

## ENERGY STAR Guidelines for Modular Housing

### 1. Fenestration & Insulation-

- a. U-Value .32 & shgc .40
- b. Insulation meets RESNET Grade I (Exhibit 1)

### 2. Air Barriers- Fully aligned air barriers at:

- a. Walls behind showers/tubs
- b. Attic knee walls
- c. Walls adjoining porches/garages.
- d. Floors above unconditioned crawlspaces or cantilevered floors.

### 3. Reduced Thermal Bridging

- a. Insulated ceilings with attic above, Grade I insulation extends to the inside face of the exterior wall below.
- b. R-30 Below HVAC platforms and walkways in attic.
- c. At above grade walls separating conditioned from unconditioned, one of the following options is used:
  - i. Continuous R-5 rigid insulation, insulated siding or a combination of the two.
  - ii. Advanced framing
    1. Corners insulated
    2. Headers above windows and doors insulated to R-5 for 2x6 framing R-3 for 2x4 framing
    3. Framing limited at all windows & doors to one pair of king studs, plus one pair of jack studs per window opening to support the header and sill
    4. Interior / exterior wall intersections insulated to the same R-value as rest of exterior wall.
    5. Stud spacing can either be 16 o.c. or 24 o.c. (better)

### 4. Air Sealing with caulk, foam or equivalent

- a. Ducts, flues, shafts, plumbing, piping, wiring, exhaust fans, & other penetrations to unconditioned space sealed, with blocking/flushing as needed.

- b. Recessed lighting fixtures adjacent to unconditioned space are ICAT labeled and gasketed. Also, if in insulated ceiling without attic above, exterior surface of fixture insulated to R-10
- c. Above grade sill plates adjacent to conditioned space sealed to foundation or sub-floor. Gasket also placed beneath above-grade sill plate if resting atop concrete / masonry & adjacent to conditioned space.
- d. Continuous top plate or blocking is at top of walls adjoining unconditioned space and sealed
- e. Drywall sealed to top plate at all unconditioned attic / wall interfaces using caulk, foam, drywall adhesive (but not other construction adhesives), or equivalent material. Either apply sealant directly between drywall and top plate or to the seam between the two from the attic above.
- f. Rough opening around windows & exterior doors sealed.
- g. In multi family buildings, the gap between the common wall and the structural framing between units sealed at all exterior boundaries.
- h. Attic access panels and drop-down stairs are equipped with durable R-10 cover that is gasketed (i.e. not caulked).

#### **5. Heating & Cooling Contractor & Equipment**

- a. HVAC contractor must be credentialed by an EPA-recognized HVAC Quality Installation Training and Oversight Organization (H-QUITO) for any ducted HVAC system. For mini-split / multi-split systems a credential is not required. [www.energystar.gov/newhomeshvac](http://www.energystar.gov/newhomeshvac).
- b. Bedrooms pressure-balancing using any combination of transfer grills, jump ducts, dedicated return ducts, and / or undercut doors to achieve a Rater-measured pressure differential 3 Pa.
- c. All supply and return ducts in unconditioned space, including connections to trunk ducts, are insulated to R-6. Ducts located in attic are insulated to R-8

#### **6. Whole-House Mechanical Ventilation System**

- a. Readily-accessible ventilation override control installed and also labeled if its function is not obvious.
- b. No outdoor air intakes connected to return side of the HVAC system, unless controls are installed to operate intermittently & automatically

based on a timer and to restrict intake when not in use (e.g. motorized damper).

- c. If system utilizes the HVAC fan, then the specified fan type is ECM / ICM, or the controls will reduce the standalone ventilation run-time by accounting for hours when the HVAC system is heating or cooling.
- d. If bathroom fans are used for Whole-House Ventilation, then they must be ENERGY STAR Certified.

## **7. Local Mechanical Exhaust**

- a. Kitchen-
  - i. Continuous:  $\geq 5$  Air Changes per Hour (ACH) based on kitchen volume.
  - ii. Intermittent:  $\geq 100$  CFM and, if not integrated with range, also 5 ACH based on kitchen volume.
- b. Bathroom
  - i. Continuous:  $\geq 20$  CFM
  - ii. Intermittent:  $\geq 50$  CFM

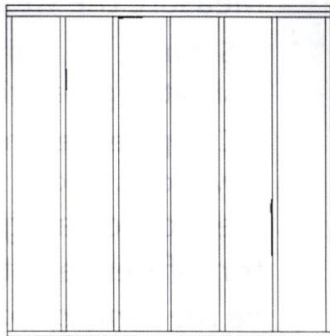
## **8. Filtration**

- a. At least one MERV 6 or higher filter installed in each ducted mechanical system in a location that facilitates access and regular service by the owner.
  - b. All return air and mechanically supplied outdoor air passes through filter prior to conditioning.
9. **Combustion Appliances**-Furnaces, boiler and water heaters located within the home's pressure boundary are mechanically drafted or direct-vented.

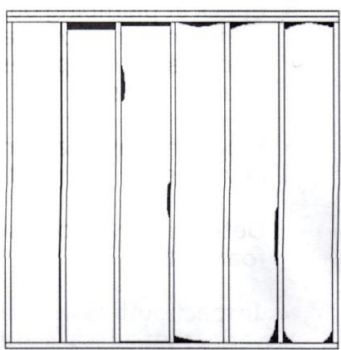
**Prudent Energy  
Systems**

## Exhibit 1

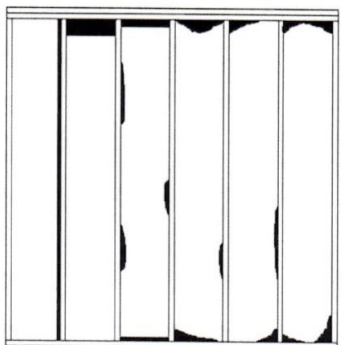
### Insulation Grades



Grade 1 Insulation: Compressed or incomplete fill amounting to 2% or less, if the empty spaces are less than 30% of the intended fill thickness, are acceptable for “Grade 1”



Grade 2 Insulation: No more than 10% of surface area of insulation compressed or incomplete fill, by up to 30% (70% or more of intended thickness is acceptable for “Grade II”



Grade 3 Insulation: Installation with substantial gaps and voids, with missing insulation amounting to greater than 2% of the area, but less than 5% of the surface area is intended to occupy.

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