EarthLinked®
SYSTEM SIZING GUIDE
HYDRONIC COOLING

EARTHLINKED TECHNOLOGIES

This worksheet applies to systems using a hydronic water module (HWM) or a compressor equipped with an internal refrigerant to water heat exchanger, to supply chilled water in a climate where the cooling load of the structure dominates.

1. Determine cooling and heating 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 in the **EarthLinked® System Sizing and Performance Tables**. Elite RHVAC or Wrightsoft Right-J software is recommended.

   If domestic water heating by Heat Recovery Module (HRM) is part of the system, add 2,000 BTUH for each adult and teenager to the Design Heating Load.

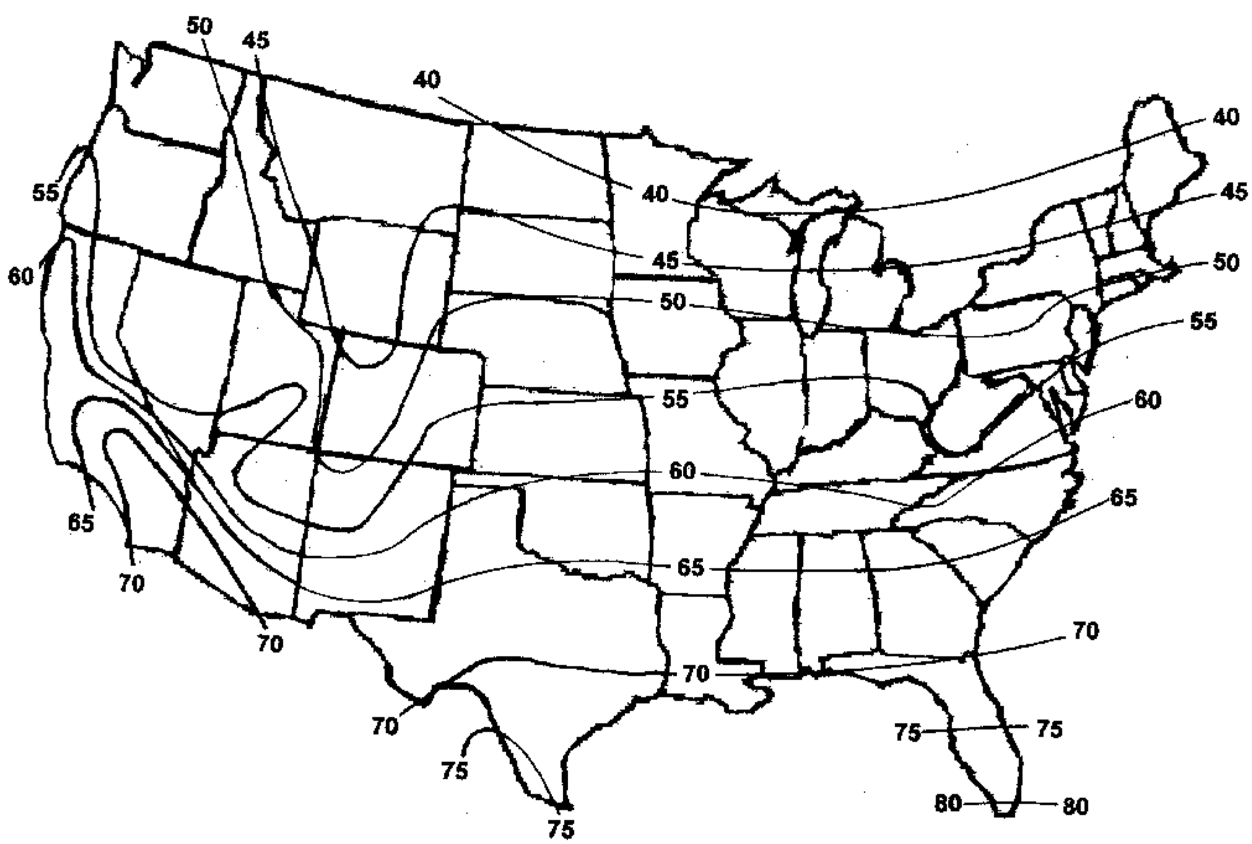
   If domestic water heating by Domestic Water Module (DWM) is part of the system, add 2,000 BTUH for each adult and teenager to the Design Heating and Cooling Load.

