



# Flat Ceiling Insulation

*This pamphlet is one in a series that describes residential energy conservation requirements of the Oregon Residential Specialty Code and Structural Specialty Code. Other pamphlets in this series may be downloaded from Oregon Department of Energy web site at <http://egov.oregon.gov/ENERGY/CONS/Codes/cdpub.shtm> or local building departments or from Oregon Building Codes Division.*

## Prescriptive requirements for flat ceiling insulation

Table 1104.1(1), Prescriptive Envelope Requirements lists the required flat ceiling R-value. Flat ceiling insulation R-value in standard wood frame construction for Standard Base Case is R-38 and R-49 for Log Homes.

The code specifies required R-values, not products. Any insulation product or combination of insulation products that meets the installed R-value requirement is acceptable when installed at its nominal thickness.

Section drawings or written specifications that accompany the plans must identify ceiling insulation R-value.

## R-38 ceiling insulation

Flat ceiling R-values are most often achieved by blowing in loose-fill fiberglass, cellulose or rock wool. Sometimes two R-19 batts are cross-layered to achieve R-38 or one R-38 batt is used. For help determining R-value of unfaced batts, see the pamphlet *R-Value Codes for Unfaced Batt Insulation*. Blown-in insulation may be used when the roof pitch is 4/12 or greater and there is at least 44 inches of headroom at the ridge.

## R-49 ceiling insulation options

Some of the Additional Measure packages specified in Table N1101.1(2) require R-49 flat ceiling insulation. Blown-in loose fill insulation is the most common way to achieve R-49. Sometimes cross-layered R-30 and R-19 batts are used. Figure 1 shows typical attic insulation details.

## Achieving required R-value with loose fill

To achieve the required R-value with loose fill insulation no matter what the product a certain number of pounds of insulation must be installed per square foot of ceiling surface. Otherwise, insulation will settle and its R-value will be less than required.

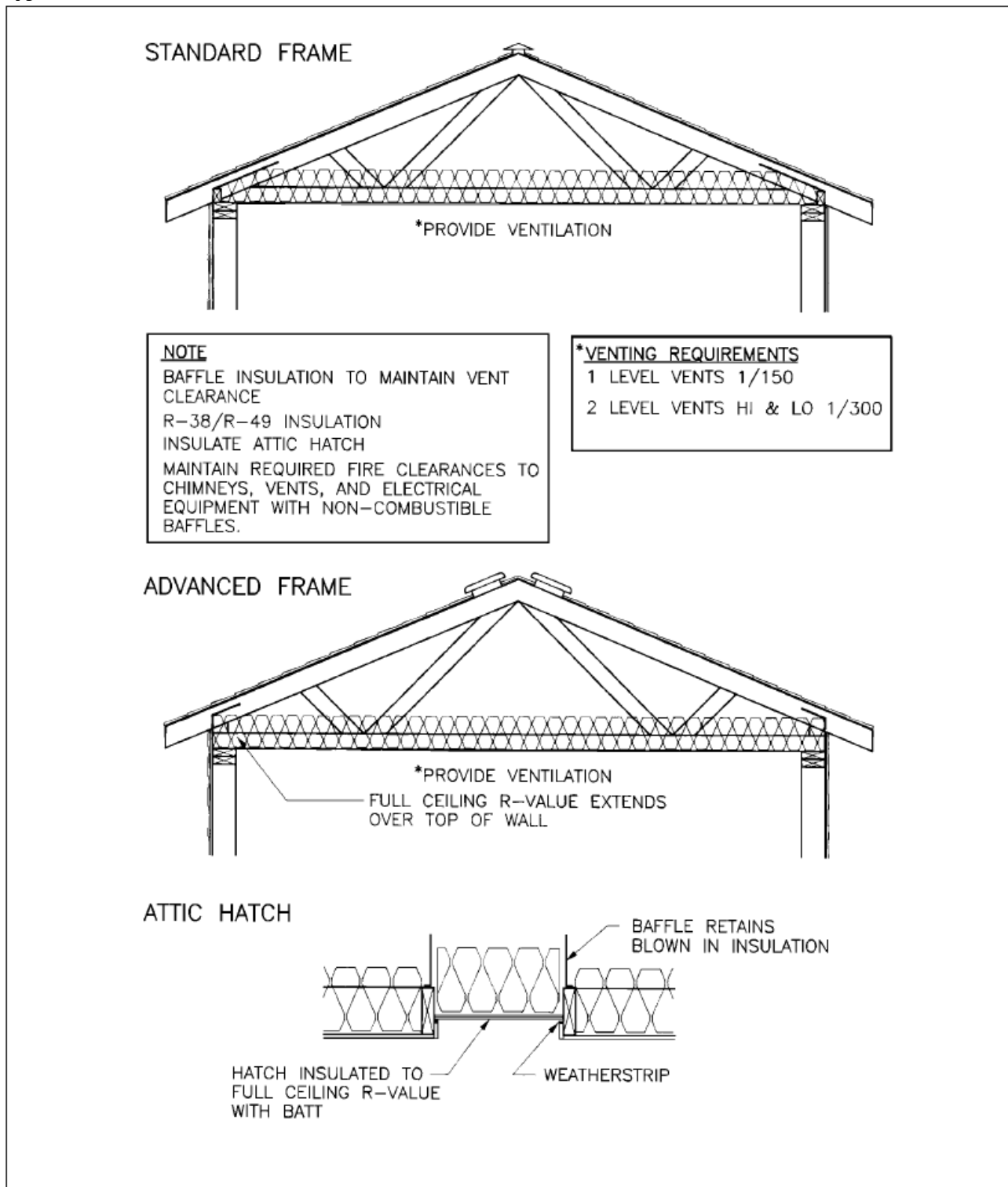
Each manufacturer of loose fill insulation indicates on the bag label pounds per square foot density required for that particular product to achieve stated R-values. The label also indicates how many bags per 1,000 square feet must be installed to yield required density.

