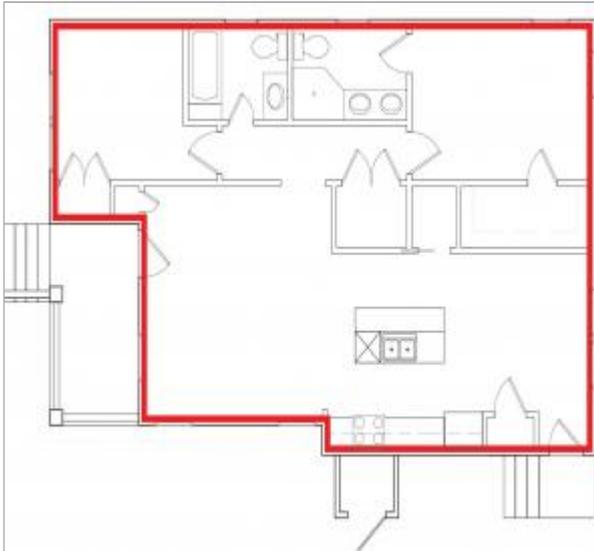


2009 IECC Code Level Insulation – ENERGY STAR Requirements

Last Updated: 03/14/2016

Scope



Identify what materials will constitute the continuous air barrier around the building envelope.

Install ceiling, wall, and foundation insulation that meets or exceeds the requirements of the most recent International Energy Conservation Code adopted by your state or municipality.

- The [ENERGY STAR Certified Homes](#) Program (Version 3/3.1, Revision 08) requires that ceiling, wall, floor, and slab insulation levels meet or exceed those specified in the [2009 International Energy Conservation Code \(IECC\)](#) with some alternatives and exceptions. See the Compliance Tab for more details. Also see the interactive [map of 2009 IECC insulation levels](#) by climate zone and by state on the DOE Building Energy Codes website.
- The [DOE Zero Energy Ready Home Program](#) requires homes to meet or exceed 2012 IECC insulation levels. See the guide [2012 IECC Code Level Insulation – DOE Zero Energy Ready Home Requirements](#) for more details.

See the [Compliance Tab](#) for related codes and standards requirements, and criteria to meet national programs such as DOE's Zero Energy Ready Home program, ENERGY STAR Certified Homes, and Indoor airPLUS.

Description

For builders who wish to certify their homes to the ENERGY STAR Certified Homes program (Ver 3/3.1, Rev 08), the ENERGY STAR Rater Design Review Checklist, Item 3.1, specifies that the home's ceiling, wall, floor, and slab insulation levels must comply with one of the following options:

3.1.1 Meet or exceed 2009 IECC levels OR

3.1.2 Achieve ? 133% of the total UA resulting from the U-factors in 2009 IECC Table 402.1.3, and meet infiltration limits described below.

Details for these options are described below.

Option 3.1.1

Following this option, insulation installed in the home must meet or exceed the 2009 IECC R-values listed in Table 1 below.

Table 1. Minimum Insulation Levels^a Adapted from 2009 IECC Table 402.1.1

Climate Zone	Ceiling R-Value	Wood Frame Wall R-Value ^b	Mass Wall ^c R-Value	Floor R-Value	Basement Wall R-Value	Slab R-Value ^g and Depth	Crawlspace ^g Wall R-Value
1	30	13	3/4	13	0	0	0
2	30	13	4/6	13	0	0	0
3	30	13	5/5	19	5/13 ^f	0	5/13
4 except Marine	38	13	5/10	19	10/13	10, 2 ft	10/13
5 and Marine	38	20/13+5 ^{b,c}	13/17	30 ^d	10/13	10, 2 ft	10/13
6	49	20/13+5 ^{b,c}	15/19	30 ^d	15/19	10, 4 ft	10/13
7 and 8	49	21	19/21	38 ^d	15/19	10, 4 ft	10/13

Source: Adapted 2009 IECC Table 402.1.1

a. R-values are minimums.

b. The first value is cavity insulation, the second value is continuous insulation or insulated siding, so "13+5" means R-13 cavity insulation plus R-5 continuous insulation or insulated siding.

c. If structural sheathing covers 25 percent or less of the exterior, insulating sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25 percent of exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2.

d. Or insulation sufficient to fill the framing cavity, R-19 minimum.

e. "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. "10/13" means R-10 continuous insulated sheathing on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall.

f. Basement wall insulation is not required in warm-humid locations as defined by 2009 IECC Figure 301.1 and Table 301.1.

g. R-5 shall be added to the required slab edge R-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Zones 1 through 3 for heated slabs.

