Attic Eave Minimum Insulation

Last Updated: 02/13/2018

Scope

Design the roof to allow full insulation over the top plates of the exterior walls.

- Install raised heel trusses or use another roof framing method that allows space to install insulation over the top plates of the exterior walls, or install high-density insulation, to achieve an R-value that meets or exceeds code minimums for attic insulation.
- ENERGY STAR requires \( \frac{1}{2} \) R-21 in climates zones 1 through 5 and \( \frac{1}{2} \) R-30 in climates zones 6-8. The insulation must extend to the inside face of the exterior wall and be installed using Grade 1 insulation techniques (ENERGY STAR 2018).

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

In vented attics, insulation is laid on the ceiling deck of the top floor of the home. Maintaining the insulation level throughout the entire plane of the ceiling and over the top of the perimeter walls is key to preventing heat flow through the ceiling and into or out of the home. When the roof pitch is low at the eaves, insulation may be compressed or lacking, causing cold spots in winter along exterior walls and possibly contributing to ice dam formation in snowy climates. This can be true of roofs built with pre-made trusses and roof rafters constructed on site.

![Standard Truss with tapered insulation depth](image1)

**Figure 1** - Standard roof trusses are narrow at the eaves, preventing full insulation coverage over the top plate of the exterior walls.

![Standard rafter and top plate with tapered insulation depth](image2)

**Figure 2** - Standard site-built roof rafters may pinch the insulation at the eaves.

Builders and architects have several options for designing pitched, vented roofs that allow the insulation to achieve its full thickness over the plate line of the exterior walls: elevating the heel (sometimes referred to as an energy truss, raised-heel truss, or Arkansas truss), use of cantilevered or oversized trusses, lowering the ceiling joists, or framing with a raised rafter plate (BECP 2011). For a truss roof, raised heel energy trusses or oversized (cantilevered) trusses that form elevated overhangs, in combination with rafter baffles and soffit dams, will provide clearance for both full-height insulation and ventilation.

In stick-built roofs where rafters and ceiling joists are cut and installed at the construction site, laying an additional top plate across the top of the ceiling joists at the eave will raise the roof height, prevent compression of the attic insulation, and permit ventilation. When installing a raised top plate, place a band joist at the open joint cavities of the roof framing. The band joist also serves as a soffit dam, helping to prevent wind washing of the attic insulation (where air entering the soffit vents flows through the attic insulation, which can reduce attic insulation R-values on extremely cold days or add moisture to the insulation) (Southface and ORNL 2000, Straube and Grin 2010).

With a cathedral ceiling, a vaulted parallel chord truss roof can be constructed. Cathedral ceilings must provide space between the roof deck and ceiling for adequate insulation and ventilation. The 2009 IECC requires at least R-30 in areas where the roof-ceiling design doesn’t allow for more. Insulation levels of R-30 or higher can be achieved through the use of truss joists, scissor truss framing, or sufficiently large rafters. For example, cathedral ceilings built with 2x12 rafters have space for standard 10-inch, R-30 batts and ventilation.

The designer should specify energy trusses or other constructions that will allow full height construction and baffles on building plans. These designs will be implemented by the framer. The insulation contractor should install the insulation correctly to full depth and install rulers. This task should be included in the contract for the appropriate trade, depending on the workflow at a specific job site.

See the “compliance” tab for 2009 IECC-specified wall insulation levels. Some building scientists note that fully vented, pitched attic assemblies can be the lowest cost, highest R-value, and most durable roofs in all climates zones (except perhaps IECC Zone 1 and Zone 2 with high coastal humidity), as long as no major sources of potential air leakage (e.g., HVAC ducts or recessed light fixtures) are present in the ceiling plane. Given the low cost, high insulation levels (R-60 to R-100) are affordable and economically justified in Zones 5 through 8 and the only change required to meet these high levels, other than an airtight ceiling, is to construct raised heel trusses or rafter designs to accommodate the increased amount of insulation (Straube and Grin 2010).
How to Construct a Roof with Full Insulation at the Eaves

1. Order and install oversized or raised heel trusses (Figure 3), or install site-built rafters with raised top plates (Figure 4). Specify 2- to 2½-foot overhangs, which are higher, providing more room for insulation at the top plate and additional window shading.

