



Permissible Tile Headlap for Tile Installations on Sealed Underlayment Systems of Application

The purpose of this technical brief is to explain headlap variations that are recommended during the installation of concrete roof tiles. The prescriptive 3" headlap referenced in the manufacturer's installation instructions is intended to assure the proper performance of the system and takes into account the variations that are likely to occur both during the manufacture of the tile as well as the roof installation.

Tile Dimensional Tolerances

In order for a roof tile to gain building code recognition, it must be manufactured in accordance with the standards that have been developed by the roof tile industry and building officials. In this country, the required physical property requirements for roof tiles are contained in the ASTM C-1492 (Concrete tile), ASTM C-1167 (Clay tiles) and ICC AC 180 test standards. The physical property requirements in these standards include measurements of strength, water absorption, permeability, freeze/thaw resistance and dimensional consistency.

Both the ASTM and ICC AC 180 standards set variation limits on weight and dimensions to be no greater than plus or minus 5% of the manufacturer's specifications. Example: a tile that is designed to be 16.5" long would have to be manufactured at a length between 15.675" and 17.325" long.

Tile Installation Requirements

When it comes to the actual tile installation, unless precluded by design, most of the roof tile manufacturers recommend that their field tiles be installed with a 3" headlap. Since tile roofs are prepared prior to the delivery of the tile, the roofer will have measured and snapped chalk lines based on the published dimensions provided by the manufacturer. Reductions in actual headlap will invariably occur due to product and workmanship variations.

Tile System Testing Performed

In areas where sealed underlayments are incorporated as part of the installed roof system, testing has actually been performed to prove the performance of these systems with a 2" headlap in accordance with the South Florida Building Code and Dade County Protocol PA118-94. The test selected was Protocol PA 100-94, "Wind Driven Rain Test Procedure for Discontinuous Roof Systems." The test was performed at the Center for Applied Engineering and it included a high-profile tile installed with a 2" headlap over a sealed 30/90 hot mopped system with mechanical attachments through a strip of asphalt roof cement placed at the nail line. The results of this test showed no tile movement and no leakage at the completion of the test.

Conclusions for Mechanically Based Systems

As a result of our testing program, TRI recognizes that the reduced headlap of isolated courses of field tile does not appear to compromise the performance of an otherwise properly installed tile roof with a sealed underlayment. It is therefore deemed appropriate that TRI should issue the following guidelines for roof tile applications that are installed over any code-approved sealed underlayment that is recognized for this use.

- This bulletin applies to any sealed roof where the tiles are to be mechanically attached with nails, screws or clips and an asphalt strip is applied at the point of fastener penetration into the roof deck.

- If the overall layout of the roof shows that the obvious intent was to maintain an average 3" headlap, the occurrence of courses with less than a 3" headlap will be acceptable provided that such courses do not constitute more than 20% of the roof.
- No individual tile or tile course shall have a headlap less than 2", but in no case shall there be any exposed fasteners.
- It is our hope that Florida building officials use the authority cited in Section 104.11 of the 2004 Florida Building Code (FBC) to recognize this practice as an "Alternate Materials, Design & Method of Construction" to conclude that the FBC intent is satisfied with this method of application and inspection.

For more information on tile roofing, please visit our website at tileroofing.org or email info@tileroofing.org for specific inquiries.