



Automated Air Sealing

Technology Overview

Air leakage is a significant driver of energy use within buildings, in some instances being the largest driver of heating and cooling loads. This technology seals the building envelope by pressurizing it, using a modified blower door, and then distributing an atomized non-toxic water-based sealant that is automatically drawn to leaks. System software monitors the temperature, air pressure, and humidity of the space while controlling the distribution of sealant and recording progress in real-time. Before the automated system is deployed, all finished horizontal surfaces, as well as openings that shouldn't be sealed, are covered. The space is then pressurized, and a wireless mesh network controls an array of nozzles and distributes sealant by following the air leaking from the building. The sealant particles, which are ultra-low volatile organic compounds (VOCs), with no off-gassing, build on each other incrementally, closing envelope leaks to the degree specified by the system software. The system creates a digital record, tracking air leakage before and after treatment. Once the sealing procedure is complete, the space can be re-entered within 30 minutes.

Why is GSA Interested?

A tightly sealed building can reduce mechanical loads, decrease HVAC capacity requirements, and save energy. It can also improve indoor air quality and increase occupant comfort by preventing unwanted moisture, dust, allergens, and pollutants from penetrating interior spaces. GSA regularly renovates tenant spaces. Such a technology, assuming it proves out, could become a routine part of the renovation process.

How Will Success Be Measured?

The testbed design will assess three key manufacturer claims: HVAC energy savings, the accuracy of envelope sealing and the ability to seal leaks from 0.001 inch to ½ inch, and payback of less than 5 years.

Additional criteria to be evaluated include ease of use and no adverse impacts on building systems.

Deployment Potential

This technology will be the easiest to deploy in new construction or major renovation. However, this pilot evaluation will also gauge the technology's ease of use in occupied space.

Green Proving Ground (GPG), in association with a Department of Energy national laboratory, is evaluating the real-world performance of Automated Envelope Sealing in federally owned buildings within GSA's inventory. The technology will be provided by Aeroseal (Miamisburg, OH) and coordinated with other ongoing evaluations of this technology.