HEAT-SHEET® HEAVY MATERIAL PROPERTY DATA SHEET

Rev.101019

PRODUCT NAME

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

MANUFACTURER

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- Form Solutions
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  1-888-706-7709
- Form Systems Inc.
  330 Cain Drive
  Haysville, KS, USA, 67060-2004
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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", 5/8", or 3/4" I.D. tubing, with 4" 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, can be used in retrofit and overlay applications. Refer to the Heat-Sheet Installation Guide for details.

STANDARDS

- ASTM C578 – Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
- ASTM C518 – Standard Test Method for Steady-state Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- ASTM D1621 – Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
- ASTM D1622 – Standard Test Method for Apparent Density of Rigid Cellular Plastics.
- ASTM D2842 – Standard Test Method for Water Absorption of Rigid Cellular Plastics.
- ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
- ASTM E96 – Standard Test Methods for Water Vapor Transmission of Materials.
- ASTM C203 – Standard Test Methods for Breaking Load and Flexural Properties of Block-Type Thermal Insulation.
- ASTM C303 – Standard Test Method for Dimensions and Density of Preformed Block and Board-Type Thermal Insulation.
- ASTM D2863 – Standard Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index).
- CAN/ULC-S701 – Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- CAN/ULC S102.2 - Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies.
- NFPA 286 "Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth".

CODE EVALUATION APPROVALS

- CCMC 14007-L
- QAI Certification Listing No.B1031-2

PHYSICAL PROPERTIES

Made with Type 3 expanded Polystyrene (EPS), per CAN/ULC S701, and Type IX EPS, per ASTM C578, with minimum compression strengths of 25 psi (higher compression strengths are available).

Available EPS densities can range above 1.8 pcf to produce higher compressive strengths.

Meets vapor barrier/retarder requirements in accordance with the National Building Code of Canada, and the International Residential Code. Confirm with local bylaws.

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, will not produce harmful emissions to the environment.

FIRE INFORMATION

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

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

Laying Heat-Sheet Heavy Panels

1. Ensure the ground is reasonably level.
2. A vapor barrier may be required by your local building code. When installing a vapor barrier, ensure it is in place before you begin laying Heat-Sheet Heavy panels.
3. Remove the interlock from the two sides of the starting panel to avoid an air gap.
4. 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.
5. Continue placing panels until you come to a wall. You will likely need to cut the final panel in this row to fit.
6. Use the left over segments to start the next rows, and be sure to maintain the 4" spacing pattern of the nodules.

Laying The Tubing

1. Install the tubing by "stepping" into the panels.

   NOTE: Heat-Sheet Heavy panels are designed with a 4" 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 top of the panels if required.
4. Remove debris on top of the panels prior to placing concrete.

* "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

Screed volume rates:
To top of Heat-Sheet nodules = 0.069 ft^3/ft^2
For each additional inch of slab = 0.083 ft^3/ft^2

Product	Nominal Panel Thickness [1]	Nominal Overall Thickness [2]	Average R-value [3]	Panels/ Bundle [5]	Sqft/ Bundle
HSH-R8	1 1/2"	2 3/4"	8	10	80
HSH-R10 [4]	2"	3 1/4"	10	8	64
HSH-R12 [4]	2 3/8"	3 5/8"	12	6	48
HSH-R14 [4]	2 7/8"	4 1/8"	14	6	48
HSH-R16.1 [4,6]	2 7/8"	4 1/8"	16	6	48

1. Refers to thickness of the panel minus the nodules (grid height per image).
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. Meets water vapor barrier/retarder in accordance with the National Building Code of Canada, and the International Residential Code. Confirm with local bylaws.
5. Panels per bundle may vary. Contact your local Heat-Sheet representative to confirm.
6. Made with Graphite Polystyrene (GPS) to provide an incremental R-2.1.
7. Confirm availability of products with your local Heat-Sheet supplier.

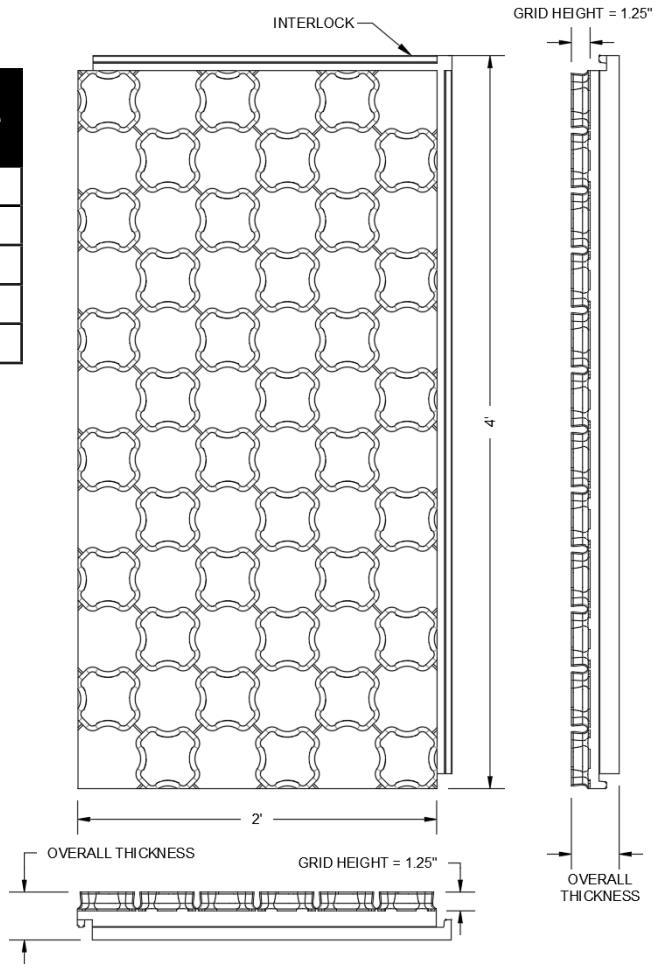

Table 2: Material Properties

ASTM C578 [1]	Type IX
Thermal Resistance Min. @ 75°F	See Table 1
Compressive Resistance Min., psi	25 [2]
Flexural Resistance Min., psi	50
Water Vapor Permeance Max., perms	0.78 [3]
Water Absorption Max., %	2
Dimensional Stability Max., %	2
Oxygen Index Min., %	24
CAN/ULC S701 [1]	**Type 3**
Thermal Resistance Min. @ 24°C	See Table 1
Compressive Resistance Min., kPa	170 [2]
Flexural Resistance Min., kPa	300
Water Vapor Permeance Max., ng/Pa-s-m^2	44 [3]
Water Absorption Max., %	2
Dimensional Stability Max., %	1.5
Oxygen Index Min., %	24

1. Unless noted otherwise, properties are based on a uniform 1" thickness.
2. Compressive strengths greater than 25 psi (170 kPa) are available upon request. Confirm availability with your local Hea-Sheet supplier.
3. Tested at 2" thickness by QAI, per ASMT E96.

Table 3: Surface Burning Characteristics

	Flame Spread Index Max.	Smoke Developed Index Max.	Thickness Max.	Density
ASTM E84	25	450	6 in.	2 pcf
CAN/ULC S102.2	210	415	102 mm	32 kg/m^3