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| <b>FLORIDA BUILDING CODE, ENERGY CONSERVATION</b>     |                             |
| <b>Residential Building Thermal Envelope Approach</b> |                             |
| <b>R-Value Computation Method</b>                     |                             |
| <b>FORM R402—2020</b>                                 | <b>Florida Climate Zone</b> |

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|--|---|
| <b>PROJECT NAME AND ADDRESS:</b><br><br><b>OWNER:</b><br><b>PERMIT TYPE:</b><br><b>WORST CASE?</b> | <b>BUILDER:</b><br><b>PERMITTING OFFICE:</b><br><b>JURISDICTION NUMBER:</b><br><b>PERMIT NUMBER:</b><br><b>NUMBER OF UNITS:</b><br><b>CONDITIONED FLOOR AREA:</b> |
|--|---|

**Scope:** Compliance with Section R402.1.2 of the *Florida Building Code, Energy Conservation*, shall be demonstrated by the use of Form R402 for single- and multiple-family residences of three stories or less in height, additions to existing residential buildings, alterations, renovations and building systems in existing buildings, as applicable. To comply, a building must meet or exceed all the energy efficiency requirements and applicable mandatory requirements summarized on this form. If a building does not comply with this method, or by the UA Alternative method, it may still comply under Section R405 or R406 of the *Florida Building Code, Energy Conservation*.

**General Instructions:**

- Fill in all the applicable spaces of the "INSTALLED" row in the INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT table with the information requested. All "INSTALLED" values must be equal to or more efficient than the required levels. "AVG" indicates an area weighted average is allowed; "LOWEST" indicates the lowest R-value to be installed must be entered.
- Complete the tables for air infiltration and installed equipment.
- Read the MANDATORY REQUIREMENTS table and check each box to indicate your intent to comply with all applicable items.
- Read, sign and date the "Prepared By" certification statement at the bottom of this form. The owner or owner's agent must also sign and date the form.

**INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT<sup>1</sup>**

| REQUIREMENTS      | FENESTRATION U-FACTOR <sup>2,3,4</sup> | SKYLIGHT <sup>2</sup> U-FACTOR | GLAZED FENESTRATION SHGC <sup>2,3</sup> | CEILING R-VALUE | WOOD FRAME WALL R-VALUE <sup>5</sup> | MASS WALL R-VALUE <sup>5,6</sup> | FLOOR R-VALUE | BASEMENT WALL R-VALUE | SLAB <sup>7</sup> R-VALUE & DEPTH | CRAWL SPACE WALL R-VALUE |
|-------------------|--|--------------------------------|---|-----------------|--------------------------------------|----------------------------------|---------------|-----------------------|-----------------------------------|--------------------------|
| CLIMATE ZONE 1    | NR                                     | 0.75                           | 0.25                                    | 30              | 13                                   | 3/4                              | 13            | 0                     | 0                                 | 0                        |
| CLIMATE ZONE 2    | 0.40                                   | 0.65                           | 0.25                                    | 38              | 13                                   | 4/6                              | 13            | 0                     | 0                                 | 0                        |
| VALUE             | AVG                                    | AVG                            | AVG                                     | LOWEST          | LOWEST                               | LOWEST                           | LOWEST        | LOWEST                | LOWEST                            | LOWEST                   |
| <b>INSTALLED:</b> |  |                                |   |                 |                                      |                                  |               |                       |                                   |                          |

**R-Value Calculation Method - [PASS / FAIL]**

For SI: 1 foot = 304.8 mm; NR = No requirement.

- R-values are minimums. U-factors and SHGC are maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the installed R-value of the insulation shall not be less than the R-value specified in the table.
- The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration. Exception: Skylights may be excluded from glazed fenestration SHGC requirements in Climate Zones 1 through 3 where the SHGC for such skylights does not exceed 0.30.
- For impact rated fenestration complying with Section R301.2.1.2 of the *Florida Building Code, Residential* or Section 1609.1.2 of the *Florida Building Code, Building*, the maximum U-factor shall be 0.65 in Climate Zone 2. An area-weighted average of U-factor and SHGC shall be accepted to meet the requirements, and up to 15 square feet of glazed fenestration area are exempted from the U-factor and SHGC requirement based on Section R402.3.1, R402.3.2 and R402.3.3.
- One side-hinged opaque door assembly up to 24 square feet is exempted from this U-factor requirement based on Section R402.3.4.
- R-values are for insulation material only as applied in accordance with manufacturer's installation instructions.
- The second R-value applies when more than half the insulation is on the interior of the mass wall.
- 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 Climate Zones 1 through 3 for heated slabs.

