



# Town of Christiansburg

Building Department  
100 E Main St ~ Christiansburg, VA ~ 24073  
540-382-6120

## RESIDENTIAL ENERGY SUBMITTAL

### BUILDING THERMAL ENVELOPE – Select method of compliance:

- R-value method. All items in Table N1102.1 must comply. (No trade-offs permitted.)
- U-factor method. All items in Table N1102.1.2 must comply. (No trade-offs permitted.)
- Total UA method. The average of all U-factors assemblies must meet the values in Table N1102.1.2. (Trade-offs permitted – Rescheck required.)

### DUCT SEALING – Select method of compliance:

- Post-construction duct test complying with N1103.2.2.1.
- Rough-in duct test complying with N1103.2.2.1.
- Visual inspection complying with N1103.2.2.2. – **All joints and seams are subject to field verification.**

### AIR SEALING / INSULATION – Select method of compliance:

- Blower Door test complying with N1102.4.2.1 – **Inspection required to verify manometer readings.**
- Third Party visual inspection complying with N1102.4.2.2. and Table N1102.4.2.
  - \* **Third Party inspector must hold a BPI or RESNET certification and be approved by the Building Official.**

### In addition to the items above the following items below will be field verified by the inspections department:

- The building thermal envelope shall be durably sealed to limit infiltration. The sealing methods between dissimilar materials shall allow for the differential expansion contraction. The following shall be caulked, gasketed, weather-stripped, or otherwise sealed with an air barrier material, suitable film or solid material:
  1. All joints, seams and penetrations
  2. Site-built windows, doors and skylights.
  3. Openings between window and door assemblies and their respective jambs and framing.
  4. Utility penetrations.
  5. Dropped ceilings or chases adjacent to the thermal envelope.
  6. Knee walls.
  7. Walls and ceilings separating the garage from conditioned spaces.
  8. Behind tubs and showers on exterior walls.
  9. Common walls between dwelling units.
  10. Attic access openings.
  11. Rim joist junctions.
  12. Other sources of infiltration.
- Access hatches and doors from conditioned spaces to unconditioned spaces shall be weather-stripped and insulated to a level equivalent to the insulation on the surrounding surfaces.
- Floor insulation shall be installed to maintain permanent contact with the underside of the subfloor decking.

- Windows, skylights, and sliding glass doors shall have an air infiltration rate of no more the 0.3 cubic foot per minute per square foot, and swinging doors no more than 0.5 cubic foot per minute per square foot.
- All windows, doors, and skylights shall have label in place at time of inspection.
- All recessed lighting shall be tested and sealed to limit leakage between conditioned and unconditioned spaces. All recessed luminaires shall be IC rated and sealed with a gasket or caulk between the housing and the interior wall or ceiling covering.
- A minimum of 50 percent of the lamps in permanently installed lighting fixtures shall be high-efficacy lamps.
- Where the primary heating system is a forced air furnace, at least one thermostat per dwelling unit shall be capable of controlling the heating and cooling system on a daily schedule to maintain different temperature set points at different times of the day.
- Heat pumps having supplementary electric-resistance heat shall have controls that, except during defrost, prevent supplemental heat operation when the heat pump compressor can meet the heating load.

**Table N1102.1  
Insulation and Fenestration Requirements by Component <sup>a</sup>**

Climate Zone	Fenestration U-factor	Skylight <sup>b</sup> U-factor	Glazed Fenestration SHGC	Ceiling R-Value	Wood Frame Wall R-Value	Mass Wall R-Value <sup>k</sup>	Floor R-Value	Basement <sup>c</sup> Wall R-Value	Slab <sup>d</sup> R-Value & Depth	Crawl Space <sup>c</sup> Wall R-Value
4 except Marine	0.35	0.60	NR	38	13	5/10	19	10/13	10, 2 ft	10/13

- a. *R*-values are minimums-factors and SHGC are maximums. R-19 batts compressed into a nominal 2 x 6 framing cavity such that the *R*-value is reduced by R-1 or more shall be marked with the compressed batt *R*-value in addition to the full thickness *R*-value.
- b. The fenestration *U*-factor column excludes skylights. The SHGC column applies to all glazed fenestration.
- c. “15/19” means R-15 continuous insulated sheathing on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. “15/19” shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulated sheathing on the interior or exterior of the home. “10/13” means R-10 continuous insulated sheathing on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall.
- d. R-5 shall be added to the required slab edge *R*-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Zones 1 through 3 for heated slabs.
- k. The second *R*-value applies when more than half the insulation is on the interior of the mass wall.

**Table N1102.1.2  
Equivalent U-Factors <sup>a</sup>**

Climate Zone	Fenestration U-Factor <sup>b</sup>	Skylight U-factor	Ceiling U-factor	Frame Wall U-factor	Mass Wall U-Factor <sup>b</sup>	Floor U-Factor	Basement Wall U-Factor	Crawl Space Wall U-Factor <sup>c</sup>
4 except Marine	0.35	0.60	0.030	0.082	0.141	0.047	0.059	0.065

- a. Nonfenestration *U*-factors shall be obtained from measurement, calculation or an approved source.
- b. When more than half the insulation is on the interior, the mass wall *U*-factors shall be a maximum of 0.17 in Zone 1, 0.14 in Zone 2, 0.12 in Zone 3, 0.10 in Zone 4 except Marine, and the same as the frame wall *U*-factor in Marine Zone 4 and Zones 5 through 8.
- c. Basement wall *U*-factor of 0.360 in warm-humid locations as defined by Figure 301.1 and Table 301.2.