



Technical Report

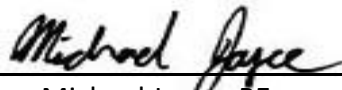
R-values for a Reflective Insulation Assembly with a Continuous Insulation and Compliance with Florida Building Code

Prepared For:

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Report: RD21570


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The test results in this report apply only to the specimens tested. The tests conform to the respective test methods except for the report requirements. The report includes summary data but a full complement of data is available upon request. This report shall not be reproduced, except in full, without written approval of R & D Services, Inc. This report must not be used by the client to claim product endorsement by R & D Services, Inc., IAS or any other organization.

R-values for a Reflective Insulation Assembly with a Continuous Insulation and Compliance with Florida Building Code

Thermal resistances (R-values; $\text{ft}^2 \cdot \text{h} \cdot ^\circ\text{F}/\text{Btu}$) for an insulation assembly designed by Fi-Foil Company, Inc., Auburndale, Florida have been evaluated using data that are the basis for the thermal resistances of plane air spaces in the ASHRAE Handbook-Fundamentals (Chapter 26, Table 2, 2017). The composite insulation assembly consists of a 0.5-inch thick layer of cellular plastic foam insulation (Flex-Foam) having a thermal resistance of $1.64 \text{ ft}^2 \cdot \text{h} \cdot ^\circ\text{F}/\text{Btu}$. The Flex-Foam layer encloses a cavity between furring strips that contains a product that provides two enclosed reflective air spaces when installed. Insulation assemblies constructed using either 0.75 by 1.5 inch furring or 0.875 by 1.5 inch furring strips were evaluated. Two reflective insulation materials are available for installation in wall cavities formed by the furring, flex-foam, and interior sheathing.

The Fi-Foil products AA2 and M-Shield form two enclosed reflective air spaces when installed. These products include aluminum foil that provides one 0.03 emittance surface in each of the air spaces. When installed with 0.07-inch thick stapling flanges, a 0.82 inch cavity is provided for AA2 or M-Shield installed on 0.75 by 1.5 inch furring. When installed with 0.07 inch thick stapling flanges on 0.875 by 1.5 inch furring, a 0.945 inch cavity is provided for installation of AA2 or M-Shield. The enclosed reflective air spaces formed by the reflective insulation materials are contained in the 0.875 inch or 0.945 inch cavities. The interior enclosed reflective air spaces is 0.5 inch across with the balance of space forms the second reflective air space. The heat flow direction is horizontal. The temperatures bounding the reflective insulation assembly consisting of Flex-Foam and a two-layer reflective insulation material are 90°F and 60°F . These boundary temperatures result in an average temperature of 75°F and a temperature difference of 30 degrees F as specified in ASTM C1224, the product specification for reflective insulations.

The results of the testing evaluation and subsequent calculations are as follows.

Furring Type	Cavity Depth (in.)	R-values ($\text{ft}^2 \cdot \text{h} \cdot ^\circ\text{F}/\text{Btu}$)			
		Foam	Air Space 1	Air Space 2	Total
0.750 by 1.50	0.820	1.64	2.55	1.72	5.91
0.875 by 1.50	0.945	1.64	2.55	2.34	6.53

The R-values for these two types of assemblies at average temperature 75°F are:

R =5.9 for ½-inch of Flex Foam with AA2 or M-Shield in 0.820 inch cavity.

R =6.5 for ½-inch of Flex Foam with AA2 or M-Shield in 0.945 inch cavity.



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The Florida Building Code-Energy Conservation, 6th Edition (2017) R303.1.1.1 requires that “The Thermal Resistance (R-value) of insulation shall be determined in accordance with the U.S. Federal Trade Commission R-value rule (CFR Title 16, Part 460) in units of h·ft²·°F/Btu at a mean temperature of 75°F (24°C).” The material R-value measurement for Flex-Foam was made in accordance with ASTM C518 as specified in the Rule. The enclosed reflective air space R-values were determined by interpolation in the data represented by the reflective air space thermal resistance table in the ASHRAE Handbook as described in commentary.

A handwritten signature in black ink that reads 'David W. Yarbrough'.

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