Footnotes to 3.1.1:

(4) Specified levels shall meet or exceed the component insulation levels in 2009 IECC Table 402.1.1. The following exceptions apply:

a. Steel-frame ceilings, walls, and floors shall meet the insulation levels of 2009 IECC Table 402.2.5. In CZ 1 and 2, the continuous insulation requirements in this table shall be permitted to be reduced to R-3 for steel-frame wall assemblies with studs spaced at 24 in. on center. This exception shall not apply if the alternative calculations in d) are used;

b. For ceilings with attic spaces, R-30 shall satisfy the requirement for R-38 and R-38 shall satisfy the requirement for R-49 wherever the full height of uncompressed insulation at the lower R-value extends over the wall top plate at the eaves. This exemption shall not apply if the alternative calculations in d) are used;

c. For ceilings without attic spaces, R-30 shall satisfy the requirement for any required value above R-30 if the design of the roof / ceiling assembly does not provide sufficient space for the required insulation value. This exemption shall be limited to 500 sq. ft. or 20% of the total insulated ceiling area, whichever is less. This exemption shall not apply if the alternative calculations in d) are used;

d. An alternative equivalent U-factor or total UA calculation may also be used to demonstrate compliance, as follows:

An assembly with a U-factor equal or less than specified in 2009 IECC Table 402.1.3 complies.

A total building thermal envelope UA that is less than or equal to the total UA resulting from the U-factors in Table 402.1.3 also

complies. The performance of all components (i.e., ceilings, walls, floors, slabs, and fenestration) can be traded off using the UA approach. Note that Items 3.1 through 3.3 of the Rater Field Checklist shall be met regardless of the UA tradeoffs calculated. The UA calculation shall be done using a method consistent with the ASHRAE Handbook of Fundamentals and shall include the thermal bridging effects of framing materials. The calculation for a steel-frame envelope assembly shall use the ASHRAE zone method or a method providing equivalent results, and not a series-parallel path calculation method.

(5) Consistent with the 2009 IECC, slab edge insulation is only required for slab-on-grade floors with a floor surface less than 12 inches below grade. Slab insulation shall extend to the top of the slab to provide a complete thermal break. If the top edge of the insulation is installed between the exterior wall and the edge of the interior slab, it shall be permitted to be cut at a 45-degree angle away from the exterior wall. Alternatively, the thermal break is permitted to be created using R-3 rigid insulation on top of an existing slab (e.g., in a home undergoing a gut rehabilitation). In such cases, up to 10% of the slab surface is permitted to not be insulated (e.g., for sleepers, for sill plates). Insulation installed on top of slab shall be covered by a durable floor surface (e.g., hardwood, tile, carpet).

(6) Where an insulated wall separates a garage, patio, porch, or other unconditioned space from the conditioned space of the house, slab insulation shall also be installed at this interface to provide a thermal break between the conditioned and unconditioned slab. Where specific details cannot meet this requirement, partners shall provide the detail to EPA to request an exemption prior to the home's certification. EPA will compile exempted details and work with industry to develop feasible details for use in future revisions to the program. A list of currently exempted details is available at: [energystar.gov/slab edge](http://energystar.gov/slab%20edge).

