



# Residential Energy Efficiency Worksheet – 2009

2009 IRC, 2009 IECC & PA Alternative Residential Energy Provisions

Address of Project: \_\_\_\_\_ Building Permit #: \_\_\_\_\_

## PA UCC Energy Compliance Path (Check One)

1. \*PA – Alternate Residential Provisions    
  2. IRC Chapter 11    
  3. IECC – Compliant Software  
\*(86 AFUE Furnace, 8.8 HSPF Heat Pump, Geothermal, HERS Index of 85 or less, or alternative energy system needed to use PA Alternate provisions)

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

Wood Frame Walls (R-value)	<b>R-20</b> cavity <u>or</u> <b>R-13</b> cavity + <b>R-5</b> insulated sheathing
Ceilings with Attic Space (R-value)	<b>R-38</b> ( <b>R-30</b> approved if not compressed over wall top plates)
Ceilings without Attic Space (R-value)	<b>R-30</b> where roof/ceiling assemblies do not allow <b>R-38</b> <u>Limited to 500 square feet of area in IRC only</u>
Floors (R-value)	<b>R-30</b> (or insulation to fill framing cavity, min R-19) <b>R-19</b> permitted in basement floors per PA Alt.
Basement Walls (R-value)	<b>R-10</b> continuous insulation or <b>R-13</b> cavity insulation
Crawl Space Walls (R-value)	<b>R-10</b> continuous insulation or <b>R-13</b> cavity insulation
Unexcavated Foundation (R-value)	<b>R-10</b> to a depth of 2 feet (add <b>R-5</b> if slab heated)
Mechanical System Piping	<b>R-3</b> (IRC) or <b>R-2</b> (PA Alt) HVAC piping <55 deg or > 105 deg
HVAC Duct Insulation	<b>R-8</b> Supply ducts in attics, <b>R-6</b> other ducts, no insulation required for ducts inside the building thermal envelope
Window & Door (U-factor)	<b>0.35</b> maximum ( <b>15</b> sqft. window exemption) <u>(Opaque Door Exemptions - 24 sq. ft. IRC, 54 sq. ft. PA Alt.)</u>
Thermally Isolated Sunroom	<b>R-24</b> Ceilings, <b>R-13</b> Walls, <b>0.50</b> Glazing U-factor
Recessed Lights in Thermal Envelope	IC rated and <i>labeled</i> ASTM E283
Lighting Equipment	Minimum of 50% <i>high-efficacy</i> lamps in permanent light fixtures

**Air Sealing and Insulation.** Building envelope air tightness and insulation installation shall be demonstrated to comply with one of the following options. **Choose one of the following: (additions & alterations default to visual option)**

- Testing option.** Tested air leakage is less than 7 ACH when tested with a blower door at a pressure of 50 Pascals (0.007 psi) in accordance with ASHRAE 119 Air Leakage Performance for Detached Single-Family Residential Buildings. 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 PA304.2.1 for complete requirements. **Approved Testing Agency (RESNET Certified or BPI Envelope Specialist) providing evidence of blower door testing or Contractor performing testing with Manheim Township Code Official present**
- Visual inspection option.** The items listed in Table N1102.4.2 (IRC) or Table PA304.2.2 (PA Alternate), applicable to the method of construction, are subject to inspection approval by Manheim Township Code Official. **Air sealing inspection will take place during the framing inspection. Follow-up insulation inspection needed prior to drywall.**

**Duct Sealing.** Ducts, air handlers, filter boxes and building cavities used as ducts shall be sealed. Joints and seams shall comply with IRC Section M1601.4.

- Fiberglass Ducts:** The closure systems used with rigid fibrous glass ducts shall comply with UL 181 A and shall be marked "181 A-P" for pressure-sensitive tape, "181 A-M" for mastic or "181 A-H" for heat -sensitive tape.
- Flexible Air Ducts:** The closure systems used with flexible air ducts and flexible air connectors shall comply with UL 181B and shall be marked "181 B-FX" for pressure sensitive tape or "181 B-M" for mastic.
- Metal to Metal Duct Joints:** The closure systems used with metal to metal duct joints shall comply with one of the following: Mastics shall be listed to "181B-M". Tapes shall be listed and labeled to indicate compliance with "UL 181B-FX".



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**Duct Testing.** Please choose either Option 1a, 1b, 2a or 2b 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)

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

- Option 1a. **Post-construction test:** Leakage to outdoors shall be less than or equal to 8 cfm (3.78 L/s) per 100 sq. ft. (9.29 m<sup>2</sup>) of conditioned floor area. This test requires simultaneous operation of a blower door test. ANSI/ASHRAE Standard 152-2004 to be referenced for the test protocol.
- Option 1b. **Post-construction test:** Total leakage less than or equal to 12 cfm (5.66 L/s) per 100 sq. ft. (9.29m<sup>2</sup>) of conditioned floor area when tested at a pressure differential of 0.1 inch w.g. (25 Pa), **including the manufacturer’s air handler enclosure.** See N1103.2.2 (IRC) or PA402.2 (PA Alternate) for complete requirements

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

- Option 2a. **Rough-in test:** Total leakage shall be less than or equal to 6 cfm (2.83 L/s) per 100 sq.ft. (9.29 m<sup>2</sup>) of conditioned floor area when tested at a pressure differential of 0.1 inch w.g. (25 Pa), **including the manufacturer’s air handler enclosure.** See N1103.2.2 (IRC) or PA402.2 (PA Alternate) for complete requirements.
- Option 2b. **Rough-in test:** Total leakage shall be less than or equal to 4 cfm (1.89 L/s) per 100 ft<sup>2</sup> (9.29 m<sup>2</sup>) of conditioned floor area when tested at a pressure differential of 0.1 w.g. (25 Pa) if **the air handler is not installed at the time of the test.**
- Approved Testing Agency (for example: RESNET Certified, 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.

**Print Name-Title:** \_\_\_\_\_ **Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Company:** \_\_\_\_\_