HEAT-SHEET® MATERIAL PROPERTY DATA SHEET

PRODUCT NAME
Heat-Sheet® - radiant floor heating expanded polystyrene (EPS) panels

MANUFACTURER
- Beaver Plastics Ltd.
  7-26318-TWP RD 531A
  Acheison, Alberta, Canada, T7X 5A3
  1-888-453-5961
- AMC Foam Technologies Inc.
  35 Headingly St.
  Headingley, Manitoba, Canada, R4H 0A8
  1-877-789-7622
- Form Solutions
  P.O. Box 358
  Port Hope, ON, Canada, L1A 3W3
  1-888-706-7709
- Form Systems Inc.
  330 Cain Drive
  Haysville, KS, USA, 67060-2004
  1-888-838-5038

PRODUCT DESCRIPTION
Made with high density expanded polystyrene (EPS) designed to support the weight of cast-in-place concrete, and foot traffic during construction.

The staggered nodules provide a simple and efficient system for tube installation, while ensuring a tight fit, and proper tube alignment.

The nodules create a tube channel that accommodates multi-directional placement of 1/2” or 5/8” I.D. tubing, with 3” on-center points.

Manufactured in 2ft x 4ft panels with interlocking edges to ensure a stable fit between panel joints. Panels are available in a variety of thicknesses. See Table 1, Product Chart.

BASIC USE
Used under concrete slabs where radiant floor heating is required such as slab-on-grade, sandwich slab construction, and snow melt systems. In addition, Heat-Sheet can be used in retrofit and overlay applications. Refer to the Heat-Sheet Installation Guide for details.

STANDARDS

- CAN/ULC S102.2 – Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies.

CODE EVALUATION APPROVALS
- CCMC 14007-L
- QAI Certification Listing No.B1031-2

PHYSICAL PROPERTIES
Made with Type 2 or 3 expanded Polystyrene (EPS), per CAN/ULC S701. And Type II, IX or XIV EPS, per ASTM C578.

However, compressive strengths between 16 psi and 60 psi are available.

Additional vapor barrier/retarder may not be required. See Table 1, Product Chart.

Conforms to the physical properties shown in Tables 2 and 3.

Resists compressive creep and shrinkage. Predicted maximum creep strains of 2.0% (less than 50 yrs) provided compressive stress does not exceed 35% of compressive resistance** listed in Table 1.

ENVIRONMENTAL DATA
Produced without the use of chlorofluorocarbon (CFCs), hydrochlorofluorocarbon (HCFCs) or formaldehyde. As a result, Heat-Sheet will not produce harmful emissions to the environment.

FIRE INFORMATION
Products are made of combustible materials and may need to be protected from high heat sources. In addition, a thermal barrier may be required when used in the interior of a building. Refer to your local building codes for appropriate protection and thermal barrier requirements.

INSTALLATION
Installing Heat-Sheet involves laying the Heat-Sheet panels and tubing before concrete placement.

For detailed installation instructions refer to the Heat-Sheet Installation Guide.

Laying Heat-Sheet Panels
1. Ensure the ground is reasonably level.
2. Place a vapor barrier/retarder, if required, before laying Heat-Sheet panels.
3. Remove the interlock from the two sides of the starting panel to avoid an air gap. Cut the interlock along the 4ft length only on the next panel to be placed. Place trimmed panels so they interlock along the 2ft dimension.

NOTE: R4 and R6 Heat-Sheet panels are designed to be applied only over flat surfaces such as concrete slabs and wood subfloors. To secure the R4 and R6 Heat-Sheet panels, apply foam friendly adhesive, such as PL300 Foamboard Adhesive, between the panels and the subfloor.

4. Continue placing panels until you come to a wall. You will likely need to cut the final panel in this row to fit.
5. Use the left over segments to start the next rows, and be sure to maintain the 3” spacing pattern of the nodules.

Laying The Tubing
1. Install the tubing by “stepping” into the panels.

NOTE: Heat-Sheet panels are designed with a 3” grid for easy tube spacing. Consult a HVAC designer to determine the required separation points.

2. Ensure the tubing is fully seated when turning a corner before you begin your next run.
3. Place wire mesh and rebar directly on the top of the panels if required.
4. Remove debris on top of the panels before starting concrete placement.

* “Prediction of Creep Strain of the Expanded Polystyrene (EPS) in Long-term Compression,” ISSN 1392–1320
MATERIALS SCIENCE (MEDŽIAGOTYRA). Vol. 13, No. 4. 2007
### Table 1: Product Chart

