Considerations for Locating, Installing, and Ducting Heat & Energy Recovery Ventilators

APPLICATION GUIDE

POINTS TO CONSIDER WHEN LOCATING THE HRV/ERV UNIT

The Heat or Energy Recovery Ventilator (HRV/ERV) must be installed where temperatures will remain above freezing (32°F). The unit must be installed where it is easily accessible for maintenance and filter changes. The unit should be relatively close to an exterior wall to minimize the length of insulated duct to the exterior vent hoods. The outdoor duct connections must be insulated with a complete exterior vapor jacket to prevent indoor moisture from condensing on the inner duct, which would water-log the insulation layer. The duct connections to the heat exchanger and the exterior vent hoods must be designed to maintain this vapor jacket over the insulation. The fresh air intake must be located approximately six feet or more from any exhaust device, including the discharge from the HRV/ERV. It should not be installed where noxious gases from outdoor sources are likely to be present, such as the exhaust of an automobile in a driveway.

DUCTING TO THE INTERIOR SPACES - EXHAUST AIR CIRCUIT

American Aldes recommends using the HRV/ERV to ventilate bathrooms and non-cooking, low exhaust areas in kitchens, pantries and laundry rooms, provided that the duct runs can be accomplished within the recommended distance and availability of wall and ceiling/floor cavities or special chases. If this is possible, the HRV/ERV can do double duty as the local exhaust of these spaces and as general indoor air quality throughout the dwelling. In addition, quiet ventilation of these areas is assured by the remote mounting of the ventilator.

FRESH OUTDOOR AIR CIRCUIT

Fresh supply air should be ducted to the bedrooms and main living areas (bedrooms with an attached bath that is being exhausted do not require a dedicated supply, as fresh air will be drawn through the bedroom to the bathroom).

AMERICAN ALDES DOES NOT RECOMMEND CONNECTING TO FORCED-AIR DUCTING. Contrary to the recommendations of most manufacturers of heat and energy recovery ventilators, American Aldes strongly discourages drawing exhaust air from the return HVAC ducting and supplying the fresh air directly into the HVAC duct system. In the case of both heating and cooling systems, connecting to the ducting can result in severe imbalance of supply and exhaust airflows as the HRV/ERV operates on low to high speeds, as well as the variable speed operation of modern furnaces and air conditioners. It is virtually impossible to assure the design airflows will remain in balance when the two systems are operated at varying blower speeds, and the result is a large variation of static pressure in the HVAC ducting system.

The exhaust fan in the HRV/ERV is working against the negative pressure in the return plenum. If the return plenum pressure is sufficiently high with the HVAC blower running, it can reduce or even stall the exhaust airflow. At the same time, if the HRV/ERV supplies air to the return plenum, the supply blower has the assistance of the HVAC blower to supply excess fresh air whenever the HVAC system is operating. This situation makes it difficult to assure the HRV/ERV will remain in balance.

If the HRV/ERV is set up to operate only with the HVAC system, then mechanical ventilation is not provided when most needed – in milder weather but when windows remain closed. Ventilation is likely to be excessive in severe weather when the air handler operates more frequently.

POINTS TO CONSIDER REGARDING CONTINUOUS OPERATION OF THE HVAC OR FURNACE

NOTE: American Aldes uses the term furnace to refer to a forced air heating system and HVAC to refer to a forced air heating and cooling system. In climates where no air conditioning is required, it is possible to exhaust from and supply to the furnace return and operate the furnace blower continuously (although there may be a significant electrical penalty for the continuous operation of the furnace blower 24 hours per day).

Continuous operation of the HVAC blower is strongly discouraged in climates with warm summers and high humidity, whether or not fresh air is introduced to the system. If the blower continues to run for extended times after the cooling thermostat is satisfied, the water remaining on the coil and in the drain pan re-evaporates. During this time, the air continues to be cooled by the cold AC coil and by the evaporation of water, so the space temperature continues to decrease, while the relative humidity increases. On the next cooling cycle, this humidity has to be condensed again, so any efficiency gain in evaporating this water is offset by the next cycle and by the loss of comfort at higher relative humidity.

