

# Thermal Insulation

Two terms are commonly encountered when discussing the thermal insulation values of materials, the K factor and the R factor. The K factor is referred to as the thermal conductivity and has only one value for a material at a given temperature. The K factor is independent of the sample thickness. The K factor of material is determined by a laboratory evaluation. The R factor is directly related to thickness and can be calculated by using the K factor. These two factors are related by the simple equation below:

$$R = \frac{\text{Thickness (perpendicular to the heat flow)}}{K \text{ (thermal conductivity)}}$$

Example:

What is the R factor for a 1" thick piece of 2A Volara?

2A Volara has been measured to have a K factor equal to 0.25 BTU-inch/Ft(2)-Hr- deg.F

$$R = \frac{1" \text{ thick}}{0.25 \text{ BTU-inch/FT}^2 \text{ - Hr - deg.F}} = \frac{4 \text{ ft}^2\text{-Hr-deg.F}}{\text{BTU}}$$

Thermal conductivity is dependent on density. A rule of thumb for closed-cell foams is, the greater the density, the poorer the insulation value.

	R Factor		
	K Factor	1" Thickness	3" Thickness
Volara 2A & 2E	0.25	4.0	12.0
Volara 4A	0.30	3.3	9.9
Volara 6A	0.32	3.1	9.3
2pcf Polystyrene	0.26	3.9	11.7
2pcf Urethane	0.17	5.8	17.4
5pcf PVC	0.26	3.9	11.7
7-10pcf Cork	0.26	3.9	11.7
4-10pcf Perlite (Expanded Silica)	0.38	2.6	7.8

Because we cannot anticipate or control the many different conditions under which this information and our products may be used, we do not guarantee the applicability of the accuracy of this information or the suitability of our products in any given situation. Users of our products should make their own tests to determine the suitability of each product for their particular purposes. The products discussed are sold without warranty, either expressed or implied, and buyer assumes all responsibility for loss or damage arising from the handling and use of our products, whether done in accordance with directions or not. Also, statements concerning the possible use of our products are not intended as recommendations to use our products in the infringement of any patent.