Width of door | Stiffener Width | # of stiffeners
--- | --- | ---
24" | 4" | 4
26" | 4" | 4
28" | 4" | 6
30" | 4" | 6
32" | 4" | 6
34" | 4" | 6
36" | 4" | 6
38" | 4" | 8
40" | 4" | 8
42" | 4" | 8
44" | 4" | 8
46" | 4" | 8
48" | 4" | 10
50" | 4" | 10
52" | 4" | 10
54" | 4" | 10
56" | 4" | 10
58" | 4" | 12
58 7/16" | 4" | 12

Distance from lock edge is 6" maximum

Spacing between stiffeners is 6" maximum

Stiffener height = vertical space - 3"
(For example, if net height is 83 1/4" stiffeners will be 80")

If door is closer reinforced, 4 stiffeners need to be downsized an additional 6"
(For example, if door has 6 stiffeners and is 83 1/4" tall, 4 stiffeners will be 74")
PermaTherm EPS is a closed cell, lightweight, resilient, foamed plastic composed of hydrogen and carbon atoms. PermaTherm EPS has a compressive strength of 10-60 psi for most construction applications. Within that range PermaTherm EPS can be molded to meet specific application requirements.

Applied in roofs, walls, and foundations, PermaTherm EPS has a successful history of efficient use in industrial, commercial, cold storage and residential construction. Where energy efficiency and cost effectiveness have long been primary design considerations, architects have made PermaTherm EPS the dominant thermal insulation.

Long-term Insulation Value
PermaTherm EPS insulation (1.0 pcf) provides a typical R-value of 4.17 per inch (k-factor=0.24) at a mean temperature of 40°F, and a typical R-value of 3.85 per inch (k-factor=0.26) at a mean temperature of 75°F. The higher the R-value, the higher the insulating effect. When properly installed and protected from moisture, the R-value of PermaTherm EPS insulation remains constant. The R-value will not decrease with age. As a result, the thermal resistance, or R-value of PermaTherm EPS may be used without any adjustment for aging.

Moisture Resistance
A study by the Energy Materials Testing Lab (EMLT) has shown that EPS insulation material installed in well constructed roofs does not absorb appreciable moisture, even under conditions characteristic of prolonged, cold, damp winters. The small amount of moisture absorbed (an average of 0.2% by weight) has little or no effect on the compressive or flexural strength and the EPS insulation retains between 95% and 97% of its thermal efficiency.

Though EPS has low water vapor transmission, EPS is not a vapor barrier. Rather, it "breathes" and, therefore needs no costly venting as do some other relatively impermeable insulation materials which could otherwise trap moisture within walls and roof assemblies.

Temperature Cycling
PermaTherm EPS is able to withstand the abuse of temperature cycling, assuring long-term performance. In a series of tests conducted by Dynatech Research and Development Co. Cambridge, Mass., core specimens removed from existing freezer walls, some as old as 16 years, demonstrate EPS freeze thaw cycles without loss of structural integrity or other physical properties.

### Typical Physical Properties of PermaTherm EPS Insulation

<table>
<thead>
<tr>
<th>Specification Reference: ASTM C 578-92</th>
<th>Type I</th>
<th>Type VIII</th>
<th>Type II</th>
<th>Type IX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property</td>
<td>Units</td>
<td>D303 or D 1622</td>
<td>0.90</td>
<td>1.15</td>
</tr>
<tr>
<td>Density, minimum</td>
<td>(pcf)</td>
<td>0.90-1.14</td>
<td>1.15-1.34</td>
<td>1.35-1.79</td>
</tr>
<tr>
<td>Density Range</td>
<td></td>
<td>0.90-1.14</td>
<td>1.15-1.34</td>
<td>1.35-1.79</td>
</tr>
<tr>
<td>Thermal Conductivity at 25° F</td>
<td>BTU/hr.</td>
<td>C177 or C518</td>
<td>0.23</td>
<td>0.22</td>
</tr>
<tr>
<td>K Factor at 40°F</td>
<td>(sp. Ft/°F/lin.)</td>
<td>@ 1.625&quot;</td>
<td>0.24</td>
<td>0.235</td>
</tr>
<tr>
<td>at 75°F</td>
<td></td>
<td>0.26</td>
<td>0.255</td>
<td>0.24</td>
</tr>
<tr>
<td>Thermal Resistance at 25° F</td>
<td></td>
<td>4.35</td>
<td>4.54</td>
<td>4.76</td>
</tr>
<tr>
<td>R-value* at 40° F at 1 inch</td>
<td></td>
<td>4.17</td>
<td>4.25</td>
<td>4.55</td>
</tr>
<tr>
<td>at 75° F</td>
<td></td>
<td>3.85</td>
<td>3.92</td>
<td>4.17</td>
</tr>
</tbody>
</table>

