



# TECHNICAL BULLETIN

## Application of Asphalt Shingle Systems to Decks Installed over Insulation or Radiant Barriers

*Revised April 2021*

The Asphalt Roofing Manufacturers Association (ARMA) has established the following recommendations for applying asphalt shingles and/or asphalt-based underlayment directly over insulation, insulated roof decks, and radiant barriers.

### **Asphalt Shingle and/or Asphalt-based Underlayment Application Directly over Insulation**

Applying shingles and/or asphalt-based underlayment directly over insulation is not recommended for several reasons.

- Asphalt shingles and/or asphalt-based underlayments are designed for attachment to deck surfaces such as plywood and oriented strand board or other surfaces acceptable to the asphalt shingle or underlayment manufacturer.
- Continuous free-flow ventilation is impossible to achieve when applying shingles and asphalt-based underlayment directly over insulation. Heat build-up, a typical result of inadequate ventilation, may accelerate weathering and reduce the anticipated life of the products.
- Asphalt shingles and/or asphalt-based underlayment may be damaged or punctured when nailed onto a non-rigid surface such as roofing insulation.
- Insulation does not have adequate nail-holding ability. Consequently, shingle damage and/or blow-off may occur if shingles are attached to insulation. Wind classification of the installed roofing system may be affected.

The fire classification of asphalt roofing products may be adversely affected when applied directly over insulation. Individual asphalt shingle and/or asphalt-based underlayment manufacturers should be consulted to determine the effects on such classifications. Fire classification installed roofing system may be affected.

### **Asphalt Shingle and/or Asphalt-based Underlayment Application Directly over Insulated Roof Decks**

Applying asphalt shingles and/or asphalt-based underlayment to insulated roof decks is not recommended unless the following factors are considered.

- Direct installation over insulated roof decks is not recommended unless an adequate continuous ventilation space, free of obstructions, is provided between the top of the insulating material and the underside of an acceptable roof sheathing. Proper ventilation must be provided to dissipate heat and humidity build-up under the roof

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sheathing. More information on this can be found in ARMA's technical bulletin, *Ventilation and Moisture Control for Residential Roofing*. Factors influencing the minimum ventilation requirement include type of construction, roof pitch/run, temperature, humidity, etc. Consult the deck manufacturer, deck system designer, and asphalt shingle/underlayment manufacturer for specific requirements.

- Asphalt shingles and/or asphalt-based underlayment should only be fastened to deck surfaces such as plywood and oriented strand board or other surfaces acceptable to the asphalt shingle manufacturer.
- Application of asphalt shingles and/or asphalt-based underlayment directly over insulated deck systems without providing adequate ventilation may affect the asphalt shingle and/or asphalt-based underlayment manufacturers' product warranties. Consult individual product manufacturers for details and refer to local building codes.

## **Asphalt Shingle and/or Asphalt-based Underlayment Application over Deck Systems Containing Radiant Barriers**

Applying asphalt shingles and/or asphalt-based underlayment over deck systems containing radiant barriers is at times acceptable, but several considerations should be noted.

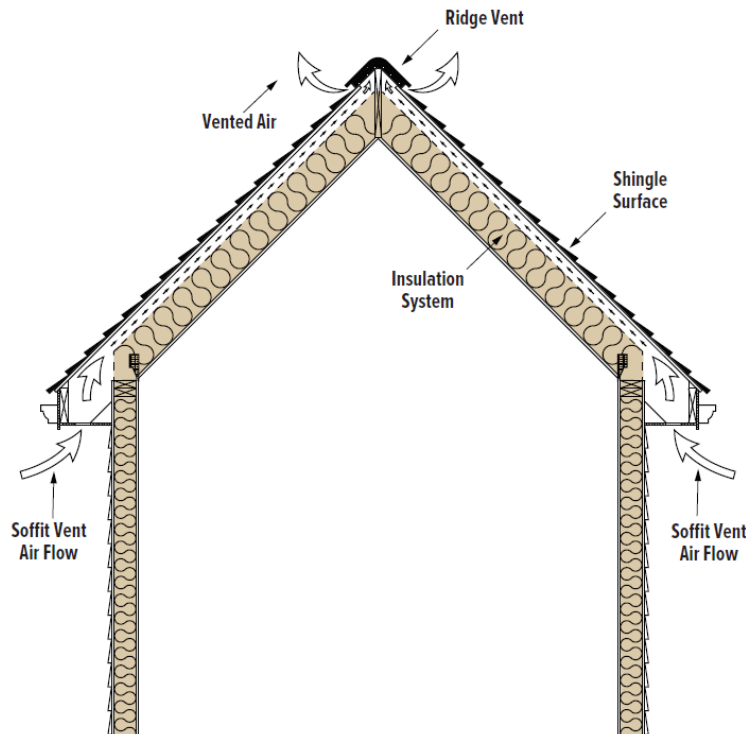
- Radiant barrier sheets that are fastened between or beneath the roof rafters should have proper ventilation between the radiant barrier and the decking so heat and humidity build-up can be dissipated.
- Radiant barriers require a minimum 1-inch air space between the metallic surface and the next nearest surface. Otherwise, thermal conduction will override the reduction in radiant heat transfer. See the US Department of Energy's bulletin on Radiant Barriers for more information (found [here](#)).
- Radiant barriers installed directly beneath and in contact with the roof deck sheathing may interfere with proper deck ventilation. The asphalt shingle and/or asphalt-based underlayment manufacturers' product warranties may be affected, so consult individual manufacturers for details. Refer to local building codes for specific project requirements that may apply.

