

# Review of 2012 IECC & IRC for Attic Accesses

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*Why is it important and what is compliant?*

## **Introduction**

In discussions with a number of code officials and contractors, there are a number of sections of the code that must be understood in order to clarify what the minimum requirements are for attic accesses. These sections include C101.4, C101.5, C201.3, C202, C301, C303.2, R402.1, R402.1.1, R402.1.2, R402.1.4, R402.2.4, R402.4.1, R402.4.1.1, R405.5, R405.5.2 and R405.6 of the IECC as well as sections N1102.1.1, N1102.2.1, N1102.2.4, N1102.4, R102.2, R102.7.1, R202, R807.1 and the related Commentary. This document is the product of input from code officials and other experts to produce a straight forward compilation of the code requirements.

## **Compliance with the Codes**

Whether using the 2012 International Energy Conservation Code (IECC) with or without the 2012 version of REScheck, or the 2012 International Residential Code (IRC), the following are minimum requirements for any attic access from a conditioned to an unconditioned space:

1. Insulation R-Value (Choose one)
  - REScheck Compliance Certificate
  - R-Value Equivalent to the rest of attic
2. Type of Insulation
  - Access shall be provided to prevent damaging or compressing insulation ( No exposed Batt insulation, but this does not exclude the use of loose fill or batt insulation in a measure )
3. Protective Barrier around the opening
  - Wood
  - Equivalent (Plywood , rigid foamboard-no batt insulation or cardboard)
4. Air Seal
  - Continuous air sealing measure (no gaps)
  - The sealing methods between dissimilar materials shall allow for differential expansion and contraction.
5. Size and Location
  - Opening 22x30 inches or greater
  - 30 inches of unobstructed clearance
  - Located in hallway or other readily accessible area

## **Background**

There are a number of factors that led up to the adoption of the new code requirements for attic accesses. First, it is known that more energy is lost through the attic than any other area of a home. The use of thermal cameras, blower door device and computer modeling revealed the large amounts of conductive and convective heat transfer that occur through attic accesses in both hot and cold weather.

UA calculations have been used in weatherization for calculating the insulating value of an area with uneven levels of insulation. This calculation proved that an attic access without insulation will significantly reduce the insulating value of the entire attic. Further, since the attic access cover will be moved to enter and exit the attic, it is important that the insulation used is durable and not subject to being compressed or otherwise compromised.

Loose fill insulation has increasingly been used as an alternative to batt insulation. This insulation can readily fall into the living space when entering and exiting the attic thereby creating a need for a permanent blocking device to keep loose fill insulation in the attic and maintain a consistent insulating value in the area around the attic access.

Blower Door tests reveal that more air leakage and the accompanying convective heat transfer occurred through the attic than originally suspected. With the tightening of the thermal envelope everywhere else in the structure, any remaining opening such as the attic access remains a source of significant air leakage. Air leakage through the attic access in the otherwise tightened thermal envelope contributes to or causes other significant problems in the structure such as air quality, rainy attics, mold and ice damming.

## The Code

The standards for attic hatches and doors address each of the above items. The new standards exist primarily in two separate and distinct sections of each code. For the 2012 IECC, sections R402.2.4, R402.4.1 and R402.4.1.1 set forth the specific new requirements. For the IRC, the same requirements exist in sections N1102.2.4 and N1102.4.1.1 respectively. The 2012 IRC contains additional requirements in sections R807.1 and M1305.1.3 relating to the size and location for any attic space equal to or greater than 30 sq. ft. for buildings with combustible ceiling or roof construction.

Section R807.1 requires a minimum rough framed opening for the attic access to be not less than 22 x 30 inches with minimum unobstructed headroom of 30 inches above the ceiling framing members. For wall openings, a minimum size rough framed opening is not less than 22 wide and 30 inches high. Finally, the attic access must be located in a hallway or other readily accessible location. Section M1305.1.3 of the IRC requires attic access openings to be large enough to allow removal of the largest appliance.

