



## Technical Report

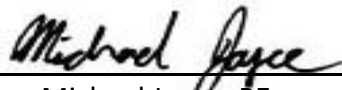
### R-values for a Reflective Insulation Assembly with a Continuous Insulation and Compliance with Florida Building Code

Prepared For:

Fi-Foil Company, Inc.  
P.O. Box 800  
612 Bridgers Ave. West  
Auburndale, FL 33823

R & D Services, Inc.  
P.O. Box 163  
Watertown, Tennessee 37184

Report: RD21571

  
Michael Joyce, PE

June 8, 2021

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.

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

Thermal resistances (R-values; ft<sup>2</sup>·h·°F/Btu) for an insulation assembly designed by Fi-Foil Company, Inc., Auburndale, Florida have been evaluated using data from Test Method ASTM C1363 and data that are the basis for the thermal resistances of plane air spaces in the ASHRAE Handbook-Fundamentals (Chapter 26, Table 3, 2020). 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 ft<sup>2</sup>·h·°F/Btu. The Flex Foam layer encloses a cavity between furring strips that is an enclosed reflective air space with effective emittance 0.04. Insulation assemblies constructed using either nominal 1 by 2 inch furring or 2 by 2 inch furring strips placed 24 in. OC. have been evaluated. The cavities formed by the 1 by 2 inch furring provides an air space that is 0.75 inches wide while the 2 by 2 inch furring strips provide an enclosed reflective air space that is 1.5 inches wide.

The temperatures bounding the reflective insulation assembly tested using ASTM C1363 were 55.75°F (cold-side air temperature) and 96.0°F(warm-side air temperature). These boundary temperatures result in an average temperature of 75.9°F and a temperature difference of 28 degrees F. The preceding temperatures satisfy the conditions in Section 9.7.3 of 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 (ft <sup>2</sup> ·h·°F/Btu)		
		Foam	Air Space 1	Total
0.75 by 1.50	0.75	1.64	2.88	4.52
1.50 by 1.50	1.50	1.64	3.06	4.70

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

**R =4.5 for ½-inch of Flex Foam with a 0.75 inch enclosed reflective enclosure.**

**R =4.7 for ½-inch of Flex Foam with a 1.50 inch enclosed reflective enclosure.**

Flex Foam complies with Section 2614.3, “Surface Burning Characteristics” contained in the 7th Edition of the Florida Building Code. Section 2614.3 is reproduced below.



P.O. Box 163  
Watertown, Tennessee 37184  
Phone: 931-372-8871  
Fax: 931-525-3896

**2614.3 Surface-burning characteristics.** Reflective plastic core insulation shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 450 when tested in accordance with ASTM E84 or UL 723. The reflective plastic core insulation shall be tested at the maximum thickness intended for use. Test specimen preparation and mounting shall be in accordance with ASTM E2599.

The following results were reported by Intertek Laboratory in Elmendorf, Texas. The material tested was Flex Foam: ½ inch thick foam core reflective insulation provided by Fi-Foil Company, Auburndale, Florida having one side low-emittance aluminum and second face white plastic. The Flex Foam specimens were tested for flame spread index (FSI) and smoke-developed index (SDI) in accordance with ASTM E84 using mounting method E2599. The results are listed below.

<u>Intertek Report</u>	<u>Issue Date</u>	<u>Specimen</u>	<u>FSI</u>	<u>SDI</u>
104323536SAT-001	<u>5/12/20</u>	Flex Foam/Silver Side	5	15
104323536SAT-002	<u>5/12/20</u>	Flex Foam/White Side	0	5
104323536SAT-003	<u>5/12/20</u>	Flex Foam/Silver Side with simulated field joint	0	5

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

David W. Yarbrough, PhD, PE (Florida 50959)  
June 8, 2021