

Ducts Buried Within Insulation

2018 IECC (w/ VA Specific Amendments)



Ducts Buried Within Insulation:

Summary: New within the residential portion of the Virginia Energy Conservation Code (VECC) is the option to bury ducts in insulation when they are located in an attic. This provides better thermal insulation for the ducts and minimizes heat losses and gains while ensuring sufficient attic insulation is provided. This guide will cover proper implementation of this strategy as well as potential issues that can be caused by this installation method.

Why: HVAC ductwork that is run outside of the building thermal envelope in a vented attic is only required to have R-8 insulation protecting it from extreme summer and winter temperatures in that space. While best practice dictates installing ductwork in conditioned space, many contractors prefer to make use of the open space that attics provide. In order to better protect ductwork from attic temperatures, the 2018 VECC allows for ducts to be buried within the attic insulation.

Items of Note:

- * *Code language is silent on whether batts are allowed to be used for this installation method. In practice, only a blown product will provide adequate insulating value and be able to be installed properly. When the R-value of a batt is determined, all 6 sides of the batt are covered with an air barrier. When laying batts over a duct, an air gap will be created. The absence of an air barrier in this area will degrade the R-value of the batt. Additionally, it will be difficult to comply with N1102.4.1.1 (R402.4.1.1) as the install will likely not meet the manufacturer's installation instructions.*
- * *It is recommended to place the ducts in contact with the ceiling drywall or as close to it as possible.*
- * *The potential for condensation on the ducts is increased in humid climates when burying ducts. It is recommended to encapsulate them in close cell spray foam to minimize the potential for condensation. In the absence of encapsulating the duct in closed cell foam, extra attention should be paid to ensure the continuity of the vapor barrier on the duct insulation jacket.*

Visual Reference:

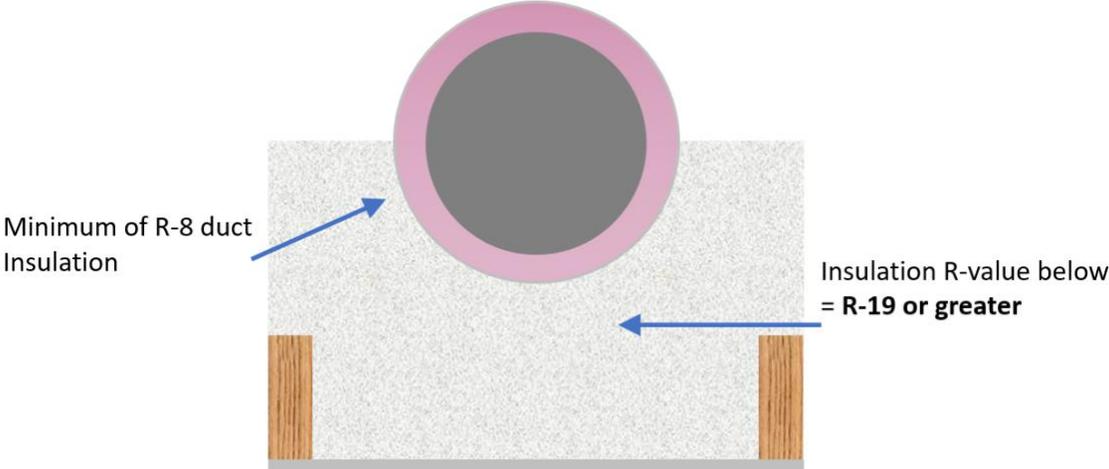
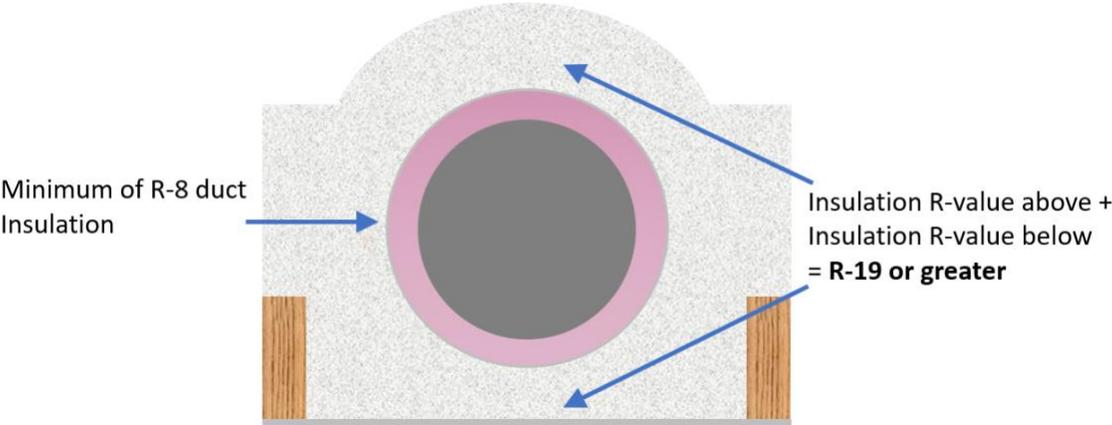
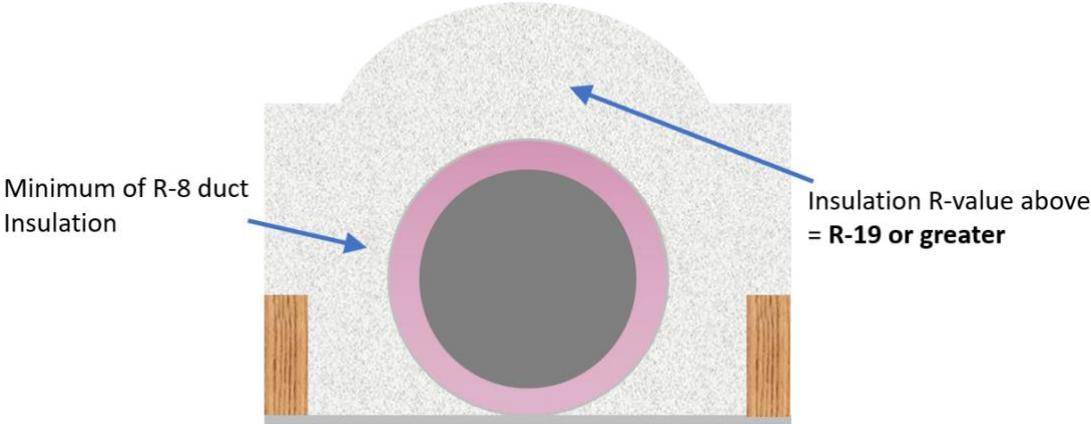


