



**EZ PERMIT STANDARDS DUCTWORK &  
WARM-AIR APPLIANCES**

**(For Residential New Construction)**

For the Installation of New Ductwork, Registers/Grilles/Diffusers, and Warm-Air Appliances Revised 6/26 (IRC-2021 / IMC-2021 / IECC-2021)

**EZ Permit Standards: Ductwork & Warm-Air Appliances (New Construction)**

Obtain permits for the installation of new ductwork, registers, grills and diffusers, and warm-air appliances for Residential New Construction (One- and Two-Family Dwellings) without submitting plans by meeting the Conditions and Design Limitations below. Any deviations from this permit standard will result in permit revocation.

**Special Flood Hazard Area:** If subject property is located within a Special Flood Hazard Area (Floodplain), additional documentation may be required.

**Conditions**

- Ductwork and air-handling equipment must be self-contained within single tenant space.
- All penetrations of fire-resistant rated construction must comply with Section B-714, including duct & air transfer openings. No penetrations are permitted at the following locations:
  - Exterior walls less than 3 ft from a lot line
  - Party walls
  - Common walls, except where common wall penetration protection complies with an approved assembly listing and applicable code provisions
- HVAC Equipment Design & Equipment Certification form to be completed to identify equipment sizing. Contractors shall specify size of appliance tonnage.
- Return or exhaust air system to be provided approximately equal to supply air flow rate.
- Residential whole-house mechanical ventilation worksheet shall be completed and submitted with EZ Permit Application.

**Construction Requirements**

- Non-metallic ducts to be constructed of Class 0 or 1 duct material in accordance with UL 181.
- All metallic ducts to be constructed as specified by SMACNA *HVAC Duct Construction Standards—Metal & Flexible*.
- All fibrous glass duct construction to conform to SMACNA *Fibrous Glass Duct Construction Standards* or NAIMA *Fibrous Glass Duct Construction Standards*.
- Floor registers shall resist, without structural failure, a 200-lb concentrated load, and shall not be installed on floors within toilets and bathrooms required to have smooth, hard, nonabsorbent surfaces, with exceptions of dwelling units.

**Equipment/Appliance Installation Requirements**

- Self-contained, factory-built equipment and appliances utilizing refrigerants must be listed and labelled with tested standards per Philadelphia Mechanical Code, Table 1101.2.
- Installed refrigerant quantities shall not exceed allowable quantities under Philadelphia Mechanical Code, Table 1103.1.
- Refrigerant piping materials and fittings shall respectively conform to listing standards under Philadelphia Mechanical Code, Table 1107.4 & 1107.5, or be listed and labelled as complying with UL 207.
- Refrigerant piping must be located within protective enclosures, such as concealed spaces or within concrete floor embedments in pipes, conduits, ducts, and shaft enclosures.
- Refrigerant piping systems must be pressure and leakage tested before being covered or enclosed, with certificate of test for system acceptance be made available to the code official.

**Residential Mechanical Energy Mandatory Requirements**

- Thermostats shall be programmable.
- Ducts in unconditioned spaces  $\geq 3$ " diameter shall be insulated to  $\geq R-8$ . Ducts in unconditioned spaces  $< 3$ " diameter shall be insulated to  $\geq R-6$ .
- Air handler shall have a manufacturer's designation of  $\leq 2\%$  air leakage when tested per ASHRAE 193.
- The *Duct and Envelope Testing* form shall be completed and submitted to the inspector.
- HVAC pipe insulation is R-3 minimum (e.g. hydronic systems, refrigerant lines) and outdoor insulation is protected.
- Manual J report, including heating and cooling design loads, shall be submitted to the inspector. Heating and cooling equipment shall be selected in accordance with Manual S, based on loads calculated per Manual J.
- **Manual S.** Specified cooling equipment capacity shall be  $\leq 1.15$  times the design load or the next larger nominal size, whichever is greater. (*Exception: Heat pumps may exceed the design load by 1.25 times or the next nominal size.*) Specified heating equipment capacity shall be  $\leq 1.40$  times the design load or next larger nominal size, whichever is greater.



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**Flexible Air Connectors & Ducts**

- Flexible air connectors shall have a maximum length of 14'-0", and must not pass through any wall, floor, or ceiling.
- Flexible air ducts and air connectors to be installed with a minimum clearance to an appliance as specified in the appliance manufacturer's installation instructions.

**Duct Support**

- Field- and shop-fabricated metal and flexible ducts shall be supported in accordance with the SMACNA HVAC *Duct Construction Standards – Metal and Flexible*.
- Field- and shop-fabricated fibrous glass ducts shall be supported in accordance with the SMACNA *Fibrous Glass Duct Construction Standards* or the NAIMA *Fibrous Glass Duct Construction Standards*.
- Factory-made ducts listed in accordance with UL 181 shall be supported in accordance with the manufacturer's installation instructions.

