

Appendix C

North Carolina Housing Finance Agency Supportive Housing Development Program Affordable Housing with Energy Star® using *SystemVision*™

1. General Requirements

- 1.1. All buildings must meet Advanced Energy's *SystemVision*™ standards as described below.
- 1.2. All buildings must be certified by Advanced Energy as meeting the *SystemVision*™ standards.
- 1.3. All buildings must meet the criteria to be certified as an Energy Star® compliant by US EPA. (Exclusions may exist for buildings above 4 stories and some rehab)
- 1.4. All standards below shall be included within the development plans and/or specifications. A plan review must be completed by Advanced Energy prior to preparation of the final bid package.

2. Air Tightness

- 2.1. There shall be a continuous, rigid and durable air barrier enclosing the conditioned space. The location of the air barrier shall be indicated on the construction drawings. Examples of details with inadequate air barriers include, but are not limited to:
 - Openings in the framing between outdoor utility or storage closets and conditioned space
 - Access holes for plumbing drains under tubs and showers
 - Uncapped utility chases, dropped ceilings or soffits
 - Lack of backing and proper framing in knee walls adjacent to attic space
 - Behind tub and shower units on exterior walls
 - Unsealed holes through band joists between floors
 - Penetrations and uncapped party walls between units
- 2.2. Building air leakage shall be less than or equal to .30 CFM50 per square foot of conditioned envelope area. Among other areas, this will require attention to air sealing the following:
 - Sub-floor to bottom plate connections
 - Window and door rough openings
 - Attic hatches
 - All electrical, plumbing and mechanical penetrations
 - Other details may be recommended by Advanced Energy

3. Ventilation and Moisture Management

- 3.1. There must be a whole-house mechanical fresh air ventilation system in compliance with ASHRAE 62.2 for each living unit. Compliant systems include:
 - Supply duct tied into return box or plenum of HVAC system (must contain damper and filter; filter must be easily accessible for service); or

- Continuous duty exhaust fan wired to run continuously (such as Panasonic WhisperGreen™, or [Broan SmartSense®](#)); or
 - If applicable, pressurized corridors may provide adequate ventilation in select multifamily buildings
- 3.2. All bathrooms shall have a fan ducted to the outside which, as installed, exhausts at least 50 CFM intermittently (requires a minimum fan rating of 70 CFM)

NOTE: One continuously operating multi-speed bath exhaust fan, which, as installed moves at least 20 CFM on low speed and at least 50 CFM on high speed, may be used to fulfill both sections 1.1 and 1.2.

- 3.3. All kitchens shall have a fan ducted to the outside which, as installed, exhausts at least 100 CFM. (requires a minimum fan rating of 120 CFM)
- Apartment units with two bedrooms or less which use a continuously operating bath exhaust are not required to install vented kitchen range hoods.
- 3.4. All ventilation ducts in unconditioned spaces, excluding kitchen exhaust ducts, shall be insulated.
- 3.5. All ventilation ducts shall terminate at or beyond the exterior skin of the building.
- 3.6. Crawlspace floors shall have 100% coverage with vapor retarder.

4. Insulation and Windows

- 4.1. Insulation contractors must attend field training prior to installation.
- 4.2. Insulation shall be installed to manufacturer's specifications, with no substantial gaps, voids, compression or wind intrusion.
- 4.3. Insulation and the air barrier shall be installed in physical contact with each other.
- 4.4. Attic insulation shall equal R-30 or greater.
- 4.5. Wall insulation shall equal R-13 or greater.
- 4.6. Slabs shall be insulated to code.
- 4.7. Windows and glass doors shall have an overall solar heat gain co-efficient (SHGC) of .35 or less.
- 4.8. Windows and glass doors shall have an overall U-value of .30 or less.
- 4.9. Metal framed windows must contain a thermal break

5. HVAC Sizing and Installation

- 5.1. HVAC contractors must attend field training prior to installation.
- 5.2. Heat pumps shall have a minimum SEER rating of 13 and a minimum HSPF of 7.7.
- 5.3. Central air conditioners shall have a minimum SEER rating of 13.
- 5.4. Heat pumps shall have an outdoor thermostat installed to prevent supplementary heater operation when the heat pump is capable of meeting the load.

- 5.5. All duct connections shall be sealed with a UL listed “bucket” mastic product.
- 5.6. Total duct leakage, measured in cubic feet per minute at 25 pascals, shall not exceed 3% of the conditioned square footage.
- 5.7. Mechanical systems shall be sized to within ½ ton of the ACCA Manual J. ACCA Manual J room-by-room load calculations, including all inputs, shall be submitted for each plan to verify sizing.
- 5.8. The measured airflow for each room shall be within +/- 10% of the ACCA Manual J calculation.
- 5.9. Refrigerant charge shall be installed per manufacturer’s specifications.
- 5.10. Inert gas (nitrogen) shall be used during any brazing/soldering of refrigerant lines.
- 5.11. Indoor and outdoor system components shall be “matched” according to the Air Conditioning and Refrigeration Institute (ARI) directory.

6. Pressure Balancing

- 6.1. All rooms within the conditioned space – except baths and laundry – shall not exceed +/- 3 pascals pressure differential with respect to the outside when interior doors are closed and the air handler is operating. Returns, transfer grilles or jump ducts may be required to balance each room in addition to door undercuts.

7. Energy Star and Appliances

- 7.1. Units shall meet Energy Star® Home requirements, if building type is applicable.
- 7.2. Units shall have Energy Star® labeled refrigerators and dishwashers, if applicable.
- 7.3. Units shall have a minimum of 75% Energy Star® lighting fixtures, or fluorescent lamps. T-8 tubular, circular fluorescents or compact fluorescents are acceptable.
- 7.4. Electric water heaters shall have an energy factor (EF) of at least .93.
- 7.5. Gas water heaters shall have an energy factor (EF) of at least .61.
- 7.6. Recessed lights, if used, shall be air tight and insulation contact (IC) rated.

8. Combustion Safety

- 8.1. Any combustion appliance inside the conditioned space, other than gas ranges and wood fireplaces, must be direct vent or power vented. Vent free gas logs are not allowed.
- 8.2. One hard-wired carbon monoxide (CO) detector shall be installed per bedroom area in buildings which have any combustion appliance within the conditioned space or which have an attached garage. (minimum 1 per floor)

Please Note: Supportive housing building types vary greatly. The above requirements work well with the far majority of housing. However, if design elements or local restrictions make meeting any specific guideline difficult, please contact Advanced Energy’s affordable housing department and reference supportive housing. (Advanced Energy 919-857-9000)