   Summer Design Temp: __________ °F   Total Cooling Load: _____________ BTUH

   Winter Design Temp: __________ °F   Design Heating 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

3. Locate the System Performance Data for **Hydronic Cooling** based on the following parameters:
   - Local Earth Temperature: __________ °F (enter temperature from map)
   - Earth Loop Configuration: __________ (V1, H1, etc. based upon available land area and geology of the earth at the site)

4. **Adjusted Cooling Output**

   The size of the system will be determined by the DESIGN Total cooling (100% Load) output from the appropriate Hydronic Cooling Performance Table selected, based on Steps 2 and 3 above. **The initial selection of a system size (capacity) should have a DESIGN total cooling output of 105% of the Total Cooling Load. Enter information below:**

   The Adjusted Cooling Output is the Total Cooling Output @ Design (100% Load) multiplied by the appropriate correction factor on that performance data page. The correction factor is based on the Leaving Water Temperature.

   Adjusted Cooling Output = Total Cooling Output @ Design ____________________ BTUH

   x Correction factor __________ = ______________ BTUH

System Size	Total Cooling Output @ (100% Load)	Total Design Cooling Load
___________ Tons	______________ BTUH	________________ BTUH

   Verify that the **Adjusted Cooling Output** is equal to or greater than the Total Cooling Load:

   Is **Adjusted Total Cooling Output** greater than Total Cooling Load? ☐ Yes ☐ No

5. EarthLinked® compressor units that provide space cooling shall be equipped with the **EarthLinked® Hybrid Cooling Module** when (1)required by the performance tables OR (2) where BOTH of the following circumstances occur:
   - Ambient outdoor temperatures have exceeded the outdoor summer design temperature conditions for at least 7 hours of continuous system run time, coupled with the conditions described in the next sentence.
   - Low thermal conductivity soils do not effectively absorb and dissipate heat. Examples of such soils are light dry soil, dry sand, peat and organic soils, dry clay soils and hardpan.

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The following table provides the appropriate Hybrid Cooling Module size for the compressor unit selected, based on the foregoing system sizing process.

Compressor Unit Size	Hybrid Cooling Module Model
	R-410A
-018 thru -036	HCM-1836C
-042 thru -072	HCM-4272C

6. **Adjusted Heat Output**

If Hydronic Heating is also required, locate the Performance Data for **hydronic heating** capacity of the compressor unit selected above.

System Size	Design Heat Output @ 100% Load	Design Heating Load
________ Tons	____________ BTUH	________ BTUH

The Adjusted Heat Output is the Heat Output @ Design (100% Load) multiplied by the appropriate correction factor on that performance data page. The correction factor is based on the Leaving Water Temperature.

Adjusted Heat Output = Heat Output @ Design (100%) ________________ BTUH

X Correction factor __________ = ___________ BTUH

Check to see that the Adjusted Heat Output is at least 100% of the Design Heating Load.

Is the Adjusted Heat Output at least 100% of the Design Heating Load? ☐ YES ☐ NO

Supplemental heat (electric strip heat) of at least 20% of the design heating load is required.

7. 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: __________________________

Heat Recovery Module Model: __________________________

8. **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.

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

- **Adjusted heating output capacity @ design point (100% Load)**, determined in 6.
- **Heating output capacity @ 5% Load**, determined by the procedure that follows.

Heating output capacity 5% Load is the <u>MAXIMUM heating capacity</u> taken from the performance table for the specific system selected.

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 @ 5% Load =

EQUIPMENT CAPACITY @ 100% Load =

results

BALANCE POINT CAPACITY =

BALANCE POINT TEMPERATURE = 70°F INDOOR DESIGN (fixed)

Under "ENTER DATA", input the values for <u>Building Design Heating Load</u> (from 1.); <u>Outdoor Winter Design Temperature</u> (from 1.); <u>Heating Output (Equipment) Capacity @ 5% Load</u> (from 8. above); and <u>Adjusted Heating Output (Equipment) Capacity@ Design (100% Load)</u> (from 6).

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

Balance Point Capacity = ____________________ **BTUH**

Balance Point Temperature = ____________________ **°F**