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Ground Loop Temperature question

Last Post 25 Dec 2009 08:51 PM by darknessplayboy. 36 Replies.

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Author

Messages

decafdrinker

 Basic Member

 Posts:297

18 Dec 2009 12:29 PM

My 4-ton GeoMax 2 is already showing only 32 F on the pipe coming back from the ground (analog thermometer on the brass manifold where the loops come into the house). I know that the water is colder going into the ground, but I'm surprised that already in the season, the heat from the ground can only produce 32 in the returning liquid. I have 2 300-foot boreholes, each with 2 loops. Yes, I'm still getting heat, of course, but is 32 F a reasonable return temp in mid-December? I'm asking only to try to find out if this is normal or whether this is indicative of poor loop heat conductivity or future system performance issues. I'm planning on asking the installer today, too, but he has only put in 2 other geo systems. I'm hoping for the voice of experience from anyone reading this. Duct air temp is still reading around 94 F.

Thanks,
Stuart

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Ona

18 Dec 2009 12:52 PM

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Basic Member



Posts:182

I can't tell you if this is good or bad, but my incoming temp is also 32 degrees F right now. My system is working now and worked well through the 2008-2009 season. I have a 3 ton WF closed vertical loop (450 ft deep).

Ona

just trying to make my old home better
www.geochoices.com

decafdrinker



Basic Member



Posts:297

18 Dec 2009 01:18 PM

Thanks, Ona. Where are you in the US? I'm southeastern PA. I'm glad I'm not the only one right now. I know the system won't be bringing in 54 F water, but it seemed to be really low, really fast.

Ona



Basic Member



Posts:182

18 Dec 2009 01:24 PM

I am in the Albany, NY area. So we're a little colder here.

Ona

just trying to make my old home better
www.geochoices.com

waterpirate



Basic Member



Posts:276

18 Dec 2009 05:54 PM

Hi and welcome,

If the well field maintains that temp through the winter and you are comfortable in your home no problem. It is early in the season to be seeing that temp imo. Was the system operational in the summer? One thing that stands out is just because an engineer thought it was a good idea to put more than one loop in a borehole to save on drilling cost, does not make it a common or accepted practice.

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Eric Sackett
www.weberwelldrilling.com
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18 Dec 2009 06:03 PM

Apparently, the double-loop in a single hole is a Rehau devised thing, and features "a double U-bend" which suspiciously sounds like a new kind of toilet plumbing. Seriously, Rehau sent a rep up from somewhere to supervise the installation. I guess we all want to see whether it's an actual good idea from an engineering standpoint.

The system wasn't put in until October, so no temp data from the summer as far as heat-output into the ground. I just spoke to the installer and he said that the loop has anti-freeze and 32 is not a problem. Like you said, if it maintains, then it's doing its job when it's 20 F outside.




decafdrinker 

Basic Member

Posts:297

18 Dec 2009 06:49 PM

A double loop in a borehole is a legitimate way to slightly increase performance. But it certainly doesn't eliminate the need for any boreholes.




32F at this point is a problem for your efficiency.

Just an Engineer with well supported opinions




jonr 

Veteran Member

Posts:1241

19 Dec 2009 09:45 AM

What is the delta T? or what is the leaving temp at? 32 degrees coming back seems to be way low (your ground temp should be around 50 - 55 degrees F). Do you have auxillary heat (e.g. electric heat elements) installed in your system? If so, you may be supplying much of the heat to your home via electric backup.




rjdalga 

New Member

Posts:32

RJDalga, CRI
Home Analysts, Inc.
Kalamazoo, MI 49009

decafdrinker 

Basic Member

Posts:297

19 Dec 2009 10:35 AM




Not sure the delta. The little thermometer doesn't go below 30 F, and while I could attach it to the "leaving" side of the manifold, I would just have to guesstimate the temp to find the delta. I *do* have electric aux backup and I can tell you that EVERY time I look at the thermostat, which is set for 70, the aux heat is ON. The one time I looked and it was off, the thermo was only reading 68 and it was trying to get to 70. Seems like the house won't get to 70 without aux. That seems odd. The energy audit found the house wasn't super-tight, but wasn't drafty or have missing insulation or anything. It's 28 F outside right now, we're getting the northeast "blizzard", but again, 28 outside and a loop return of 32???? Seems very odd.

