Technical Explanation

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Power Zoning – What it is and How it Works

Power Zoning is a year round green, energy saving solution that solves three major challenges found in most residential structures.

- The #1 household energy problem in is uneven heating and cooling.
- The #1 electrical expense in the home is running the air conditioning in the summer.
- The #1 gas expense in the home is running the furnace in the winter.

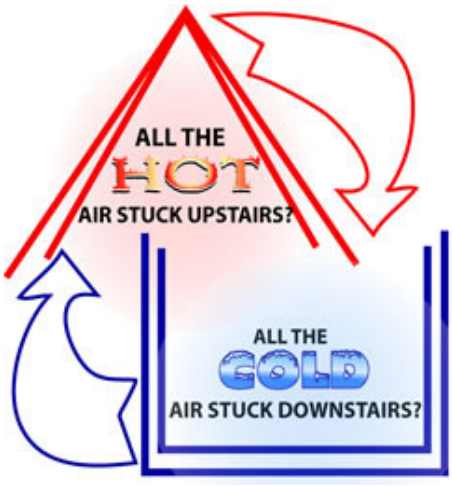

Figure 1 – Air Flow In the Structure

Airflow plays a particularly strong role in cause and effect for all three. Power Zoning addresses these issues in the home during the heating/cooling run cycle as well as the off cycle. Improperly designed and installed duct systems with weak Airflow characteristics will not maximize conditioning of the living space. Timely and efficient transfer across the elements (heat exchanger / evaporator coil) in the air stream is also dependant upon rapid and forceful Airflow. The same weak Airflow characteristics lower the effectiveness and efficiency of the elements. Again, the comfort levels are poor, and operating expenses are high.

When consumers ask us what power Zoning is, it more or an airflow energy clean process and strategy rather than a single apparatus. Because each structure is different, each installation will vary in the materials used to effectively power Zone the house. The Power Zoning Process is the combination of the four combined elements of:

1. ADDED AIRFLOW CAPACITY TO THE APPLIANCE
2. PROPER PLACEMENT OF RETURN AND AIRFLOW SYSTEMS
3. DUAL COOLING AND HEATING ALTERNATIVES
4. BAROMETRICALLY CONTROLLED PRESSURIZATION OF THE STRUCTURE

I. ADDED AIRFLOW CAPACITY TO THE APPLIANCE

According to the manufacturers of household air moving equipment, lack of sufficient return air is the #1 reason for the poor performance of appliances in the field. There is no way to attain rated AFUE's , SEER's, or efficient comfort levels with restrictions in the Airflow system. Blower motors operate under static friction configurations. If there are high static conditions on both the intake and delivery sides of the duct system, plus the restrictions caused by the two elements in the air stream, then there is loss of comfort and efficiency.

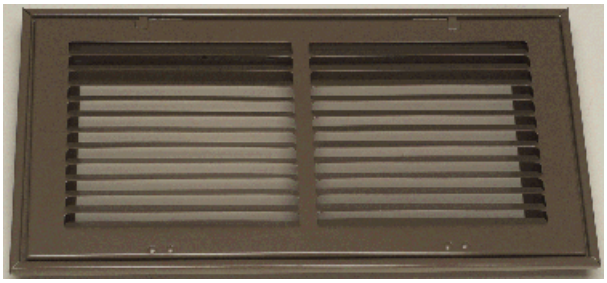

Figure 2 – Added Filter Grill to Appliance

Power Zoning provides a large secondary return air duct to the air moving appliance. This allows the whole system to breathe easier and perform better. In other words, this secondary duct adaptation configured immediately at the blower cabinet and terminated as directly as possible into the living space greatly reduces the static resistance on the return side of the duct system. This allows more efficient transfer across the elements and more powerful Airflow on the supply side. The appliance is now operating at the high end of the manufacturer's design specifications. This results in highly improved comfort and efficiency.

II. PROPER PLACEMENT OF RETURN AND AIRFLOW SYSTEMS

Return air placement can be crucial to the overall effectiveness of the air distribution system. As important as the large ducted return at the appliance in the lower level is to the process, there is another equally important consideration. The upper level must have a series of high returns in every room. These high returns are essential to the accelerated de-stratification and mixing approach on that level. Thermodynamics dictate that cold air falls and hot air rises. To successfully de-stratify the top of the structure properly with the Power Zoning method, there is a predetermined process. One of the lower return functions is to over-pressurize the upper level to force the hot stratified layer to dislodge and mix. In order to achieve this successfully, it is also important to close the doors to those areas. This creates a temporary zone for the supply air to replace the stratified air as it is forced out the return opening. In many homes, the bedroom returns are low or more often non-existent. If low, an effort is made to raise them up. If non-existent, a set of transom (transfer) grills are cut in, usually above the door. When the door is closed, this allows for the creation of a zone that can be over-pressurized and de-stratified in a very short period of time.