Option 3.1.2

ENERGY STAR's Option 3.1.2 uses U-factors instead of R-values and allows some tradeoffs among the envelope components. To comply with Option 3.1.2, the builder must achieve 133% of the total UA resulting from the U-factors in 2009 IECC Table 402.1.3 (adapted in Table 2 below), per guidance in Footnote 4d, AND the home cannot exceed the following infiltration limits:

- 3 ACH50 in CZs 1,2
- 2.5 ACH 50 in CZs 3,4
- 2 ACH 50 in CZs 5,6,7
- 1.5 ACH 50 in CZ 8

Table 2. Equivalent U-Factors^a Adapted from 2009 IECC Table 402.1.3

Climate Zone	Ceiling U-Factor	Frame Wall U-Factor	Mass Wall U-Factor ^b	Floor U-Factor	Basement U-Factor	Crawlspace U-Factor ^c
1	0.035	0.082	0.197	0.064	0.360	0.477
2	0.035	0.082	0.165	0.064	0.360	0.477
3	0.035	0.082	0.141	0.047	0.091 ^c	0.136
4 except Marine	0.030	0.082	0.141	0.047	0.059	0.065
5 and Marine	0.030	0.057	0.082	0.033	0.059	0.065
6	0.026	0.057	0.060	0.033	0.050	0.065
7 and 8	0.026	0.057	0.057	0.028	0.050	0.065

Source: adapted from the 2009 IECC Table 402.1.3

a. U-factors for non-fenestration components to be obtained from measurement, calculation, or an approved source.

b. When more than 50% of the insulation is on the interior, the mass wall U-factors shall be a maximum of: Zone 1: 0.17, Zone 2: 0.14, Zone 3: 0.12, Zone 4 except Marine: 0.10, and the same as the frame wall U-factor in Marine Zone 4 and Zones 5-8.

c. Basement wall U-factor of 0.360 in warm-humid locations as defined by Figure 301.1 and Table 301.1 in the 2009 IECC.

Footnotes to 3.1.2:

(4d) An alternative equivalent U-factor or total UA calculation may also be used to demonstrate compliance, as follows:

An assembly with a U-factor equal or less than specified in 2009 IECC Table 402.1.3 complies.

A total building thermal envelope UA that is less than or equal to the total UA resulting from the U-factors in Table 402.1.3 also complies. The performance of all components (i.e., ceilings, walls, floors, slabs, and fenestration) can be traded off using the UA approach. Note that Items 3.1 through 3.3 of the Rater Field Checklist shall be met regardless of the UA tradeoffs calculated. The UA calculation shall be done using a method consistent with the ASHRAE Handbook of Fundamentals and shall include the thermal bridging effects of framing materials. The calculation for a steel-frame envelope assembly shall use the ASHRAE zone method or a method providing equivalent results, and not a series-parallel path calculation method.

(5) Consistent with the 2009 IECC, slab edge insulation is only required for slab-on-grade floors with a floor surface less than 12

inches below grade. Slab insulation shall extend to the top of the slab to provide a complete thermal break. If the top edge of the insulation is installed between the exterior wall and the edge of the interior slab, it shall be permitted to be cut at a 45-degree angle away from the exterior wall. Alternatively, the thermal break is permitted to be created using R-3 rigid insulation on top of an existing slab (e.g., in a home undergoing a gut rehabilitation). In such cases, up to 10% of the slab surface is permitted to not be insulated (e.g., for sleepers, for sill plates). Insulation installed on top of slab shall be covered by a durable floor surface (e.g., hardwood, tile, carpet).

(6) Where an insulated wall separates a garage, patio, porch, or other unconditioned space from the conditioned space of the house, slab insulation shall also be installed at this interface to provide a thermal break between the conditioned and unconditioned slab. Where specific details cannot meet this requirement, partners shall provide the detail to EPA to request an exemption prior to the home's certification. EPA will compile exempted details and work with industry to develop feasible details for use in future revisions to the program. A list of currently exempted details is available at: energystar.gov/slab edge.

In addition to these requirements, ENERGY STAR (Ver 3 Rev 08) requires that insulation be installed to RESNET Grade 1 quality as described in the guide [Insulation Installation \(RESNET Grade 1\)](#). ENERGY STAR requires that the insulation be fully aligned with (in continuous contact with) a complete air barrier and that thermal bridging be reduced and building assemblies properly air sealed as described in the [ENERGY STAR Rater Field Checklist](#).

