Home Certification Requirements for Whole Building Mechanical Ventilation

This Technical Bulletin introduces the four strategies of whole building mechanical ventilation. The purpose of whole building mechanical ventilation is to maintain acceptable indoor air quality with equipment that is programmed to ventilate at a rate appropriate for that house. Earth Advantage and Energy Trust of Oregon's new homes program follow the national ventilation code found under ASHRAE 62.2.2010. You must incorporate one of these four strategies to meet the whole building mechanical ventilation requirement in ASHRAE 62.2010.

To meet Earth Advantage prerequisite 5.1.8 Fresh Air Mechanical Ventilation, Earth Advantage technical field consultants will measure the actual airflow rate of the fans at the final inspection and program the ventilation controls as needed. The amount of whole building mechanical ventilation required is determined using a formula that takes into consideration the conditioned square footage of the building and the potential number of occupants.

WHOLE BUILDING MECHANICAL VENTILATION

Requirements common to all ventilation strategies

- The formula is: **(total square footage of the home/100) + ((number of bedrooms+1) X 7.5 cfm)**. For example: a 2500 square foot house with 3 bedrooms needs (2500/100) + ((3+1) X 7.5) = 25 + 30 = 55 cfm of continuous mechanical ventilation. Continuous ventilation runs 24 hours a day, 7 days a week.
- Airflow must be measured to +/- 15CFM or +/- 15% of calculated requirement (whichever is greater)
- All ventilation air inlets must be located ≥10 ft. from known contamination sources such as exhaust vents or vehicle exhaust.
- Ventilation air inlets must be located ≥ 4 ft. above grade or roof deck and not obstructed by snow, plantings, condensing units or other material at time of inspection.
- Ventilation air inlets must be provided with rodent / insect screen with ≤ 0.5 inch mesh.
- Ventilation air must come directly from outdoors and not from adjacent dwelling units, garages, crawlspaces, or attics.

1. WHOLE BUILDING EXHAUST SYSTEMS

Description: One of the most simple and common ventilation strategies is to use a whole house exhaust system. Exhaust systems are often installed in centrally located areas and can be a single fan or several fans in different locations, like bathrooms or laundry rooms.

Requirements:

- See requirements common to all ventilation strategies above.
- ENERGY STAR labeled exhaust fan that is rated for continuous operation.
  *EA recommends using fans with DC motors, as DC motors overcome static operation and help assure proper airflow.
- Sone rating must be 1.0 or less.
- Fan must be capable of operating continuously, or intermittently, with commissioned controls.
- There are multiple wiring configurations specified for different fan units that meet this requirement. Always defer to manufacturer's specifications, as the wiring guidelines below may not work for all models.
- For two speed bath fans used for whole building mechanical ventilation and spot ventilation run a 14-3 Romex wire from the wall switch to the fan. The black wire will always be hot and the red wire will be switched. Earth Advantage will program the fan controls (must be able to adjust airflow rate and run time) to meet ASRAE for whole building mechanical ventilation while on hot, while the wall switch will boost the fan to high speed for improved spot ventilation.
- Single speed fans used to meet ASHRAE 62.2.2010 are a risky strategy because the measured air flow rate may not be within +/- 15%, or 15 cfm, whichever is larger, of the required actual air flow for ASHRAE 62.2010. We suggest only specifying fans where the cfm or run time can be programmed at the fan unit. Fans controlled by humidistat or motion detection must also be programmable by cfm or run times.
- If multiple fans are programmed for automatic operation the CFM's of the fans can be added together to meet ASHRAE 62.2.

2. WHOLE BUILDING SUPPLY SYSTEMS

Description: Whole house supply systems are typically used in conjunction with a ducted central HVAC system. Fresh outdoor air is drawn in through the cold air return before the air filter, conditioned and distributed throughout the house. An electronically operated mechanical damper controls when outdoor air is able to enter the system. For optimal performance and comfort, the electronic control system should have a smart damper that is programmable with an economizer mode that favors opening when the system calls for heating or cooling.

Requirements:

- See requirements common to all ventilation strategies above
- The fresh air duct includes an electronic adjustable damper operated by an automatic controller capable of controlling airflow to a rate meeting ASHRAE 62.2 2010 requirements.
- The controller must be programmed to provide airflow to specified ventilation levels at the blower high-speed setting.
- From our experience a 6" to 8" duct with minimum elbows will meet the requirements. Houses greater than 2000 Sq. Ft. or with complicated supply duct runs may not pull in enough outdoor air to meet the minimum air flow rate for that house using a 6" diameter supply duct. Those projects should strongly consider an 8" supply duct.

3. BALANCED SYSTEM WITHOUT HEAT RECOVERY

Description: Introduction of outside air shall be accomplished as per whole house supply system requirements and a separate central exhaust fan sized and installed as per the requirements for exhaust only systems is installed. A pressure balanced ventilation system includes specific controls for both air intake and air exhaust. These two systems can be wired together to operate at the same time or intermittently. Note: exhaust flows and supply flows cannot be added together to meet the total cfm of airflow required to meet the ASHRAE 62.2 2010 requirements.

Requirements:

- See requirements common to all ventilation strategies above
- Follow all requirements for 1 and 2 above.

4. HEAT RECOVERY VENTILATORS (HRVS) OR ENERGY RECOVERY VENTILATORS (ERVS)

Description: HRV/ERV's simultaneously supply balanced fresh air and exhaust stale air throughout the home. These systems can be used to reduce energy loss from mechanical air exchange by tempering incoming air. These systems perform best when installed as independently ducted systems providing fresh air to individual rooms. These systems should be installed in conditioned space and properly commissioned, per manufacturer's specs. Spot ERVs are smaller than ducted HRV and ERV units and have a single point of supply air and exhaust at the face of the unit. Note: exhaust flows and supply flows cannot be added together to meet the total cfm of airflow required to meet the ASHRAE 62.2 2010 requirements.

Requirements:

- See requirements common to all ventilation strategies above

Please contact our Green Certifications Field Manager, Waylon White for further questions regarding the requirements in this document: **503-840-7286 | wwhite@earthadvantage.org**
or speak with your Green Building Consultant