2. Install baffles and soffit dams at each rafter bay to provide a clear path for ventilation air above the insulation and to prevent insulation from falling into the soffit vents.

3. For cathedral roofs, specify and install parallel chord trusses (Figure 5).

4. Install attic rulers to show that blown insulation is installed to the proper depth. (The rules should be installed with numbering facing the attic entrance; one ruler for every 300 ft²).

5. Fill the attic with blown, spray foam, or batt insulation to at least the required minimum insulation level. Blown or spray foam insulation should cover the tops of the ceiling joists. Batts should completely fill the joist cavities; an additional layer of batts can be layered over top of and running perpendicular to the joists. Shake batts to ensure proper loft. If joist spacing is uneven, fill any gaps with scrap pieces of insulation. Cut slits in batt insulation to fit around wiring, plumbing, or ductwork without compressions.
Ensuring Success

The quality of the insulation installation should be visually inspected by the site supervisor. It may be possible to detect heat loss at the tops of exterior walls with an infrared camera if a sufficient temperature difference exists between the outside and the conditioned space of the house. Attic rulers should be installed upright from the ceiling deck and facing the attic entrance, one ruler for every 300 ft$^2$ including at the eaves, to make it easier for the inspector to confirm that proper insulation depth has been achieved.
Install insulation in amounts that meet or exceed code-required levels for your climate zone. Please see this table for the minimum insulation requirements for ceilings, walls, floors, and foundations in new homes, as listed in the 2009, 2012, 2015, and 2018 IECC and IRC.

**ENERGY STAR Certified Homes, Version 3/3.1 (Rev. 09)**

National Rater Field Checklist

3. Reduced Thermal Bridging.

3.1 For insulated ceilings with attic space above (i.e., non-cathedralized), Grade I insulation extends to the inside face of the exterior wall below and is ? R-21 in CZ 1-5; ? R-30 in CZ 6-8.\(^1\)

Footnote 13) The minimum designated R-values must be achieved regardless of the trade-offs determined using an equivalent U-factor or UA alternative calculation, with the following exception:

For homes permitted through 12/31/2012: CZ 1-5: For spaces that provide less than 5.5 in. of clearance, R-15 Grade I insulation is permitted. CZ 6-8: For spaces that provide less than 7.0 in. of clearance, R-21 Grade I insulation is permitted.

For homes permitted on or after 01/01/2013: Homes shall achieve Item 3.1 without exception. Note that if the minimum designated values are used, then higher insulation values may be needed elsewhere to meet Item 1.2. Also, note that these requirements can be met by using any available strategy, such as a raised-heel truss, alternate framing that provides adequate space, and / or high-density insulation.

**DOE Zero Energy Ready Home (Revision 07)**

DOE Zero Energy Ready Home (Rev 07) requires that ceiling, wall, floor, and slab insulation meets or exceeds 2015 IECC levels.
Training

Right and Wrong Images

Display Image: ES_TESRC_4.1_PG88_148b_102811_0.jpg
INSTALL 1" RIGID INSULATION
CUT TO FIT BETWEEN THE
RAFTERS. FOAM SEAL BOTH
SIDES ALONG RAFTER WITH
EXPANDING FOAM SEALANT.
MAINTAIN EQUAL VENT SPACE
FOR LENGTH OF RIGID
INSULATION.

INSTALL 1" RIGID INSULATION VERTICALLY TO
CONNECT INSULATING
SHEATHING TO RIGID
INSULATION BAFFLE.
FOAM SEAL BOTH
JOINTS.
CAD FILE: 42_CAD_1-4_slab_1-1-2-inch_rigid_foam_5-01003_GBA_1-31-12.dwg
PDF: 42_CAD_1-4_slab_1-1-2-inch_rigid_foam_1-00004_GBA_1-31-12.pdf

CAD FILE: 42_CAD_1-4_slab_w_3-4-inch_rigid_foam_1-00001_1-31-12.dwg
PDF: 42_CAD_1-4_slab_w_3-4-inch_rigid_foam_1-00001_1-31-12.pdf
Compliance

The Compliance tab contains both program and code information. Code language is excerpted and summarized below. For exact code language, refer to the applicable code, which may require purchase from the publisher. While we continually update our database, links may have changed since posting. Please contact our webmaster if you find broken links.