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| <b>Air infiltration:</b> | Blower door test is required on the building envelope to verify leakage $\leq 7$ ACH50; test report must be provided to code official before CO is issued. <i>Florida Building Code, Energy Conservation</i> Section R402.4.1.2 testing exception may apply for additions, alterations, or renovations. |
|--------------------------|---|

(continued)

## APPENDIX RD — FORMS

**FORM R402—continued**  
**EQUIPMENT REQUIREMENTS AND INSTALLED VALUES**

Fill in the "INSTALLED EFFICIENCY LEVEL" column with the information requested. For multiple systems of the same type, indicate the minimum efficient system. All "INSTALLED" values must be equal to or more efficient than the required level. If a listed "SYSTEM TYPE" is not to be installed, write in "N/A" for not applicable.

| SYSTEM TYPE  | MINIMUM EFFICIENCY LEVEL REQUIRED   | INSTALLED EFFICIENCY LEVEL  |
|--|---|---|
| Air distribution system <sup>1</sup>   | Not allowed in attic  | Location:   |
| Air handling unit<br>Duct R-value  | Factory Sealed<br>= R-8 (Ducts in unconditioned attics, Diameter ≥ 3 in.)<br>= R-6 (Ducts in unconditioned non attics, Diam. ≥ 3 in.)<br>= R-6 (Ducts in unconditioned attics, Diameter < 3 in.)<br>= R-4.2 (Ducts in unconditioned not attics, Diam. < 3 in.)<br>All ducts are in conditioned space (No minimum) | Factory Sealed? Y/N<br>R-Value (In unc. attic) =<br>R-Value (In unc. non attics) =<br>R-Value (Small ducts in attic) =<br>R-Value (Small ducts in unc) =<br>All in conditioned space? Y/N |
| Air leakage/Duct test  | Air handler installed: Total leakage = 4 cfm/100 s.f.<br>Air handler not installed: Total leakage = 3 cfm/100 s.f.  | Total leakage = _____ cfm/100 s.f.<br>Air handler installed? Y/N  |
| Duct testing   | Test not required if all ducts and AHU are within the building thermal envelope and for additions or alterations where ducts extended from existing heating and cooling system through unconditioned space are < 40 linear ft.  | Test report required? Y/N   |
| Air conditioning systems:<br>Central system ≤65,000 Btu/h<br>PTAC<br>Other:  | Minimum federal standard required by NAECA <sup>2</sup> :<br>SEER 14.0<br><br>EER [from Table C403.2.3(3)]<br><br>See Tables C403.2.3(1)–(11)   | SEER (Min)=<br><br>EER (Min)=<br><br>Type =            Effic. (min) =   |
| Heating systems:<br>Heat pump ≤ 65,000 Btu/h<br>Gas furnace, non-weatherized<br>Oil furnace, non-weatherized<br><br>Other:               | Minimum federal standard required by NAECA <sup>2</sup> :<br>HSPF ≥ 8.2<br>AFUE ≥ 80%<br>AFUE ≥ 83%   | HSPF (Min) =<br>AFUE (Min) =<br>AFUE (Min) =<br><br>Type =            Effic. (min) =  |
| Water heating system (storage type):<br><br>Electric <sup>3,6</sup><br>Gas fired <sup>4,6</sup><br><br>Other (describe) <sup>5,6</sup> : | Minimum federal standard required by NAECA <sup>2</sup> :<br><br>UEF 40 gal. 0.923; 50 gal.: 0.921; 60 gal.: 2.051<br>UEF 40 gal. 0.580; 50 gal.: 0.563; 60 gal.: 0.766   | Capacity =<br><br>UEF (Min) =<br>UEF (Min) =<br><br>Type =            Effic. (min) =  |