If the state or local residential building energy code requires higher insulation levels than those specified in the 2009 IECC, you must meet or exceed the locally mandated requirements. Some states have adopted the 2012 or 2015 IECC. Visit the U.S. DOE [Building Energy Codes](#) Program to see what code has been adopted in your state. Some states and regions of the country have ENERGY STAR requirements that differ from the national requirements. Visit [ENERGY STAR's Regional Specifications](#) page for more information on those region-specific requirements.

Ensuring Success

For Option 3.1.1, consult the insulation requirements of the 2009 International Energy Conservation Code (IECC) to ensure the R-value requirements are met or exceeded. Also review the exceptions that ENERGY STAR provides for ceilings as these can affect the required insulation levels.

Option 3.1.2 relaxes overall insulation requirements for the ceiling, walls, and foundation components if specified infiltration rates are met.

Climate

Climate-specific requirements as specified in the 2009 IECC are shown in the table below and discussed further in the Description tab of this guide.

Minimum Insulation Levels^a Adapted from 2009 IECC Table 402.1.1

Climate Zone	Ceiling R-Value	Wood Frame Wall R-Value ^b	Mass Wall ^c R-Value	Floor R-Value	Basement Wall R-Value	Slab R-Value ^g and Depth	Crawlspace ^g Wall R-Value
1	30	13	3/4	13	0	0	0
2	30	13	4/6	13	0	0	0
3	30	13	5/5	19	5/13 ^f	0	5/13
4 except Marine	38	13	5/10	19	10/13	10, 2 ft	10/13
5 and Marine	38	20/13+5 ^{b,c}	13/17	30 ^d	10/13	10, 2 ft	10/13
6	49	20/13+5 ^{b,c}	15/19	30 ^d	15/19	10, 4 ft	10/13
7 and 8	49	21	19/21	38 ^d	15/19	10, 4 ft	10/13

Source: Adapted 2009 IECC Table 402.1.1

a. R-values are minimums.

b. The first value is cavity insulation, the second value is continuous insulation or insulated siding, so "13+5" means R-13 cavity insulation plus R-5 continuous insulation or insulated siding.

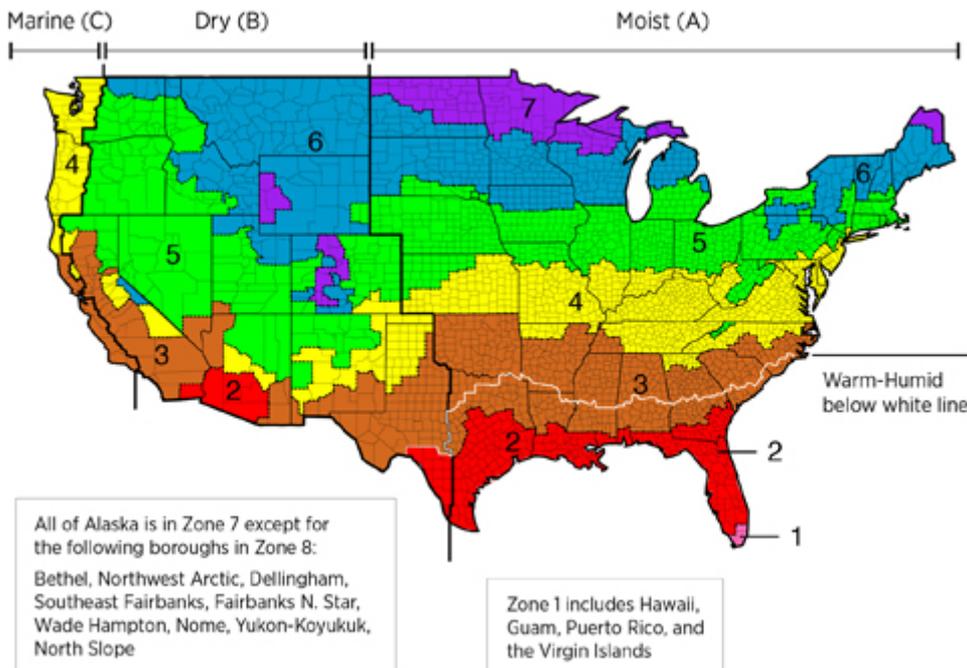
c. If structural sheathing covers 25 percent or less of the exterior, insulating sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25 percent of exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2.

