



# R-Value Chart

## R-Value Factor

Thermal resistance is an index of material's resistance to the flow of heat. It is the reciprocal of the K or C-value.

$$R = \frac{T}{K} \text{ or } \frac{1}{C}$$

The higher the R-value, the better the resistance to the flow of heat (BTUs) and the better the insulation. R-values are usually reported for a stated thickness. R-values for different materials, or different thicknesses of the same material, may be added together to reach a total R-value for a system.

| Typical Physical Properties of EPS Used in SBS Panels |           |                 |                  |        |           |         |         |          |         |
|---|-----------|-----------------|------------------|--------|-----------|---------|---------|----------|---------|
| Properties  | Units     | ASTM Test       | ASTM Designation |        |           |         |         |          |         |
|   |           |                 | Type XI          | Type I | Type VIII | Type II | Type IX | Type XIV | Type XV |
| ASTM Density  | pcf (min) | C 303 or D 1622 | 0.70             | 0.90   | 1.15      | 1.35    | 1.80    | 2.40     | 2.85    |
| Common Designation                                    | pcf       |                 | 0.75#            | 1#     | 1.25#     | 1.5#    | 2#      | 2.5#     | 3#      |
| Thermal Resistance Values                             | at 75°F   | C 177 or C 158  | 3.20             | 3.85   | 3.92      | 4.20    | 4.36    | 4.40     | 4.40    |
|   | at 40°F   | C 177 or C 158  | 3.50             | 4.22   | 4.35      | 4.55    | 4.66    | 4.70     | -       |
|   | at 25°F   | C 177 or C 158  | 3.90             | 4.40   | 4.55      | 4.82    | 4.94    | 4.96     | -       |
| Compressive 10% Deformation                           | psi       | D1621           | 8.0              | 12.0   | 16.5      | 20.0    | 28.0    | 45.0     | 60.0    |
| Flexural Strength                                     | psi       | C203            | 18.0             | 29.0   | 35.0      | 42.0    | 55.0    | 75.0     | 95.0    |

## Wood Structural Panel R-Values

### Oriented Strand Board (OSB)

The thermal resistance, or R-value (in ft<sup>2</sup> - hr - °F / BTU), of OSB panels is listed below. Thicker panels have more insulating value; therefore R-values increase with increasing panel thickness. These values are listed in Table 2 of the Structural Board Association's "OSB in Wood Frame Construction," (U.S. Edition 1996/97).

| OSB Thickness (inch) | R-Value |
|----------------------|---------|
| 3/8                  | 0.45    |
| 7/16                 | 0.51    |
| 1/2                  | 0.62    |
| 5/8                  | 0.74    |
| 3/4                  | 0.91    |

### Plywood

The thermal resistance, or R-value (in ft<sup>2</sup> - hr - °F / BTU), of plywood panels is listed below. Thicker panels have more insulating value; therefore R-values increase with increasing panel thickness. These values are listed in Chapter 25, Table 4 of the 2001 ASHRAE Handbook published by the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE).

| Plywood Thickness (inch) | R-Value |
|--------------------------|---------|
| 1/4                      | 0.31    |
| 3/8                      | 0.47    |
| 15/32                    | 0.59    |
| 1/2                      | 0.62    |
| 19/32                    | 0.74    |
| 5/8                      | 0.78    |
| 23/32                    | 0.90    |
| 3/4                      | 0.94    |
| 7/8                      | 1.09    |
| 1                        | 1.25    |
| 1-1/8                    | 1.41    |

## U-Value Factor

Overall coefficient of heat transmission, or the quantity which will flow through a specific building section composed of a number of materials one square foot in area during one hour when there is hot or cold side temperature difference 1° F.

$$U = \frac{1}{R_1}$$

Where R<sub>1</sub> = Sum of all the R-values in the section including air space and film. (R + R + R + R = R<sub>1</sub>)