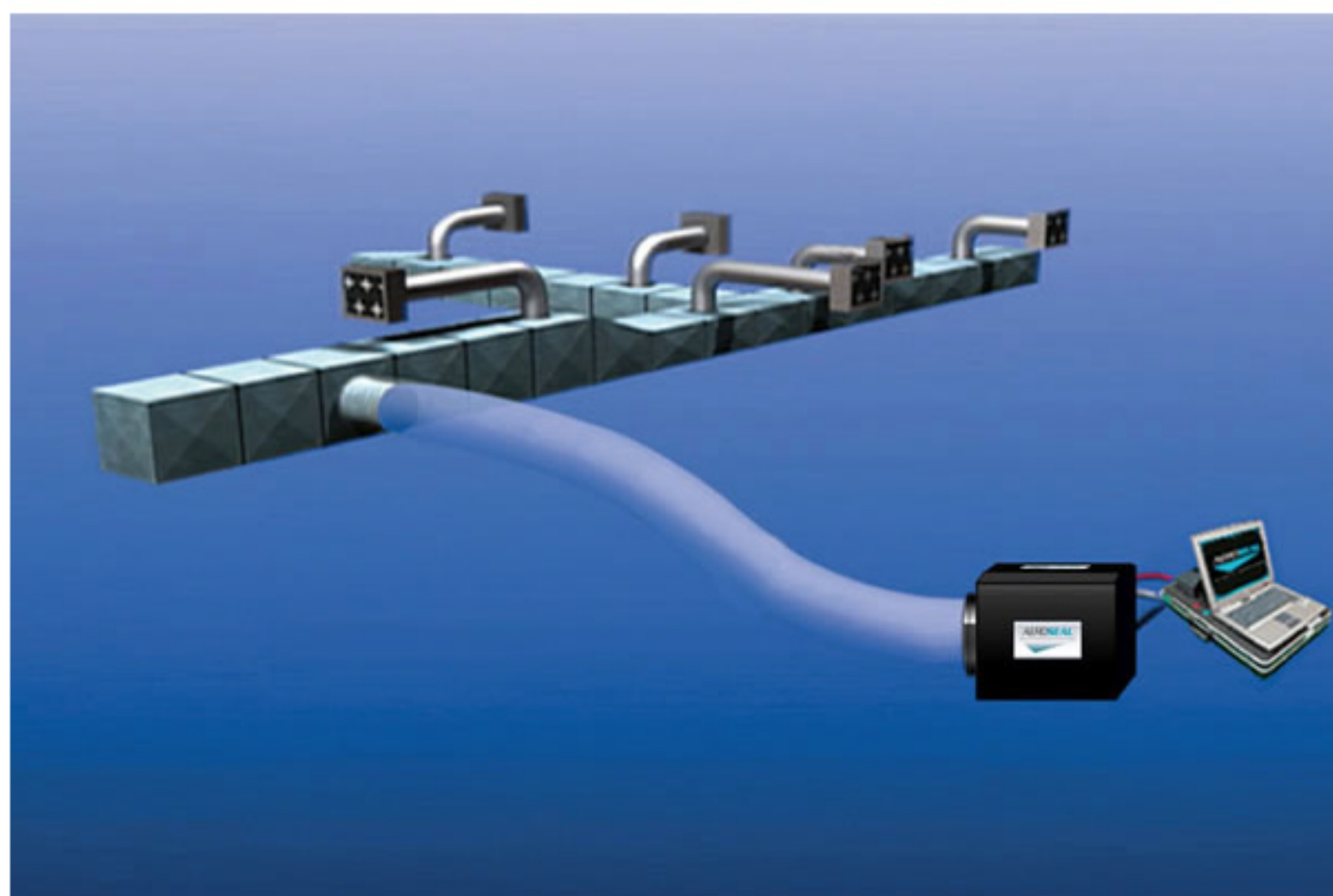


## Duct Leakage: AeroSeal Provides an IAQ Breakthrough

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The Center for Disease Control (CDC) estimates that 2 out of 3 indoor air quality problems involve the HVAC system – both the heating and air conditioning side of the equation as well as the more obvious component involving ventilation. In fact, an overwhelming amount of IAQ problems can be traced directly to duct leakage.

Leaks in supply ductwork can cause an excessive amount of negative pressure within the home or building envelope. This increased pressure causes air from surrounding areas – it may be the outdoors, a wall cavity, attic, or garage — to be drawn back into the living space. That air often contains dust and other contaminants, which now become airborne and easily spread throughout the house.

