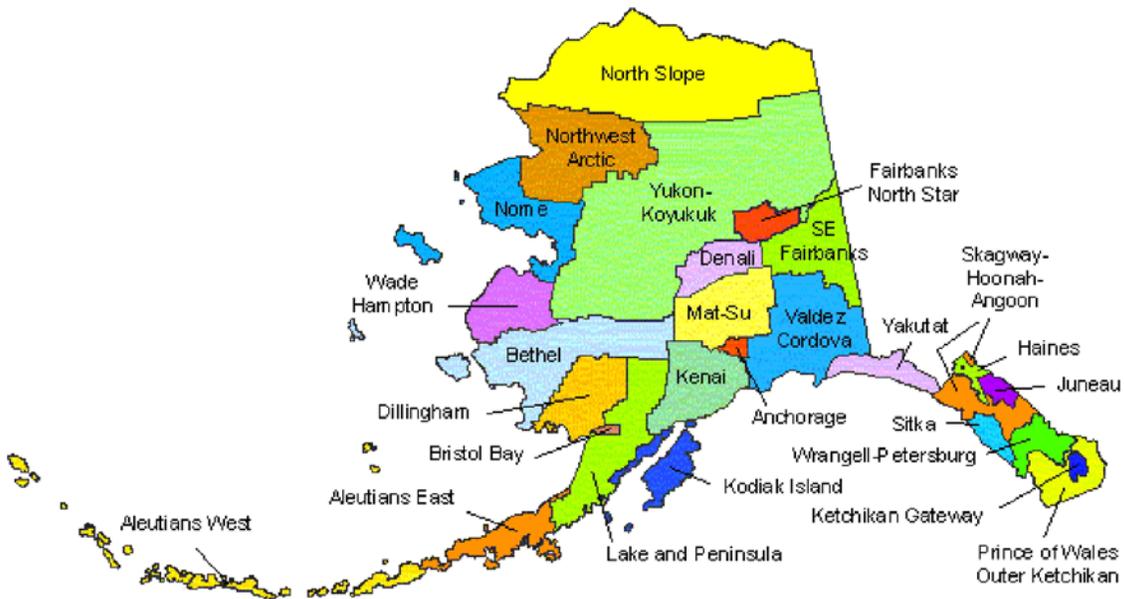


Figure A301.1 Alaska Census Area

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Wrangell-Petersburg	Kenai Peninsula	Southeast Fairbanks	
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IECC zones for Alaska	HDD^a Range (IECC)	Old BEES Climate Regions	HDD^a Range (Old BEES)
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Zone 8	12,600 -16,800	Region 3&4 - Interior & Western	11,300-17,700
Zone 9	16,800 -21,000	Region 5 – Arctic Slope	16,900-20,300

a. HDD = Heating Degree Day (based on 65 degrees Fahrenheit)

CHAPTER 4 [RE] - Residential Energy Efficiency

R401.1 Scope. Replace this subsection with:

This chapter applies to residential buildings and the residential portion of buildings with mixed occupancies.

R401.3 Certificate (Mandatory). No longer mandatory.

A permanent certificate shall be completed and posted on or in the electrical distribution panel by the builder or registered design professional. The certificate shall not cover or obstruct the visibility of the circuit directory label, service disconnect label or other required labels. The certificate shall list the predominant R-values of insulation installed in or on ceiling/roof, walls, foundation (slab, basement wall, crawlspace wall and/or floor) and ducts outside conditioned spaces; U-factors for fenestration and the solar heat gain coefficient (SHGC) of fenestration, and the results from any required duct system and building envelope air leakage testing done on the building. Where there is more than one value for each component, the certificate shall list the value covering the largest area. The certificate shall list the types and efficiencies of heating, cooling and service water heating equipment. Where a gas-fired unvented room heater, electric furnace, or baseboard electric heater is installed in the residence, the certificate shall list “gas-fired unvented room heater,” “electric furnace” or “baseboard electric heater,” as appropriate. An efficiency shall not be listed for gas-fired unvented room heaters, electric furnaces or electric baseboard heaters.

R402.1 - R402.3, R403.2.1 & R404.1 (Prescriptive). R404.1. No longer mandatory.