d. Or insulation sufficient to fill the framing cavity, R-19 minimum.

e. "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. "10/13" means R-10 continuous insulated sheathing on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall.

f. Basement wall insulation is not required in warm-humid locations as defined by 2009 IECC Figure 301.1 and Table 301.1.

g. R-5 shall be added to the required slab edge R-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Zones 1 through 3 for heated slabs.



Training

Right and Wrong Images



Display Image: [ES_TESRC_2.2_PG52_17c_102811_1.jpg](#)

Reference: [Thermal Enclosure System Rater Checklist Guidebook](#)

Author(s): EPA

Organization(s): EPA

Guide describing details that serve as a visual reference for each of the line items in the Thermal Enclosure System Rater Checklist.



Display Image: [ES_TESRC_2.2_PG52_17c_102811_1.jpg](#)

Reference: [Thermal Enclosure System Rater Checklist Guidebook](#)

Author(s): EPA

Organization(s): EPA

Guide describing details that serve as a visual reference for each of the line items in the Thermal Enclosure System Rater Checklist.



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Reference: [Thermal Enclosure System Rater Checklist Guidebook](#)

Author(s): EPA

Organization(s): EPA

Guide describing details that serve as a visual reference for each of the line items in the Thermal Enclosure System Rater Checklist.



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Reference: [Thermal Enclosure System Rater Checklist Guidebook](#)

Author(s): EPA

Organization(s): EPA

Guide describing details that serve as a visual reference for each of the line items in the Thermal Enclosure System Rater Checklist.



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Reference: [Thermal Enclosure System Rater Checklist Guidebook](#)

Author(s): EPA

Organization(s): EPA

Guide describing details that serve as a visual reference for each of the line items in the Thermal Enclosure System Rater Checklist.



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Reference: [Thermal Enclosure System Rater Checklist Guidebook](#)

Author(s): EPA

Organization(s): EPA

Guide describing details that serve as a visual reference for each of the line items in the Thermal Enclosure System Rater Checklist.



Display Image: [ES_TESRC_2.2_PG52_21g_102811_0.jpg](#)

Reference: [Thermal Enclosure System Rater Checklist Guidebook](#)

Author(s): EPA

Organization(s): EPA

Guide describing details that serve as a visual reference for each of the line items in the Thermal Enclosure System Rater Checklist.



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Reference: [Thermal Enclosure System Rater Checklist Guidebook](#)

Author(s): EPA

Organization(s): EPA

Guide describing details that serve as a visual reference for each of the line items in the Thermal Enclosure System Rater Checklist.



Display Image: [ES_TESRC_2_2_PG52_23i_1028112.jpg](#)

Reference: [Thermal Enclosure System Rater Checklist Guidebook](#)

Author(s): EPA

Organization(s): EPA

Guide describing details that serve as a visual reference for each of the line items in the Thermal Enclosure System Rater Checklist.

CAD

None Available

Compliance

ENERGY STAR Certified Homes

ENERGY STAR Certified Homes (Version 3/3.1, Revision 08), Rater Field Checklist

Thermal Enclosure System:

1. High-Performance Fenestration & Insulation:

1.2 Insulation meets or exceeds levels specified in Item 3.1 of the Rater Design Review Checklist. (See the Description tab for more information on this requirement.)

ENERGY STAR Revision 08 requirements are required for homes permitted starting 07/01/2016.

DOE Zero Energy Ready Home Program

The U.S. Department of Energy Zero Energy Ready Home [National Program Requirements](#) (Rev 05) specify as a mandatory requirement (Exhibit 1, #2.2) that all labeled homes, whether prescriptive or performance path, meet or exceed the ceiling, wall, floor, and slab insulation requirements of the 2012 or 2015 IECC. See the guide [2012 IECC Code Level Insulation – DOE Zero Energy Ready Home Requirements](#) for more details.

