

Understanding thermal values (R-values) of carpet and cushion

An industry-sponsored study of the thermal characteristics of carpet, with and without cushion, conducted by the Georgia Institute of Technology School of Textile Engineering, concluded that the total R-value is more dependent on the total thickness of the carpet than on the type fiber content.

When the carpet R-value is not available, the study suggested multiplying the total carpet thickness measured in inches by a factor of 2.6 to approximate the carpet's R-value. The study also found that R-values are additive for any combination of materials. For example, a combination of carpet with an R-value of 1.3 and a prime polyurethane cushion with an R-value of 1.6 will yield an overall R-value of 2.9.

The following R-value information was taken from the study conducted by the Georgia Institute of Technology School of Textile Engineering.

CARPET – Typical R-Values

Sample No.	Fiber Type	Yarn Type	Style	Pile Height (inches)	Pile Weight (oz/sq. yd.)	Gau ge	Stitches per inch	Tufts/ln ² SPI x GA	R-Value
1.	Nylon	CF	LL	.125	10	1/10	8.0	80	0.68
2.	Nylon	CF	LL	.109	20	1/8	6.0	48	0.65
3.	Nylon	CF	LL	.192	28	1/8	8.4	67.2	0.67
4.	Nylon	CF	LL	.125	24	1/10	8.6	86	0.55
5.	Nylon	S	Plush	.250	24	1/8	11.0	88	1.12
6.	Nylon	CF	HLL	--	24	5/32	8.6	55	1.33
7.	Nylon	CF	Shag	1.07	24	3/16	5.2	27.7	1.51
8.	Acrylic	S	LL	.210	42	1/10	8.0	80	0.78
9.	Acrylic	S	LL(FB)	.210	42	1/10	8.0	80	1.03
10.	Polyester	S	Plush	.280	42	5/32	8.5	54.4	0.95
11.	Polyester	S	HLL	--	42	5/32	8.5	54.4	1.66
12.	Nylon	S	Saxon y	.552	40	3/16	5.5	29.3	1.96
13.	Nylon	CF	Shag	1.25	43	3/16	4.2	22.4	2.46
14.	Wool	S	Plush	.487	43	5/32	7.0	44.8	2.19
15.	Nylon	S	Plush	.812	58	1/8	10.0	80	1.83
16.	Acrylic	S	Plush	.688	53	5/32	9.0	57.6	1.90
17.	Acrylic	S	Plush	.530	44	3/16	8.25	44	1.71
18.	Olefin	CF	LL	--	20	--	--	--	0.70

Legend: LL = Level Loop; HLL = High-Low Loop (tip sheared); FB = Attached foam back; S = Spun Yarn; CF = Continuous Filament Yarn

CARPET CUSHION – Typical R-Values

Material	Thickness (in.)	Weight oz/sq yd	Density lbs/cubic ft.	R -Value
Prime Polyurethane	.40	10.3	2.2	1.61
Slab Rubber	.23	62.0	---	0.62
Waffled Sponge Rubber	.43	49.2	---	0.78
Hair & Jute Coated	.44	52.6	---	1.71
Bonded Polyurethane	.50	---	4.0	2.09