

ATTIC VENTILATION AND SEALED ATTICS IN WARM, HUMID CLIMATES

by

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Introduction

Early versions of the *ASHRAE* (American Society of Heating, Refrigerating and Air Conditioning Engineers) *Fundamentals Handbook* detail attic ventilation only for heated buildings in cold climates. The main purpose of the ventilation was to allow moisture to escape from the inside of the building to the outside without harming the structure. Building code officials took this requirement and wrote it into building codes, without regard to varying climatic conditions. Newer *ASHRAE* studies, and subsequent updated handbook versions, have found this practice to be detrimental to structures in warm, humid climates. *ASHRAE* has gone even further to detail construction practices for three climatic conditions – cold, mixed, and warm, humid. Building codes have not, however, been so quick to respond and alter their codes accordingly. However, the new FBC (Florida Building Code) does allow construction practices which do not require the attic to be ventilated.

Code Review

The intended purpose of attic ventilation is “to remove excess heat through cross ventilation.” Sections 1203.1.3 and 2309.7 of the FBC are the two sections of the code which govern the installation of attic ventilation. Section 1203.1.3 merely states, “Attics not used for habitational purposes shall have provisions for the removal of excess heat.” However, Section 2309.7 outlines the exact requirements of ventilated openings relative to the location and quantity of the openings. A more detailed technical explanation can be found in the *ASHRAE Handbook of Fundamentals*, Chapter 24. It is important to note these requirements in Section 2309.7 are for “hipped” or “gabled” roofs in wood construction only. Recent studies by the Building Science Corporation have proven that attic ventilation in warm, humid climates has little effect on the attic temperature. The two major factors which control attic temperatures are roof color and climatic conditions. The major problem with ventilated attics is the moisture load which enters the attic through the vent

airstream. This problem was detected by the Florida Solar Energy Center many years ago. Their conclusion was that a major portion of the moisture load in a building was introduced through the ventilated attic. This condition is evidenced through sweating grills, ductwork, and air conditioning equipment.

Building ventless, or sealed, attics in new construction and selectively closing vents in old construction is the preferred practice in warm, humid climates. The Florida Energy Efficiency Code, which became Chapter 13 of the FBC in 2001, is an important section of the code relevant to unvented attics. This chapter defines both “attics” and “buffered unconditioned space.” An attic is “an unconditioned space located immediately below an uninsulated roof and immediately above the ceiling.” This same space becomes “unconditioned buffered space” when the thermal envelope is moved from the ceiling to the upper chord of the roof truss. This space is not defined as an “attic” and is not to be ventilated. The Florida Energy Code also requires the air (infiltration) barrier to be installed at the roof, with the insulation. As a matter of practical experience, it is impossible to build a house with a ventilated attic and meet the Energy Efficiency Code. Insulating a sealed attic requires more thought to the placement and type of insulation than vented attics. Technical Bulletin No. 5, ***Insulation*** provides additional information.

Sealing attics in new construction is simple because the insulation can be properly placed in the upper chord of the roof system. Sealing attics in existing buildings is somewhat more difficult due to the location of the insulation at the ceiling level. To seal an existing attic and meet FBC requirements, the insulation must be relocated to the upper chord of the truss. However, from a technical and practical standpoint, the insulation can remain in place at the ceiling level without adverse effects on the building. New upper chord insulation is recommended but not required. In addition, the insulation at the ceiling should not be removed unless it is contaminated. It is important to confer with building officials prior to sealing an existing attic.