IECC 2012 Sections R402.1 through R402.3, R403.2.1, and R404.1 describe the prescriptive method for compliance and establish minimum thermal envelope insulation, fenestration requirements, duct insulation levels, and lighting equipment specifications for *residential* buildings. IECC 2012 Tables 402.1.1 and 402.1.3 shall be replaced with Tables R-A402.1.1 and R-A402.1.3, respectively. In these replacement tables, below, only the zones applicable to Alaska are given (i.e., 6-9). These zones are defined in Chapter 3[RE].

Climate Zone	Windows, Doors & Skylights	Ceiling ^a	Exterior Wood Frame Wall	Floor	Below Grade ^b Wall	Slab ^c & Depth	Crawl Space ^b Wall
6	3.33	54 or 43	25	38	15/19	15, 4ft	15/19
7	3.33	54 or 43	25	38	15/19	15, 4ft	15/19
8	4.5	59 or 48	30	38	15/19	15, 4ft	15/19
9	5	65 or 52	35	43	NR	NR	NR

- The smaller value may be used with a properly sized, energy-heel truss. Zones 6 and 7 may use a 13" energy heel truss.
- "15/19" means R-15 continuous insulated sheathing on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. "15/19" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulated sheathing on the interior or exterior of the home.
- R-5 shall be added to the required slab edge R-values for heated slabs.
- A vapor retarder may be installed within the thermal insulation so long as the R-value of the thermal insulation on the warm side of the vapor retarder does not exceed one third of the total R-value. [Note that "one third" is a general statewide maximum and more restrictive values may be needed in the colder climate zones.

Climate Zone	Windows, Doors & Skylights	Ceiling	Exterior Wood Frame Wall	Floor	Below Grade Wall	Slab	Crawl Space Wall
6	0.30	0.023	0.048	0.028	0.050	0.067	0.050
7	0.30	0.023	0.048	0.028	0.050	0.067	0.050
8	0.22	0.021	0.042	0.028	0.050	0.067	0.050
9	0.20	0.020	0.036	0.026	NR	NR	NR

- Nonglazing U-factors shall be obtained from measurement, calculation or an approved source.

R402.2.1 Ceilings with attic spaces.

Replace the second sentence in the subsection with the following two sentences: "Similarly, R-43, R-48, or R-52 shall be deemed to satisfy the requirement for R-54, R-59, or R-65, respectively, wherever the full height of the uncompressed R-43, R-48, or R-52 insulation extends over the wall top plate at the eaves. In all cases, the installed insulation shall not compromise required attic ventilation clearances."

R402.2.2 Ceilings without attic spaces.

Replace the second to last sentence of subsection with "This reduction of insulation from the requirements of Section 402.1.1 shall be limited to 450 square feet (42 m²) or 15% of ceiling area, whichever is less."

R402.2.5 Mass walls. Delete this subsection.

[Mass walls are not a significant energy saver in northern climates; see Wilson, Alex. *Thermal Mass and R-value: Making Sense of a Confusing Issue*. Environmental Building News. Available online

at: <http://www.buildinggreen.com/auth/article.cfm/1998/4/1/Thermal-Mass-and-R-value-Making-Sense-of-a-Confusing-Issue/>]

R402.2.7 Floors. At end of subsection, add:

Exception: The above requirement is waived for floor systems that require space between the insulation and the floor for radiant tubing or other plumbing, ducting, or wiring, provided that the required amount of floor insulation is maintained and the perimeter edges are

- (1) insulated to the appropriate wall R-value and
- (2) sealed to prevent infiltration of cold air.”

R402.2.9 Slab-on-grade floors. In the second sentence, delete “or inside”.

R402.2.10 Crawl space walls. Replace the second sentence and third sentence with:

Crawl space wall insulation shall be permanently fastened to the wall and extend downward from the floor to the finished grade level and then either (a) for insulation on the inside of the wall, vertically down to the top of the footer, or (b) for insulation of the outside of the wall, vertically down and/or horizontally outward for a total of at least 36 inches. Exposed earth enclosed in crawl space foundations shall be covered with a continuous Class I vapor retarder in accordance with the *International Building Code* or *International Residential Code*, as applicable.

Add two paragraphs with:

A vapor retarder may be installed within the thermal insulation so long as the R-value of the thermal insulation on the warm side of the vapor retarder does not exceed one third of the total R-value.

