



Technical Bulletin TB-C0001

Date: September 10, 2001 (rev.4/1/02)
Subject: Loop Leak Verification
Pressurized Flow Center Loop Installations

Introduction:

The purpose of this Technical Service Bulletin is to assist in verifying leaks in pressurized geothermal closed loop systems. The procedures discussed are only guidelines to help assist in troubleshooting for loop leaks. Any questions regarding loop leak testing should be directed to your local Distributor/Field Technical Manager or the factory Technical Service Department at 1 800 299-9747 in Oklahoma City, OK.

Initial Service Call for Loop Pressure Problems

Insert the pressure gauge into the "water in" P/T port, install the repressurization tool (*see photo last page*) into the "water out" P/T port of the unit located on or near the unit water coax fittings between the WSHP and the Flow Center Pump.

Note: *Care must be taken to first "pre-purge all air out of the water hose connected to the repressurization tool and the P/T port to reduce the additional introduction of air into the closed loop system. Best results are accomplished with the Flow Center pump(s) operating. We recommend the use of a 0-100 PSI dial type pressure gauge for easy reading of system pressures.*

The domestic water supply for the home can commonly be accessed with a 3/4" garden hose on the drain outlet of the domestic hot water heater, utility sink, or water hose faucet. This can be used to "top off" the loop system pressure as needed as only a few ounces added will change the system pressure dramatically. Open the ball valve on the repressurization tool and purge the air from the remaining fittings before insertion of the tool into the "water-out" P/T port on the unit. Watch the pressure gauge, if it takes the gauge more than a few seconds to move, this is a good indication that air is in the loop, but not necessarily a leak (remember, air can be compressed, not water). Once pressure is back into the loop system, another indication that there is air in the loop is fluctuation in the loop pressure (bouncing of the gauge needle). The system should be reflushed if a large amount of air is present. If the pump is making noise, this is another sign of low pressure or air in the loop system. The pump should quiet down quickly after repressurization.



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Note: *Low loop pressure may be the result of pipe expansion from seasonal fluid temperature changes not a leak. It is considered Normal for pressurized loop systems to require at least one additional loop pressure "topping off" after a complete Heating/Cooling season. The initial loop "charge pressure" is normally around 45 - 50 PSI depending upon the type of "Flush Cart" used to purge and fill the system. The geothermal unit performance is only affected by the "gpm flow rate" not the system pressure. Loop pressure is only needed to assure proper Flow Center "gpm flow rates, lubrication, and sometimes cooling" of the pumps. Acceptable unit "Water In" operating pressure ranges may be: 3-100 PSI +/- 10% although pressures near 25-30 PSI during the end of the Heating Season is preferred (this should assure proper pressures during upcoming Cooling Season)*

Step One - Checking Inside Piping and Flow Center

There are various methods for determining if there is a leak in the loop piping system. Do not pressure test the inside piping through the flow center. An outside leak could not be distinguished from an inside leak since the flow center joins both inside and outside systems.

To isolate the inside piping from the outside portion, turn the 3-way brass valves (located on the side (Taco) or front (Grundfos) of the Flow Center, depending upon the type) on the pump manufacture so that the outside loop piping is closed off.

Note: *Do Not remove the Flushing Plugs from the Flush Ports.*

Pressure Testing The Loop System

When pressure testing a closed loop; 100-psi is more than enough pressure. **Due to expansion of polyethylene pipe, the pressure on the system will drop about 10% on the initial pressurization and about 5% on the second.** Actual testing times will vary depending upon the severity of the leak. This is a judgement call on the Servicing Contractor. Allow compensation for temperature change during extended pressure test times.

Step Two - Checking Outside Piping

To test for outside leaks, disconnect the inside piping at the supply and return lines near the Flow Center, pressure test the piping to the outside, before digging up the outside portion. Installation of any combination of pipe caps/plugs will work. Be sure to allow for a (P/T) Pressure/Temperature port on at least one of the pipes to use the Re-pressurization tool (*See Photo*).

Horizontal/Vertical Loops

Once it has been determined that the leak is outside, the manifold header area outdoors should be excavated to expose all the loop circuits near the header only. If there are no leaks exposed near the manifold headers, cut the 3/4" PE Pipe off of the manifold, one circuit at a time and pressure test each individual circuit. Once the leaky pipe circuit is located, corrective action will depend upon the type of loop installed.

Caution: *Remove the pressure on the outside piping before cutting the loop circuits.*

Note: *The most cost-effective method of repair to the loop circuit(s) may be to abandon the defective circuit(s) and install a new loop circuit(s) beside the affected one(s). Another method used has also been to apply water under pressure to the outside loop for a few days until the surface of the ground appears wet. The best method still seems to be abandonment of the defective loop circuit and replace it with a new one.*

Pond Loops

Once it has been determined that the leak is outside, the use of compressed air can be used to force the fluid in the loop out of the piping system. Then fluid solution can be retained into drums or containers and reused most of the time. Removal of the fluid from the loop will allow the piping to float to the surface, making leak locations identifiable and possible. Depending upon the counterpoise weights used to sink the loop.

Note: *Assuming the total footage of piping used outdoors is known, you can calculate the total fluid volume to determine the needed storage vessels to hold the fluid. (2.8 gal/100 ft .75" PE - 7.8 gal/100ft 1.25" PE pipe).*

Caution: *Extreme safety considerations should be made before attempting Winter Season repairs to Pond/Lake Loop Designs. Never enter cold water where hypothermia conditions exist. Waiting until better weather conditions exist may be the best solution.*

Loop Repressurization Tool Parts List:

- | <u>Qty</u> | <u>P/N</u> | <u>Description</u> |
|------------|------------|---------------------------------------|
| • 1 ea. | APTGA | P/T Port Adapter, for use with APG100 |
| • 1 ea. | APG100 | Pressure Gauge, 0-100 PSI |

Parts List from others:

- 2 ea. .25" x Close Pipe Nipple
- 1 ea. .25" FPT Tee
- 1 ea. .25" x .50" MPT Red. Coupling
- 1 ea. .50" MPT x .25" FPT Red. Bushing
- 2 ea. .50" x Close MPT Pipe Nipple
- 1 ea. .50" FPT x .75" FM Swivel Hose Adapter w Gasket
- 1 ea. .50" FPT Ball Valve (Gas Cock)
- Pipe Thread Sealant



Photo of Actual Loop Repressurization Tool