ENERGY STAR Certified Homes, Version 3/3.1 (Rev. 09)

National Rater Field Checklist

Thermal Enclosure System.

3. Reduced Thermal Bridging.

3.1 For insulated ceilings with attic space above (i.e., non-cathedralized), Grade I insulation extends to the inside face of the exterior wall below and is \( R-21 \) in CZ 1-5; \( R-30 \) in CZ 6-8.\(^{13}\)

Footnote 13) The minimum designated R-values must be achieved regardless of the trade-offs determined using an equivalent U-factor or UA alternative calculation, with the following exception:

For homes permitted through 12/31/2012: CZ 1-5: For spaces that provide less than 5.5 in. of clearance, \( R-15 \) Grade I insulation is permitted. CZ 6-8: For spaces that provide less than 7.0 in. of clearance, \( R-21 \) Grade I insulation is permitted.

For homes permitted on or after 01/01/2013: Homes shall achieve Item 3.1 without exception. Note that if the minimum designated values are used, then higher insulation values may be needed elsewhere to meet Item 1.2. Also, note that these requirements can be met by using any available strategy, such as a raised-heel truss, alternate framing that provides adequate space, and / or high-density insulation.

Please see the ENERGY STAR Certified Homes Implementation Timeline for the program version and revision currently applicable in in your state.

DOE Zero Energy Ready Home (Revision 07)

Exhibit 1 Mandatory Requirements.

Exhibit 1, Item 1) Certified under the ENERGY STAR Qualified Homes Program or the ENERGY STAR Multifamily New Construction Program.

Exhibit 1, Item 2) Ceiling, wall, floor, and slab insulation shall meet or exceed 2015 IECC levels and achieve Grade 1 installation, per RESNET standards. See the guide 2015 IECC Code Level Insulation – DOE Zero Energy Ready Home Requirements for more details.

Footnote 13) Steel-frame ceilings, walls, and floors shall meet the insulation requirements of the 2015 IECC – Table 402.2.6. Compliance can be determined by meeting Zero Energy Ready Home requirements based on prescriptive insulation requirements, or U-factor alternatives. 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.

2009 - 2018 IECC and IRC Minimum Insulation Requirements: The minimum insulation requirements for ceilings, walls, floors, and foundations in new homes, as listed in the 2009, 2012, 2015, and 2018 IECC and IRC, can be found in this table.

2009 IECC

Table 402.1.1 lists ceiling R values by climate zone: CZ 1-3: R-30, CZ 4-5: R-38, CZ 6-8: R-49.

Section 402.2.1. Ceilings with attic spaces. R-30 will satisfy the requirement for R-38 insulation on the ceiling if the R-30 is uncompressed and extends over the top plates at the eaves. In the same way, R-38 suffices in climate zones requiring R-49 attic insulation.

2012 IECC

Table 402.1.1 lists ceiling R values by climate zone: CZ 1: R-30, CZ 2-3: R-38, CZ 4-8: R-49.

Section 402.2.1. Ceilings with attic spaces. R-30 will satisfy the requirement for R-38 insulation on the ceiling if the R-30 is uncompressed and extends over the top plates at the eaves. In the same way, R-38 suffices in climate zones requiring R-49 attic insulation.

2015 IECC and 2018 IECC

Table 402.1.2 lists ceiling R values by climate zone: CZ 1: R-30, CZ 2-3: R-38, CZ 4-8: R-49.

Section 402.2.1. Ceilings with attic spaces. R-30 will satisfy the requirement for R-38 insulation on the ceiling if the R-30 is uncompressed and extends over the top plates at the eaves. In the same way, R-38 suffices in climate zones requiring R-49 attic insulation.