**Equipment Efficiency— [PASS / FAIL]**

- (1) Ducts & AHU installed "substantially leak free" per Section R403.3.2. Test required by either individuals as defined in Section 553.993(5) or (7), *Florida Statutes*, or individuals licensed as set forth in Section 489.105(3)(f), (g), or (i), *Florida Statutes*. The total leakage test is not required for ducts and air handlers located entirely within the building thermal envelope, and for additions where ducts from an existing heating and cooling system extended to the addition through unconditioned space are less than 40 linear ft.
- (2) Minimum efficiencies are those set by the *National Appliance Energy Conservation Act* of 1987 for typical residential equipment and are subject to NAECA rules and regulations. For other types of equipment, see Tables C403.2.3 (1-11) of the Commercial Provisions of the *Florida Building Code, Energy Conservation*.
- (3) For electric storage volumes ≤ 55 gallons, minimum UEF = 0.9349 – (0.0001 \* volume). For electric storage volumes > 55 gallons, minimum UEF = 2.2418 – (0.0011 \* volume).
- (4) For natural gas storage volumes ≤ 55 gallons, minimum UEF = 0.692 – (0.0013 \* volume). For natural gas storage volumes > 55 gallons, minimum UEF = 0.8072 – (0.0003 \* volume).
- (5) For electric tankless, min. UEF = 0.92. For natural gas tankless, min. UEF = 0.81.
- (6) Referenced UEFs shown are for medium draw pattern value provided by manufacturer.

(continued)

## FORM R402—continued

## MANDATORY REQUIREMENTS

| Component   | Section              | Summary of Requirements  | Check |
|---|----------------------|--|-------|
| Air leakage   | R402.4               | To be caulked, gasketed, weatherstripped or otherwise sealed per Table R402.4.1.1. Recessed lighting IC-rated as having $\leq 2.0$ cfm tested to ASTM E283.<br>Windows and doors: 0.3 cfm/sq. ft (swinging doors: 0.5 cfm/sf) when tested to NFRC 400 or AAMA/WDMA/CSA 101/I.S. 2/A440.<br>Fireplaces: Tight-fitting flue dampers & outdoor combustion air |       |
| Programmable thermostat   | R403.1.2             | A programmable thermostat is required for the primary heating or cooling system.   |       |
| Air distribution system   | R403.3.2<br>R403.3.4 | Ducts shall be tested as per Section R403.3.2 by either individuals as defined in Section 553.993(5) or (7), <i>Florida Statutes</i> , or individuals licensed as set forth in Section 489.105(3) (f), (g) or (i), <i>Florida Statutes</i> . Air handling units are not allowed in attics.   |       |
| Water heaters   | R403.5               | Comply with efficiencies in Table C404.2. Hot water pipes insulated to $\geq R-3$ to kitchen outlets, other cases. Circulating systems to have an automatic or accessible manual OFF switch. Heat trap required for vertical pipe risers.  |       |
| Cooling/heating equipment   | R403.7               | Sizing calculation performed & attached. Special occasion cooling or heating capacity requires separate system or variable capacity system.  |       |
| Swimming pools & spas   | R403.10              | Spas and heated pools must have vapor-retardant covers or a liquid cover or other means proven to reduce heat loss except if 70% of heat from site-recovered energy. Off/timer switch required. Gas heaters minimum thermal efficiency is 82%. Heat pump pool heaters minimum COP is 4.0.  |       |
| Lighting equipment  | R404.1               | Not less than 90% of the lamps in permanently installed luminaires shall have an efficacy of at least 45 lumens-per-watt or shall utilize lamps with an efficacy of not less than 65 lumens-per-watt.  |       |
| I hereby certify that the plans and specifications covered by this form are in compliance with the <i>Florida Building Code, Energy Conservation</i> .<br>PREPARED BY: _____ Date: _____<br>I hereby certify that this building is in compliance with the <i>Florida Building Code, Energy Conservation</i> .<br>OWNER/AGENT: _____ Date: _____ |                      | Review of plans and specifications covered by this form indicate compliance with the <i>Florida Building Code, Energy Conservation</i> . Before construction is complete, this building will be inspected for compliance in accordance with Section 553.908, F.S.<br>CODE OFFICIAL: _____<br>Date: _____   |       |

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