rjdalga 

New Member

Posts:32

19 Dec 2009 11:07 AM

I agree that's odd??? I would get another thermometer installed so you can monitor both the temps in the loop (and determine your delta T). I don't know exactly how much heat you are getting from the ground loops for sure since I have an open loop system, but I can tell you my maximum heat gain is 10 degrees (my water supply is usually around 54 degrees F during the winter (here in SW lower MI) and my outgoing (or leaving) water temp is 44 degrees or so. I would expect you to have somewhat less of a delta T (maybe 6 - 8 degrees or so) but there again I don't know too much about closed loops systems.

RJDalga, CRI
Home Analysts, Inc.
Kalamazoo, MI 49009

decafdrinker 

Basic Member

Posts:297

19 Dec 2009 01:15 PM

The installer said that he thought 32F was on the low side for this early in the season, and he's contacting Rehau to find out the exact "operating characteristics" of the system. I told him, too, that the aux heat was going on but the house was having trouble maintaining 70. He ran some tests and discovered that the 2nd stage aux (it's 2 stage with a timer, 10 kw, then + 4.4 kw) wasn't going on properly. He was concerned that aux heat was even going on, although the DATs was reading duct temperatures of 93 F on just geothermal alone. He suggested disconnecting aux for a few days since we're around and checking how well the house maintains temperature, leaving the thermostat set permanently at 70 with no setbacks.


I guess it can't hurt for a few days.

Meanwhile, we discovered a very sloppy duct reconfiguration done by one of his minions...the return air ducts in the unheated basement weren't sealed...in fact....gaping holes, big enough to stick hands through. So basically, 50 F air is being pulled in and heated to 94 and we're wondering why the system is struggling.

We also discovered by accident that the 11x11 duct that feeds the upstairs (in my opinion, not big enough) is connected to the main trunk through a weird collection of THREE 90 degree tight corners, and the hole the connects the duct to the feed was only 16 square inches.

Basically, when upstairs called for heat, 1100 cfm tried to go through a 16 square inch hole and around 3 90-degree bends, followed by an 11x11 duct, another 90 rounded elbow, up through the hall closet, another 90 degree rounded elbow, then to 4 8-inch flex ducts, 2 per bedroom.

I can't think that's the best way.

geo fan 



Basic Member



Posts:408

19 Dec 2009 02:48 PM

well the huge holes in the ducts could certainly explain the lower then average (for this time of year) EWT and your trouble maintianing 70 without aux.
and while the SAT will increase with the repair , sealing and insulation (I hope) of the ducts .
the ewt will likely only slow its decline for the rest of the year

jonr 



Veteran Member



Posts:1241

19 Dec 2009 04:56 PM

An old saying:

"If it's not tested, assume it doesn't work".

As far as I can tell, the standard for geo installs is "it produces some heat, you are all set".

Just an Engineer with well supported opinions

waterpirate 



Basic Member



Posts:276


19 Dec 2009 05:26 PM

The ducting issues coupled with a lazy second stage would explain your aux heat coming on, but not your ewt. If first stage ran non stop it would be a simmilar load to the two stages cycling on and off. The load is the load. If your house is "good and tight" The next stop after your current issues is to get into the design of the loops themselves. Footage vs. tonnage compared to the anticipated conductivity. Since the holes are in a copy of the drillers log can be obtained to compare anticipated conductivity with actual soils type encountered. If you are in rock a grout issue could be possible if the hole did not flood. A rock hole needs the grout to be 100% to obtain the thermal link.

Eric Sackett

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decafdrinker 



Basic Member



Posts:297

20 Dec 2009 05:58 PM

Is it possible that a new borehole has "to settle" for a year?

