

Compliance Worksheet – Central Zone 2009 Pennsylvania Alternative Residential Energy Provisions

	Address	
PROJECT	Contractor	
	Permit #	
	Date	
	Date of Plan	

Entrance requirements. This compliance path permits some reductions in energy efficiency that will allow for simplified enforcement and construction. To provide for equivalent energy performance, the building owner or agent must choose one of the following energy enhancements:

Choose one	Description	Minimum efficiency
<input type="checkbox"/>	Ductless systems ^a or all air ducts located inside the thermal envelope	
<input type="checkbox"/>	On-site electric generation installed ^b	
<input type="checkbox"/>	HERS Index of 85 or less ^c	
<input type="checkbox"/>	Geothermal or water source heat pump installed	
<input type="checkbox"/>	Solar hot water system installed ^d	1.1 SEF
<input type="checkbox"/>	Improved efficiency air source heat pump installed	8.8 HSPF
<input type="checkbox"/>	Improved efficiency furnace installed	86 AFUE

Notes: a. Electric resistance heat is not allowed in this option.
 b. This option is limited to systems of 1 kW or larger and include combined heat and power systems, fuel cell systems or photovoltaic solar systems.
 c. HERS rating is required to be performed by Residential Energy Services Network (RESNET) Certified Rater and shall include plan review, inspections and post-construction testing. The RESNET-Certified Rater must certify to the building official that the building has a HERS Index of 85 or less and that it complies with the requirements of this document.
 d. SEF is a certified performance rating of the solar water heating system determined in accordance with the Solar Rating and Certification Corporation's OG-300 Protocol. The collectors for the system must be mounted with a tilt from horizontal of no less than 15 degrees and no more than 45 degrees, and have an azimuthal orientation of within 45 degrees of true south.

Insulation and Fenestration: The building thermal envelope shall meet or exceed the required criteria. Please fill in the actual R-values and U-factors for the various components.

	Fenestration U-factor	Skylights ^b U-factor	Ceiling ⁱ R-value	Wood frame wall R-value	Mass Wall R-value ^h	Floor R-value	Basement ^c wall R-value	Slab ^d R-value and depth	Crawlspace ^c wall R-value
Required	0.35	0.60	38	20° or 13 + 5 ^g	13/17	30 ^f	10/13	10, 2 ft	10/13
Proposed									

Notes: a. R-values are minimums. U-factors and solar heat gain coefficient (SHGC) are maximums. R-19 batts compressed into 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.
 c. The first R-value applies to continuous insulation, the second to framing cavity insulation; either insulation meets the requirement.
 d. R-5 shall be added to the required slab edge R-values for heated slabs.
 e. Low density spray applied foam and cellulose insulation in a 2x6 wall cavity shall be considered in compliance with this requirement.
 f. Or insulation sufficient to fill the framing cavity, R-19 minimum. Floor insulation may also be reduced to R-19 if installed above an unconditioned basement.
 g. "13 + 5" means R-13 cavity insulation plus R-5 insulated sheathing. If structural sheathing covers 25% or less of the exterior, R-5 sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25% of exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2.
 h. The second R-value applies when more than half the insulation is on the interior.
 i. Cathedral ceiling minimum insulation is R-30.

Air sealing and insulation. Building envelope air tightness and insulation installation shall be demonstrated to comply with one of the following options. Please indicate which option you will use:

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.

Visual inspection option. The items listed in Table PA304.2.2, applicable to the method of construction, are field verified. Where required by the code official, an *approved* party independent from the installer of the insulation shall inspect the air barrier and insulation. See PA304.2.2 for complete requirements.

Mechanical Systems:

Ducts Insulation. Ducts shall meet or exceed the following insulation requirements.

Location	Minimum R-value
Supply ducts in attics	R-8
All other ducts outside, or integral to, the building thermal envelope	R-6
Portions of ducts located completely within the building thermal envelope	None

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. Please choose either Option 1 or 2 for duct tightness testing, or the exception if it applies.

Option 1. **Post-construction test:** Leakage to outdoors shall be less than or equal to 8 cfm (3.78 L/s) per 100 ft² (9.29 m²) of conditioned floor area or a total leakage less than or equal to 12 cfm (5.66 L/s) per 100 ft² (9.29m²) of conditioned floor area when tested at a pressure differential of 0.1 inch w.g. (25 Pa), including the manufacturer's air handler. See PA402.2 for complete requirements.

Option 2. **Rough-in test:** Total leakage shall be less than or equal to 6 cfm (2.83 L/s) per 100 ft² (9.29 m²) of conditioned floor area when tested at a pressure differential of 0.1 inch w.g. (25 Pa), including the manufacturer's air handler. See PA402.2 for complete requirements.

Exception: Duct tightness test is not required if the air handler and all ducts are located within *conditioned space*.

Mechanical system piping insulation. Mechanical system piping capable of carrying fluids above 105°F (40°C) or below 55°F (13°C) shall be insulated to a minimum of R-2.

Circulating hot water systems. All circulating service hot water piping shall be insulated to at least R-2. Circulating hot water systems shall include an automatic or *readily accessible* manual switch that can turn off the hot water circulating pump when the system is not in use.

Lighting equipment. A minimum of 50 percent of the lamps in permanently installed lighting fixtures shall be *high-efficacy lamps*.

Compliance Statement: The proposed building design described here is consistent with the building plan, specifications and other information submitted with the building permit application. Additionally, the building and its systems will comply with all requirements of the 2009 *Pennsylvania Alternative Residential Energy Provisions* (www.engr.psu.edu/phrc).

Name – Title

Signature

Date