### Strength Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>psi</th>
<th>D 1621</th>
<th>10 - 14</th>
<th>13 - 18</th>
<th>15 - 21</th>
<th>25 - 33</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressive 10% Deformation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flexural</td>
<td>C 203</td>
<td>10 - 14</td>
<td>25 - 30</td>
<td>30 - 38</td>
<td>40 - 50</td>
<td>50 - 75</td>
</tr>
<tr>
<td>Tensile</td>
<td>D 1623</td>
<td>10 - 14</td>
<td>25 - 30</td>
<td>30 - 38</td>
<td>40 - 50</td>
<td>50 - 75</td>
</tr>
<tr>
<td>Shear</td>
<td>D 723</td>
<td>10 - 14</td>
<td>25 - 30</td>
<td>30 - 38</td>
<td>40 - 50</td>
<td>50 - 75</td>
</tr>
<tr>
<td>Shear Modulus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modulus of Elasticity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Moisture Resistance

<table>
<thead>
<tr>
<th>Property</th>
<th>perm. in.</th>
<th>E 96</th>
<th>2.0 - 5.0</th>
<th>1.5 - 3.5</th>
<th>1.0 - 3.5</th>
<th>0.6 - 2.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>WVT Absorption (vol.)</td>
<td>%</td>
<td>C 272</td>
<td>&lt; 4.0</td>
<td>&lt; 3.0</td>
<td>&lt; 3.0</td>
<td>&lt; 2.0</td>
</tr>
<tr>
<td>WVT</td>
<td></td>
<td></td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
</tbody>
</table>

### Coefficient of Thermal Expansion

<table>
<thead>
<tr>
<th>Property</th>
<th>in./(in.)(f)</th>
<th>D 696</th>
<th>0.000035</th>
<th>0.000035</th>
<th>0.000035</th>
<th>0.000035</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Service Temperature</td>
<td>F</td>
<td></td>
<td>167</td>
<td>167</td>
<td>167</td>
<td>167</td>
</tr>
<tr>
<td>Long term exposure</td>
<td></td>
<td></td>
<td>180</td>
<td>180</td>
<td>180</td>
<td>180</td>
</tr>
<tr>
<td>Intermittent exposure</td>
<td></td>
<td></td>
<td>180</td>
<td>180</td>
<td>180</td>
<td>180</td>
</tr>
</tbody>
</table>

### Oxygen Index

<table>
<thead>
<tr>
<th>Property</th>
<th>%</th>
<th>D 2863</th>
<th>24.0</th>
<th>24.0</th>
<th>24.0</th>
<th>24.0</th>
</tr>
</thead>
</table>

R-value is a measure of resistance to heat flow. The higher the R-value, the greater the insulating effect.
PERMATHERM, INC.
269 INDUSTRIAL PARK ROAD
MONTICELLO, GA 31064

EMERGENCY TELEPHONE NUMBER
(706-468-7500)

SECTION NOMENCLATURE
CHEMICAL NAME.......Expanded Polystyrene foam (EPS)
CHEMICAL FAMILY......Polystyrene
FORMULA............\((C_6H_5)_n\) with flame retardant

SECTION II HAZARDOUS INGREDIENTS
None when residual pentane blowing agent is reduced to level described in Section IX.

SECTION III PHYSICAL DATA
BOILING POINT........Not Applicable
SOLUBILITY IN WATER.....None
DENSITY...............0.75 - 2.0 PCF
PERCENT VAPORABLE (VOL).....0.18% Pentane & Water
EVAPORATION RATE.......Not Applicable
APPEARANCE & COLOR.....Rigid Cellular Foam
Block or Board, White, No Odor.