Sections 402.4.1.1 of the IECC and N1102.4.1.1 of the IRC have a requirement for attic access openings to be air sealed. Since this is a mandatory requirement in both the IRC and IECC, it cannot be addressed by a simulated performance alternative. It is noteworthy that the requirements for air sealing are now the same for site built doors, windows, openings between window and door assemblies and their respective jambs and framing, and skylights as they are for attic accesses. The importance of the air sealing requirement is made clear by the IECC Commentary for **R402.4 Air leakage( Mandatory)**, “Sealing the building envelope is critical to good thermal performance...The seal will prevent warm, conditioned air from leaking out ...during the heating season, thereby reducing the cost of heating the residence. During hot summer months, a proper seal will stop hot air from entering the residence, helping to reduce the air conditioning load on the building.” Commentary for **R402.4.2 Building thermal envelope** states, “Air infiltration is a major source of energy use because the incoming air usually requires conditioning. Uncontrolled infiltration also has a tendency to create or aggravate moisture problems. The elements in Table R402.4.1.1 include some of the largest sources of infiltration.” The attic access is listed on this table.

The IRC and IECC both have the following new prescriptive requirements:

1. Insulation R-Value equivalent to the rest of the attic
2. Wood or Equivalent protective baffle when loose fill insulation is installed
3. Access shall be provided to all equipment that prevents damaging or compressing the insulation
4. Weather-stripped access door

Proper understanding of equipment reveals that virtually all attic accesses fall under this requirement of insulation that is prevented from compression in # 3 above. Sections R201.3 of the IECC and sections R202 and E3501.1 of the IRC define equipment as all piping, ducts, vents, control devices, and other components of systems other than appliances that are permanently installed and integrated to provide control of environmental conditions for buildings. Equipment also includes material, fittings, devices, luminaires, apparatus, machinery and the like used in part of, or in connection with, an electrical installation.

The intention of this section is further clarified in the Commentary for section **R402.2.4 Access hatches and doors** "...an attic access door is a weak part of the building envelope. The purpose of this provision is to ensure that measures are taken to prevent large loss of energy through this opening." The use of the plural tense measures indicates that it refers to all four requirements listed in that section including the requirement to have insulation that is prevented from compression.

Section R401.3 allows for prescriptive requirements of various sections and specifically Section R402.2.4 to be met by section R405, Simulated Performance Alternative. This includes the use of approved compliance software tools such as the ResCheck software.

## **ResCheck**

The ResCheck program provides an alternative measure for the insulating R-Value requirement of the attic access. This is accomplished with a UA calculation for the entire structure. This calculation takes into account the fact that there are areas of a structure where it is not feasible to have levels of insulation that meet the required R-Value. This alternative typically reduces the R-Value requirement for the attic access in most cases.

ResCheck is clear in the scope of what it addresses: "REScheck is appropriate for insulation and window trade-off calculations in residential detached one- and two-family buildings and multi-family buildings three stories or less in height above grade, such as apartments, condominiums, and townhouses. REScheck works by performing a simple U-factor x Area (UA) calculation for each building assembly to determine the overall UA of a building. The UA that would result from a building conforming to the code requirements is compared against the UA for your building. If the total heat loss (represented as a UA) through the envelope of your building does not exceed the total heat loss from the same building conforming to the code, the software generates a report that declares your building is compliant with the code." Source: <http://www.energycodes.gov/rescheck>

If the Rescheck program is used and the insulating values are met for the total structure including the attic access, then it produces an IECC Compliance Certificate. It is important to note that the only information submitted on the ResCheck checklist pertaining to the attic access is "Attic Access Hatch & Door insulation R-Value of the adjacent assembly".

ResCheck does not have any entry for the requirements listed in 2-4 above for wood or equivalent protective baffle, access that prevents compressing the insulation and weather-stripping.

The purpose of these other 2012 IECC requirements is clearly stated in the code. For example, “a wood or equivalent baffle or retainer is required to be provided when loose insulation is installed” It goes on to clarify, “the purpose of which is to prevent the loose fill insulation from spilling into the living space when the attic access is opened, and, to provide a permanent means of maintaining the installed R-Value of the loose fill insulation.” This is an important requirement because it provides a permanent means to achieve and maintain the proper insulating value in the attic. This requirement is not included in the ResCheck check list.