Duct leakage in an exhaust chase could lead to other ramifications. Like trying to suck liquid through a straw with a hole in it, leaky ventilation ducts severely limit the effectiveness of the exhaust system. This in turn promotes the growth of mold and mildew, and limits the elimination of smoke, odors and other air contaminants.

Given the huge impact that duct leaks play in promoting poor IAQ, duct sealing is often the single most effective means of making IAQ improvements. Unfortunately traditional manual duct sealing is more often than not, woefully ineffective at having any significant impact on IAQ concerns.

Traditional duct sealing involves manually locating and sealing the leaks from the outside of the duct wall using metal duct sealing tape or mastic. Unfortunately, there are several issues related to these methods that make them less-than-ideal.

On new ductwork, manual sealing is contingent upon the quality of workmanship done by the sealers. The individual duct sections are usually first assembled piece-by-piece on the ground, sealed and then lifted into place. Once installed, the ductwork can be tested for leakage – not before. If workers didn't do a sufficient job of sealing the first time, the manual sealing process must then be repeated (now with the ducts in place) and then retested. Oftentimes, this requires several attempts, a process that usually proves to be quite time consuming and expensive.

When it comes to existing ductwork, traditional duct sealing methods are particularly problematic. The biggest concern is access. Most of installed ductwork is hidden behind walls, under ceilings or other inaccessible locations. In such cases, accessing the leaks to seal them by hand often requires major building demolition – tearing down the walls and other structures that obscure access to the leaky ducts.

Along with hidden ductwork, commercial ducts are often wrapped in insulation. Sealing by hand using tape or mastic requires insulation removal and then rewrapping once the sealing process is completed.

Finally, existing building ducts that are not hidden behind walls can still be quite difficult to locate and reach for traditional manual sealing. Ductwork is often installed so close to walls and ceilings that finding the leaks and sealing them with tape or mastic is a difficult project at best.

For all of these reasons, the time, expense and disruption that is associated with duct sealing often makes the prospect of fixing leaks unviable and so, the problem is, more often than not, simply ignored. According to a recent survey conducted by the Building Commissioning Association, 68% of building engineers find that duct leakage rates of 15% or more is a common phenomenon found in U.S. buildings today.

With this reality in mind, the U.S. Department of Energy, along with the EPA and other organizations funded research to develop a viable, cost-effective solution to this critical problem. Then around 1995, researchers at Lawrence Berkeley National Laboratory unveiled an aerosol-based duct sealing technology that would prove groundbreaking for the building industry.

Commercially known as AeroSeal, the new technology works from the inside of the ducts to seal leaks. The computerized equipment used in the sealing process is typically attached to the ductwork via a long flexible tube that extends from the equipment to the ducts. In buildings, the duct connection is either made via entry points found on the rooftop by removing individual exhaust fans (as with ventilation shafts) or via temporary holes made in the side of the duct itself.

As part of the setup process, all of the registers serviced by the ductwork are temporarily blocked so that any air being pushed into the ducts can only escape through leaks. When this is done, the AeroSeal service tech can use the computerized equipment to measure the exact amount of leakage before the sealing process begins.

When ready, the equipment is then used to send an aerosol mist of microscopic sealing particles into the interior of the ductwork. These particles do not coat the entire interior walls but stay suspended in air until they come in contact with the leak(s). Here they cling to the edge of the hole and then to other sealant particles until the entire leak is sealed.

This unique “from the inside” process offers several significant advantages:

- **Accessibility.** Accessing all the leaks is now simple and doesn't require demolition of any kind.
- **Finding.** The process automatically finds all the leaks. With traditional manual sealing, leaks can be overlooked or never identified.
- **Effectiveness.** AeroSealing ductwork is 95% effective at sealing leaks. Studies found it to be as much as 60% more effective than manual sealing.
- **Cost.** Studies found AeroSealing ductwork can reduce both labor time and repair costs by up to 30%.
- **Efficiency.** The computerized AeroSeal process begins with testing and analysis to determine the amount of duct leakage in the system. During the process itself, a computer monitor provides details of the leakage rate as holes are being filled. At the end of each sealing event, the system generates a computerized report that provides an accurate account of the pre and post-seal leakage rate.



This ongoing monitoring and reporting removes the guesswork from the duct sealing process. Unlike manual sealing methods that require retesting each time sealing takes place, the AeroSeal process provides ongoing “live” feedback of the results as the procedure is happening. The final report alleviates the need for TAB retesting and certification at the end of the process.

For decades, issues related to poor indoor air quality in buildings have simply gone unaddressed for one simple reason – an effective, viable solution did not exist. Aerosol-based duct sealing technology changes all that.