

SPF THERMAL PERFORMANCE

CURRENT TEST METHODS USED TO QUANTIFY THE THERMAL PERFORMANCE OF SPRAY FOAM INSULATION PRODUCTS

ASTM C518:

STANDARD TEST METHOD FOR STEADY-STATE THERMAL TRANSMISSION PROPERTIES BY MEANS OF THE HEAT FLOW METER APPARATUS:

ASTM C518 is a controlled test environment that measures the thermal performance of SPF products.

ASTM C1363:

STANDARD TEST METHOD FOR THERMAL PERFORMANCE OF BUILDING MATERIALS AND ENVELOPE ASSEMBLIES BY MEANS OF A HOT BOX APPARATUS:

ASTM C1363 measures the actual wall thermal characteristics by using a calibrated hot box (CHB), which quantifies foam performance in a representative wall assembly.

ASTM C1363: Interior side of SPF test wall



ASTM C1363: Interior side with gypsum wallboard and thermocouple grid



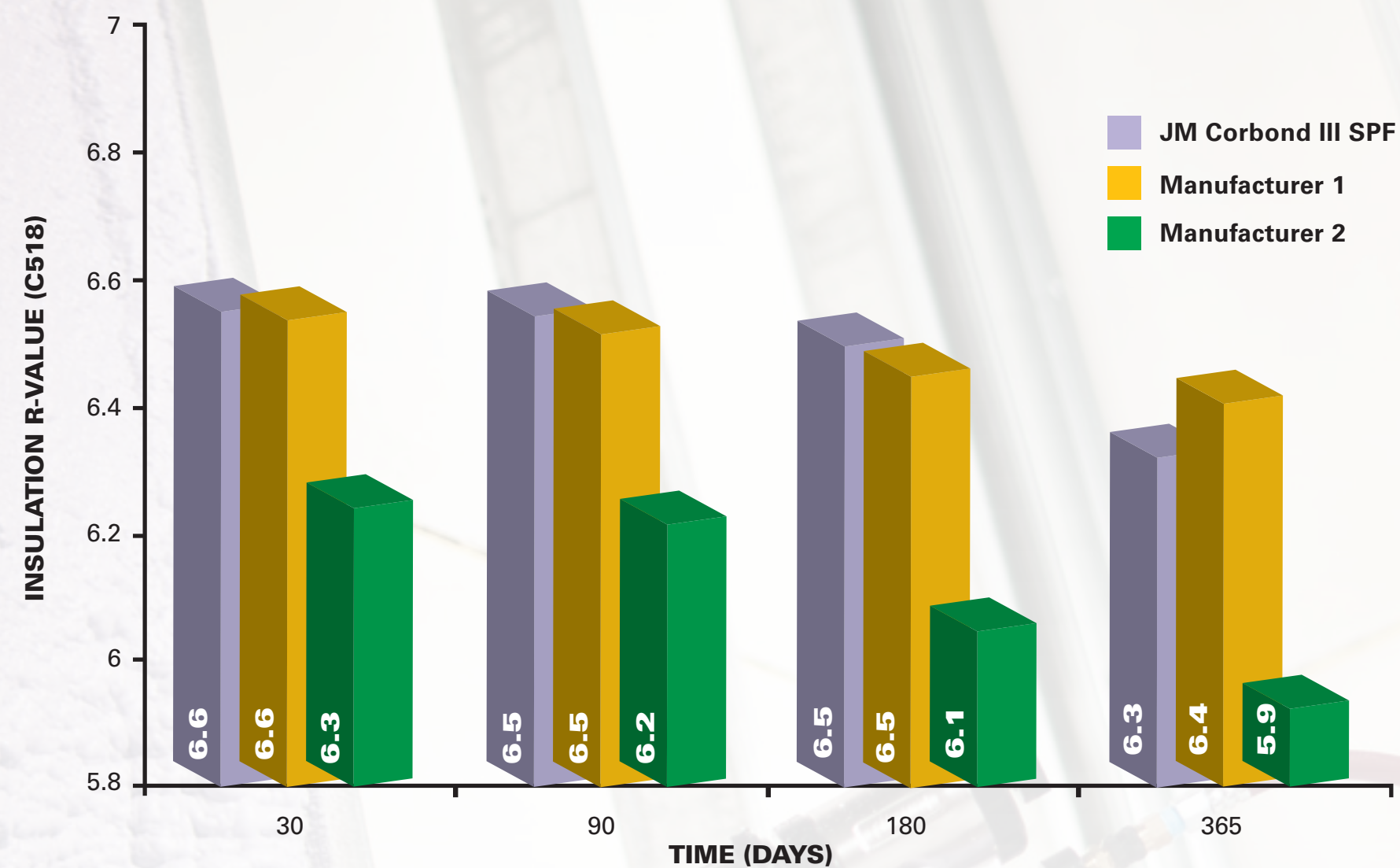
ASTM C518 AND ASTM C1363: WALL ASSEMBLY TESTS

Testing of the wall assemblies per ASTM C1363, as well as small-scale ASTM C518 thermal testing, was conducted at the Johns Manville Technical Center at 30-, 90-, 180- and 365-day intervals to understand the change in R-value over time of three foam products: JM Corbond III® SPF and two products from leading manufacturers. All samples for both test series were aged at ambient interior Littleton, Colorado, conditions.