[Note that “one third” is a general statewide maximum and more restrictive values may be needed in the colder climate zones.]

It is recommended that the installation of a double vapor retarder be avoided. Weather proofing on the exterior of a below grade wall is not considered a vapor retarder as referenced in the “one third rule”; this section does not require the installation of a vapor retarder on crawl space walls.

At end of this subsection add:

Exception: This alternative is permitted if the only venting in the crawlspace is mechanical.”

R402.2.13 Exterior below grade insulation. (New subsection)

All exterior below grade insulation extending away from the building shall be protected by pavement or by a minimum of 10 inches (254 mm) of soil to protect from insect and rodent damage.

R402.3.7 Glazing area limitation (New subsection).

The total glazed area may not exceed 18% of the conditioned floor area using the prescriptive method.

R402.3.7 Skylights (New subsection).

In very cold climates, a skylight is essentially a low-R-value hot roof that is subject to ice damming and subsequent leakage; their use is strongly discouraged unless they are carefully designed to avoid these problems. The total skylight area shall not exceed 1% of the total ceiling thermal envelope area if the prescriptive path is used.

R402.4.1.2 Testing. [NB - New in IECC/BEES 2012; was an optional recommendation in BEES 2009]

R402.4.1.3 Crawl space vapor retarder (Additional subsection) Replaced last paragraph (bolded).

Exposed earth in crawl space foundations shall be covered with a continuous vapor retarder. All joints of the vapor retarder shall overlap by 6 inches (153 mm) and be sealed or taped. The edges of the vapor retarder shall extend at least 6 inches (153 mm) up the stem wall and shall be attached to the stem wall. Where all-weather wood foundations are used, a separation between the crawlspace vapor barrier over the ground and stem wall vapor barrier shall be made in order to mitigate moisture migration from soils into below grade insulated all-weather wood wall assembly. **Crawl space floor insulation may be installed 100% on the warm side of the crawl space vapor retarder to avoid damage to the insulation; to meet the requirements of**

this section, voids and air spaces must should exist between both the ground-to-vapor retarder connection and the vapor retarder-to-insulation connection.

This subsection moved to R402.2.10: A vapor retarder may be installed within the thermal insulation so long as the R-value of the thermal insulation on the warm side of the vapor retarder does not exceed one third of the total R-value. [Note that “one third” is a general statewide maximum and more restrictive values may be needed in the colder climate zones.]

R402.4.3 Fenestration air leakage. Modify *Exception* to read:

Exceptions:

- (1) site-built windows, skylights and doors, and
- (2) products for which air infiltration data are not available on the manufacturer’s labels or at the manufacturer’s website.

R403.1 Controls (Mandatory). At end of subsection add:

Exception: solid fuel burning devices that are not designed to be controlled with a thermostat.

R403.1.1 Programmable thermostat.

Replace “Where the primary heating system is a forced-air furnace, at” with “At” and at the end of the subsection, add the following: **“Exception:** buildings using radiant in-floor heating distribution systems and other systems with significant thermal inertia.”

R403.2.1 Insulation (Prescriptive). Replace first two sentences with:

Installing supply and return ducts in unconditioned spaces is not recommended; however, if they are installed outside of the thermal envelope they shall be insulated to the same R-value as is required for wood-framed walls. These R-values can be found in Table R-A402.1.1.

R403.2.3 Building cavities (Mandatory). Replace this section with the following language from the 2009 IRC:

Stud wall cavities and the spaces between solid floor joists to be used as air plenums shall comply with the following conditions:

1. These cavities or spaces shall not be used as a plenum for supply air.
2. These cavities or spaces shall not be part of a required fire-resistance-rated assembly.
3. Stud wall cavities shall not convey air from more than one floor level.
4. Stud wall cavities and joist-space plenums shall be isolated

from adjacent concealed spaces by tight-fitting fire-blocking in accordance with Section R602.8.

5. Stud wall cavities in the outside walls of building envelope assemblies shall not be utilized as air plenums.

R403.2.4 Duct material. [Additional subsection]

A duct transporting ventilation air shall be constructed of a smooth-walled material, such as galvanized steel or lined fiberglass (rigid or semi-rigid), as much as possible. When necessary to use flexible ducting, it shall be supported along its full length with no sags and no bends greater than 90 degrees. The radius of any bend must be at least 1.5 times the nominal duct size. For example, a 6" duct would require at least a 9" bend.

