

Nelson, Dan

From: Erick Powell <erick.powell@brockwayeng.com>
Sent: Friday, November 17, 2017 11:48 AM
To: Nelson, Dan; Edl, Michele
Cc: zach.latham@brockwayeng.com
Subject: Additional Volume Estimates for Permit no. 37-22783
Attachments: Geothermal heating - peak & monthly.pdf

Hi Dan and Michele,

Sorry for the delay, I had a tough time getting ahold of the installer of the system. I spoke with him today, and have adjusted the volume estimates for heating and cooling for permit no. 37-22783.

This system is a bit different, as the primary heating source is radiant heating, with a secondary unit of forced air. The installer indicated that the units are able to provide the following BTU output:

1. Radiant Heating (primary unit) = 75,000 BTU/hr at 22 gpm
2. Heating Forced Air (secondary unit) = 18,750 BTU/hr at 4 gpm
3. Cooling Forced Air (primary unit for cooling) = 63,500 BTU/hr at 26 gpm

I've put together a spreadsheet to reflect these numbers, and came up with a heating volume of 25.2 acft and cooling volume of 3.1 acft or a combined heating and cooling volume of 28.3 acft. I'm not sure how these numbers jive with your spreadsheet, since I don't have access to it. But I'm guessing they are higher than your values. I would attribute that to the primary heating method of radiant heating. The estimates are reasonable, given the parameters provided.

If you have any additional questions, please let me know.

Regards,

Erick

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RESIDENTIAL HEATING AND COOLING PEAK FLOW AND MONTHLY AVERAGE FLOW REQUIREMENT

Brockway Engineering PLLC
11/17/2017

Total square footage of livable space (A) 3997 s.f.
Inside design temperature (Ti) 65 F
Resource temperature (Ts) 50 F
2-story (No = 1, Yes = 2) 1
Efficiency factor (e)** 0.67
Design outside temperature for peak load (Tp) -1.7 deg F

PEAK FLOW CALC: Heat load Radiant 75000 BTU/hr
Heat load 2nd Unit 18750 BTU/hr
Cold load Air 63500 BTU/hr
T drop 1.5 deg F
Peak Q 26.0 gpm = 0.06

MONTHLY FLOW CALC FOR HEATING:

Month	No. Days	Heating [deg F]*	Heat Load [BTU/hr]	Heat with Radiant Avg Q (gpm)	Heat with 2nd Unit Avg Q (gpm)	Volume [ac-ft]
January	31	21	118,758	22	4.0	3.56
February	28.25	28	98,351	22	4.0	3.25
March	31	36	77,496	22	0.5	3.09
April	30	41	62,938	18	0.0	2.45
May	31	50	41,466	12	0.0	1.67
June	30	58	17,654	5	0.0	0.69
July	31	65	0	0	0.0	0.00
August	31	63	5,686	2	0.0	0.23
September	30	54	29,568	9	0.0	1.15
October	31	43	57,969	17	0.0	2.33
November	30	32	87,211	22	2.6	3.26
December	31	22	116,256	22	4.0	3.56
Annual volume						25.2

*Average monthly temperature at Hailey, ID [degrees F]

MONTHLY FLOW CALC FOR COOLING:

Month	No. Days	Cooling [deg F]*	Cooling Load [BTU/hr]	Average Req'd Q (gpm)	Volume [ac-ft]
January	31	65	0	0.0	0.00
February	28.25	65	0	0.0	0.00
March	31	65	0	0.0	0.00
April	30	65	536	0.2	0.03
May	31	66	1,987	0.8	0.11
June	30	69	10,712	4.4	0.58
July	31	72	19,869	8.1	1.11
August	31	71	15,377	6.3	0.86
September	30	67	5,892	2.4	0.32
October	31	65	691	0.3	0.04
November	30	65	0	0.0	0.00
December	31	65	0	0.0	0.00
Annual volume					3.1

Estimated Total Volume for Heating and Cooling
28.3 acft

*Average monthly temperature at Hailey, ID [degrees F]

*Efficiency factors:

- 0.28 Best energy efficiency - extra insulation, caulked and weatherstripped, with storm windows and doors
- 0.44 Better energy efficiency - standard insulation, caulked and weatherstripped, with storm windows and/or doors
- 0.67 Average residence - standard insulation, no weatherproofing but with storm windows or double panes
- 1.11 Poor energy efficiency - minimal insulation, no weatherproofing or storm windows (older homes, shops or greenhouses)