<table>
<thead>
<tr>
<th>Product</th>
<th>Nominal Panel Thickness</th>
<th>Overall Thickness</th>
<th>Average R-value</th>
<th>Panels/Bundle</th>
<th>Sq ft/Bundle</th>
</tr>
</thead>
<tbody>
<tr>
<td>HS-R4</td>
<td>0.5&quot;</td>
<td>1 3/8&quot;</td>
<td>4</td>
<td>16</td>
<td>128</td>
</tr>
<tr>
<td>HS-R6</td>
<td>1.0&quot;</td>
<td>1 7/8&quot;</td>
<td>6</td>
<td>14</td>
<td>112</td>
</tr>
<tr>
<td>HS-R8</td>
<td>1.5&quot;</td>
<td>2 3/8&quot;</td>
<td>8</td>
<td>8</td>
<td>64</td>
</tr>
<tr>
<td>HS-R10</td>
<td>2.0&quot;</td>
<td>2 7/8&quot;</td>
<td>10</td>
<td>8</td>
<td>64</td>
</tr>
<tr>
<td>HS-R12</td>
<td>2.5&quot;</td>
<td>3 3/8&quot;</td>
<td>12</td>
<td>6</td>
<td>48</td>
</tr>
<tr>
<td>HS-R14</td>
<td>3.0&quot;</td>
<td>3 7/8&quot;</td>
<td>14</td>
<td>6</td>
<td>48</td>
</tr>
<tr>
<td>HS-R16</td>
<td>3.5&quot;</td>
<td>3 7/8&quot;</td>
<td>16.1</td>
<td>6</td>
<td>48</td>
</tr>
<tr>
<td>HS-R20</td>
<td>4 3/8&quot;</td>
<td>5 1/4&quot;</td>
<td>20</td>
<td>6</td>
<td>48</td>
</tr>
</tbody>
</table>

1. Refers to thickness of the panel minus the nodules (grid height per image shown).
2. Refers to thickness of nodule plus nominal panel thickness.
3. In accordance with ASTM C578, and CAN/ULC S701, at 75°F (24°C). R-value is determined based on weighted average R-value of nodule and panel profile.
4. These panels do not interlock, and are designed to be applied only over flat surfaces such as concrete slabs and wood subfloors.
5. Additional vapor barrier may not be required when using Type 3 EPS, per CAN/ULC S701, and the National Building Code of Canada.
6. Additional vapor retarder may not be required when using Type IX or XIV EPS, per ASTM C578, and the International Residential Code. Contact your local building official prior to use.
7. Panels per bundle may vary. Contact your local Heat-Sheet representative to confirm.
8. Made with Graphite Polystyrene (GPS) to provide an incremental R-2.1.
9. Custom orders may be available upon request. Confirm availability of all Heat-Sheet products with your local supplier.

### Table 2: Material Properties

<table>
<thead>
<tr>
<th></th>
<th>ASTM C578 1</th>
<th>Type II</th>
<th>Type IX</th>
<th>Type XIV</th>
<th>Type XIV</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Thermal Resistance Min. @ 75°F</strong></td>
<td>See Table 1</td>
<td>See Table 1</td>
<td>See Table 1</td>
<td>See Table 1</td>
<td>See Table 1</td>
</tr>
<tr>
<td><strong>Compressive Resistance Min., psi</strong></td>
<td>16 2</td>
<td>25 2</td>
<td>40 2</td>
<td>60 2</td>
<td></td>
</tr>
<tr>
<td><strong>Flexural Resistance Min., psi</strong></td>
<td>35</td>
<td>50</td>
<td>60</td>
<td>&gt; 60</td>
<td></td>
</tr>
<tr>
<td><strong>Water Vapor Permeance Max., perms</strong></td>
<td>3.5</td>
<td>2.5 1</td>
<td>2.5 3</td>
<td>2.5 3</td>
<td></td>
</tr>
<tr>
<td><strong>Water Absorption Max., %</strong></td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>Dimensional Stability Max., %</strong></td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>Oxygen Index Min., %</strong></td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>CAN/ULC S701 1</th>
<th>Type 2</th>
<th>Type 3</th>
<th>Type 3</th>
<th>Type 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Thermal Resistance Min. @ 24°C</strong></td>
<td>See Table 1</td>
<td>See Table 1</td>
<td>See Table 1</td>
<td>See Table 1</td>
<td>See Table 1</td>
</tr>
<tr>
<td><strong>Compressive Resistance Min., kPa</strong></td>
<td>110 2</td>
<td>140 2</td>
<td>276 2</td>
<td>414 2</td>
<td></td>
</tr>
<tr>
<td><strong>Flexural Resistance Min., kPa</strong></td>
<td>240</td>
<td>300</td>
<td>&gt; 300</td>
<td>&gt; 300</td>
<td></td>
</tr>
<tr>
<td><strong>Water Vapor Permeance Max., ng/Pa-s-m</strong></td>
<td>200</td>
<td>130 3</td>
<td>130 3</td>
<td>130 3</td>
<td></td>
</tr>
<tr>
<td><strong>Water Absorption Max., %</strong></td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>Dimensional Stability Max., %</strong></td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td><strong>Oxygen Index Min., %</strong></td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td></td>
</tr>
</tbody>
</table>

1. Unless noted otherwise, properties are based on a uniform 1" thickness.
2. Compressive strengths up to 60 psi (414 kPa) are available. Check availability with your local supplier.
3. Additional vapor barrier/retarder may not be required depending on nominal panel thickness. See Notes 5 and 6 of Table 1.

### Table 3: Surface Burning Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Flame Spread Index Max.</th>
<th>Smoke Developed Index Max.</th>
<th>Thickness Max.</th>
<th>Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM E84</td>
<td>25</td>
<td>450</td>
<td>6 in.</td>
<td>2 pcf</td>
</tr>
<tr>
<td>CAN/ULC S102.2</td>
<td>210</td>
<td>415</td>
<td>102 mm</td>
<td>32 kg/m³</td>
</tr>
</tbody>
</table>

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