



NEW HAMPSHIRE ENERGY STAR HOMES PROGRAM GUIDELINES

By incorporating the following suggestions into your plans for a new home you can ensure that your home is maximizing its energy performance.

1. Testing

Must have a performance based (with blower door and duct testing—if applicable) **HERS Index of 80 or lower (lower is better)**, conducted by an accredited home energy rating specialist (**Bruce Bennett, GDS Associates, Inc.**)

(HERS = Home Energy Rating System, a nationally recognized program for determining energy efficiency)

2. Code Compliance

- The home **must** meet or exceed the statewide NH Residential Energy Code and IECC 2006 energy code requirements (NH Residential Energy Code)

3. Building Thermal Envelope and Air Sealing

A high performing energy efficient home consists of a home that is well insulated home with proper air sealing.

- Completed ***EPA Thermal Bypass Inspection Checklist*** (See Attachment). Some of the following items may be redundant with items already on the Thermal Bypass Checklist
- The insulation and the pressure/air barrier **must** be continuous, in full contact with each other and aligned for the home to meet minimum standards. In other words insulation and air sealing are two separate components where the insulation material serves the purpose of reducing conductive heat loss and the air barrier eliminates heat loss through air leakage. Therefore, there are places where air-sealing must occur prior to insulation.
- Caulk / seal framing members such as bottom plates to sub-floor, between double or triple studs, double top plates, gaps in sheathing etc;
- All penetrations through the thermal barrier (walls, floors and ceilings that separate heated and unheated areas) must be tightly sealed with foam, caulk or metal panning. Such penetrations typically include plumbing, electrical, mechanical (ductwork) and chimney penetrations
- All attic hatches **must** have a minimum of 4" rigid foam cover with weatherstripped seals.
- All window and door frames must be sealed in place (between frame and rough opening) using low-expansion insulating foam. (I suggest purchasing a foam gun for better control of the product and more accurate application, rather than straw applicators that come with individual cans)
- All vent terminations **must** be sealed with foam or caulk, high temp caulking where applicable.
- All walls serving as a thermal barrier between the conditioned and ambient conditions **must** be insulated to a minimum of R19 (R21 is recommended)¹. Any walls between heated and

¹ SPECIAL NOTE FOR THOSE CHOOSING TO INSTALL FIBERGLASS BATTS IN WALLS AS AN INSULATION MATERIAL. FIBERGLASS BATTS, ALTHOUGH ACCEPTABLE AS A MATERIAL MUST BE INSTALLED CORRECTLY AND PERFECTLY TO ACHIEVE ITS DESIGNED PURPOSE AND R-VALUE.

- Kraft-faced fiberglass batts **MUST** have the paper flange stapled to the face of the stud and **must NOT** be side stapled this creates a gap between the sheetrock and the insulation material;
- If unfaced batts – a poly vapor barrier must be installed or vapor retardant paint applied to the warm side.
- Fiberglass batt **MUST** be fully lofted (NOT compressed) and completely fill the stud bays on all six sides from front to back, right to left and top to bottom in full contact with no gaps;
- Fiberglass batt **must NOT** be tucked under or behind wires or plumbing, **MUST** be cut to accommodate ALL electrical boxes.
- Fiberglass batts when installed properly provides a moderate insulative quality (R-value per inch), however, it **DOES NOT** stop air flow. The home **MUST** be air-sealed prior, during and after insulation. If air infiltration exists, it will freely penetrate through fiberglass thus reducing a home's efficiency

unheated areas (such as walk-in attic spaces) must be closed on the back side (house-wrap such as Tyvek/Typar is acceptable for this purpose).

- A 6 mil vapor barrier must be installed properly prior to the installation of shower, tub or hot tub assembly on an exterior wall.
- **No fiberglass insulation will be allowed in strapped ceilings where the insulation AND air barrier (typically this is the sheetrock) are not in full contact with one another.** In situations where the strapping has been installed prior to insulation, a blown-in product should be used product (open blown in attics and or blown in blanket (BIB) in walls, sloped ceilings and floors (e.g. over garage). Alternatively, ¾" rigid foam insulation should be cut to fit between the strapping, taking up the ¾" gap created by the strapping.
- Flat Ceilings/Attics must be insulated to a minimum of R38. However, R-49 is often required to comply with the NH Energy Code and the IECC 2006. Sloped ceilings must be insulated to a minimum of R30, however, R38 is usually required to meet code and ENERGY STAR Homes performance requirements. **No fiberglass insulation will be allowed in strapped ceilings where the insulation AND air barrier (typically this is the sheetrock) are not in full contact with one another.**
- Doors between conditioned and unconditioned areas must have weatherstripping and a door sweep. (For example, a door from the heated first floor to an unconditioned basement; or a door from a heated upper level hallway to an unheated walk-in attic area over a garage)
- Use only a rigid foam insulation under slabs (no tarp type insulation).

