

Insulation Explained - Understanding the "R-value"

When someone say "R-value", what are they really talking about?

They are talking about the resistance to heat flow through a given medium. We are led to believe that the higher the number, the greater resistance to heat flow. While this is true, we should first understand what is in the number and how the number is arrived at.

Thermal Resistance or "R" factor (or value) is used in combination with numbers to designate thermal resistance values. *eg: R-11 equals 11 Resistance units.* The higher the "R" number, the better the insulating value. "R" is the reciprocal or equal of "U" or "C", thus $R = 1 \text{ divided by } U$ or $1 \text{ divided by } C$.

Thermal Conductance or "C" factor (or value) is the number of BTU's that will pass through 1 square foot of material with 1 deg. F temperature difference for a specified thickness. The "C" factor is the "K" factor divided by the thickness of the insulation.

Thermal Conductivity or "K" factor (or value) is the number for an insulation material and is based on the number of BTU's per hour that pass through a 1" thick by 1' square block of insulation with 1 deg. F temperature difference between the two surfaces.

British Thermal Units or "BTU's" are the unit of measurement for heat. One BTU is equal to the amount of heat needed to raise the temperature of 1 lb. of water by 1 deg. F.

The testing is done under laboratory conditions and does not account for air movement (wind) or any amount of moisture (water vapor).

This is where the R-value myth comes into effect. The testing does not reflect real-world, environmental conditions. If you were to take fiberglass insulation saturated with water and a 15 kph wind blowing, your R-value would be zero. Under the same conditions with solid insulation like the polyurethane used in A Better Panel's products, it would be largely unaffected.

Studies prove that stick and batt construction, typical of many buildings, can reduce R-values by as much as 30%, due to the conductive points in the design as well as the compression to the insulation. *eg: In wood structures such as a 2 x 6 constructed building there is no insulation around the 2 x 6's. In steel buildings the insulation is compacted at the purling and girts.*

Using A Better Panel's products will give you a true R-value.

Please refer to the chart below so you can make an educated choice for your building requirements. Keep in mind that these insulation ratings were achieved under laboratory conditions.

INSULATED WALLS - "R" VALUE COMPARISONS	
Material	"R" Factor
1" Fiberglass Insulation	3.72
2" Fiberglass Insulation	7.5
3" Fiberglass Insulation	10.28
4" Fiberglass Insulation	13.46
6" Fiberglass Insulation	19.17
8" Fiberglass Insulation	23.56
12" Fiberglass Insulation	36.21

8" Brick	2.44
12" Brick	3.23
16" Brick	4.00
4" Conic Block, Hollow	1.96
8" Conic Block, Hollow	2.56
12" Conic Block, Hollow	2.70
8" Conic Block, Solid	2.56
12" Conic Block, Solid	2.78
6" Thick Poured Concrete	3.22
8" Thick Poured Concrete	4.00
10" Thick Poured Concrete	4.76
12" Thick Poured Concrete	5.56
1" Polystyrene	3.50
2" Polystyrene	7.00
3" Polystyrene	10.50
4" Polystyrene	14.00
5" Polystyrene	17.50
6" Polystyrene	21.00
1" Polyurethane	7.10
2" Polyurethane	14.20
3" Polyurethane	21.30

4" Polyurethane	28.40
5" Polyurethane	35.50
6" Polyurethane	42.60

*** products used by A Better Panel Inc. ***