Footnotes:

(11) Building envelope assemblies, including exterior walls and unvented attic assemblies (where used), shall comply with the relevant vapor retarder provisions of the 2012 International Residential Code (IRC). If the project is instead meeting 2015 IECC insulation levels (see footnote 15 below), then assemblies shall comply with the relevant vapor retarder provisions of the 2015 IRC.

(14) Insulation levels in a home shall meet or exceed the component insulation requirements in the 2012 International Energy Conservation Code (IECC) - Table R402.1.1. The following exceptions apply:

a. Steel-frame ceilings, walls, and floors shall meet the insulation requirements of the 2012 IECC – Table 402.2.6.

b. For ceilings with attic spaces, R-30 shall satisfy the requirement for R-38 and R-38 shall satisfy the requirement for R-49 wherever the full height of uncompressed insulation at the lower R-value extends over the wall top plate at the eaves. This exemption shall not apply if the alternative calculations in d) are used;

c. For ceilings without attic spaces, R-30 shall satisfy the requirement for any required value above R-30 if the design of the roof / ceiling assembly does not provide sufficient space for the required insulation value. This exemption shall be limited to 500 sq. ft. or 20% of the total insulated ceiling area, whichever is less. This exemption shall not apply if the alternative calculations in d) are used;

d. An alternative equivalent U-factor or total UA calculation may also be used to demonstrate compliance, as follows: An assembly with a U-factor equal or less than specified in 2012 IECC Table 402.1.3 complies. A total building thermal envelope UA that is less than or equal to the total UA resulting from the U-factors in Table 402.1.3 also complies. The insulation levels of fenestration, ceilings, walls, floors, and slabs can be traded off using the UA approach under both the Prescriptive and the Performance Path. Also, note that while ceiling and slab insulation can be included in trade-off calculations, Items 4.1 through 4.3 of the ENERGY STAR for Homes Ver 3 (Rev 07) Thermal Enclosure System Rater Checklist [Items 3.1-3.3 or the ENERGY STAR Ver 3 Rev 08 Rater Field Checklist] shall be met regardless of the UA tradeoffs calculated. The UA calculation shall be done using a method consistent with the ASHRAE Handbook of Fundamentals and shall include the thermal bridging effects of framing materials. The calculation for a steel-frame envelope assembly shall use the ASHRAE zone method or a method providing equivalent results, and not a series-parallel path calculation method.

(15) In states where the residential provisions of the 2012 International Energy Conservation Code (IECC) have been adopted, qualifying homes must instead meet the envelope insulation requirements of the 2015 IECC, effective 12 months after the effective date of the 2012 IECC in that state. The exact date at which time a state will migrate to 2015 IECC envelope compliance may vary based on the timing of RESNET rating software updates, but will not be any sooner than 12 months following the effective date of the 2012 IECC in that state.

Note that sub-items A through D of the previous end note all still apply for 2015 IECC envelope compliance.

2009 IECC

Building thermal envelope components to meet or exceed the values in Table 402.1.1 Insulation and Fenestration Requirements By Component. Section 402.2.1 Ceilings with attic spaces, R-30 satisfies the requirement for R-38 in the ceiling wherever insulation achieves its full height over the wall top plate at the eaves and is uncompressed. Similarly, R-38 can satisfy an R-49 wherever insulation achieves its full height over the wall top plate at the eaves and is uncompressed. Section 402.2.2 Ceilings without attic spaces, R-30 satisfies the requirement for any required value above R-30 if the design of the roof/ceiling assembly does not provide sufficient space for the required insulation value. This exemption is limited to 500 sq. ft. or 20% of the total insulated ceiling area, whichever is less. Section 402.2.8 Slab-on-grade floors, slabs less than 12 inches below grade to be insulated per Table 402.1.1 with insulation extending downward from top of the slab on inside or outside of the foundation wall. Below-grade insulation to extend the distance in Table 402.1.1. Insulation extending away from the building to be protected by pavement or at least 10 inches of soil. The top insulation edge may be cut at a 45-degree angle away from the exterior wall. Slab

insulation isn't required in areas of very heavy termite infestation, with approval of code official.*