## **Ventilation Considerations**

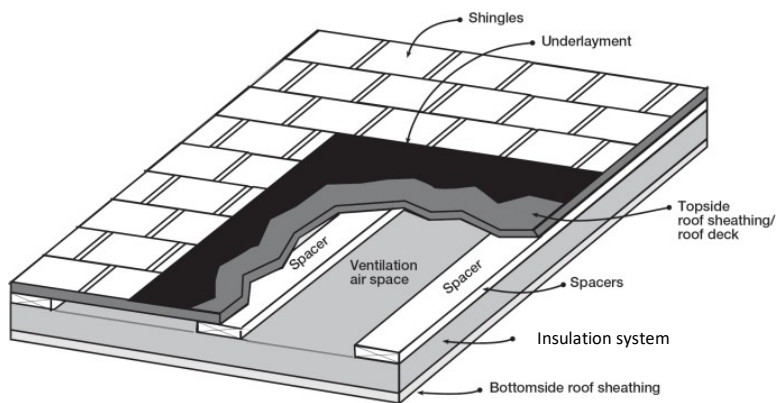
Most vent system manufacturers recommend a soffit/ridge (inlet/outlet) venting ratio of between 50 and 60 percent. An air space of 3/4-inch (19 mm) is suggested as a minimum ventilation space; a 1.5-inch (38 mm) or wider space is preferred. Factors influencing this measurement include type of construction, roof pitch/run, temperature, humidity, etc. Larger roof expanses, such as those on commercial buildings, may require a much larger air space to move heat and moisture from the system because of their longer run. Adequate intake airflow must also be provided for proper ventilation dynamics. Consult the deck manufacturer, deck

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system designer, and asphalt shingle/underlayment manufacturer, as well as local building codes, for specific requirements. Some methods for creating a continuous air space for proper ventilation are shown in Figures A, B and C.



**Figure A:** Continuous airflow through an insulated roof system using soffit and ridge vents

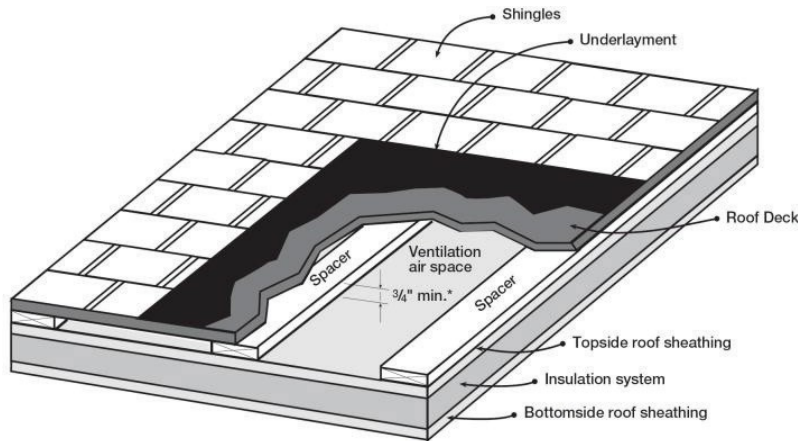


**Figure B:** Vented roofing assembly created by installing spacers between the rigid insulation and the nailable roof deck sheathing

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**Figure C:** Vented roofing assembly created by installing spacers between rigid “nailboard” roof insulation and a topside nailable deck sheathing

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