EarthLinked®
SYSTEM SIZING WORKSHEET
AIR HEATING

EARTHLINKED TECHNOLOGIES

This worksheet applies to systems using a DX air handler or cased coil to supply heat in a climate where the heating load of the structure dominates.

1. Determine heating and cooling requirements of the structure, based on **ACCA Manual J (latest edition)** procedure using the **99.6% heating design temperature** and the **0.4% cooling design temperature** from the **EarthLinked® Geothermal Heating and Cooling System Applications and Sizing Guide.** Elite RHVAC or Wrightsoft Right-J software is recommended.

   If domestic water heating by desuperheater is part of the system, add 2,000 BTUH for each adult and teenager to the Design Heating Load.

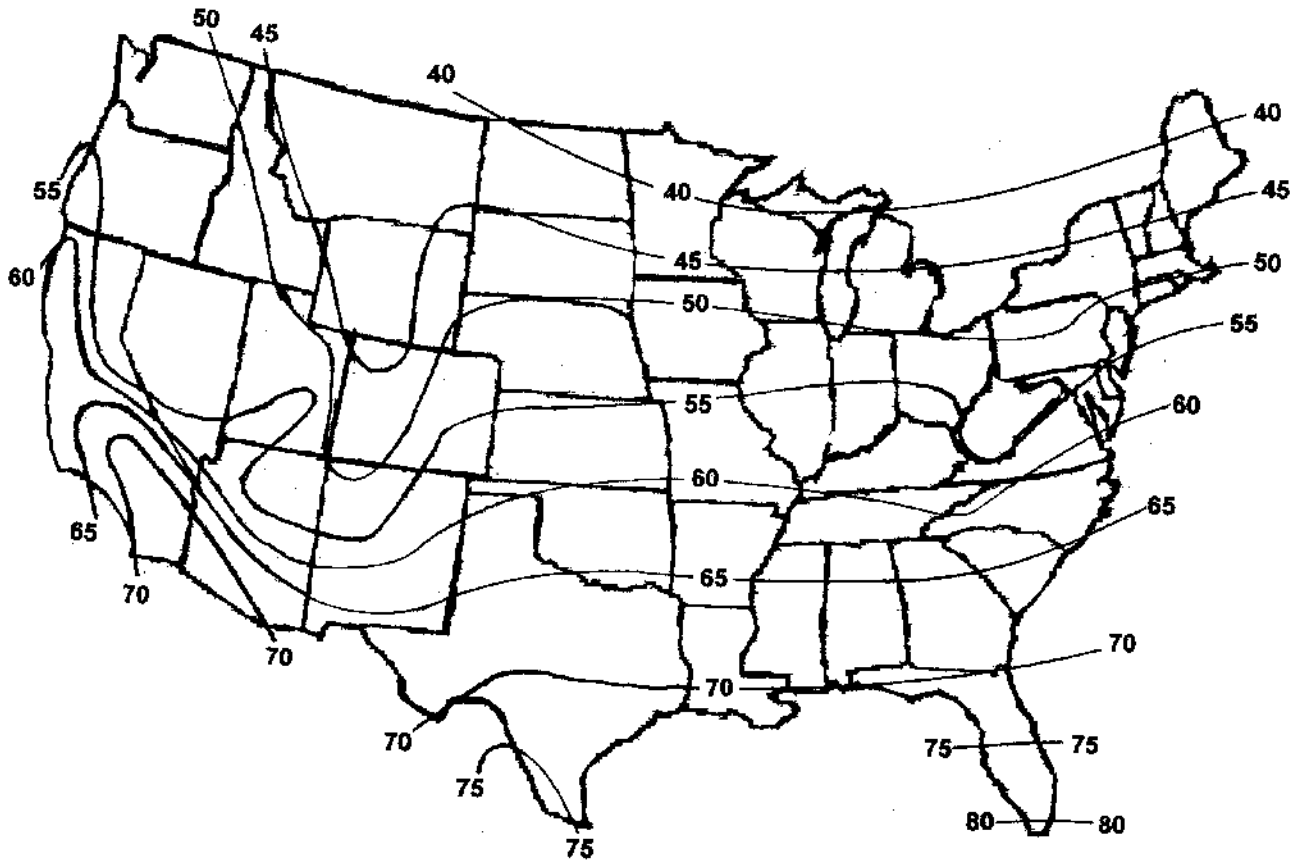
   Winter Design Temp: _____ °F Design Heating Load: _____ BTUH

   Summer Design Temp: _____ °F Total Cooling Load: _____ BTUH

   Sensible Cooling Load: _____ BTUH

2. Determine local earth temperature from Temperature Map:

   Site Location: _____ (city) _____ (state/prov.) Earth Temp.: _____ °F



EARTH TEMPERATURES IN CONTIGUOUS UNITED STATES AND SOUTHERN CANADA

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3. Locate the System Performance Data for **Air Heating*** based on the following parameters:

- Refrigerant: ☐ R-410A
- Power: ☐ 230-1-60 ☐ 230-3-60 (check one box)
- Local Earth Temperature: _____ °F (enter temperature from map)
- Earth Loop Configuration: _____ (V1, H5, etc. based upon available land area and geology of the earth at the site)

4a. The size of the system will be determined by the **heat output of the system at the Winter Design Temperature (DT)** from the appropriate Air Heating Performance Table selected based on steps 2 and 3 above. The initial selection of a system size (capacity) should have a heat output of at least 100% of the Design Heating Load in step 1. **Electric supplemental heat with a rating of at least 20% of the design heating load, in BTUH, is a required component of the system handler**

Enter information below:

System Size	Heat Output @ DT	Design Heating Load
_____ Tons	_____ BTUH	_____ BTUH

4b. **<u>Adjusted Heating Output Capacity</u>**

The adjusted heating output capacity for a system utilizing a direct expansion air handler or cased coil is INCREASED by the power input to the air handler or cased coil blower motor.

