

Understanding Energy Star: Furnace Ducting and Return Air Systems

By Stacey Hawkins

Many people know that buying an Energy Star home will save them money on their utility bills, and reduce the negative impact they have on the environment, but to understand why Energy Star homes are the way to go when purchasing a home, it's vital to understand what makes these homes truly more efficient.

Despite the popular myth that creating an Energy Star home is all about increasing a home's insulation, an Energy Star home is essentially a system, made up of many different components that work together to achieve not only energy efficiency, but a healthy, comfortable home.

Throughout the *Understanding*

Energy Star series, Victor Fiume, general manager of The Durham Group and past president of the Ontario Home Builders' Association (OHBA) will explain the components that create an Energy Star Home, including Proper Sealing of the Outside Walls and Roof, Furnaces, Heat Recovery Ventilators (HRVs), Windows, Appliances, Below and Above Grade Insulation, Framing Techniques, Furnace Ducting and Return Air Systems, and Passive Solar Energy Techniques. Homeowners in the resale market can also reap the benefits of energy efficiency by incorporating some of the components into their homes.

This week, the focus is on ducting and return air systems.

The function of duct system in a house is to distribute the conditioned

air to all areas of the house in the amounts that each area requires.

The function of the return air system is to bring air back to the furnace from the different levels of the home and to mix the cooler air from the basement; the hotter air from the second floor along with temperate air from the main floor. The duct work in a home is generally sized to accommodate the greater air flow requirements of air conditioning.

When an Energy Star® home is constructed, the amount of air that is gained and lost is known prior to the home being built, and the exact size of the air conditioner required to cool the home can be determined. Since generally an air conditioner in an Energy Star home is sized smaller than a conventional home, the ductwork is sized to the reduced air flow requirements which means less raw materials are needed to build the home.

In Energy Star homes, all exposed duct work must be sealed. In traditional homes, up to 25 per cent of air that goes through the duct system is lost through gaps and holes in the ductwork and piping.

When designing an Energy Star home, the builder is able to calculate how much conditioned air will be gained or lost in each individual room.

Because each room requires

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a different amount of air flow to maintain a comfortable, consistent temperature, registers are strategically placed for maximum efficiency, and the pipes are sized to allow for the proper amount of air flow needed to heat or cool the room.

Another important factor in maintaining proper air flow and consistent temperature is the return air system. The furnace needs a steady supply of

air behind the fan blades to produce consistent heat. If there is not enough air for the furnace to draw from, it will not operate at its peak performance level.

Since air travels along the path of least resistance, in most homes, the furnace tends to draw a disproportionate amount of air from the basement and main floor, leaving the upper levels with the same air. This is why the second floor is always much warmer than the basement.

Energy Star Homes use stud and floor joist cavities to take air equally from all levels and bring it back down to the furnace fan. Durham Homes uses dedicated pipes to ensure their furnaces get the return air flow t needed. Since the air travels through a pipe, there is no resistance, and the air moves easily from the second floor to the basement.

Next week: Heat Recovery Ventilators (HRVs).

