

RESIDENTIAL SPACE HEATING/COOLING REQUIREMENTS FOR COLD GEOTHERMAL SOURCES

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 Computations for: Heating of commercial building

REQUIRED DATA:

Area of livable floor space, ft ² (A)	13237
2 story? (N=1, Y=2)	1
House efficiency factor (e) *	0.28
Inside design temperature (Ti)	72
Average outside temperature (To) **	43
Source temperature, degrees F (S)	80
Heating/cooling days per season (D)	365
Hours/day system operates (H)	24

* e values are as follows:

- 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)

** Suggested average outside temperatures:

WINTER
 4 deg F Boise
 6 deg F Grand View
 -8 deg F Cascade

SUMMER
 80 deg F Boise
 90 deg F Grand View
 70 deg F Cascade

CALCULATED DATA:

DESIGN HEAT LOAD (BTU/hr required)

Formula: $E = [e \times (T_i - T_o)] A$

Applies factor of 0.8 for two-story dwelling

E = 107,484 BTU/hour

TEMPERATURE DROP ACROSS SYSTEM

Formula: $T_s = 0.3 \times [S - T_i]$

Ts = 2.4 degrees F

FLOW RATE REQUIRED (at given source temperature)

Formula: $Q = E / (500 \times T_s) \times 448.8$

Q = 0.20 cfs

DIVERTED VOLUME OVER SEASON

Formula: $V_{div} = Q \times D \times H / 24 \times 1.9835$

Vdiv = 144.5 AFA

AVERAGE TEMPERATURE CALCULATION:

4 DEG MIN + 80 DEG HIGH / 2 =

42 DEG AVERAGE YEAR ROUND TEMP.