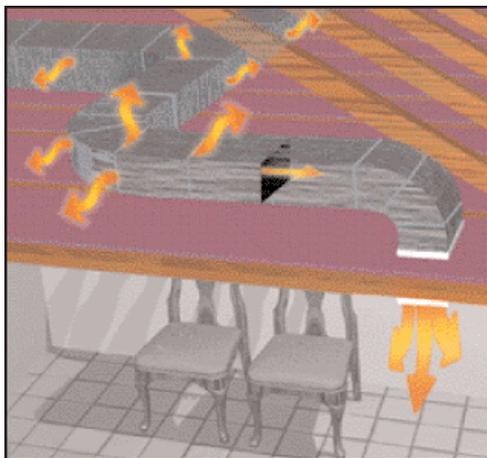
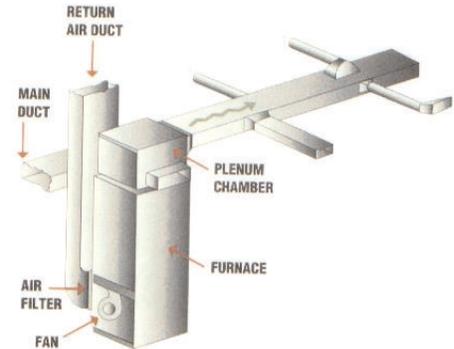


## Increasing Your Duct Efficiency - Existing Homes

One of the most important systems in your home, though it's hidden beneath your feet and over your head, may be wasting a lot of your energy dollars. Thankfully, researchers and builders have developed strategies to reduce the impact of duct leakage. Additionally, energy efficiency experts agree that minimizing duct leakage is one of the most important energy conservation measures they can take. It may provide payback from energy savings and mitigates the health and durability issues associated with duct leakage to and from unconditioned spaces. Unfortunately, many duct systems are poorly insulated or not insulated at all. Ducts that leak conditioned air into unconditioned spaces can add hundreds of dollars a year to your heating and cooling bills. Insulating ducts that are in unconditioned spaces is usually very cost effective. If part of your HVAC retrofit project includes the installation of new ductwork, consider a duct system that comes with insulation already installed.



### Duct Leakage Basics

Your home's duct system, a branching network of tubes in the walls, floors, and ceilings, carries the air from your home's furnace and central air conditioner to each room. Ducts are made of sheet metal, fiberglass, or other materials. Forced-air heating and cooling systems distribute air by means of an air handler and a duct system. The air handler is designed to remove air from the house, condition it, and supply it back to each room. In a perfect setting, the exact amount of conditioned air moved from the air handler enters the conditioned space and is circulated through the return system.

However, duct leakage can occur on either the supply side or the return side of the air handler, as well as in the air handler itself. Both supply and return leaks cause air to move in unforeseen ways, usually through unconditioned spaces, often by-passing air, thermal, and moisture barriers.

**Supply leakage** - When supply ducts leak, it creates a negative pressure in the house because more air is being removed than is being supplied. The negative pressure draws air from outside and/or from unconditioned spaces (infiltration) through holes in the house's air barrier. Supply leakage can lead to the following potentially dangerous situations:

- Back-drafting of combustion devices (water heaters, space heaters, fireplaces)
- introduction of outside air pollution, pollen, and other allergens
- disturbance of in-door airborne particles (such as dust, insulation, and VOCs) from floors, walls, and ceiling cavities
- reduced comfort level (damp or drafty rooms)
- greater conditioning load leading to reduced HVAC system life

Supply leaks also forces conditioned air into unconditioned spaces (i.e. attic or crawlspace) wasting energy and creating the potential for mold growth, condensation, and rot.

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## Increasing Your Duct Efficiency - Existing Homes

***Return leakage*** - When return ducts leak, a significant amount of the return air is drawn from unconditioned spaces and the outside atmosphere rather than from the house. This dirty air often bypasses the air handler's filter system. This leakage creates a positive pressure in the house because more conditioned air is being supplied than return air to be removed. This positive pressure forces air through any cracks or holes in the house's air barrier. Return duct leakage can lead to the following potentially dangerous situations:

- introduction of outside and/or unconditioned air, including moisture, dirt, and pollutants
- reduced comfort level (conditioned air is leaving the house)
- increased conditioning load leading to reduced HVAC system life

### **Reducing Duct Leakage**

Duct sealing is a primary way to decrease duct leakage. Researchers and builders have studied the duct leakage phenomenon for about 15 years and have found that sealing the duct system with a combination of fiberglass mesh and mastic is both inexpensive and cost-effective. Several residential studies have shown that these simple repairs can reduce total duct leakage saving 15%-20% of cooling and heating costs or about \$60 annually. At an installed cost of about \$200, this improvement generally pays for itself in less than four years. The basic premise of this concept is that the air barrier of the duct system needs to be continuous and directly connected to the air barrier of the house.

If you would like additional energy savings tips, please see our energy efficiency section at [www.vectren.com](http://www.vectren.com) or contact us by e-mail at [marketinginfo@vectren.com](mailto:marketinginfo@vectren.com).