



Residential Energy Efficiency Worksheet

2021 IRC, 2021 IECC & PA Alternative Residential Energy Provisions

Address of Project: _____ Building Permit #:_____

Print Name-Title: _____ Signature: _____ Date: _____

PA UCC Energy Compliance Path (Check One)

- 1. Pennsylvania Alternate Energy Provisions – Choose Entry Option on Page #2
- 2. IRC Chapter 11
- 3. IECC – Chapter 4
- 4. Above Code Program -REScheck or other: _____

Insulation and Fenestration Requirements by Component (PA Alternate & IRC Chapter 11)

| | |
|--|---|
| Wood Frame Walls (R-value) | R-20 cavity <u>or R-13</u> cavity + R-5 insulated sheathing |
| Ceilings with Attic Space (R-value) | R-49 (R-38 approved if not compressed over wall top plates) |
| Ceilings without Attic Space (R-value) | R-30 where roof/ceiling assemblies do not allow R-38 <u>Limited to lesser of 500 square feet or 20% of area - IRC only</u> |
| Floors (R-value) | R-30 (or insulation to fill framing cavity, min R-19) |
| Basement Walls (R-value) | IRC R-10 continuous insulation or R-13 cavity insulation PA Alt. R-10 continuous insulation or R-13 cavity insulation |
| Crawl Space Walls (R-value) | IRC R-10 continuous insulation or R-13 cavity insulation PA Alt R-10 continuous insulation or R-13 cavity insulation |
| Unexcavated Foundation (R-value) | R-10 to a depth of 2 feet (add R-5 if slab heated) |
| Mechanical System Piping | R-3 HVAC piping <55 deg or > 105 deg |
| HVAC Duct Insulation | Attic Ducts R-8 for 3" diameter & greater, R-6 less than 3" Other Ducts R-6 for 3" diameter & greater, R-4.2 less than 3" No insulation required for ducts completely inside thermal envelope |
| Window & Door (U-factor) | 0.30 maximum (15 sqft. window exemption) <u>(Opaque Door Exemptions - 24 sq. ft. IRC, 54 sq. ft. PA Alt.)</u> |
| Thermally Isolated Sunroom | R-19 Ceilings, R-13 Walls, 0.45 Glazing U-factor |
| Recessed Lights in Thermal Envelope | IC rated and <i>labeled</i> ASTM E283 |
| Lighting Equipment | Minimum 90% <i>high-efficacy</i> lamps in permanent light fixtures |

Air Leakage – Building Thermal Envelope. Building envelope air tightness and insulation installation shall be demonstrated to comply with one of the following options. **Testing does not apply to additions & alterations.**

- Testing of Building Thermal Envelope.** Tested air leakage is less than 3 ACH when tested with a blower door at a pressure of 50 Pascals (0.007 psi) in accordance with RESNET/ICC380, ASTM E779 or ASTM E1827. Testing shall occur after rough in and after installation of penetrations of the building envelope, including penetrations for utilities, plumbing, electrical, ventilation and combustion appliances. See IRC Section N1102.4.1.2 or PA Alt. 304.1.2 for complete requirements.

Provide evidence of blower door testing from an approved testing agency (RESNET Certified or BPI Envelope Specialist).

Duct Sealing. Ducts, air handlers, filter boxes and building cavities used as ducts shall be sealed. Joints and seams shall comply with the 2021 IMC or IRC Section M1601.4.1.



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Duct Testing. Please choose either Option 1a, 1b or 2 for duct tightness testing, or the exception if it applies.
Choose one of the following: (duct testing applies to additions and alterations only when new HVAC system(s) installed)

Rough-In Test Options. (Partial system testing is not permitted. i.e. ducts in exterior walls)

Option 1a. **Rough-in test (Air handler installed):** Total leakage shall be less than or equal to 4 cfm (113.3 L/min) per 100 sq.ft. (9.29 m²) of conditioned floor area when tested at a pressure differential of 0.1 inch w.g. (25 Pa). 2018 IRC Section N1103.3.4 or PA Alternative Section 403.3 & Table 402.4

Option 1b. **Rough-in test (no air handler):** Total leakage shall be less than or equal to 3 cfm (85 L/min) per 100 sq.ft. (9.29 m²) of conditioned floor area when tested at a pressure differential of 0.1 w.g. (25 Pa). 2018 IRC Section N1103.3.4 or PA Alternative Section 403.3 & Table 402.4

Post Construction Test Option. (Partial system testing is not permitted. i.e. ducts in exterior walls)

Option 2. **Post-construction test (Air handler installed):** Total leakage less than or equal to 4 cfm (113.3 L/min) per 100 sq. ft. (9.29m²) of conditioned floor area when tested at a pressure differential of 0.1 inch w.g. (25 Pa). 2018 IRC Section N1103.3.4 or PA Alternative Section 403.3 & Table 402.4

Approved Testing Agency (RESNET Certified or BPI Envelope Specialist) providing evidence of duct testing or contractor performing duct testing with Manheim Township Code Official Present

Conditioned Floor Area Square Footage _____

Exception: Duct tightness test is not required if the air handler and all ducts (supply & return) are located within conditioned space. Ducts located in exterior walls are not within conditioned space. When ducts are installed in exterior walls, duct testing is required.

PA – Alternate Residential Provisions Entrance Requirements (Chose One)

| <input checked="" type="checkbox"/> | Option | Description | Minimum efficiency | |
|-------------------------------------|--------|---|------------------------|-----------------|
| | | | Climate Zone (4) | |
| | 1 | Ductless heat pumps | 10 HSPF & 15 SEER | |
| | 2 | All air ducts located inside the thermal envelope | Compliant | |
| | 3 | Solar photovoltaic system no longer option for entrance | N/A | |
| | 4 | Geothermal or water source heat pump installed | Compliant | |
| | 5 | Improved efficiency air source heat pump installed | 9.5 HSPF & 19 SEER | |
| | 6 | Improved efficiency furnace installed | 95 AFUE | |
| | 7 | Exterior continuous insulation | R20+10 | |
| | 8 | Improved airtightness no longer option for entrance | N/A | |
| | 9 | Improved efficiency windows | U-factor = 0.19 | |
| | 10 | Package: Improved efficiency windows and higher attic R-value with raised heel truss ^a | Windows | U-factor = 0.21 |
| | | | Attic | R-value = 60 |
| | 11 | Package: Improved efficiency windows and heat pump water heater | Windows | U-factor = 0.21 |
| | | | Heat Pump Water Heater | Compliant |

Note a. Full height of uncompressed insulation shall extend over the top plate at the eaves.