R403.3 Mechanical system piping insulation (Mandatory). Add:

Exception: piping carrying fluids above 105°F (41°C) within the thermal envelope.

R403.5 Mechanical ventilation (Mandatory). Replace this section with the following:

The building shall be provided with ventilation that meets the requirements of the ANSI/ASHRAE Standard 62.2-2010 as amended below. Outdoor air intakes and exhausts shall have automatic or gravity dampers that close when the ventilation system is not operating or positive closure that can be operated by occupants. An exterior exhaust vent shall be located to minimize exhaust air rising into an attic vent.

R403.5.1 Whole-house mechanical ventilation system fan efficacy. This subsection is waived,. (Product availability sparse)

Mechanical ventilation system fans shall meet the efficacy requirements of Table R403.5.1.

Exception: Where mechanical ventilation fans are integral to tested and listed HVAC equipment, they shall be powered by an electronically commutated motor.

TABLE R403.5.1 MECHANICAL VENTILATION SYSTEM FAN EFFICACY

FAN LOCATION	AIR FLOW RATE MINIMUM (CFM)	MINIMUM EFFICACY (CFM/WATT)	AIR FLOW RATE MAXIMUM (CFM)
Range hoods	Any	2.8 cfm/watt	Any
In-line fan	Any	2.8 cfm/watt	Any
Bathroom, utility room	10	1.4 cfm/watt	< 90

Bathroom, utility room	90	2.8 cfm/watt	Any
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For SI: 1 cfm = 28.3 L/min.

R404.1 Lighting equipment. No longer mandatory.

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

Exception: Low-voltage lighting shall not be required to utilize high-efficiency lamps.

The following amendments refer to the *ANSI/ASHRAE Standard 62.2-2010* and are numbered according to that standard.

ASHRAE 62.2-2010 – Section 3 – Definitions

Add the following:

Air change rate at 50 Pascals: the *air change rate* when a pressure differential of 50 Pascals is maintained between the inside and outside of the envelope; it is commonly abbreviated as ACH₅₀.

Amend definition of *occupiable space* by adding at the end: “; does not include garages or crawl spaces”

ASHRAE 62.2-2010 – Section 4 – Whole Building Ventilation

4.1 Ventilation Rate. Equations 4.1a and 4.1b shall be replaced by:

$$Q_{fan} = 0.01A_{floor} + 10(N_{br} + 1) \qquad R-A(4.1a)$$

and Tables 4.1a and 4.1b shall be replaced by

Table R-A4.1a, Ventilation Air Requirements, cfm

Floor Area (ft ²)	Bedrooms				
	0-1	2-3	4-5	6-7	>7
<1500	35	55	75	95	115
1501-3000	50	70	90	110	125

3001-4500	65	85	105	125	145
4501-6000	80	100	120	140	160
6001-7500	95	115	135	155	175
>7500	110	130	150	170	190

where the floor area (A_{floor}) is based on the definition of occupiable space.

1.1 Different Occupant Density. Replace “4.1a and 4.1b” with “R-A4.1a”, “Equation 4.1” with “Equation R-A4.1a”, and “7.5 cfm (3.5 L/s)” with “10 cfm.”

4.2 System Type. Add the following three sentences after the first one: “Supply-only systems are not permitted in Alaska during the heating season. Balanced, heat-recovery ventilation systems as described in Appendix C2.1 that provide well distributed ventilation throughout the entire occupiable space are strongly recommended in Alaska.

4.5 Delivered Ventilation. Replace “(from Table 4.1a or 4.1b)” with “(from Table A4.1a)”

4.6.2 Very Cold Climates. Replace this subsection with: “In Alaska supply-only ventilation during the heating season is not allowed.”

ASHRAE 62.2-2010 – Section 6 – Other Requirements

6.6 Ventilation Opening Area. After the second sentence, add: “Ventilation air through an exterior door or operable window shall not be considered as part of a mechanical ventilation system design and shall not be included in a calculation showing compliance with the required minimum ventilation rate.”

