



What is the Whole Wall R-Value of my Wall?

You might think you have R-40 walls, but have you factored in your studs and windows? With the recent emphasis on home retrofits and energy efficiency, many people define their walls by the R-value.

For instance, if you have 2x6 walls filled with fiberglass batt insulation (R-19), plus drywall and plywood, you probably consider your overall R-value to be R-21. But that only counts the insulated portion of your wall and ignores the weaker parts, such as windows, doors and structural framing (or studs), that provide primary paths for heat to escape. Just as water and electricity seek the path of least resistance, heat flows through the weakest thermal component of the wall assembly.

To see how much studs and windows affect the performance of your wall, CCHRC calculated the “whole wall R-value” for a hypothetical 2x6 house with 11 percent of the wall taken up by studs (24-inch on center framing) and 15 percent taken up by double-pane windows. The original R-21 wall is reduced to R-18.3 when you factor in the studs (R-8.8). And the whole wall R-value is further diminished to R-8.2 when you factor in windows with a U-value of 0.5 (standard double-pane windows).

How can this information help you improve the energy efficiency of your home? First, it gives an accurate picture of the overall thermal resistance of your wall. (Though there are many other components of a house, such as attic insulation, heating system, and ventilation system, that impact efficiency.) Second, it reveals how much thermally weak points can counteract stronger points in your wall.

And third, it illuminates retrofitting options, each with their ups and downs. Replacing windows, for example, may achieve a greater whole wall R-value, but it can be pricey. Adding exterior foam, on the other hand, can be a cheaper way to cut heat loss through the insulated wall and through the studs. But you must be careful to add the right amount of insulation, and possibly extra ventilation, to avoid moisture problems within the walls. The best way to weigh these costs and benefits and make the most of your retrofit is first get a home energy audit.

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