Insulation depth is a less reliable indicator of installed R-value because an installer may “fluff” loose-fill insulation as its being blown in place. The insulation may meet required thickness without having the required density.

To verify that required density has been installed, weigh a sample of insulation taken from a square foot of ceiling area. Or check the bag count by calculating the ceiling area, dividing by 1,000 square feet and multiplying by the number of bags per 1,000 square feet.



Figure 1:  
Typical attic insulation details



For example, the ceiling area is 2,300 square feet and the manufacturer's label says it takes 20 bags per 1,000 square feet to achieve R-38. How many bags should the installer use?

$$\begin{aligned} 2,300 \div 1,000 &= 2.3 \\ 2.3 \times 20 &= 46 \end{aligned}$$

Forty-six bags are needed to achieve the density required for R-38.

### Keeping loose fill out of vent openings

The energy code requires that retainers or baffles be used to deflect ventilation air above insulation and to keep attic ventilation paths open. Treated cardboard baffles are often used to retain loose fill. Baffles should be in place at the framing inspection. Without baffles, insulation may restrict attic ventilation or wind may blow loose fill away from the vent area, creating an uninsulated bare spot in front of the vent.

Deeper layers of insulation require longer baffles to retain insulation properly.

### Vapor retarders in ceilings with attics above them

Oregon code requires vapor retarders in floors and walls, but does not require vapor retarders in ceilings with vented attic space above them.

Rated vapor retarder paint often serves as the ceiling vapor retarder. Polyethylene is another option. If polyethylene is used, the ceiling must be insulated right after the ceiling drywall is hung. That way, moisture released in the home during mudding, taping, texturing, and painting will not condense on a cold vapor retarder and cause water damage to the ceiling.

### Ventilation in attics

The attic ventilation requirement is one square foot of net free vent area per 150 square feet of ceiling. This is often abbreviated as 1/150. If half the vents are placed low, at the eaves, and half the vents are placed high, at the ridge or gable end, the vent to ceiling ratio may be reduced to 1/300. Consult the pamphlet *Moisture Control Measures in the Oregon Residential Energy Code* for more information on attic ventilation.

### Fire clearances

Baffles may be needed to keep insulation away from flues, metal chimneys, gas vents, or fixtures that require clearances or ventilation for fire safety. New recessed lights installed in new or existing construction must be IC- (insulation cover-) rated and airtight. The IC rating indicates that it is safe to cover the fixture with insulation.

If ceiling insulation levels are being increased as part of a remodel, the insulation installer may find existing recessed lights that are not IC-rated. If a light is not IC-rated, a non-combustible baffle is required to maintain a three-inch fire clearance between the light and insulation. Baffles must be non-combustible and be at least as high as the finished insulation level.

Consult the pamphlet *Recessed Lights and the Oregon Residential Energy Code* for more information on recessed light requirements.