6.8 Air Inlets. Replace the second sentence with “The intake shall be placed so that entering air is not obstructed by snow, plantings, or other material, and shall be located at least 18 inches above an adjacent finished grade.” Add an additional exception: “(d) A ventilation system’s supply and exhaust vents on the exterior of a building may be separated less than 10 feet as long as they are separated a minimum of 6 feet horizontally. They may be separated less than this if they are part of a system engineered to prevent entrainment of the exhaust air. Care should be taken to locate an intake vent where it can be easily cleaned at regular intervals.”

ASHRAE 62.2-2010 – Section 7 – Air-moving Equipment

7.1 Selection and Installation. Add at end of subsection: “A ventilation appliance shall be located in a place that is accessible and convenient to access for annual or more frequent maintenance (changing of filters, oiling, cleaning, etc.).

ASHRAE 62.2-2010 – Informative Appendix C (not part of

standard) [New Appendix]

C1.0 Exhaust Ventilation. For exhaust-only systems, passive intake vents should be provided where the sum of the intake capacity is at least equal to the exhaust rate and no single intake vent is rated at more than 25 cfm." In very cold climates, intakes that do not temper the incoming ventilation air have proven sufficiently problematic, that their use is strongly discouraged. A mechanical system with balanced supply and exhaust fan rates is strongly preferred.

C2.0 Distribution and Circulation of Supply Air. A ventilation system should be designed and installed to uniformly mix and circulate supply air throughout the occupiable space. Supply air should be introduced into a room in a manner that does not create human discomfort and is not potentially damaging to the building. There should be adequate air circulation into and out of a room at all times. A door or transom louver, undercut door, wall transfer fan, return grille or other means should be used.

This is the end of the amendments to *ANSI/ASHRAE Standard 62.2-2010*.

Numbering resumes according to the IECC 2012:

R403.6 Equipment sizing and installation (Mandatory) . This subsection is waived thru 12.31.2014. This section will be required effective 1.1.2015.

Add at end of subsection: "The AkWarm design heating load methodology is an approved heating calculation methodology. All heating, cooling, and ventilating equipment shall be installed in accordance with the manufacturer's installation instructions and the requirements of this code. All heating and cooling equipment shall be sized to meet less than 125% of the load calculated by the method provided in ACCA Manual J or other heating and cooling load calculation methodology whenever this is feasible given the size options for the equipment available from the manufacturer; when this is not feasible, the equipment delivering the smallest output that will satisfy the load calculation shall be chosen."

R403.11 Combustion Safety (New Section). Due to the increased risk of back-drafting and carbon monoxide poisoning that comes with increasingly air-tight homes, it is strongly recommended that all installed space and water heating equipment be sealed combustion appliances.

R403.11.1 Combustion Safety Testing (Mandatory) (New Section)

A safety inspection of all combustion appliances must be completed in accordance with the Building Performance Institute standard as required in AHFC regulations. This inspection includes all of the following tests: carbon

monoxide measurement at each appliance, draft measurement and spillage evaluation for atmospherically vented appliances, and worst-case negative pressure measurement for each combustion appliance zone.

Section R405 - Simulated Performance Alternative (Performance)

R405.2 Mandatory requirements.

Replace second sentence of this subsection with: “All supply and return ducts not completely inside the *building thermal envelope* shall be insulated to at least the R-value specified in Table R-A402.1.1 for the portion of the envelope assembly (i.e. wall, floor, or ceiling) penetrated by the duct.”

R405.3 Performance-based compliance. Replace subsection with: Compliance with this code may be shown through a home energy rating under a program approved by the Alaska Housing Finance Corporation (AHFC) that meets the following requirements:

- a) At least an AkWarm rating of 89 (*Five-Star*) or equivalent to qualify.
- b) An air-tightness level of 4 ACH₅₀, or less, utilizing an AHFC-approved blower-door testing protocol.
- c) Only a person authorized by AHFC shall submit a rating for compliance. A copy of the energy rating shall be provided to AHFC officials. (A list of authorized home energy raters may be obtained from the AHFC Research Information Center.)”

Delete the remainder of this section (R405.4 – R405.6.3).

CHAPTER 5 [RE] – Referenced Standards

Add to the ASHRAE section: “62.2-2010 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings.” - References Sec. R403.5.3 Mechanical Ventilation Standards