RIGHT-SIZED/COMPACT DUCTS

Heating and Cooling System Improvements

Air distribution system ducts are designed to supply conditioned air from heating and cooling equipment to the living spaces and return an equal volume of air from the living spaces back to the heating and cooling equipment to be reconditioned. However, ducts that are not properly designed and installed can result in poor air distribution, bad indoor air quality, occupant discomfort, additional heat losses or gains, increased noise levels, and higher energy bills.

The major goal in duct design is to provide proper air distribution throughout a residence. In order to achieve this in an energy-efficient manner, the ducts must be designed to facilitate air flow and minimize friction, turbulence, and heat loss and gain. The optimal air distribution system has "right-sized" ducts, minimal runs, smooth interior surfaces, and the lease amount of direction and size changes. The overall design and construction of the building envelope will impact the duct system. Figure 1 shows standard residential construction practice where supply ducts are run to the perimeter of a house to offset drafts from cold exterior surfaces, especially windows. Figure 2 shows that homes with tight construction, increased insulation levels, and high-performance windows (e.g. ENERGY STAR qualified homes) do not need the expense of extensive duct runs. This is because wall, window, floor , and ceiling surface temperatures are warmer in winter and cooler in summer and drafts are eliminated.

FIGURE 1: Standard Air Distribution System

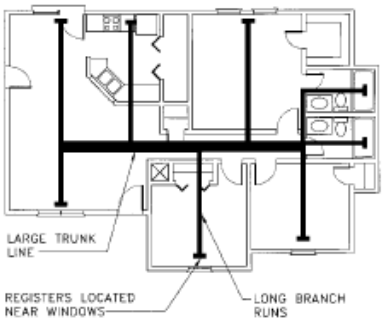
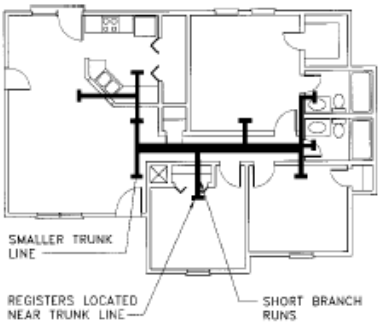


FIGURE 2: High-Efficiency Air Distribution System



BENEFITS

Right-sized/compact ducts can provide many benefits including:

Improved comfort. Right-sizing ducts with a compact system layout helps to ensure that the proper amount of air is distributed to each room at a comfortable temperature. This can result in quicker recovery from night-time setbacks and a more consistent level of comfort throughout a house.

Quieter home. Supply registers, return air grilles, and ducts can be sources of unwanted noise within a home. Undersized ducts can be noisy due to a high volume of air being pushed through an inadequate area. Properly sizing the ducts for required air flow improves the ability of the heating and cooling equipment to distribute air properly with minimum noise. This results in a quieter home.

Lower equipment costs. To compensate for the additional friction, dynamic losses, and heat losses or gains of an ineffective air distribution system, some builders install oversized, more costly heating and cooling equipment. In many cases, a right-sized, compact duct system is less expensive to install and can often allow for the installation of smaller, less costly heating and cooling equipment.

ENERGY STAR® promotes the use of high-efficiency technologies and equipment to help homeowners improve the energy-efficiency of their homes. ENERGY STAR is sponsored by the U.S. Environmental Protection Agency and the U.S. Department of Energy.