<table>
<thead>
<tr>
<th>Climate Zone</th>
<th>Ceiling R-Value</th>
<th>Wood Frame Wall R-Value</th>
<th>Mass Wall R-Value* (2009 IRC: 6)</th>
<th>Floor R-Value</th>
<th>Basement Wall R-Value</th>
<th>Slabb R-Value &amp; Depth</th>
<th>Crawl Spacec Wall R-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>0</td>
<td>0</td>
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<td>13</td>
<td>13</td>
<td>20 or 13+5h</td>
<td>13</td>
<td>19</td>
<td>19</td>
<td>5/13</td>
</tr>
<tr>
<td>4 except Marine</td>
<td>38</td>
<td>49</td>
<td>13</td>
<td>20 or 13+5h</td>
<td>5/10</td>
<td>8/13</td>
<td>19</td>
</tr>
<tr>
<td>5 and Marine 4</td>
<td>38</td>
<td>49</td>
<td>20 or 13+5h</td>
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<td>20 or 13+5h</td>
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<td>15/20</td>
<td>30f</td>
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<tr>
<td>7 and 8</td>
<td>49</td>
<td>49</td>
<td>21</td>
<td>20 or 13+10h</td>
<td>19/21</td>
<td>19/21</td>
<td>38d</td>
</tr>
</tbody>
</table>

For SI: 1 foot = 304.8 mm.

*The IRC code requirement differs from the IECC code requirement, as noted.

a. Table adapted from Table R402.1.1 in the 2009 and 2012 IECC and Table R402.1.2 in the 2015 and 2018 IECC (Table N1102.1 in 2009 IRC, Table 1102.1 in 2012 IRC, and Table N1102.1 in 2015 and 2018 IRC).

2012, 2015, and 2018 IECC: R-values are minimums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the installed R-value of the insulation shall not be less than the R-value specified in the table. 2009 IECC: R-values are minimums. R-19 batts compressed into a nominal 2x6 framing cavity such that the R-value is reduced by R-1 or more shall be marked with the compressed batt R-value in addition to the full thickness R-value.

b. Refers to fenestration requirements not shown on this excerpted table.

c. 2009-2018 IECC: “10/13” means R-10 continuous insulation (called “insulated sheathing” in 2009 IECC) on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall. “15/19” means R-15 continuous insulation on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. Alternatively, compliance with “15/19” shall be R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the home.

d. 2018 IECC: R-5 insulation shall be provided under the full slab area of a heated slab in addition to the required slab edge insulation R-value for slabs, as indicated in the table. The slab edge insulation for heated slabs shall not be required to extend below the slab.

2009, 2012, and 2015 IECC: 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 Climate Zones 1 through 3 for heated slabs.

e. Refers to fenestration requirements not shown on this excerpted table.

f. 2009-2018 IECC: Basement wall insulation is not required in warm-humid locations as defined by Figure R301.1 and Table R301.1 (Figure/Table N1101.2 in 2009 IRC and Figure/Table N1101.10 in 2012, 2015, and 2018 IRC).

g. 2009-2018 IECC: Alternatively, insulation sufficient to fill the framing cavity and providing not less than an R-value of R-19.

h. 2015 and 2018 IECC: The first value is cavity insulation, the second value is continuous insulation. Therefore, as an example, “13+5” means R-13 cavity insulation plus R-5 continuous insulation.

2012 IECC: First value is cavity insulation, second value is continuous insulation or insulated siding, so “13+5” means R-13 cavity insulation plus R-5 continuous insulation or insulated siding. If structural sheathing covers 40 percent or less of the exterior, continuous insulation R-value shall be permitted to be reduced by no more than R-3 in the locations where structural sheathing is used – to maintain a consistent total sheathing thickness.

2009 IECC: “13+5” means R-13 cavity insulation plus R-5 insulated sheathing. 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.

i. 2018 IECC: Mass walls shall be in accordance with Section R402.2.5 (N1102.2.5 in 2018 IRC). The second R-value applies where more than half of the insulation is on the interior of the mass wall.

2009, 2012, and 2015 IECC: The second R-value applies where more than half of the insulation is on the interior of the mass wall.

(In the 2009 IRC, footnote “k” addresses mass wall insulation while footnote “i” and “j” address fenestration.)

j. 2009 IECC Only: Refers to fenestration requirements not shown on this excerpted table.


