

## Unvented Attic Assemblies Factsheet

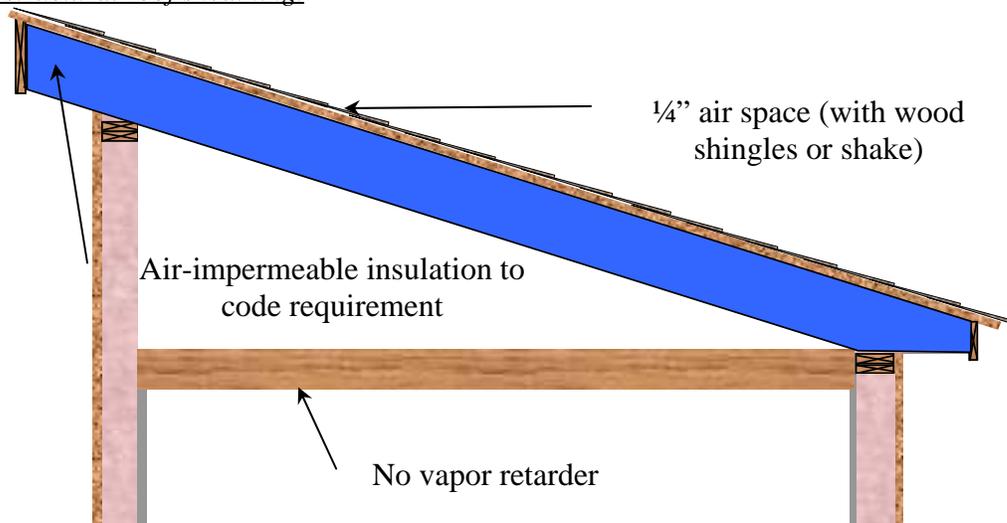
WSU Energy Program  
May 22, 2009

The Washington State University Energy Program (WSUEP) has received a number of questions regarding the Washington State Building Code Council's (SBCC) approval of an Energy Code change allowing unvented attics. The code change will go into effect on July 1, 2010, barring any additional changes prior to that time. The new language is an exception to WSEC Section 502.1.6.3, and is underlined below.

*502.1.6.3 Roof/Ceilings: Roof/ceiling assemblies where the ventilation space above the insulation is less than an average of 12 inches shall be provided with a vapor retarder. Faced batt insulation where used as a vapor retarder shall be face stapled. Single rafter joist vaulted ceiling cavities shall be of sufficient depth to allow a minimum one inch vented air space above the insulation.*

*EXCEPTION: Unvented attic assemblies (spaces between the ceiling joists of the top story and the roof rafters) shall be permitted if all the following conditions are met:*

- 1. The unvented attic space is completely contained within the building thermal envelope.*
- 2. No interior vapor retarders are installed on the ceiling side (attic floor) of the unvented attic assembly.*
- 3. Where wood shingles or shakes are used, a minimum 1/4 inch (6 mm) vented air space separates the shingles or shakes and the roofing underlayment above the structural sheathing.*
- 4. Any air-impermeable insulation shall be a vapor retarder, or shall have a vapor retarder coating or covering in direct contact with the underside of the insulation.*
- 5. Either Items a, b or c shall be met, depending on the air permeability of the insulation directly under the structural roof sheathing.*
  - a. Air-impermeable insulation only. Insulation shall be applied in direct contact to the underside of the structural roof sheathing.*

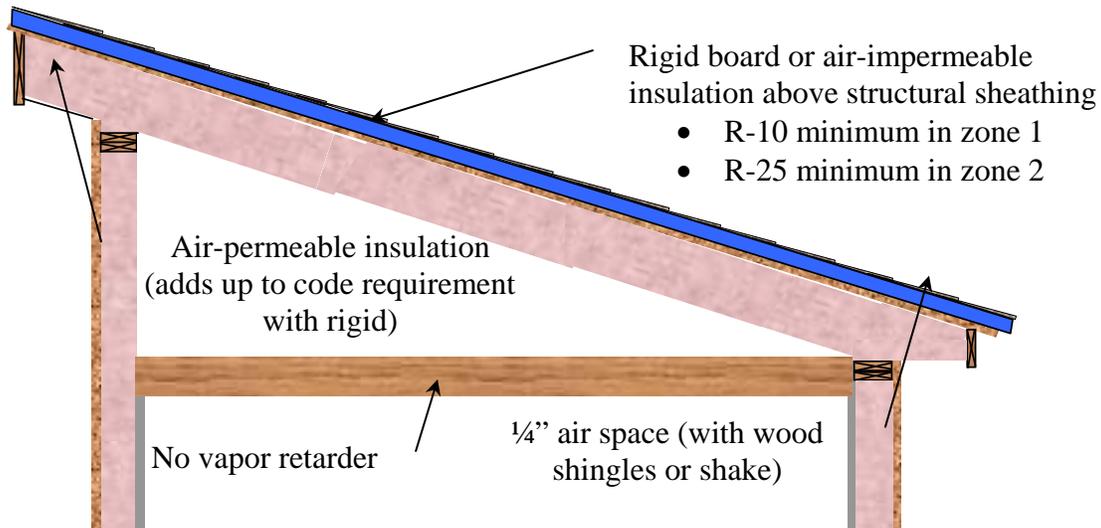


***Exception 5. a – air impermeable insulation only, in direct contact with roof sheathing***

b. Air-permeable insulation only. In addition to the air-permeable insulation installed directly below the structural sheathing, rigid board or sheet insulation shall be installed directly above the structural roof sheathing as specified per WA Climate Zone for condensation control.

i. Climate Zone #1 - R-10 minimum rigid board or air-impermeable insulation R-value.

ii. Climate Zone #2 - R-25 minimum rigid board or air-impermeable insulation R-value.

