Professional Testing Laboratory LLC

TEST REPORT

DATE: 10-31-2024 **TEST NUMBER**: 0311620

CLIENT	Palziv North America

TEST METHOD CONDUCTED	ASTM C518 (R-Value) Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus

DESCRIPTION OF TEST SAMPLE	
IDENTIFICATION	HQ .1875" Commercial Cushion
REFERENCE	PO24001640

TEST METHOD

The material was tested in accordance with the ASTM International Test Method C518, Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus. This test method covers the measurement of steady state thermal transmission through flat slab specimens using a heat flow meter apparatus. The heat flow meter apparatus is used widely because it is relatively simple in concept, rapid, and applicable to a wide range of test specimens. This is a comparative, or secondary, method of measurement since specimens of known thermal transmission properties are used to calibrate the apparatus. Properties of the calibration specimens, obtained from a recognized national standards laboratory, are traceable to an absolute measurement method.

The heat flow meter apparatus establishes steady state one-dimensional heat flux through a test specimen between two parallel plates at constant but different temperatures. By appropriate calibration of the heat flux transducer with calibration standards and by measurement of the plate temperatures and plate separation. Fourier's law of heat conduction is used to calculate thermal conductivity and thermal resistance.

This test method provides a rapid means of determining the steady-state thermal transmission properties of thermal insulations and other materials with a high level of accuracy when the apparatus has been calibrated appropriately. Proper calibration of the heat flow meter apparatus requires that it be calibrated using specimens having thermal transmission properties determined previously by Test Methods C 177 or C 1114.

The thermal transmission properties of specimens of a given material or product may vary due to variability of the composition of the material; be affected by moisture or other conditions; change with time; change with mean temperature and temperature difference; and depend upon the prior thermal history. It must be recognized, therefore, that the selection of typical values of thermal transmission properties representative of a material in a particular application should be based on a consideration of these factors and will not apply necessarily without modification to all service conditions.

APPROVED BY: Lee Phillips

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TEST RESULTS

Prior to testing, the R-Matic was calibrated using the National Institute of Standards and Technology (NIST) Standard Reference Material 1453, Expanded Polystyrene Board. SRM 1453 has a known Thermal Resistance of 2.254 ± 0.028 h•ft^2•^{0}F•Btu^{-1} at a thickness of 0.528 inch at mean temperature of 75^0 F.

U.S. Customary Units

Mean Temperature	75.00	°F
Thickness	0.192	inch
Density as Tested	5.55	lbs/ft^3
Thermal Conductivity, λ	0.2930	Btu in./h ft^2 F
Thermal Resistance, *R*	0.655	F ft^2 h/Btu
Heat Flux, *q*	76.48	Btu/h ft^2
U Value, *U*	1.526	Btu/(h ft^2 F)
Test Duration	25	minutes

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