



PTCS Ground Water Source Open Loop Heat Pump & Ground Source Closed Loop Heat Pump Installation Specifications

Updated: April 1, 2022

1. **Applicability.** This specification outlines the installation requirements for new, ground water-source open loop heat pumps and ground source closed loop heat pumps, that are ENERGY STAR® rated.
 - a. These specifications apply to Water to Water and Water to Air systems.
2. **Guidelines and Specifications.** System shall be installed according to IGSHA guidelines and manufacturer's specifications.
3. **Equipment Selection and Sizing.** The heat pump system shall be sized, rounding up or down to the nearest 6000 Btu/hr capacity at AHRI rating conditions.
 - a. Heating loss and cooling gain calculations shall be made using 70°F indoor design temperature for heating and 75°F for cooling.
 - The system shall be sized to maintain the indoor heating design temperature at an outdoor temperature of 25°F or less without the use of auxiliary heat.
 - For closed loop systems, equipment shall be sized for an EWT (Entering Water Temperature) of 30° or higher at design load conditions.
 - b. The recommended ASHRAE winter design temperature and cooling design temperature from the nearest weather station representative of the installation shall be used.
 - c. The recommended method and form for calculations is available in the Air Conditioning Contractors of America (ACCA) Manual J. Alternate computer or manual methods of calculating heating and cooling loads may be used if approved in advance by the utility.
 - d. Component U-values and F-values used in the heat loss and heat gain coefficients shall reflect the actual construction of the building and be generally consistent with those found in ACCA Manual J 7th Edition, or later.
4. **External Static Pressure.** Does not apply to water to water systems.
 - a. The total external static pressure acting on the system air handler must not exceed 0.8 inches of water (200 Pa).
5. **Air Flow.** Does not apply to water to water systems.
 - a. 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;
 - TrueFlow plate
 - External static pressure – CFM manufacturer lookup table
 - Duct Blaster pressurization fan matching
6. **Refrigerant Charge.** Verify refrigerant charge using methods if recommended by the manufacturer.
7. **Auxiliary Heat Control.** Auxiliary heat shall be controlled in the following manner depending on system type:
 - a. Auxiliary heat shall be controlled in such a manner that it does not engage when the outdoor air temperature is above 30°F.

PTCS GSHP Installation Best Practices

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

- Check with the local utility about any requirements that they have about sizing auxiliary heat.
- Installation must comply with all applicable codes.
- Make sure openings in the unit cabinet or building structure are properly sealed.
- Sizing
 - If a house (de)pressurization test has not been performed, use a default infiltration rate of:
 - 0.8 air changes per hour (ACH) for homes built before 1980,
 - 0.5 ACH for homes built between 1980 – 1990,
 - 0.35 ACH for homes built after 1990,
 - If a duct pressurization test has not been performed, use a default duct system loss of:
 - Up to 25% if ducts are insulated and fully located in the attic and/or crawlspace.
 - Up to 15% if ducts are insulated, sealed, and fully located in the attic and/or crawlspace
 - If the air handler and all ductwork are within the thermal envelope of the house, use 0%.
 - Use a value between 0% - 25% if some ducts are inside conditioned space
 - Use window U-Values provided below if NFRC values are not available:
 - Double-Pane Vinyl: 0.30 – 0.40
 - Double-Pane Wood: 0.35 – 0.55
 - Double-Pane Metal: 0.60 - 0.70
 - Single-Pane Wood: 0.80 – 0.95
 - Include basements as conditioned space in sizing calculations in most cases