Section R101.4.3 (Section R501.1.1 in 2015 and 2018 IECC). Additions, alterations, renovations, or repairs shall conform to the provisions of this code, without requiring the unaltered portions of the existing building to comply with this code. (See code for additional requirements and exceptions.)

2009 IRC

Table 1102.1.1 lists ceiling R values by climate zone: CZ 1-3: R-30, CZ 4-5: R-38, CZ 6-8: R-49. Section 1102.2.1, Ceilings with attic spaces. R-30 will satisfy the requirement for R-38 insulation on the ceiling if the R-30 is uncompressed and extends over the top plates at the eaves. In the same way, R-38 suffices in climate zones requiring R-49 attic
insulation.

**2012 IRC**

Table 1102.1.1 lists ceiling R values by climate zone: CZ 1: R-30, CZ 2-3: R-38, CZ 4-8: R-49.
Section 1102.2.1, Ceilings with attic spaces. R-30 will satisfy the requirement for R-38 insulation on the ceiling if the R-30 is uncompressed and extends over the top plates at the eaves. In the same way, R-38 suffices in climate zones requiring R-49 attic insulation.

**2015 IRC and 2018 IRC**

Table 1102.1.2 lists ceiling R values by climate zone: CZ 1: R-30, CZ 2-3: R-38, CZ 4-8: R-49.
Section 1102.2.1, Ceilings with attic spaces. R-30 will satisfy the requirement for R-38 insulation on the ceiling if the R-30 is uncompressed and extends over the top plates at the eaves. In the same way, R-38 suffices in climate zones requiring R-49 attic insulation.


Section N1101.3 (Section N1107.1.1 in 2015 and 2018 IRC). Additions, alterations, renovations, or repairs shall conform to the provisions of this code, without requiring the unaltered portions of the existing building to comply with this code. (See code for additional requirements and exceptions.)

Appendix J regulates the repair, renovation, alteration, and reconstruction of existing buildings and is intended to encourage their continued safe use.
Access to some references may require purchase from the publisher. While we continually update our database, links may have changed since posting. Please contact our webmaster if you find broken links.

Case Studies
None Available

References and Resources*

1. **2009 IECC - International Energy Conservation Code**
   Author(s): International Code Council
   Organization(s): ICC
   Publication Date: January, 2009
   
   Code establishing a baseline for energy efficiency by setting performance standards for the building envelope (defined as the boundary that separates heated/cooled air from unconditioned, outside air), mechanical systems, lighting systems and service water heating systems in homes and commercial businesses.

2. **2009 IECC Air Barrier and Insulation Inspection Component Criteria**
   Author(s): Southface Energy Institute
   Organization(s): Southface Energy Institute
   Publication Date: January, 2009
   
   Document intended to help graphically demonstrate the air leakage provisions of section 402.4 of the 2009 IECC.

3. **2009 IRC - International Residential Code for One and Two Family Dwellings**
   Author(s): International Code Council
   Organization(s): ICC
   Publication Date: January, 2009
   
   Code for residential buildings that creates minimum regulations for one- and two-family dwellings of three stories or less. It brings together all building, plumbing, mechanical, fuel gas, energy and electrical provisions for one- and two-family residences.

   Author(s): International Code Council
   Organization(s): ICC
   Publication Date: January, 2012
   
   Code establishing a baseline for energy efficiency by setting performance standards for the building envelope (defined as the boundary that separates heated/cooled air from unconditioned, outside air), mechanical systems, lighting systems and service water heating systems in homes and commercial businesses.

5. **2012 IRC - International Residential Code for One and Two Family Dwellings**
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   Organization(s): ICC
   Publication Date: January, 2012
   
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   Author(s): International Code Council
   Organization(s): ICC
   Publication Date: May, 2014
   
   Code establishing a baseline for energy efficiency by setting performance standards for the building envelope (defined as the boundary that separates heated/cooled air from unconditioned, outside air), mechanical systems, lighting systems and service water heating systems in homes and commercial businesses.