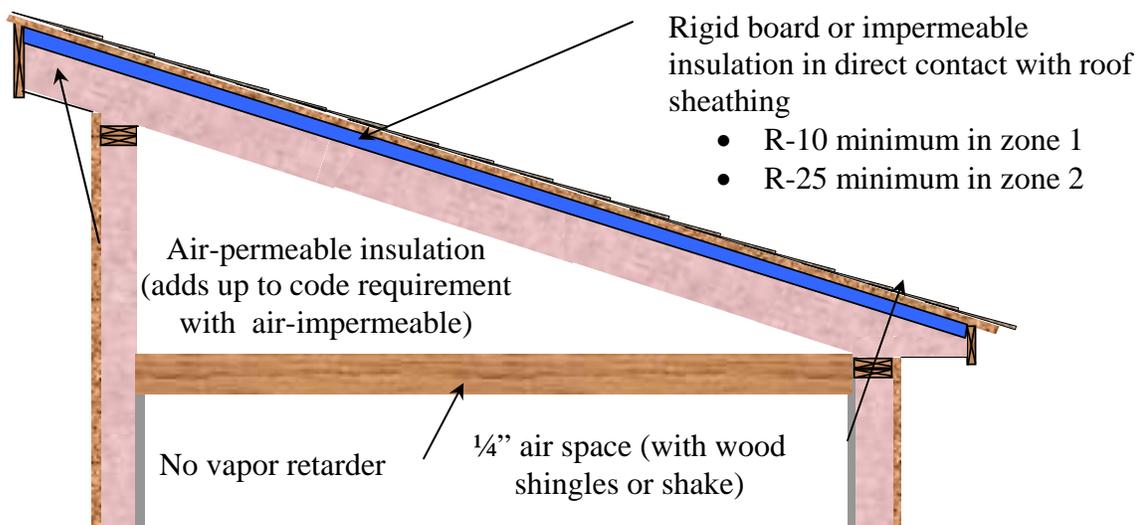


**Exception 5. b – air permeable insulation interior, air impermeable exterior.**

c. Air-impermeable and air-permeable insulation. The air-impermeable insulation shall be applied in direct contact to the underside of the structural roof sheathing as specified per WA Climate Zone for condensation control. The air-permeable insulation shall be installed directly under the air-impermeable insulation.

i. Climate Zone #1 - R-10 minimum rigid board or air-impermeable insulation R-value.

ii. Climate Zone #2 - R-25 minimum rigid board or air-impermeable insulation R-value.



**Exception 5. c – air impermeable and air permeable insulation interior**

## Some things to keep in mind:

- This code change is effective on 7/1/10. Some jurisdictions have allowed builders to use this exception prior to its official adoption date. We recommend that the applicant closely follow the manufacturer's installation instructions. In addition, builders should be aware that you may be taking on additional liability since this code change has not officially gone into effect.
- Know what type of product you are using. Is it rigid sheet foam, open cell (usually 0.5 to 0.8lb/ft<sup>3</sup>) or closed cell (usually 2 lb/ft<sup>3</sup>) spray applied product? What is its R-value per inch? Look at its ICC Evaluation Service report (<http://www.icc-es.org/>); does its listing allow it to be applied to WSEC required levels, or are there limitations due to flame spread? What will its installed vapor permeance be?
- In traditional vented attics, the vast amount of moisture intrusion into attic spaces is via air leaks in the ceiling, through light fixtures and other penetrations. As such, air sealing details present in the WSEC are critical in avoiding moisture problems in that space. However, with the unvented attic assembly approach, the unvented attic space is designed and expected to operate close to the temperature and humidity levels of the living space below; as such, no special air sealing at the ceiling is needed.
- The requirement that there be no vapor retarder on the interior ceiling of the unvented attic assembly is primarily intended to avoid trapping warm moist air in the attic area in warm humid climates (not an issue in Washington) but also to make it clear that a vapor retarder is not needed at the ceiling level for the unvented attic assembly application anywhere
- Exceptions 5a and 5c will be used for spray foam application directly to the underside of the roof sheathing. This application can result in reduced building enclosure air leakage. If ducts are installed in the attic, it will minimize impacts of duct leaks.
- Exceptions 5b and 5c allow for combinations of air-impermeable and air permeable insulations in unvented attic assemblies. These are commonly referred to as "hybrid systems". The potential problem with this type of system is creating a condensing surface where an air impermeable layer transitions to an air permeable one. Indoor vapor could migrate through the air permeable layer and be stopped by the interior surface of the air impermeable layer. If the minimum rigid board or air-impermeable insulation R-value requirements are not met, this surface may be cold enough to be a condensing surface, potentially leading to mold and rot.

***Disclaimer:*** This factsheet outlines the changes in the attic ventilation requirements of the WSEC, and to identify the issues associated with those changes. It is not intended as an endorsement of the changes, or a recommendation for their use.

If you have questions, please call (360) 956-2042, or email [energycode@energy.wsu.edu](mailto:energycode@energy.wsu.edu)

© 2009 Washington State University Extension Energy Program. This publication contains material written and produced for public distribution. Permission to copy or disseminate all or part of this material is granted, provided that the copies are not made or distributed for commercial advantage, and that each is referenced by title with credit to the Washington State University Extension Energy Program. Copying, reprinting or dissemination, electronic or otherwise, for any other use requires prior written permission from the Washington State University Extension Energy Program. WSUEEP-09-017.