



Automated Aerosol-Based Duct Sealing

Technology Overview

The American National Standards Institute (ANSI) and the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) estimate that approximately 75% of commercial buildings experience air duct leakage in the range of 10–25%.¹ This leakage puts a strain on heating, ventilation, and air conditioning (HVAC) systems, leading to increased energy consumption. To put it simply, air conditioners and furnaces are comparable to the human heart, circulating air through the building like blood through arteries. If there are leaks in the ducts, the HVAC system operates less efficiently. Detecting and repairing duct leaks manually can be challenging and inefficient due to their hard-to-reach locations. As a result, these elusive leaks often persist, forcing HVAC systems to continue working suboptimally and consuming more energy than necessary.

From a single access point, the automated aerosol-based duct sealing technology is automatically drawn to leaks. The technology seals holes and seams in ductwork up to 5/8" with a non-toxic, non-flammable sealant. The sealant is aerosolized into 4–10 micron-sized particles and distributed under pressure throughout the duct system. The particles deposit only at leak sites, and the amount of seal can be specified through the software-based system, which continuously measures airflow and leakage throughout the sealing process.

Why is GSA Interested?

Many GSA buildings have ductwork that's over 50 years old and often goes without replacement. Beyond straining the HVAC system, leaky ducts can pull in more dust and moisture, raising indoor humidity and promoting mold growth within the ducts themselves. This technology aims to address these issues by effectively sealing holes or seams in existing ductwork, reducing the strain on ventilation systems, improving indoor air quality, and saving energy.

The manufacturer estimates that this technology could potentially reduce HVAC duct leakage by 95%, cut HVAC energy consumption by 2–4%, decrease fan energy/horsepower by 32%, and offer a payback period ranging from 2 to 7 years. When used alongside a new air handling unit (AHU), the automated aerosol-based duct sealing technology can lower first costs and prolong the AHU lifespan.

Deployment Potential

This technology is applicable across the GSA portfolio. It will be most beneficial to older buildings with larger ventilation loads and hard-to-reach ductwork.

¹ANSI/ASHRAE/IES Standard 215-2018. Method of Test to Determine Leakage of Operating HVAC Air Distribution Systems, <https://www.ashrae.org/news/esociety/new-updated-standards-june-2018#:~:text=for%20HVAC%20Systems,-ANSI%2FASHRAE%20Standard%20215%2D2018%2C%20Method%20of%20Test%20to,operating%20HVAC%20air%20distribution%20systems,> accessed 08/2023.

Green Proving Ground (GPG), in collaboration with the U.S. Department of Energy, is evaluating the real-world performance of aerosol-based duct sealing in federally owned buildings within GSA's inventory. The technology will be provided by AeroSeal and coordinated with other ongoing evaluations of this technology.