7. **2015 IRC - International Residential Code for One and Two Family Dwellings**
   Author(s): International Code Council
   Organization(s): ICC
   Publication Date: May, 2014
   
   Code for residential buildings that creates minimum regulations for one- and two-family dwellings of three stories or less. It brings together all building, plumbing, mechanical, fuel gas, energy and electrical provisions for one- and two-family residences.
Author(s): International Code Council  
Organization(s): ICC  
Publication Date: November, 2017  
*Code establishing a baseline for energy efficiency by setting performance standards for the building envelope (defined as the boundary that separates heated/cooled air from unconditioned, outside air), mechanical systems, lighting systems, and service water heating systems in homes and commercial businesses.*

9. **2018 IRC - International Residential Code for One and Two Family Dwellings**  
Author(s): International Code Council  
Organization(s): ICC  
Publication Date: August, 2017  
*Code for residential buildings that creates minimum regulations for one- and two-family dwellings of three stories or less. It brings together all building, plumbing, mechanical, fuel gas, energy and electrical provisions for one- and two-family residences.*

10. **Advanced Wall Framing**  
Author(s): NAHB, Southface Energy Institute, Oak Ridge National Laboratory, National Renewable Energy Laboratory  
Organization(s): NAHB, Southface Energy Institute, Oak Ridge National Laboratory, National Renewable Energy Laboratory  
Publication Date: January, 2002  
*Information sheet about advanced wall framing.*

11. **Attic Air Sealing Guide and Details**  
Author(s): Lstiburek  
Organization(s): Building Science Corporation  
Publication Date: February, 2010  
*Document providing background and approach for the prep work necessary prior to adding attic insulation - focusing on combustion safety, ventilation for indoor air quality, and attic ventilation for durability.*

12. **Attics & Roofs for Northern Residential Construction**  
Author(s): Seifert  
Organization(s): University of Alaska  
Publication Date: January, 2003  
*Document describing approaches to energy efficiency and moisture considerations for roofs in northern climates.*

Author(s): Baechler, Gilbride, Hefty, Cole, Williamson, Love  
Organization(s): Pacific Northwest National Laboratory, Oak Ridge National Laboratory  
Publication Date: April, 2010  
*Report identifying the steps to take, with the help of a qualified home performance contractor, to seal unwanted air leaks while ensuring healthy levels of ventilation and avoiding sources of indoor air pollution.*

14. **Ceilings and Attics**  
Author(s): Southface Energy Institute, Oak Ridge National Laboratory  
Organization(s): Southface Energy Institute, ORNL  
Publication Date: February, 2000  
*Information sheet with information about insulating and ventilating attics.*

15. **DOE Zero Energy Ready Home National Program Requirements (Rev. 07)**  
Author(s): U.S. Department of Energy  
Organization(s): DOE  
Publication Date: May, 2019  
*Standard requirements for DOE's Zero Energy Ready Home national program certification.*

16. **ENERGY STAR Certified Homes, Version 3/3.1 (Rev. 09) National Program Requirements**  
Author(s): U.S. Environmental Protection Agency  
Organization(s): EPA  
Publication Date: September, 2018  
*Webpage with links to documents providing the program requirements and checklists for ENERGY STAR Certified Homes (Ver. 3/3.1, Rev. 09).*

17. **Georgia State Supplements and Amendments to the International Energy Conservation Code**  
Author(s): Georgia Department of Community Affairs  
Organization(s): Georgia Department of Community Affairs  
Publication Date: January, 2011  
*Georgia state’s minimum standard energy code, including state supplements and amendments.*

18.
High-R Roofs Case Study Analysis
Author(s): Straube, Grin
Organization(s): Building Science Corporation
Publication Date: March, 2009
Report that considers a number of promising wall systems that can meet the requirement for better thermal control.

19. Measure Guideline: Guide to Attic Air Sealing
Author(s): Lstiburek
Organization(s): Building Science Corporation
Publication Date: September, 2014
Report that provides information and specifications to anyone that is attempting to air seal existing attics.

20. Raised Truss
Author(s): Department of Energy
Organization(s): DOE
Publication Date: September, 2011
Information sheet with the definition and uses for a raised truss.

21. Thermal Enclosure System Rater Checklist Guidebook
Author(s): U.S. Environmental Protection Agency
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 authors and organizations contributed to the content in this Guide.

Pacific Northwest National Laboratory, and Building Science Corporation.