Figure 3– Properly Placed Air Supply and Return

III. DUAL COOLING AND HEATING ALTERNATIVES

Typically, the secondary return is terminated into the living space in the lowest level of the home where the furnace is located. This space is normally subterranean and very stable. During the cooling season, this lower area naturally becomes a collection vat for cooler, heavier air. Since the appliance blower draws from the closest source, it can immediately collect this latent source of cooling and forcefully redistribute it throughout the structure to assist in the cooling process whenever the cooling system cycles on. But, more importantly, this geothermal cool air can be redistributed anytime to reduce the need for operating the cooling equipment. By de-stratifying the house in this manner, and with the accelerated Airflow through the duct system, the result is better comfort and efficiency.

As noted above, the secondary return air intake is typically positioned in the stable basement area where, in the winter, the temperature is much higher than the outside conditions. When the heat cycles on, the air from this level is once again collected and accelerated across the heat exchanger for redistribution throughout the house. Due to this accelerated Airflow, the house de-stratifies and the hotter air at the top is forced to mix more evenly, again assisting the heating system when it is operating. More importantly, when the upper levels are allowed to be solar collectors on sunny winter days with the window coverings open, these heating btu's can be redistributed at that time to reduce the need for the heating operation. Comfort is improved, and expense is reduced.

IV. BAROMETRICALLY CONTROLLED PRESSURIZATION OF THE STRUCTURE

Due to the required pressurization of burners and flues for safely reasons, a house has to have a certain amount of infiltration. Not enough can be risky, whereas too much is overkill. Homes operate furnaces in the winter when the indoor pressure is much lower than the outdoors. That's when the need arises. Since the home is under higher pressure than the outdoors in the summer, there is no need for infiltration, and the activity rate in and out of the structure is usually higher. With Power Zoning, needed pressurization is only introduced through a barometrically censored intake incorporated

into the return air duct. With this device, air is introduced only on an as-needed basis. Again, this keeps expenses to a minimum and comfort to a maximum.

Figure 4 – Barometrically Controlled Pressurization Control Unit

Resulting Benefits

RECYLCLING OF STRATIFIED ENERGY

Power Zoning eliminates the problem of stratified energy by increasing the airflow. Stratified energy results in uneven air temperatures in the structure.

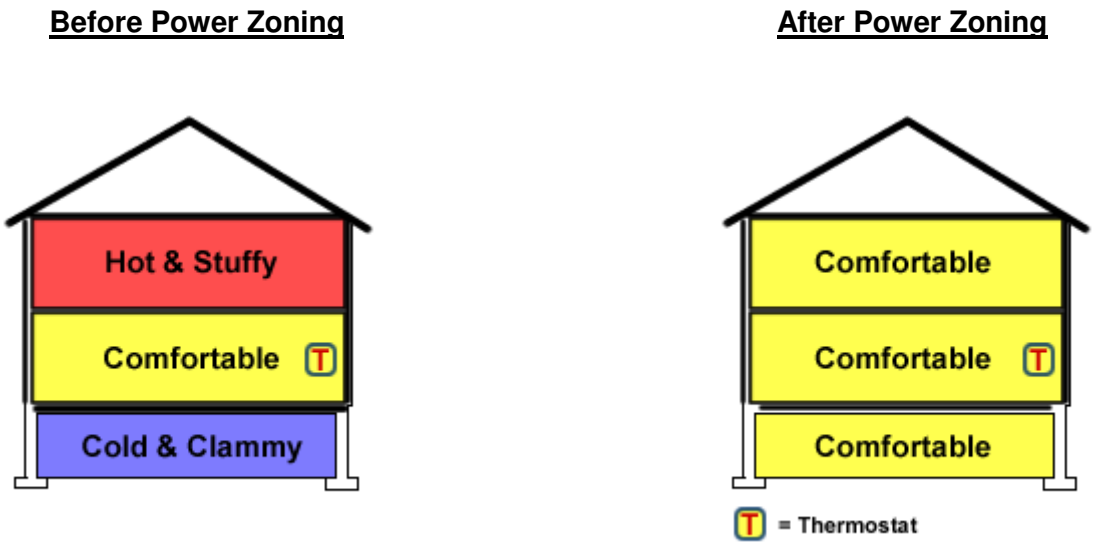

Figure 5 – Elimination of Stratification

LOWERING OF ENERGY BILLS

Power Zoning has demonstrated energy savings that range from 30% to over 40% for heating and cooling costs. Power Zoning is about to embark on a university study to prove out the energy savings.

IMPROVED AIR QUALITY

Through the accelerated agitation provided by Power Zoning and the added filters in the air stream, the indoor air quality is vastly improved. With existing systems, the ability to treat stagnated air is non-existent unless using area by area filtering. Introducing fresh air systematically also helps when the home is sealed up in the winter. In the summer, the vast amount of condensation on the evaporator coil enhances the removal of airborne irritants. With good filtering and agitation, the Power Zoning method creates a more pristine environment.

Historically, the HVAC dealers have concentrated on designing, installing, and operating within a framework of charts, graphs, instruments, and a closed loop system. The Power Zoning method rationalizes beyond that framework and logically incorporates the natural ability and advantages of an added open loop configuration. Along with the traditional electric and gas, the open loop utilizes the two other available energy sources of latent geothermal and active solar. Power Zoning reconfigures the central heating and cooling units to become a manual crossover comfort product for the home.

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