4. Windows

- Target a window-to-wall ratio of 12% or less. Even the most high performance windows are nothing more than a transparent low performance wall (e.g. a U-value of 0.3 is equal to R3)
- Select energy efficient windows with a U-Value of < 0.35 (lower is better)

5. Moisture Diffusion

- There must be an effective vapor retarder on the winter warm side of all building envelope surfaces walls, floors and ceilings²

6. HVAC Distribution Systems and Mechanical Systems

- Boilers should have an annual fuel utilization efficiency (AFUE) rating of 85% or greater
- Furnaces should have an annual fuel utilization efficiency (AFUE) rating of 90% or greater
- Central AC equipment must have an efficiency of 13 SEER or higher and can not be sized more than 25% more than the designed cooling load.
- Stand-alone water heaters must have an energy factor (EF) of .60 or higher.
- All Supply and Return ductwork **must** be tightly sealed with mastic or foil tape (not duct tape) – ***all ductwork will be pressure tested and homes that have a duct leakage rate >6 CFM per 100 sq ft of conditioned space will fail to meet the ENERGY STAR guidelines, so it is VERY IMPORTANT to ensure that the duct work is tight. For example, a 1000 s.f. home can have no more than 60 CFM of duct leakage. All duct systems will be pressure tested to determine leakage.***
- All Supply and Return ductwork **must** be dedicated ductwork (DO NOT USE BUILDING FRAME SUCH AS WALL-STUD CAVITIES, FLOOR JOIST CAVITIES AS DUCTWORK)
- All Supply and Return ductwork must be located with the insulated part of the home (and no air handlers in unconditioned attics). Ductwork in unconditioned attics can be buried within the blown-in insulation but must also have duct insulation of a minimum R5.
- Duct boots that penetrate the sub floor **must** be sealed to the subfloor.
- If Flexduct is used, it can not be kinked or compressed.
- All heat and hot water pipes in unconditioned spaces **must** be insulated to a minimum of R4.
- Boilers, water heaters and air handlers should be located within the thermal boundaries of the home. (i.e. insulate the slab and the foundation walls and, again, do not install air-handlers in an uninsulated attic)

² This is a requirement of NH Statewide Residential Energy Code. NOTE this does not necessarily mean poly vapor barrier is required. Vapor retarder may consist of kraft paper or a vapor retardant paint. Check with all local building code enforcement authorities to determine what is acceptable for local compliance.

- Integrated space heating and hot water heating systems must NOT involve tankless coils (not very common anymore).
- Clothes dryers must be vented to the outside
- ENERGY STAR Programmable Thermostats recommended
- All combustion appliances (e.g. FURNACES, BOILERS, FIREPLACES, WOODSTOVES) MUST have dedicated combustion air supplied from outside air

7. Proactive Indoor-Air-Quality (IAQ) Requirements

- Install one or more hard wired or plug-in Carbon Monoxide Alarms on each floor as per manufacturer's instructions.
- Must ventilate all bath fans and kitchen stove/range hood (especially if natural LP gas is used for cooking to the outside of the home using hard duct (not flex-duct)).
- Must install:
 - a. A High Quality, quiet (1.5 sones or less) exhaust fans vented with a solid metal or plastic exhaust ducts that run the shortest distance possible directly to an OUTSIDE vent opening. (not directly into the soffit or into the attic); These may exist as a bathroom fan or as an in-line fan mounted remotely, but with ports in various locations (e.g. bathroom, kitchen etc) wired to an automated control consisting of a 24-hour programmable timer switch OR
 - b. A Heat Recovery Ventilation (HRV) / Energy Recovery Ventilator (EVR) System in the home.

PLEASE NOTE - Ventilation is Critically Important in High Performance Homes and a requirement of the ENERGY STAR Homes Program. Ventilation units (Options A or B should be set to run either continuously or intermittently at a rate based on currently used residential ventilation guidelines.