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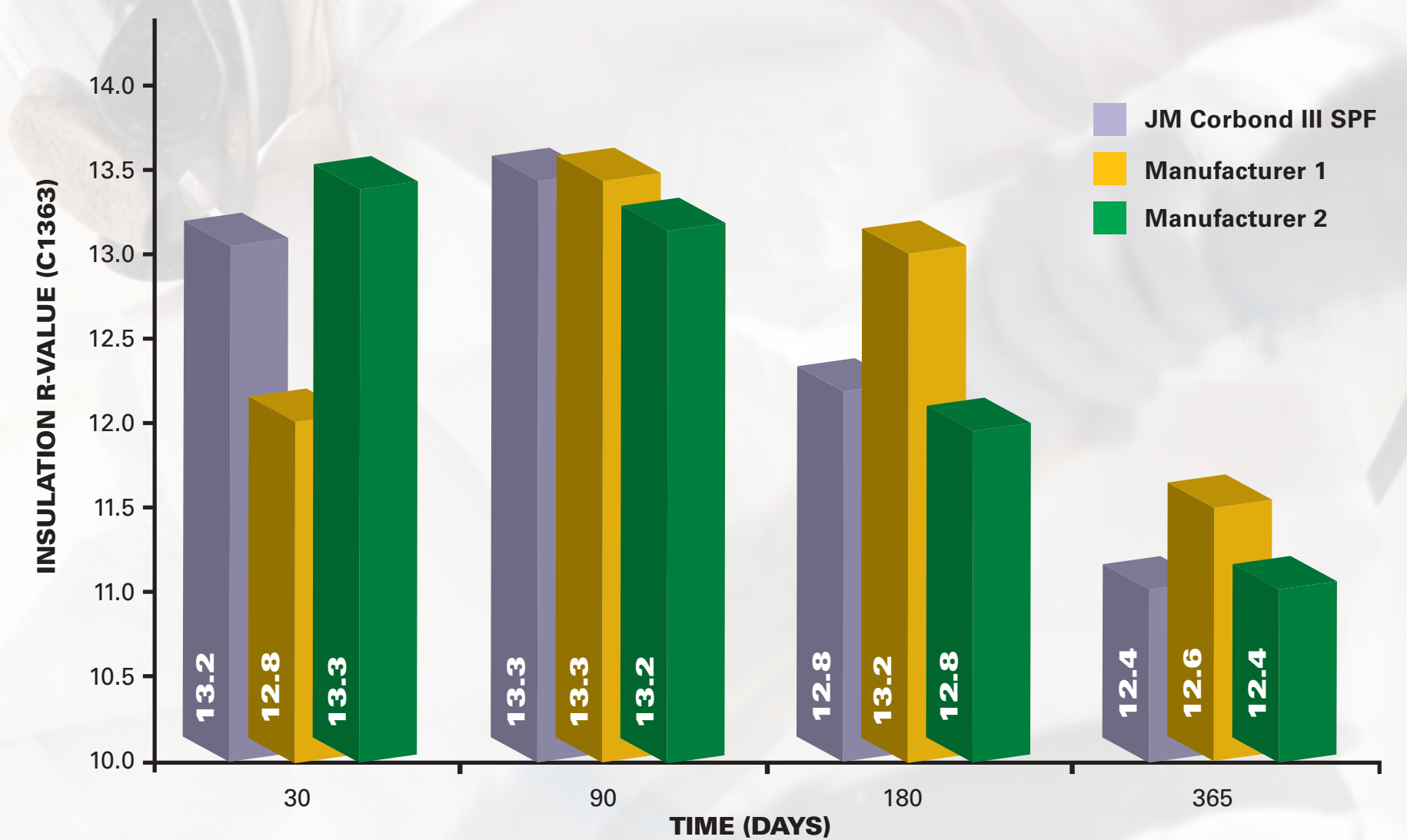
THERMAL PERFORMANCE COMPARISON OF THREE 2.0 PCF SPRAY FOAM INSULATION PRODUCTS

ASTM C518



R-value results using the standard small-scale ASTM C518 testing protocol show a small decrease in performance over a 365-day time period (above). The decrease was less than 6 percent for all three foam products with initial values for JM Corbond III[®] SPF, Manufacturer 1 and Manufacturer 2 of R-6.6, R-6.6 and R-6.3 per inch, respectively. All the samples had densities between 2.1 ± 0.1 pcf. For comparison, published technical datasheets show aged R-values at 1" for JM Corbond III SPF, Manufacturer 1 and Manufacturer 2 as R-6.4, R-7.4 and R-6.7, respectively.

ASTM C1363



CHB wall assemblies show similar performance for all three foam products at each time tested (above). The initial values for JM Corbond III SPF, Manufacturer 1 and Manufacturer 2 were R-13.2, R-12.8 and R-13.3, respectively. The difference in R-value of the wall assemblies compared to that expected from ASTM C518 results ($R-19.5 = R-6.5 \text{ per inch} \times 3 \text{ inches}$) is due to the thermal-bridging losses associated with the 2" x 4" wood stud constructions.

SUMMARY:

Regardless of the differences in R-values advertised by each manufacturer, both large-scale and small-scale testing of three 2.0 pcf spray polyurethane foam products (JM Corbond III SPF, Manufacturer 1 and Manufacturer 2) demonstrate similar thermal performance.

The majority of the closed-cell foam products on the market are likely to provide very similar thermal performance in actual field applications.