

The Importance of Duct Leakage Testing

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Air duct leakage should be a concern to everyone that touches a building or home, from the design engineer, architect, and installer to the commissioning agent, building owner, and occupants. An inefficient and ineffective duct work system for supply and return air is not sustainable and will not perform to its design. Instead, it will increase costs and energy usage, decrease system performance and create indoor air quality issues.

Leaks in forced air duct systems are recognized as a source of energy waste in both new and existing buildings and homes. Studies indicate that duct leakage can account for as much as 25% of the total energy loss, and it may have a greater impact on energy use than air infiltration through gaps or leaks in the building envelope.

Leaky ducts can increase air conditioning and heating bills, reduce equipment capacity and performance, and may result in indoor air quality (IAQ) problems. While the consequence of leaky ducts can be found in many areas, some of the most common outcomes include:

- Building depressurization from duct leaks and imbalanced duct systems can cause combustion products to vent back into the building.
- Supply duct leakage causes conditioned air to be dumped into the crawlspace, open plenums, and ceilings instead of distributed back to through the system.
- Return duct leakage pulls outside air into the duct system reducing efficiency and capacity.
- In humid climates, moist air being drawn into return leaks can and will reduce the dehumidification capacity of the HVAC system and create a clammy environment indoors.
- Leaks in the return ductwork draw air into the building from the ceilings, open plenums, crawlspaces and bring with it dust, mold spores, insulation fibers and other contaminants.

Duct leakage testing involves pressurizing the duct system with a calibrated fan and measuring the air flow through the fan and its effect on pressurizing the duct system. A tighter duct system means that less air is required from the fan to create sufficient duct system pressure. Duct leakage measurements are used to diagnose and demonstrate leakage problems, estimate efficiency losses from duct leakage, and certify the quality of duct system installation.

Maintaining an efficient and effective duct system is imperative, as a building's HVAC systems can contribute to nearly 40% of a buildings annual energy usage. Even counteractive, energy-efficient solutions, such as high efficiency equipment and the latest design techniques, are futile if the core duct system is not operating effectively. Testing and verifying the duct system is a very important aspect in the buildings efficiency in order to ensure system optimization. ■