SECTION IV FIRE AND EXPLOSION
EXTINGUISHING MEDIA.....Water Fog, CO₂,
Dry Chemical
SPECIAL FIRE FIGHTING PROCEDURES.....None
UNUSUAL FIRE & EXPLOSION HAZARDS.....May Emit Large Volumes of Dense, Black Smoke

SECTION V HEALTH HAZARD
THRESHOLD LIMIT VALUE.......None
EFFECTS OF OVEREXPOSURE.......None

EMERGENCY & FIRST AID PROCEDURES........NONE

SECTION VI REACTIVITY DATA
STABLE...................YES
INCOMPATIBILITY.........NONE
HAZARDOUS DECOMPOSITION...NONE
CONDITIONS TO AVOID........Do Not Expose to Flame or Other Ignition Source

SECTION VII SPILL OR LEAK
Normal good housekeeping should be observed in properly disposing of scrap material. Dispose of waste in accordance with local ordinances.

SECTION VII SPECIAL PROTECTION INFORMATION
RESPIRATORY PROTECTION .. NONE
May act as obstruction of swallowed.
VENTILATION..............None
PROTECTIVE GLOVES.......None
EYE PROTECTION...........Safety Glasses recommended to avoid dust if saw is used for fabrication.

SECTION IX SPECIAL PRECAUTIONS
Immediately after molding EPS into blocks the residual blowing agent, pentane, entrapped within the blocks ranges from about 2.0 to 3.0% by weight. The blocks are then stored at room temperature or at elevated temperatures (e.g. <150°F) to reduce the entrapped pentane and moisture to less than 1% by weight (0.18% by volume) for dimensional stabilization. The block storage areas must be adequately ventilated to avoid a hazardous build-up of flammable pentane vapors. If the product in block or board form is to be fabricated by hot-wire cutting, work areas should be ventilated to avoid a buildup of processing fumes.

JULY, 1998
Core Specifications:

Size: 74.5" - 80" (H) x 33 1/2" (W)
Density: 21 - 24 pounds per cubic foot.
Weight: 51 - 58 lbs/core (pallet of 40 cores each). Average 55 lbs/core
Colour: Pink
Thickness: 1 - 21/32"
Tensile Strength: 150 psi

Characteristics:
- Inorganic based composite core (Patented)
- Fibreglass sheeting on both sides.
- Maximum 3 joined pieces per door.
- Available in sheets of up to 80" in length.

For further information, please contact
Kristen Lock, Sales
Tel: (705) 730-0840 Fax: (705) 730-0855
Email: pyrophobic@aol.com

Labelling:

Approved by ITS (Warnock Hersey) and UL for 1.5 hour and 3 hour positive pressure (including negative pressure) steel doors (UBC 7-2 (1997), NFPA 252 (1999), UL 10C (1998) and ULC CAN4-S104-M80 (1985) for the following:

- single doors (up to 4'x8')
- standard double doors (up to 8' x 8'),

and approved by ITS (Warnock Hersey) for 1.5 hour positive and negative pressure for:

- double egress (up to 8' x 8').

Please contact Pyrophobic Systems Limited, ITS (Warnock Hersey) or UL for labelling.

DOOR SPECIFICATIONS:

The following specifications are required for ITS (Warnock Hersey) or UL listing. For further information, please contact ITS, UL or Pyrophobic Systems.

Fire Door:

Hollow Metal Temperature Rise Doors for Installation at 1-1/2 and 3 hour locations

Temperature Rise:

250°F @ 30 minutes (U.S. Standard)
450°F @ 60 minutes (U.S. Standard)
250°C @ 60 minutes (Canadian Standard)

Size:

- Single: up to 4' x 8' high
- Standard Pairs: up to 8' x 8' high, astragal required
- Double Egress Pairs: up to 8' x 8' high, vertical rods, fire exit hardware & astragal required

Thickness: 1 21/32"

Skins:

- Flush, 20 gauge minimum to 16 gauge maximum

Core:

- Pyrophobic core bearing a WH and UL ink stamp on each core, maximum 3 pieces per door, (9" vertical joint, 7" horizontal joint).

Adhesive:

- As approved by ITS or UL for positive pressure rated fire doors.

Vision Panels:

- 100 sq. in. maximum, 5" x 20", 10" x 10", 3" x 20", or 11.25" round listed lites.
- Listed lite kit 0.038" - 0.003".

Astragal:

- Z type (14 gauge)
- Blank, ASA or ASA/Flush bolts or flat bar type 10 gauge

Hardware:

- Hinges: Ball bearing hinges per NFPA 80 or listed spring hinges, or continuous hinges.
- Latches: Listed cylindrical latch 1/2" throw, listed mortise latch 3/4" throw.