

PTCS Air Source Heat Pump Installation Specification

1. Equipment Selection and Sizing

The new Air-Conditioning, Heating, and Refrigeration Institute (AHRI) rated air source heat pump system must be sized using a balance point of 30°F or less. To determine the balance point, the following specification must be used:

- a. A 70°F indoor design temperature for heating and 75°F for cooling load calculations using ASHRAE winter design temperature and cooling design temperature for the nearest weather station representative of the installation.
- b. U-values and F-values consistent with those found in Air Conditioning Contractors of America (ACCA) Manual J 8th Edition, or later.
- c. An infiltration rate of 0.8 air changes per hour for homes built before 1980 and 0.5 for homes built 1980 or later, unless a house (de)pressurization test has been performed and an estimate is made using the result. If a duct pressurization test has not been performed on the house, a default duct system loss of 25% shall be used.
Exception: If the air handler and all ductwork are within the thermal envelope of the house, 0% shall be used as the duct system loss in sizing calculations.

The recommended method and form for calculations is available in the ACCA Manual J. Alternate computer or manual methods of calculating heating and cooling loads may be used if approved in advance by the utility.

2. External Static Pressure

The total external static pressure acting on the system air handler must not exceed 0.8 inches of water (200 Pa).

3. Air Flow

Air flow across the indoor coil must be as specified in the heat pump manufacturer's documentation, or at least 325 to no more than 500 cubic feet per minute (CFM) per 12,000 Btu/hr output at AHRI rating conditions if the manufacturer's documentation is not specific. Approved measurement methods are using a TrueFlow plate or using the duct pressurization fan matching method per plate.

4. Refrigerant Charge

- a. **Heating.** If the outdoor temperature is 65°F or less, test in heating mode after operating the heat pump for a recommended 15 minutes, if not specified by manufacturer, with auxiliary back-up heat off. Temperature change across the air handler indoor coil must be at or above the minimum temperature split shown in the R-410A Temperature Split Table (https://www.bpa.gov/EE/Sectors/Residential/Documents/HP_Temp_Split_Table.pdf).
- b. **Cooling.** If the outdoor temperature is greater than 65°F, test in cooling mode after operating the heat pump for a recommended 15 minutes if not specified by manufacturer. The subcooling (discharge temp. – liquid line temp.) must meet manufacturer's documented requirements. See R-410A Pressure-temperature chart (https://www.bpa.gov/EE/Sectors/Residential/Documents/R-410A_Pressure_Temperature_Chart.pdf) for discharge pressures and corresponding temperatures.

Other alternative refrigerant measuring methods approved and documented by the manufacturer are also acceptable.

5. Controls

- a. **Compressor Control.** If a low ambient temperature compressor cutout option is installed, it must not cut out the compressor at temperatures above 5°F.
- b. **Auxiliary Heat Control.** Auxiliary heat must be controlled in such a manner that it does not engage when the outdoor air temperature is above 35°F, except when supplemental heating is required during a defrost cycle or when emergency heating is required during a refrigeration cycle failure.

For constant speed systems with multiple stages of compression and supply air temperature sensor control, auxiliary heat shall be controlled in such a manner that it does not engage when the supply air temperature is above 85°F.



PTCS ASHP Installation Best Practices

The program recommends but does not require the following as Air Source Heat Pump installation best practices:

- Check with the local utility about any requirements they may have about sizing auxiliary heat.
- Make sure openings in the unit cabinet or building structure are properly sealed.