



P R O G R A M G U I D E L I N E S

Buried Treasure® Ground Source Heat Pump Program

Purpose

This program is designed to promote the installation of Ground Source Heat Pumps by Palmetto Electric Cooperative, Inc. members. Participating members will reduce their energy costs, help reduce peak electric demand for Palmetto Electric Cooperative, Inc., and help postpone the need to build additional power generating facilities.

Rebate

- \$200 rebate per ton is available for installation of Ground Source Heat Pumps.
- The maximum rebate is \$1,000 per home.
- Only Palmetto Electric Cooperative, Inc. members are eligible.

General Requirements: (Must be met to qualify for rebate)

- ONLY Ground Source Heat Pumps (GSHP) will qualify.
- Installations may qualify in both new construction and existing homes.
- Installations must be in compliance with all state and local codes and ordinances.
- GSHP sizing must be determined by ACCA Manual J load calculation.
- The use of auxiliary or back-up electric resistance heaters is not permitted.
- Prior to any drilling or excavation, "Dial Before You Dig" (888-721-7877) must be contacted to determine the location of all underground utilities.
- The GSHP installer must be a licensed S.C. Mechanical Contractor.

INSTALLATION GUIDELINES

Ground Source Heat Pumps (Open Systems)

- All GSHP water-to-refrigerant heat exchangers shall be made of cupro-nickel metal.
- To ensure a constant water temperature and water quality, ground water shall be the only water source allowed, (except when other sources of water can be proven to have a temperature and quality which

can remain as constant as ground water). The installing contractor/dealer shall be responsible for meeting all state and local drilling code requirements. Also, the contractor/dealer will be responsible for insuring the well will provide an adequate water flow based on the installation requirements.

- The supply and return wells shall be a minimum of 100 ft apart and must adhere to all D.H.E.C. regulations.
- Return wells are required and must be the same diameter and depth as the supply well.
- The system shall be plumbed to allow for periodic cleaning of the water to refrigerant heat exchanger.
- Pressure/Temperature (P/T) test ports, such as "Pete's Plugs" or equal, shall be installed in the "water-in" and "water-out" pipe connections at the heat pump.

Ground Source Heat Pumps (Closed Loop Systems)

A. Loop Design

- The loop shall be sized and installed as recommended by the "Closed Loop/Ground-Source Heat Pump Installation Guide" (industry standard) by the National Rural Electric Cooperative Association, Oklahoma State University, and the International Ground Source Heat Pump Association. The loop design length shall satisfy a Manual J heat gain or heat loss, whichever is the greatest, for the structure.
- The contractor/dealer and/or heat pump manufacturer shall determine the final loop design. Adequate length is essential for proper performance.

B. Loop Installation

- Loops may be installed either in parallel or series. When parallel loops are used with a reverse return header design, the total effective length of the individual loops shall be within 5 percent of each other to ensure balanced fluid flow through the loops. However, it is recommended that the reduced header design be used instead of the reverse return header design, which will eliminate the need to maintain loop lengths within the 5 percent.
- Pipes entering the building through a foundation wall or floor shall be sealed and/or protected. The pipes shall be insulated in a sleeve to protect them from chafing on the floor or wall as it expands and contracts. If the possibility of ground water seepage exists through the opening, the area around the piping shall be protected and sealed.
- The contractor/dealer shall be responsible for meeting all local and state codes pertaining to the location of boreholes and trenches.
- The loop installer must be I.G.S.H.P.A. certified.



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- Headers and manifold pipes shall be at least 2.5 feet below the ground surface.
- Pond loop installations that meet the requirements of the heat pump manufacturer are acceptable.

C. Horizontal Loops (Excluding Headers)

- The minimum allowed depth below the ground surface to any horizontal loop shall be 3 feet.
- Loop trenches shall be at least 10 feet apart.
- All piping in trenches shall be thoroughly backfilled in a method so as to ensure complete soil contact with pipe. If trenching residue is a fine, granular material, it is suitable for backfilling. However, if large clumps of soil or rock are present, the pipe shall be surrounded with 4 inches of fine sand, or equal. The unsuitable trench residue is then used to fill the remainder of the trench.

D. Vertical Loops (Excluding Headers)

- The installation must be recorded on Water Well Form 1903 and forwarded accordingly.
- Vertical boreholes shall be drilled and backfilled with grout as specified in the "Grouting Procedures for Ground Source Heat Pump Systems" manual written by Oklahoma State University.
- Vertical boreholes shall be separated at least 10 ft if bores are in a single row. For bores in a grid pattern, a minimum center to center spacing of 15 ft is recommended.
- An accurate, dimensional diagram of the borehole and header layout with respect to the house and/or property line markers must be made available to the homeowner or contractor at the time of loop completion.

E. Piping Material and Fusing

- Only polybutylene (PB) pipe, defined by ASTM D-2666 or high-density polyethylene (PE) pipe, defined by ASTM D-3035 as specified by I.G.S.H.P.A. (International Ground Source Heat Pump Association) shall be used for closed-loop systems.
- PB or PE pipes shall only be joined by socket or butt heat fusion methods. No barbed fittings or clamps shall be allowed in the earth.
- Proper fusion equipment shall be used as required by the heat pump and/or pipe manufacturer. Proper heater plate temperatures, heating times, and curing times for various grades, thickness, and size of pipe shall be maintained.

- Equipment room piping may be PVC, copper, or other material as allowed by the heat pump manufacturer. However, it is recommended that the PB or PE pipe used in the ground be extended to the unit in over-head applications.

F. Heat Pump & Circulation System Equipment and Installation

- Pressure/Temperature (P/T) test ports, such as "Pete's Plugs" or equal, shall be installed in the "water-in" and "water-out" pipe connections at the heat pump.
- Closed Loop Systems are not required to have a water-to-refrigerant heat exchanger made of cupro-nickel metal. A copper heat exchanger is acceptable.
- All equipment room piping shall be insulated with one inch Armaflex (or equal) to prevent condensation.
- System components (such as circulating pumps) shall be installed as specified by the component and/or heat pump manufacturer.
- The system circulating pump(s) shall have sufficient capacity to circulate the required GPM of fluid based on the design. Isolation valves are necessary on each side of the circulation pump for maintenance and final flow adjustment.

G. Pressure Testing and Start-Up

- The loop shall be pressure tested before connecting to the heat pump and prior to complete backfilling. The piping shall be filled with water or air and pressure tested to at least 40-80 psi for at least 15 minutes. A visual inspection shall be made for leaks. Vertical U-bend assemblies shall be filled with water or air and pressure-tested before insertion into the boreholes.
- When pressure testing is complete and a leak-free system is assured, the system shall be thoroughly purged to remove air and debris. The system-circulating pump cannot provide enough flow to remove pockets of trapped air out of the system. The preferred method is with the use of a flush cart consisting of a 55-gallon barrel or equal, a 1 to 2 HP water pump, filter, flow meter, and two short pieces of flexible hose. A minimum fluid velocity of up to 2 feet per second is required to purge the system of trapped air.
- After the system has been filled and purged, it shall be pressurized as recommended by the heat pump manufacturer.