



# Johns Manville

Johns Manville Technical Center  
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## Memo Report THERMAL TECHNOLOGY

Memo Report No: CHB-01-01  
Date: January 16, 2000

### Title: Reflective Thin Fiber Glass: Foil/Foil - C976, C1224

Requested by: Larry Zupon  
Info. Requested: R-values of the system  
Apparatus: Calibrated Hot Box  
Test Method: ASTM-C-976<sup>†</sup>, ASTM-C-1224<sup>†</sup>

TABS No: SH12103A  
Tested by: C. Sakata  
Notebook No: CHB  
Charge Code: EXT-MISC

### Summary of Results

Three ASTM C976 tests and three ASTM C1224 tests were conducted to measure the thermal performance of an insulated building assembly using a Calibrated Hot Box (CHB) located at the Johns Manville Technical Center. These tests were performed for CGI/Silvercote, Inc. for the purpose of better understanding the heat flows and R-values of the insulation. The insulation tested was Microlite® fiber glass, 0.25 inches (0.00635 m) thick, with a foil faced sheathing exposed to the climatic chamber side (cold side) and a foil faced sheathing exposed to the metering chamber side (hot side). The insulation was centered in each cavity of a 2 X 4 framed wall with wood studs spread 16" on center and enclosed with 3/4" plywood on each side.

The C976 method requires thermocouples (TCs) placed on exterior surfaces of the construction. The air-to-air temperature difference between the Climatic and Metering chambers was 30°F, and the mean temperature was set at 75°F. The C1224 method requires thermocouples (TCs) be placed on interior surfaces of the construction. The inside surface-to-surface temperature difference between the Climatic and Metering chambers was 30°F, and the mean temperature was set at 75°F.

The insulation was tested in three heat flow configurations, heat flow horizontal, up, and down. Using system test results and ASTM calculation methods, system R-values were calculated for each method.

| Configuration<br>2 X 4, 16" o.c. | System R-Value: ASTM<br>C976 Air-To-Air | System R-Value: ASTM C976<br>Surface-to-Surface | Refl. Ins. R-Value: ASTM<br>C1224 (component) |
|----------------------------------|---|---|---|
| Heat Flow Horiz.                 | R-9.0                                   | R-8.0   | R-6.6   |
| Heat Flow Up                     | R-8.3                                   | R-7.2   | R-5.3   |
| Heat Flow Down                   | R-11.6                                  | R-10.6  | R-10.5  |

(All R-values are in hr•ft<sup>2</sup>•°F/Btu)

Reported By: Craig Sakata  
Craig Sakata R-46

Supervisor Approval: maa

Copies: M. Albers R-46  
Heat Transfer R-46

R. Christjansen R-37

<sup>†</sup> This testing conforms to the ASTM Test Method shown except for the report requirements.  
A summary report is given here. The full complement of data is available.  
The content of this report relates only to the items tested.  
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## Memo Report THERMAL TECHNOLOGY

Memo Report No: CHB-00-01

Date: July 14, 2000

### Title: Reflective Thin Fiber Glass – C976, C1224

|                  |  |              |              |
|------------------|--|--------------|--------------|
| Requested by:    | Dennis Larratt                                     | TABS No:     | SH11904A     |
| Info. Requested: | R-values of the system                             | Tested by:   | C. Sakata    |
| Apparatus:       | Calibrated Hot Box                                 | Notebook No: | CHB          |
| Test Method:     | ASTM-C-976 <sup>†</sup> , ASTM-C-1224 <sup>‡</sup> | Charge Code: | RID-40776642 |

### Summary of Results

Using Johns Manville's Calibrated Hot Box (CHB), three ASTM C976 tests and three ASTM C1224 tests were conducted to measure the thermal performance of an insulated building assembly. These tests were performed for CGI Silvercote, Inc. and the Insulation Group (IG) at Johns Manville for the purpose of better understanding the heat flows and R-values of the insulation. The insulation tested was Microlite®, 0.25 inches (0.00635 m) thick, with a white faced sheathing exposed to the climatic chamber (cold side) and a foil faced sheathing exposed to the metering chamber (hot side). The insulation was placed in a 2 X 4 framed wall with studs spread 16" on center and enclosed with ¼" plywood on each side.

The C976 method requires thermocouples (TCs) placed on exterior surfaces of the construction. The air-to-air temperature difference between the Climatic and Metering chambers was 30°F, and the mean temperature was set at 75°F. The C1224 method requires thermocouples (TCs) be placed on interior surfaces of the construction. The inside surface-to-surface temperature difference between the Climatic and Metering chambers was 30°F, and the mean temperature was set at 75°F.

The insulation was tested in three heat flow configurations, heat flow horizontal, up, and down. Using system test results and ASTM calculation methods, R-values were calculated for each method.

| Configuration<br>2 X 4, 16" o.c. | System R-Value: ASTM<br>C976 Air-To-Air | System R-Value: ASTM C976<br>Surface-to-Surface | System R-Value: ASTM C1224<br>Inside Surface-To-Surface |
|----------------------------------|---|---|---|
| Heat Flow Horiz.                 | R-8.7                                   | R-7.3   | R-5.1   |
| Heat Flow Up                     | R-7.6                                   | R-6.5   | R-4.5   |
| Heat Flow Down                   | R-10.3                                  | R-9.3   | R-7.3   |

(All R-values are in hr•ft<sup>2</sup>•°F/Btu)

A competitive product comparison section is included in this report.

Reported By: \_\_\_\_\_

*Craig Sakata*  
Craig Sakata

R-46

Supervisor Approval: \_\_\_\_\_

*maa*

Copies: M. Albers R-46  
D. Larratt R-12  
C. Appley R-13  
Brad Heffelmier CGI Silvercote

R. Christjansen R-37  
Heat Transfer R-46  
D. Graves 7-09

<sup>†</sup> This testing conforms to the ASTM Test Method shown except for the report requirements.  
A summary report is given here. The full complement of data is available.

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