This capacity increase is determined as follows:

Air Handler (Cased Coil) blower motor heating capacity increase =

1.25 X (cfm/ton) X (system tons) = _____ BTUH,

where cfm/ton is generally 400.

Adjusted Heating Output Capacity =

Heating Capacity (from performance tables) + Air Handler (Cased Coil) capacity increase =

_____ BTUH

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4c. **Adjusted Coefficient Of Performance (COP)**

The adjusted coefficient of performance (COP) for the system utilizing a direct expansion air handler or cased coil is REDUCED, due to the power input to the air handler or cased coil blower motor, and is determined as follows:

(1) Air handler (cased coil) blower motor power input = BTUH from 4.b. = _____ BTUH

(2) Determine compressor power input =

heating capacity (from performance tables) / COP (from performance tables) = _____ BTUH

Total Power Input to the system = (1) + (2) = _____ BTUH

Adjusted Coefficient Of Performance =

Adjusted Heating Output Capacity / Total Power Input = _____ = COP

5. From the appropriate **Air Cooling** Performance Table determined by steps 2 and 3 the selected system size (in Tons), **enter the system size in Tons, Total Cooling Output and Sensible Cooling Output values below. Re-Enter the Total Cooling Load and Sensible Cooling Load values below.** They are the same as the values in step 1.

System Size	Cooling Output	Cooling Load
_____ Tons	Total: _____ BTUH	Total: _____ BTUH
	Sensible: _____ BTUH	Sensible: _____ BTUH

Check to see that the cooling outputs are 10% greater than the cooling loads.

Is Total Cooling Output 10% greater than Total Cooling Load? ☐ YES ☐ NO

Is Sensible Cooling Output 10% greater than Sensible Cooling Load? ☐ YES ☐ NO

Both Output values must be 10% greater than both Load values.

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6. Total Cooling Output (BTUH) ÷ Total Cooling Load (BTUH) = _____

   This value should be **greater than 1.10,** to ensure comfortable conditions during cooling operation.

7. From the appropriate **Air** Heating Performance Table determined by steps 2 through 4 and the selected system size (in Tons), **enter the Tons, Adjusted Heat Output at Winter Design Temperature (DT), and the Winter Design Heating Load below.**

System Size	Adjusted Heat Output @ DT	Design Heating Load
_____ Tons	_____ BTUH	_____ BTUH

   Check to see that the adjusted heating output is at least 100% of the heating load.

   Is Adjusted Heating Output at least 100% of heating load? ☐ YES ☐ NO

8. Final system size is as follows:

   System Size: _____ Tons

   Compressor Unit Model: _____

   Air Handler/Cased Coil Model: _____

   Supplemental Electric Heat: _____ KW

   Earth Loop Model: _____

   Domestic Water Module Model: _____

   Desuperheater Model: _____

9. **Balance Point Temperature**

   The balance point temperature for a heating system must be determined if an outdoor thermostat is installed to initiate supplemental heat. The outdoor thermostat set point is adjusted to be the balance point temperature.

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For EarthLinked® R-410A systems three values must be known to determine balance point temperature:

- **Adjusted heating output capacity @ design point temperature**, determined in 4b.
- **Adjusted COP as determined in 4c.**
- **Adjusted heating output capacity @ 65°F**, determined by the procedure that follows.

Adjusted heating output capacity @ 65°F = 1.57 X Adjusted heating output capacity @ design point

With the above information and the building heating load determined by the Manual J method, access the Earthlinked Technologies website at www.earthlinked.com to access the **Balance Point Calculator.**

Under the heading **"Dealer Info",** scroll down and click on **"Dealers Login only".**

Go to **"Dealer Resource Center"** and scroll down to **"Forms and Policies".**

Click on **"Balance Point Calculator"** and you will see the following:

BALANCE POINT CALCULATOR

(Applies only to Heating—do not use for Cooling)

enter data	
BUILDING LOAD AT DESIGN TEMP IN BTUH =	
OUTDOOR DESIGN TEMP =	
EQUIPMENT CAPACITY @ 65°F VALUE =	
EQUIPMENT CAPACITY @ DESIGN TEMP =	
results	
BALANCE POINT CAPACITY =	
BALANCE POINT TEMPERATURE =	70°F INDOOR DESIGN (fixed)

Under "ENTER DATA", input the values for Building Heating Load (from 1.); Outdoor Winter Design Temperature (from 1.); Adjusted Heating Output (Equipment) Capacity @ 65°F (from 9.above); and Adjusted Heating Output (Equipment) Capacity@ Design Temperature (from 4.b.).

The resulting balance point capacity and temperature can be read under "RESULTS".

Balance Point Capacity = _____ **BTUH**

Balance Point Temperature = _____ **°F**