Thermablok Technical Data

Thermablok is a flexible, nanoporous aerogel blanket insulation that reduces energy loss while conserving interior space in residential and commercial building applications.

Thermablok’s unique properties – extremely low thermal conductivity, superior flexibility, compression resistance, hydrophobicity, and ease of use – make it essential for those seeking the ultimate in thermal protection.

Using patented nanotechnology, Thermablok insulation combines a silica aerogel with reinforcing fibers to deliver industry-leading thermal performance in an easy-to-handle and environmentally safe product.

Thermablok is a proven, effective insulator in building applications, providing the highest R-value of any insulation material for maximum energy efficiency in walls, floors, roofs, framing, and windows.

Thermablok Advantages

**Superior Thermal Performance**
2 to 8 times better than competing insulation products

**Reduced Thickness and Profile**
Equal thermal resistance at a fraction of the thickness

**Less Time and Labor to Install**
Easily cut and conformed to complex shapes, tight curvatures, and spaces with restricted access

**Physically Robust**
Soft and flexible but with excellent spring back, Thermablok recovers its thermal performance even after compression events as high as 50 psi

**Shipping and Warehousing Savings**
Reduced material volume, high packing density, and low scrap rates can reduce logistics costs by a factor of five or more compared to rigid, preformed insulations

**Simplified Inventory**
Unlike rigid pre-forms such as pipe cover or board, the same Thermablok blanket can be kitted to fit any shape or design

**Hydrophobic Yet Breathable**
Thermablok repels liquid water but allows vapor to pass through

**Environmentally Safe**
Landfill disposable, shot-free, with no respirable fiber content

*Nominal values. 3/8” (10mm) before installation and 1/4” (6mm) when installed. **Information on this data sheet is subject to change without notice and should not be used for writing specifications.

### Physical Properties

<table>
<thead>
<tr>
<th>Size*</th>
<th>Strip Form - 1/4in x 1 1/2in x 4ft</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6.35mm x 38mm x 1.22m</td>
</tr>
<tr>
<td>Blanket Form</td>
<td>1/4in x 57in x 125ft</td>
</tr>
<tr>
<td></td>
<td>6.35mm x 1,450mm x 41.15m</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fire Rating</th>
<th>ASTM E84</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class</td>
<td>A</td>
</tr>
<tr>
<td>Flame Spread</td>
<td>20 / Smoke Index 50</td>
</tr>
</tbody>
</table>

| Application | -328° F to +400° F |
| Temp Range  | -200° C to + 200° C |

| Color             | White |
| Hydrophobic       | Yes   |

Density* 9.4 lb/ft³ (0.15 g/cc)

Thermal Conductivity

<table>
<thead>
<tr>
<th>Temperature (°F)</th>
<th>50</th>
<th>100</th>
<th>150</th>
<th>200</th>
<th>250</th>
<th>300</th>
<th>350</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal Conductivity (k BTU/hr-ft-°F)</td>
<td>0.20</td>
<td>0.18</td>
<td>0.16</td>
<td>0.14</td>
<td>0.12</td>
<td>0.10</td>
<td>0.08</td>
</tr>
</tbody>
</table>

Thermablok Thermal Conductivity

ASTM C 177, EN 13507 Results

<table>
<thead>
<tr>
<th>Temperature (°C)</th>
<th>0</th>
<th>25</th>
<th>50</th>
<th>75</th>
<th>100</th>
<th>125</th>
<th>150</th>
<th>175</th>
<th>200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal Conductivity (k W/m²K)</td>
<td>0.091</td>
<td>0.094</td>
<td>0.096</td>
<td>0.100</td>
<td>0.104</td>
<td>0.109</td>
<td>0.114</td>
<td>0.123</td>
<td>0.135</td>
</tr>
</tbody>
</table>

(Specifications are subject to change without notice.)
## Thermablok Test Result Summary

<table>
<thead>
<tr>
<th>Test Procedure</th>
<th>Property</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM C 177</td>
<td>Thermal Conductivity via Guarded Hot Plate</td>
<td>13.1mW/m*K @ 10˚ C</td>
</tr>
<tr>
<td>EN 12667</td>
<td>Thermal Conductivity via Guarded Hot Plate</td>
<td>13.1mW/m*K @ 10˚ C</td>
</tr>
<tr>
<td>ASTM C 518</td>
<td>Thermal Conductivity via Heat Flow Meter</td>
<td>14.8mW/m*K @ 2˚ C (avg of 3 samples)</td>
</tr>
<tr>
<td>ASTM E 84</td>
<td>Flame and Smoke Spread</td>
<td>Class A: FSI &lt;5, SDI 20</td>
</tr>
<tr>
<td>EN13501-1: 2007</td>
<td>Reaction to Fire Performance</td>
<td>Passed Euroclass C-s1,d0</td>
</tr>
<tr>
<td>ASTM C 165</td>
<td>Compressive Stress / Strain</td>
<td>8.0psi @ 10% strain, 30.5 psi @ 25% strain</td>
</tr>
<tr>
<td>Specific Heat</td>
<td>Specific Heat</td>
<td>1.00 J/g*K @ 40˚ C</td>
</tr>
<tr>
<td>ASTM E 96</td>
<td>Water Vapor Transmission Rate</td>
<td>1877 ng/Pa<em>s</em>m² (dry cup method)</td>
</tr>
<tr>
<td>ASTM E 228</td>
<td>Linear Coefficient of Thermal Expansion (@ 10˚ C)</td>
<td>x: 1.06 x 10⁻⁵ K⁻¹, y: 1.90 x 10⁻⁵K⁻¹</td>
</tr>
<tr>
<td>ASTM C 1104</td>
<td>Water Vapor Sorption</td>
<td>Mass Gain = 1.08%</td>
</tr>
</tbody>
</table>