Also, I have some more data...such as I've been able to get. The installer came by and was shocked at the ductwork...and blamed his subcontractor. But he's coming back to fix it. Because the return is pulling in basement air, I took some temp. readings. The DATs (temp coming OUT of the air handler is 87 F. The air going in is about 66...a mix of basement air (unheated) and normal return from the house. T-stat set at 71 with no set backs, aux heat disabled at the breaker box.

Taping a meat thermometer to the loop manifold resulted in the following readings:

Loop from the ground - 38.9F - however, the proper analog thermo attached to the loop from the ground reads 32 F...I'm assuming the meat thermo is off by 7 F.

Loop to the ground - I would put the analog thermo on that loop, but the dial pegs at 28, so it's pointless. The meat thermo reads: 34.7, so minus 7 for accuracy gives me about 27...

A delta of 5 F...not much, is it. But it is heating the air through the handler from 66 to 87....a delta of 21 F.

I can't tell if these are good numbers or not! Any recommendations on some good digital thermos, or will any hardware store one work?

geodean 



20 Dec 2009 06:04 PM

Veteran Member



Posts:1326

[digital thermometer](#)

vertical loops should need any time to settle.

Dewayne Dean

www.PalaceGeothermal.com

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rjdalga



New Member



Posts:32

21 Dec 2009 08:39 AM

Your 20 degree temp rise off the plenum is good (mine runs typically between 17 - 20 degrees), however the 5 degree split from the ground loops seems very low. Again since I don't know much about closed loop systems I would like to hear from others about this. After you get the ducts fixed your system should be operating just fine. As far as digital thermometers go, I recommend Acurite digital thermometers. They have an external thermocouple that you can put between the pipes and the insulation. I bought mine at Lowe's. They are a silver/grey color (small) and are battery operated. Personally, I have about six of these. I monitor EWT, LWT, and Plenum temp (and my hot water heater).

RJDalga, CRI

Home Analysts, Inc.

Kalamazoo, MI 49009

a0128958



Advanced Member



Posts:587

21 Dec 2009 11:31 AM

What a good Delta T is, for the water loop, measured across the coaxial water-to-refrigerant heat exchanger, is highly dependent on the flow volume of water, and to a lesser extent the type of fluid (straight water vs antifreeze mix).

For example, my Delta T values are low, consistently between 2.5 and 4°F. This is because my water volume is so high.


You can see an example of DeltaT values in the first chart below. The blue line is for a 3 ton WaterFurnace Envision running exclusively in 1st stage; the black line is for a 5 ton unit running in 1st stage.


Yet, even with the low Delta T values, my units are producing Heat of Extraction values consistent with what the Envisions are supposed to produce at my Entering Water Temps. See the next chart below for each unit's Heat of Extraction from the water loop, in KBTU/hr. These values represent the capacity of the units (in 1st stage). The 3 ton unit can be seen to be running at about 19 KBTU/hr, and the 5 ton unit runs at about 37 KBTU/hr.

The point here is that it's difficult to make a 'good/no-good' conclusion when measuring DeltaT without at least knowing what the water flow is. A low DeltaT value may be just fine if water flow is strong (like in my case). A high DeltaT may also be fine if water flow is near the minimum acceptable amount.

Best regards,

Bill

 Attachment: DeltaT.jpg


 Attachment: HE-HR.jpg

Real time energy monitoring system at:
<http://welserver.com/WEL0043/>

21 Dec 2009 11:34 AM

rjdalga, what is the model number of the Acurite digital thermometer that you like? Thanks!

Homeowner with WF Envision NDV038 (packaged) & NDZ026 (split), one 3000' 4 pipe closed horizontal ground loop, Prestige thermostats, desuperheaters, 85 gal. Marathon.

geome 



Advanced Member



Posts:729

Ona 



Basic Member



Posts:182

22 Dec 2009 08:18 AM

Stuart ~ I must apologize, the tstat that I was using must not have worked because when my loop was measured again I was at 41 degrees F (not 32 as I posted before). Sorry for the misinformation... I'm glad the real pro's were here to help.

Ona
just trying to make my old home better
www.geochoices.com

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--Geothermal Heat Pumps

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