

THE BENEFITS OF TRIPLE-PANE WINDOWS

Windows are more than panes of glass that let occupants look outside and open to bring fresh air into a building.

In the best-case scenario, they allow occupants to connect with their outside environment and create indoor comfort. In the worst-case scenario, poor performing windows decrease the efficacy of heating and cooling within the home, and can be costly in terms of utility bills.

Double-pane configurations are the most common type of windows on the market and can get to a U-Factor of 0.23-0.24. However, triple-pane windows—which have substantially improved since first entering the market in the 1990s—are the next generation of products builders and suppliers should consider using in new construction and retrofits to existing buildings.

Also referred to as hybrid triples, thin triples, R-5, and High-R, each of these lighter versions can be used in a variety of applications, including residential, small commercial/multifamily buildings, manufactured homes, above-code new builds, and net-zero energy homes. Triple-pane windows on the market today typically have the same dimensions as double-pane windows, and are ideal for replacements and retrofits in older homes with 2x4 framing. They are also a 40% more energy efficient drop-in substitute for double-pane, low-emissivity (Low-E) windows with a U-Factor of 0.30.¹

BENEFITS

Advanced technology: The center panel in the new variation of thin triple-pane windows uses the same thin glass found in popular electronics such as smart phones, tablets, and flat-screen televisions. This feature makes them lighter in weight and easier to install, and builders do not incur additional costs for skills training and labor. Hybrid triple-pane windows use three panes that are thinner than double-pane glass, making them much lighter than earlier versions of the concept.

Energy savings: The third pane creates an additional insulating air pocket that helps further reduce heat transfer and air movement between the window and outside environment. Thermal break spacers separate the panes of glass, and inert gas such as krypton and argon is used to further increase the window's insulation value. Because windows are fuel neutral, they provide energy savings in electric- and gas-heated homes.

Occupant comfort: The additional pane also helps reduce air leaks while maintaining other features such as daylight coming into the building, views to the outdoors, and natural ventilation.²

Whole-building impact: Triple-pane windows help maintain natural light. Given the reduced air leakage, the burden on HVAC systems that struggle to effectively heat or cool a space can also be lowered, which could help offset full system replacement.³

¹ [Triple-Pane Windows Flyer, BetterBuiltNW.com, 2023.](#)

^{2,3} [Pathway to Zero Energy Windows: Advancing Technologies and Market Adoption.](#) Department of Energy, Office of Energy Efficiency & Renewable Energy, April 2022.

A COST-SAVING SUBSTITUTION

Builders can also use triple-pane windows as a lower or cost-equivalent option to meet energy codes or above-code certifications, and potentially qualify for state and federal tax credits. Energy savings come from reductions in heating and cooling loads and related electric and gas use.

According to analysis by Lawrence Berkeley National Laboratory⁴, thin triple-pane windows have the potential to cut energy use in residential buildings by 16% compared to typical double-pane Low-E windows in heating-dominated climates similar to the Northwest, 12% in mixed climates, and 7% in cooling dominated climates.

In central Oregon, the Bend-Redmond affiliate [Habitat for Humanity successfully used triple-pane windows](#) in their 27th Street Townhomes build. Using triple-pane windows in the 12 two-story, 1,150 sq. ft. unit project achieved the same level of energy efficiency that 1" rigid foam would have provided.

Cost was also a major factor in the decision to use triple-pane windows, adding only \$700 per unit to the financial bottom line of the build vs \$5,000 per unit the 1" rigid foam would have incurred. In fact, using triple-pane windows for this project cost 31% less per building than if double-pane windows, rigid foam, and furring strips for rain screens were installed.

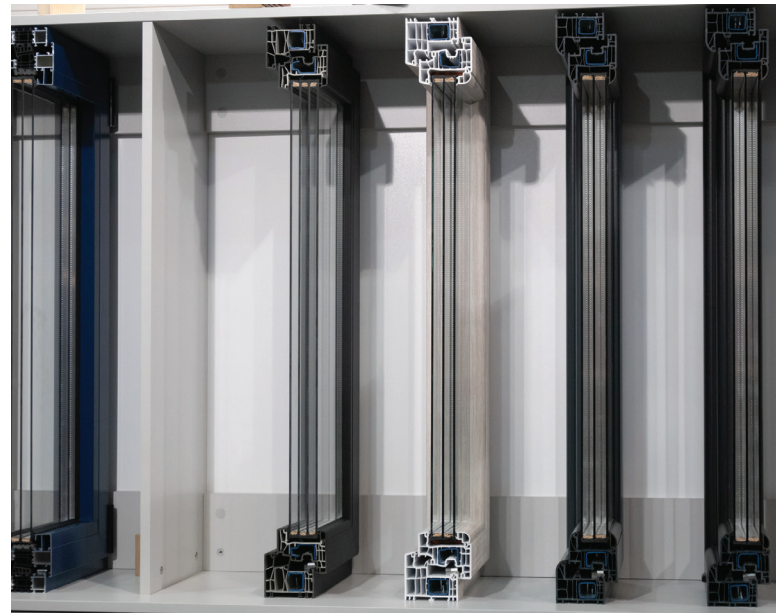
⁴Hart, R., Selkowitz, S. & Curocija, C. Thermal performance and potential annual energy impact of retrofit thin-glass triple-pane glazing in US residential buildings. *Build. Simul.* 12, 79–86 (2019). <https://doi.org/10.1007/s12273-018-0491-3>

FUTURE PLANNING

An added benefit of using triple-pane windows in new construction and retrofits is they help builders meet or exceed construction requirements. For instance, the [ENERGY STAR® version 7.0 Residential Windows, Doors, and Skylights](#) specifies a U-Factor range of 0.26–0.22 for windows in the Northern Climate Zone. Triple-pane windows not only align with the specification and where the market is headed but can play an important role in plans to improve the overall efficiency of a building.

MARKET AVAILABILITY

Many well-known brands carry variations of triple-pane windows with U-Factors of 0.22–0.15 as part of their standard line, with product lead times on par with double-pane windows.



For more information on the benefits of high-performance triple-pane windows, please contact info@betterbuiltnw.com or visit [BetterBuiltNW.com](https://www.BetterBuiltNW.com).