### Non-Combustibility & Fire Performance

**EN 13501-1 – REACTION TO FIRE CLASSIFICATION**

The reaction to fire performance of Thermablok was evaluated via BS EN 13501-1:2007. Thermablok (5-10 mm) achieved a reaction to fire classification of C-s1, d0 for construction applications as a suspended ceiling membrane. EN 13823 and ISO EN 11925-2 were carried out as part of this testing and all results were compliant for Class C classification.

**ASTM E 84 – SURFACE BURNING CHARACTERISTICS**

Thermablok was tested in accordance with ASTM E 84, the Standard Test Method for Surface Burning Characteristics of Building Materials. Thermablok satisfies the criteria for a Class A rating with a flame spread index of <5 and a smoke developed index of 20.

### Mechanical and Dimensional Stability

**ASTM C 165 – COMPRESSIVE RESISTANCE**

Compressive stress was measured at both 10% and 25% compressive strain. The average compressive stress was 8.0 psi @ 10% strain and 30.5 psi @ 25% strain.

**ASTM C 1101 – FLEXIBILITY AT AMBIENT TEMPERATURE**

Thermablok was classified as flexible at room temperature according to ASTM C 1101 test results.

**ASTM E 228 – LINEAR COEFFICIENT OF THERMAL EXPANSION**

The coefficient of thermal expansion of Thermablok was tested via ASTM E 228 from -170°C to 100°C with a reference temperature of 20°C. The results at 10°C are: x = 1.06 x 10⁻⁵ K⁻¹, y = 1.90 x 10⁻⁵K⁻¹.

### Thermal Measurements

**ASTM C 177 – THERMAL CONDUCTIVITY VIA GUARDED HOT PLATE, FULL CURVE**

Third-party validation of the thermal conductivity of Thermablok was acquired at mean temperatures ranging from -160˚ to 150°C (-256˚ to 302˚F) under a compressive load of 2 psi.

**ASTM C 177 – THERMAL CONDUCTIVITY VIA GUARDED HOT PLATE, 10˚C**

Third-party validation of the thermal conductivity of Thermablok was acquired at a mean temperature of 10°C under a compressive load of 2 psi.

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Thermal Measurements (cont’d)

EN 12667 – THERMAL CONDUCTIVITY VIA GUARDED HOT PLATE, 10°C
Third-party validation of the thermal conductivity of Thermablok was acquired at a mean temperature of 10°C under a compressive load of 2 psi. (Specifications are subject to change without notice.)

ASTM C 518 – THERMAL CONDUCTIVITY VIA HEAT FLOW METER
The average thermal conductivity result from three samples, tested via ASTM C518 was 14.8 mW/m*K at a mean temperature of 2°C.

Specific Heat
The specific heat of Thermablok was measured from -60°C to 150°C.

EN ISO 8497 – DECLARATION OF CONFORMITY
The values declared (λ90, 90) and reported on the product’s labels are determined according to the rule ISO 10456 and represent 90% of the production and with 90% of reliability. λ90, 90 = 0.014 W/m*K.

Water Resistance

ASTM C 1104 – WATER VAPOR SORPTION
The average weight gained during the ASTM C 1104 testing was 1.08%.

ASTM C 1511 – WATER RETENTION, REPELLENCY
The average weight gained during the ASTM C 1511 testing was 3.9%.

ASTM E 96 – WATER VAPOR TRANSMISSION RATE
Both water and desiccant method were tested via ASTM E 96. The results for Thermablok are 2319 ng/Pa*s*m2 (water method), 1877 ng/Pa*s*m2 (desiccant method).

EN ISO 15148 – Determination of Water Absorption Co-efficient by Partial Immersion
A series of tests was conducted at the Frauenhofer Institute to demonstrate the application suitability of Thermablok in external thermal insulation composite systems. These tests include DIN 52275-2, EN ISO 15148, EN ISO 12571, EN ISO 12572, and DIN 52103.
Results: The water absorption coefficient measured for Thermablok is 0.0072 kg/m2*h0.5.

EN ISO 12571 – Determination of Hygroscopic Sorption Properties
A series of tests was conducted at the Frauenhofer Institute to demonstrate the application suitability of Thermablok in external thermal insulation composite systems. These tests include DIN 52275-2, EN ISO 15148, EN ISO 12571, EN ISO 12572, and DIN 52103.
Results: Saturated salt solutions were prepared to give conditions of 33.0%, 53.0%, 79.5%, and 94.0% RH. The moisture content of the Thermablok was measured at each humidity condition.

EN ISO 12572 – Determination of Water Vapor Transmission Properties
A series of tests was conducted at the Frauenhofer Institute to demonstrate the application suitability of Thermablok in external thermal insulation composite systems. These tests include DIN 52275-2, EN ISO 15148, EN ISO 12571, EN ISO 12572, and DIN 52103.
Results: Two methods were used to determine the water vapor transmission properties of Thermablok. The average dry cup and wet cup; results were 0.337 MNs/g and 0.275 MNs/g r

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