Figure 1: Different configuration options for burying ducts

2018 IECC/IRC Code Reference:

N1103.3.6 (R403.3.6)

Where supply and return air ducts are partially or completely buried in ceiling insulation, such ducts shall comply with all of the following:

1. The supply and return duct shall have an insulation *R*-value not less than R-8.
2. At all points along each duct, the sum of the ceiling insulation *R*-values against and above the top of the duct, and against and below the bottom of the duct shall be not less than R-19, excluding the *R*-value of the duct insulation.
3. In *Climate Zones* 1A, 2A and 3A, the supply ducts shall be completely buried within ceiling insulation, insulated to an *R*-value of not less than R-13 and in compliance with the vapor retarder requirements of Section M1601.4.6.

Exception: Sections of the supply duct that are less than 3 feet (914 mm) from the supply outlet shall not be required to comply with these requirements.

N1102.4.1.1 (R402.4.1.1) Installation (Mandatory)

The components of the building thermal envelope as listed in Table N1102.4.1.1 shall be installed in accordance with the manufacturer's instructions and the criteria listed in Table N1102.4.1.1, as applicable to the method of construction.

Table N1102.4.1.1 (R402.4.1.1) Air Barrier and Insulation Installation

Component	Air Barrier Criteria	Insulation Installation Criteria
General Requirements	A continuous air barrier shall be installed in the building envelope. The exterior thermal envelope contains a continuous air barrier. Breaks or joints in the air barrier shall be sealed.	Air-permeable insulation shall not be used as a sealing material.
Ceiling/Attic	The air barrier in any dropped ceiling or soffit shall be aligned with the insulation and any gaps in the air barrier sealed.	The insulation in any dropped ceiling/soffit shall be aligned with the air barrier.

Definitions:

Air Barrier: Material(s) assembled and joined together to provide a barrier to air leakage through the building envelope; An air barrier may be a single material or a combination of materials

Attic: A vented, unconditioned space above the top floor of the home with insulation installed on top of the the ceiling of the conditioned space below

Building Thermal Envelope: The basement walls, exterior walls, floor, ceiling, roof, and/or any other building elements that enclose conditioned space or provide a boundary between conditioned space and exempt or unconditioned space

Conditioned Space: An area, room, or space that is enclosed within the building thermal envelope and that is directly heated or cooled or indirectly heated or cooled

R-Value: Resistance to heat flow of a single material, expressed as a whole number, with greater values denoting greater resistance to heat flow; the mathematical inverse of U-Value

Vapor Barrier: A material or product that prevents the migration of moisture via vapor diffusion

