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The How and Why of Your High Performance HVAC System

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Abstract:

Concise explanation of how a high performance HVAC system works in a high performance home.

The How and Why of Your High Performance HVAC System

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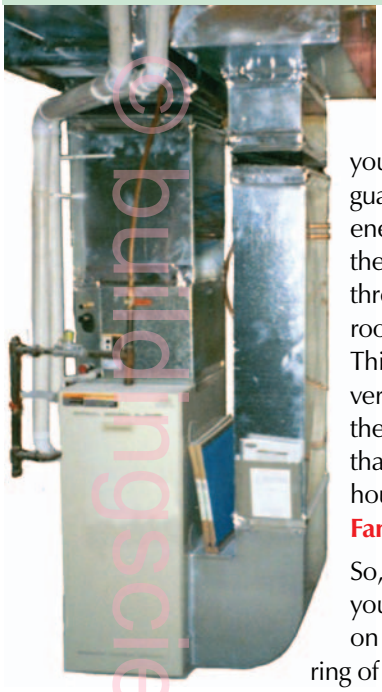
Perhaps the most frequently raised concern from owners of high performance homes is:

How can I be saving energy, money, and wear and tear on my equipment if it seems as though my system is running a lot more than systems in other homes?

The neat thing about the answer to this question is that your high performance home is not only saving you energy, money, and equipment life; it's also delivering more comfort, health, and safety to boot. And you cannot split the pieces of your system up—it's an all-or-nothing performance package. Here is how and why it works for you:



And for those of you with a performance guarantee for your home, this guarantee is for energy bills and thermal comfort throughout every room in your home. This performance is very dependent on the periodic mixing that takes place every hour because of your **FanCycler™** system.

So, the next time your air handler kicks on and you hear the ring of a cash register, remember that it's the ring of savings not of needless spending, regardless of how often your system seems to run. And think about how even and consistent the comfort is throughout your home and throughout the year. Then you should go about the business of enjoying your home while the high performance HVAC system goes about its job of delivering that performance.

1

When you build a **tight thermal envelope**, you get to build in a smaller HVAC system, whether it be your furnace, you're A/C compressor, or your air handler (this is basically the fan motor that moves the heated or cooled air from the unit to the rest of your home). And a smaller system uses less energy than a larger system.

2

When your HVAC is sized correctly, it can be as much as **40% smaller** than the typically over-sized HVAC system. Smaller systems may run longer to achieve the same level of conditioning, but their total energy consumption is still lower. The equipment runs more efficiently and lasts longer if it is not short-cycling. Just like a car's motor, it's in start-up that most of the wear and tear occurs and it runs the least efficiently.

3

Your high performance home is equipped with an outside air intake duct and a fan cycling control that keeps track of how often your air handler has been running. The outside air duct and fan cycling control ensure that a measured amount of outside air is introduced into your home each hour and that all of the air in your home is thoroughly mixed every hour. This is key to controlling indoor pollutants and interior moisture levels, as well as keeping the temperatures even throughout all your rooms. Especially during mild weather, the FanCycler™ can make your air handler run more than air handlers in homes without active fresh air ventilation. And, since the FanCycler™ is pulling in outside air that may have to be heated or cooled, there can be additional energy associated with its use. On the other hand, during these same mild periods, the FanCycler™ may be pulling in outside air that **reduces** energy use because the outside air requires less conditioning (for example, pulling in cooler outside air at night that reduces air conditioning). For a typical 1,500 ft² home[1], the annual energy cost for just the air handler's operation due to the FanCycler™ is somewhere between $33 and $49, depending on your climate.

4

Your home's overall performance—its energy costs, indoor air quality, thermal comfort, moisture control, combustion safety—is based on the HVAC system as a whole. Your builder and HVAC contractor have set up the system for optimal performance. Before you alter the fan cycling control settings, check with your builder or an HVAC contractor with experience in residential mechanical ventilation.[2] You can't take the "V" out of HVAC (**V stands for ventilating** in the Heating, Ventilating & Air Conditioning acronym). Unlike other homes, your high performance home has a dedicated and regimented system for introducing, filtering, and conditioning fresh air.

[1] For the details of how these numbers were generated, see the report on the modeling study on the BSC website: http://www.buildingscience.com/resources/mechanical/ventilation_centralfan.htm.

[2] Your builder may have decided, or you may decide, that the initially higher building product emissions in your new home — from paints, cabinets, furnishings — justify fan cycling control settings that introduce more outside air for a "break-in" period. This will result in a small one-time energy penalty if the fan cycling settings are subsequently re-set for more long-term and regular control of indoor pollutants.

U.S. Department of Energy Building America Program Partner
Building Science Consortium Architecture and Building Science

Direct all correspondence to:
Building Science Corporation, 30 Forest Street, Somerville, MA 02143

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