Consult the National Fire Protection Association (1 Battery March Park, P.O. Box 9101, Quincy, MA 02269-9101; 1-800-344-3555) for information about proper fire clearances.

### Attic hatch

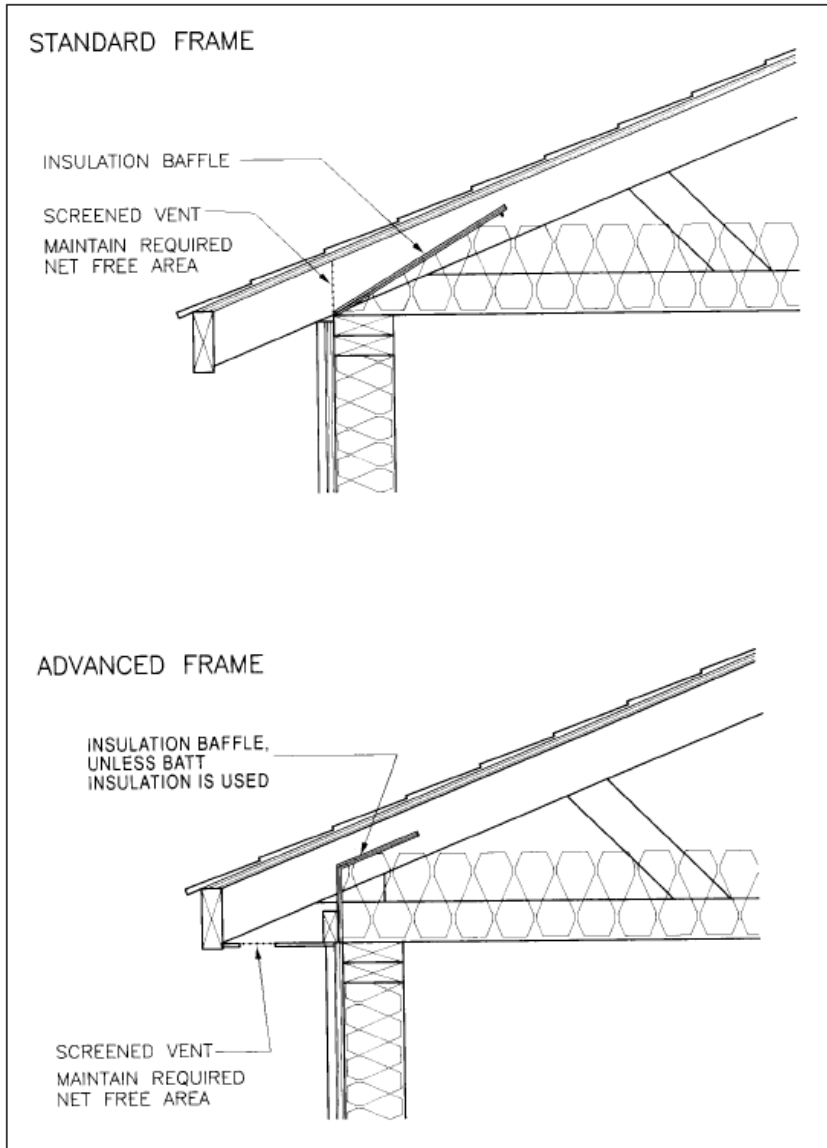
If the attic hatch is in an insulated ceiling, a baffle is required to keep insulation away from the hatch opening. The attic hatch is part of the ceiling. It must be insulated to the same level as the ceiling. Typically, pieces of batt insulation or rigid foam are used. Weatherstripping must be used to prevent air leakage from the heated space to the attic.

### Attic storage areas and furnaces in attics

Furnaces and other equipment can be installed in attics, if requirements of M1305 in the Oregon Residential Specialty Code are met. Attic equipment and passageways are not allowed to compress the ceiling insulation. A 22x30 inch passageway must be available above the insulation. The furnace must be installed above the insulation, and the 22-inch walkway from the access hole to the furnace must be above the insulation.

Attic storage areas and passageways to storage areas are not allowed to compress the ceiling insulation.

Figure 2:  
Soffit vent baffles



Information presented in this publication supports the Oregon Residential Specialty Code. This publication does not include all code requirements. Refer to the code and check with your code official for additional requirements. If information in this publication conflicts with code or your local officials, follow requirements of code and your local officials.

For more information about the residential energy code, call the Building Codes Division at (503) 378-4133 or the Oregon Dept of Energy (503) 378-4040 in Salem or toll-free, 1-800-221-8035.

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