**Duct Joints**

- Round metallic ducts shall be mechanically fastened by at least three (3) sheet metal screws or rivets spaced equally around the joint. Partially inaccessible duct connections shall have at least three (3) screws/rivets spaced equally on the exposed portion of the joint.
- Joints between plastic ducts and plastic fittings shall be made in accordance with the manufacturer's installation instructions.
- Where building cavities are used as return plenums, cavities will be required to be sealed per duct construction requirements.
- Flexible, non-metallic ducts, air handlers, and filter boxes shall be made substantially airtight by approved closure systems in the following table:

Closure Systems for Non-Metallic Duct System Joints and Seams (IRC 2021 Section M1601.4.1) (IMC 2021 Section 603.9)			
Duct Type	UL Rating	Closure Type	Closure UL Rating
Rigid Fibrous Glass Ducts	UL181A	Pressure Sensitive Tape	181 A-P
		Mastic	181 A-M
		Heat-Sensitive Tape	181 A-H
Flexible Air Ducts/Connectors	UL 181B	Pressure Sensitive Tape	181 B-FX
		Mastic	181 B-M
Flexible Non-Metallic Air Ducts	UL 181B	Mechanical Fasteners	181 B-C



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Where Additional Energy Efficiency or Energy Enhancement Packages for mechanical systems are used for project compliance, select the applicable method:

**2021 PHILADELPHIA ENERGY CONSERVATION CODE – Additional Energy Efficiency Package**

Select the applicable compliance method(s):

**More Efficient HVAC Equipment Performance** to comply with provisions of IECC 2021, Sections R401.2.1 and R408.2.2.

Mandatory Energy Code Requirements:

- Installed equipment specifications to be made available for inspection.
- Heating & Cooling Equipment shall meet one of the following efficiencies:
  - Greater than or equal to 95 AFUE natural gas furnace and 16 SEER air conditioner
  - Greater than or equal to 10 HSPF/16 SEER air source heat pump
  - Greater than or equal to 3.5 COP ground source heat pump
- Where multiple heating systems are installed, all systems must meet or exceed one of the minimum additional efficiency requirements above and must be sized to serve 100% of the heating load.
- Where multiple cooling systems are installed, all systems must meet or exceed one of the minimum additional efficiency requirements above and must be sized to serve 100% of the cooling load

**More Efficient Duct Thermal Distribution System** to comply with provisions of IECC 2021, Sections R401.2.1 and R408.2.4.

Mandatory Energy Code Requirements:

- Thermal distribution system shall meet one of the following efficiencies:
  - 100% of ducts and air handlers are located entirely within the building thermal envelope
  - 100% of ductless thermal distribution systems or hydronic thermal distribution systems are located completely inside the building thermal envelope
- 100% of duct thermal distribution systems are located in conditioned space

**Improved Air Sealing and Efficient Ventilation System** to comply with provisions of IECC 2021, Sections R401.2.1 and R408.2.5.

Mandatory Energy Code Requirements:

- Residential Duct & Envelope Testing Form to be provided prior to final inspection, and must demonstrate an air leakage rate result less than 3.0 air changes per hour at 50 pascals (3.0 ACH @ 50 Pa).
- Product Specification Sheets of Installed Energy Recovery Ventilator (ERV) and/or Heat Recovery Ventilator (HRV) to be made available for Inspection, and shall meet the following:
  - Installed ERV or HRV Sensible Recovery Efficiency Performance Specification is  $\geq 75\%$  (tested at lowest net supply airflow)
  - Installed ERV or HRV Fan Efficacy Performance Specification is  $\leq 1.1$  cfm/W
  - Installed ERV or HRV does not use recirculation for defrost
  - Installed ERV Specified Latent Recovery/(Net) Moisture Transfer is  $\geq 5$

**2025 PA ALTERNATIVE RESIDENTIAL ENERGY PROVISIONS – Energy Enhancement Package** (For One- or Two-Family Dwelling New Construction Work Scopes under 2021 Philadelphia Residential Code ONLY. Entire permit application for the building must be designed under the 2025 PA Alternative Residential Energy Compliance.)

Select the applicable compliance method(s):

**Improved Efficiency Heat Pump or Condensing Furnace Installations** (Options 1, 3, 4, or 5) to comply with PA Alt Energy Enhancement Requirements, Section PA104.

Mandatory Energy Code Requirements:

- Complete and submit the [2021 IECC Residential Compliance Path Selection form \(P\\_050\\_F\)](#) under Section D with the residential permit application.

**All Air Ducts Located Inside the Thermal Envelope** (Option 2) to comply with PA Alt Energy Enhancement Requirements, Section PA104.

Mandatory Energy Code Requirements:

- Complete and submit the [2021 IECC Residential Compliance Path Selection form \(P\\_050\\_F\)](#) under Section D with the residential permit application.

AP# \_\_\_\_\_

Applicant's Signature \_\_\_\_\_