Whether applying REScheck or following the 2012 IRC or IECC requirements, the need for insulation that prevents being compressed is also straight forward –“Access shall be provided... that prevents damaging or compressing the insulation.” The requirement is unequivocal that the insulation used on the attic hatch or door must prevent the damaging or compressing of the insulation. Exposed batt insulation on the access hatch or door does not **prevent** the batt insulation from being compressed when accessing the attic. The requirement is that it must prevent such an occurrence not in the event that one is careful to not compress the insulation. Further, the manufacturer’s installation instructions referenced below states that batt insulation is subject to compression and it should not be compressed. Therefore, exposed batt insulation is non-compliant for this fundamental requirement for insulation that prevents compression.

Based on the clarity of purpose from the explanation provided in the code, it is common sense that insulation that prevents compression and a protective barrier are needed. Nonetheless, a reading of just the authorized use of ResCheck and the Prescriptive requirements that are in R402.2.4 may appear to be inconsistent. Sections C101.4 and C303.2 provide guidance on resolving this potential conflict.

Section C101.4 titled Applicability states that, “Where, in any specific case, different sections of this code specify different materials, methods of construction or other requirements, the most restrictive shall govern.” Following this guidance, having a protective barrier is more restrictive than no barrier and having non-compressible insulation over the attic hatch or door to the attic is more restrictive than every type of insulation. That logic is consistent with the common sense approach above.

Section C 303.2 provides additional clarity on both of these requirements as it states that, “All materials, systems and equipment shall be installed in accordance with the manufacturer’s installation instructions and the International Building Code.” The manufacturers of batt insulation such as Owens Corning<sup>i</sup> indicate that “To get the marked R-Value, it is essential that this insulation be installed properly.” “Insulation should not be compressed... as this results in a reduction of R-Value.” Relying on the requirement to follow the manufacturer’s installation instructions, it is clear that the use of non-compressible insulation or compressible insulation that is prevented from being compressed in the constructed measure are the only options for materials to insulate the attic access.

Again referencing Owens Corning and its installation instructions for loose fill insulation, it states that, “Failure by the installer to provide... at least the minimum thickness will result in lower insulation R-Value.”<sup>ii</sup> Without a protective barrier around the attic access, the loose fill insulation will need to be tapered as it approaches the opening or the insulation will fall freely into the living space. In either case, the loose fill insulation will not meet the thickness required for the stated R-Value. Absent a viable

protective barrier or the contractor entering an additional ceiling component, the R-Value stated on the ResCheck checklist for the ceiling will be inaccurate, thereby producing an inaccurate compliance certificate and/or non-compliant for failure to comport with section 303.2.

Taking the ResCheck compliance certificate as a total solution for the attic access requires that the standards for a wood or equivalent protective barrier, non-compressible insulation, and a durable air seal be ignored. That would be inconsistent with the written code and detrimental to the homeowner.

### **Common Non-compliant Measures**

A structure with or without a 2009 IECC compliance certificate can often be non-compliant for:

1. Exposed Batt insulation on the hatch and folding ladder door covers
2. Inaccurate REScheck R-Value entries (No entry for the attic access, Continuous vs. Cavity or incorrect Ceiling Components)
3. Inaccurate R-Value rating on insulation products such as use of “Effective R-Value”
4. No air sealing measure or Gaps in the air sealing measure
5. No Protective Barrier
6. A Protective Barrier made of batt insulation or cardboard

### **Note**

These code requirements are intended to stop a very significant source of energy loss. Failure to comport with the requirements will not only cause energy loss, but can also lead to other serious problems including condensation, mold and ice damming.

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<sup>i</sup> Owens-Corning Website ([http://www2.owenscorning.com/literature/pdfs/21149-E%20EcoTouch%20R-21%20High%20Density%20\(for%202x6%20Exterior%20Walls\)%20Data%20Sheet.pdf](http://www2.owenscorning.com/literature/pdfs/21149-E%20EcoTouch%20R-21%20High%20Density%20(for%202x6%20Exterior%20Walls)%20Data%20Sheet.pdf))

<sup>ii</sup> Owens-Corning Website (<http://www2.owenscorning.com/literature/pdfs/22676PROPINKL77ManufacturersFactSheet.pdf>)