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The Facts About Compressing Fiber Glass Insulation

Q. What happens to the R-value when fiber glass building insulation is compressed into a space that is narrower than the thickness advertised on the label? An example would be compressing R-19 insulation (typically 6 ¼") thick into a 2x4 stud cavity that is 3 ½" deep.

A. When you compress fiber glass batt insulation, the R-value per inch goes up, but the overall R-value goes down because you have less inches or thickness of insulation. Refer to the chart on the following page to see how this affects common sizes of insulation.

Q. If the thickness or R-value I am using is not shown in the table can I estimate the R-value?

A. Yes – the compressed R-value can be estimated using the following method. For every x% the insulation material is compressed, the R-value decreases by approximately one half of that percentage or ½ x% compressed.

Example: Let's look at an R-19 batt in a 2x6 cavity

Step 1: subtract the cavity depth from the thickness of the batt (in inches).
Ex. 6.25(batt) - 5.5 (cavity depth) = 0.75"

Step 2: take that resulting figure and divide by the thickness of the batt to determine the percent compression.
Ex. 0.75 / 6.25 = 0.12, or 12% compression

Step 3: R value decreases by roughly half the percentage of compression. So, to determine the R-value loss of a batt due to compression, you multiply the batt's R-value by half the percent compression.
Ex. 19 x 6% = 1.14

Step 4: subtract the R-value loss figure from the R-value of the batt to arrive at the compressed R-value.
Ex. 19 - 1.14 = 17.86, rounded up is R-18

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R-Values for Building Insulation Compressed in Cavities

Nominal Framing Size	Depth of Cavity (inches)	Rated R-value and full cavity depth of insulation [1]												
		R6	R8	R11	R13	R15	R19	R21	R22	R25	R30 C [2]	R30	R38 C [2]	R38
		1 ¾"	2 ½"	3 ½"	3 ½"	3 ½"	6 ¼"	5 ½" *	6 ½"	8"	8 ½"	10"	10"	12"
1X2	¾	3.5												
2X2	1 ½	5.5	5.6	6	7									
2X3	2 ½	6	8	9	10	12								
2X4 (nom)	3 ½	6	8	11	13	15	14	15	15					
2X4 (full)	4	6	8	11	13	15	15	17	16	16	17			
2x6	5 ½	6	8	11	13	15	18	21	20	20	23	21		
2x8	7 ¼	6	8	11	13	15	19	21	22	24	28	26	30	28
2x10	9 ¼	6	8	11	13	15	19	21	21	25	30	29	36	33
2x12	11 ¼	6	8	11	13	15	19	21	21	21	30	30	38	37

Footnotes:

1) All listed thicknesses are approximate and may vary by ±1/2 inch.
2) The C denotes high density materials specifically designed for installation in areas where space is limited - such as cathedral ceilings.

Disclaimer: The compression data and calculation formula to predict R-value reductions due to compression set forth herein is representative of fiber glass building insulation generally, but specific company products may vary slightly. This data and calculation formula are provided for informational purposes and a general guidance. NAIMA neither warrants or guarantees any of its members' products, nor does it assume any liability for any of its members' insulation products. Use of the compression data or calculation formula for predicting R-value reductions due to compression does not ensure or guarantee a specific level of insulation performance. The data and calculation method are provided as tools to help predict or estimate possible R-value reductions due to compression. NAIMA makes no warranty or guarantee whatsoever of this information and calculation formula. NAIMA assumes no responsibility for your use of this information.

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