



Vacuum Insulated Glazing

Technology Overview

Inefficient windows in a building can negatively impact occupant comfort, energy efficiency, and the building's carbon footprint.¹ Replacing older glazing systems with new, high-performing ones is often complex, cost-prohibitive, and disruptive to building operations, and payback periods tend to be long.

Vacuum insulated glazing (VIG) is the same thickness as older single-pane windows and can replace the glass without having to remove the original, often historic framing. VIG minimizes the overall embodied carbon required to upgrade windows by reusing much of the existing framing and adding only minimal glazing components. The technology uses a 1/2" gas space to simulate insulation properties, improving acoustics and occupant thermal comfort and creating a more energy-efficient window. The inorganic edge seal employed in VIG extends the lifespan of the window beyond that of traditional insulating glazing units (IGUs), which can fail after 15 years.

Why is GSA Interested?

The manufacturer estimates that this technology can provide 10–20% whole-building energy savings from single-pane windows. The technology is long-lived and more durable than conventional IGUs. It has the potential to increase insulating value (up to R14) and achieve carbon negativity in less than 6 months. The manufacturer estimates VIG can last for 40 to 50 years and provide payback in less than 15 years.

Deployment Potential

This VIG technology is well suited for older and historic buildings and meets State Historic Preservation Office requirements. It will have the biggest impact on buildings in cold climates with single-pane windows.

¹ DOE EERE: Windows Key to Increased Energy Efficiency in Buildings and Achieving Clean Energy Economy, <https://www.energy.gov/eere/buildings/articles/windows-key-increased-energy-efficiency-buildings-and-achieving-clean>, accessed 05-2023.

Green Proving Ground (GPG), in collaboration with the U.S. Department of Energy, is evaluating the real-world performance of vacuum-insulated glazing in federally owned buildings within GSA's inventory. The technology will be provided by Pilkington North America and coordinated with other ongoing evaluations of this technology.