2012 IECC

Building thermal envelope components to meet or exceed the values in Table R402.1.1 Insulation and Fenestration Requirements By Component. Section R402.2.1 Ceilings with attic spaces, R-30 satisfies the requirement for R-38 in the ceiling wherever insulation achieves its full height over the wall top plate at the eaves and is uncompressed. Similarly, R-38 can satisfy an R-49 wherever insulation achieves its full height over the wall top plate at the eaves and is uncompressed. Section R402.2.2 Ceilings without attic spaces, R-30 satisfies the requirement for any required value above R-30 if the design of the roof/ceiling assembly does not provide sufficient space for the required insulation value. This exemption is limited to 500 sq. ft. or 20% of the total insulated ceiling area, whichever is less. Section R402.2.9 Slab-on-grade floors, slabs less than 12 inches below grade to be insulated per Table 402.1.1 with insulation extending downward from top of the slab on inside or outside of the foundation wall. Below-grade insulation to extend the distance in Table 402.1.1. Insulation extending away from the building to be protected by pavement or at least 10 inches of soil. The top insulation edge may be cut at a 45-degree angle away from the exterior wall. Slab insulation isn't required in areas of very heavy termite infestation, with approval of code official.*

2015 IECC

Building thermal envelope components to meet or exceed the values in Table R402.1.1, Insulation and Fenestration Requirements by Component. Follow specific insulation requirements in Section R402.2.*

*Due to copyright restrictions, exact code text is not provided. For specific code text, refer to the applicable code.

More Info.

Case Studies

1. [DOE Zero Energy Ready Home Case Study e2 Homes Winter Park, Florida \[2-page summary version\]](#)
(845 KB)
Author(s): PNNL
Organization(s): PNNL
Publication Date: January, 2013
Case study about the first certified DOE Zero Energy Ready Home—the “Wilson Residence” in Winter Park, Florida.
2. [DOE Zero Energy Ready Home Case Study: e2 Homes, Winter Park, Florida](#)
(1 MB)
Author(s): PNNL
Organization(s): PNNL
Publication Date: January, 2013
Case study of a DOE Challenge Home in Winter Park FL that scored HERS 57 without PV or HERS -7 with PV. This 4,305 ft² custom home has autoclaved aerated concrete walls, a sealed attic with R-20 spray foam, and ductless mini-split heat pumps.

References and Resources*

1. [Building America Best Practices Series Volume 17: Insulation, A Guide for Contractors to Share with Homeowners](#)
Author(s): Baechler, Adams, Hefty, Gilbride, Love
Organization(s): PNNL, ORNL
Publication Date: May, 2012
Guide to help contractors and homeowners identify ways to make homes more comfortable, more energy efficient, and healthier to live in.
2. [DOE Zero Energy Ready Home National Program Requirements](#)
Author(s): DOE
Organization(s): DOE
Publication Date: August, 2015
Standard requirements for DOE's Zero Energy Ready Home national program certification.
3. [ENERGY STAR Certified Homes, Version 3 \(Rev. 08\) National Program Requirements](#)
Author(s): EPA
Organization(s): EPA
Publication Date: September, 2015
Document outlining the program requirements for ENERGY STAR Certified Homes, Version 3 (Rev. 08).
4. [Thermal Enclosure System Rater Checklist Guidebook](#)
Author(s): EPA
Organization(s): EPA
Publication Date: October, 2011
Guide describing details that serve as a visual reference for each of the line items in the Thermal Enclosure System Rater Checklist.

*Publication dates are shown for formal documents. Dates are not shown for non-dated media. Access dates for referenced, non-dated media, such as web sites, are shown in the measure guide text.

Contributors to this Guide

The following Building America Teams contributed to the content in this Guide.

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