More importantly, in the case of air conditioning, American Aldes does not recommend ducting the supply air from the HRV to the

ducting of the HVAC. (During summer months, the outdoor humidity supplied through the HRV may cause condensation on interior surfaces of the HVAC equipment and the supply plenum and ducting. These surfaces will be around 60°F, and outdoor air dew points in the summer in much of the United States are well above this temperature. These are the very conditions that promote mold growth. It would be ironic if the very system tasked to provide good indoor air quality by means of ventilation were to be the means of promoting mold growth, by lack of attention to basic psychrometric principles.

THE SOLUTION RECOMMENDED BY AMERICAN ALDES

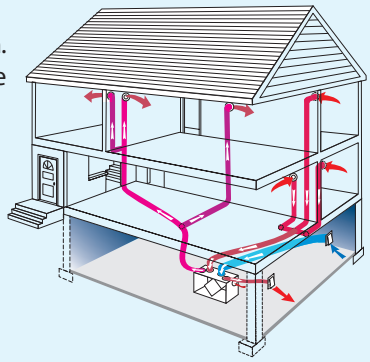
The best solution is a totally independent ducted system for the HRV/ERV, with exhaust from the bathrooms, kitchen and laundry/utility rooms, and fresh air ducted to bedrooms. (Bedrooms with attached baths connected to the HRV/ERV exhaust ducting do not need direct supply, as the exhaust of the bath will draw air from the main living areas and hallways through the bedroom to the bathroom exhaust grille.)

An alternate solution permits fresh air from the HRV/ERV to be supplied to a main living area, where it can be drawn into the return ducting and distributed by the HVAC system throughout the house. A cycle timer can operate the HVAC blower periodically to assure the distribution of fresh air. A cycle timer permits the use of the HVAC system to distribute the fresh air without the need for a dedicated supply duct system. Rather than making a hard connection of the supply air to the return duct of the HVAC system, American Aldes recommends supplying air through a supply diffuser close to a major return grille for the HVAC. This way the fresh air is dispersed in the room, avoiding a high concentration of outdoor humidity in the cold ducting.

To assure thorough mixing of fresh air throughout the home, use a cycle timer to periodically turn on the HVAC blower a few minutes every hour. This device wires in parallel with the thermostat to periodically operate the blower. It avoids redundant fan operation by starting a timed off-cycle at the end of blower operation for a heating, cooling or previous ventilation cycle. Then it turns on for a few minutes, as set by the installer or occupant. This approach reduces the electrical cost of constant fan operation and reduces draft during the winter, all while assuring good mixing of fresh air throughout the home. (If the occupant intends to operate the central fan continuously, as for an electronic air cleaner, and in those cases where the issues discussed above regarding humidity, comfort and potential of mold growth in the ducting do not apply, then the use of a cycle timer is not necessary.)

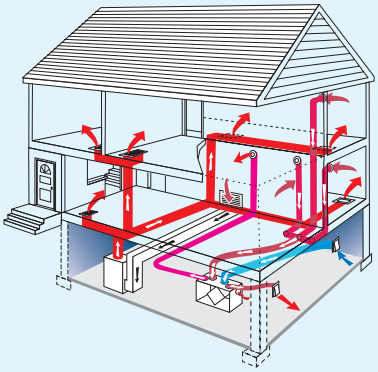
Fully Ducted System

The most desirable configuration. Highly recommended to get the best results in all climate types.



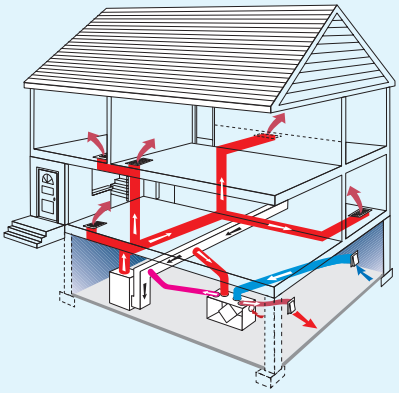
Dedicated Exhaust Points with Distribution of Fresh Supply Air through the Central H/AC System

A hybrid approach that allows the system to be an effective exhaust fan, while taking advantage of the central H/AC duct system to distribute fresh air. Maintaining unit balance is often challenging.



Exhaust from H/AC Return and Distribution of Fresh Air through H/AC System

The least desirable solution because it is difficult to assure balanced airflow and can cause moisture problems in duct during warm, humid seasons. Requires knowledgeable installer.



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