Sizing Your Hydronic System

1) Calculate Heat Loss

A) Infiltration Heat Loss (BTUH) = L x W x H x DTD X Infiltration Factor

– LxWxH: Dimensions of structure/room
– DTD: Design Temperature Difference between indoor design temperature and
    outdoor design temperature
– Infiltration Factor: IBR value for various room/structure configurations

Sample IBR Infiltration Factors

– One Outside Wall with Opening – 0.012
– Two Outside Walls with Opening – 0.08
– Three Outside Walls with Opening – 0.027

B) Conductive Heat Loss (BTUH) = L x W x DTD x U-value *

– LxW: Surface area (wall, window, etc.)
– DT: Design temperature difference between indoor and outdoor temperatures
– U-value: Measure of a material's ability to conduct heat
– Infiltration heat loss plus conductive heat loss equals total heat load of structure

*To Determine U-value (When R-value is Known):
    U-value = 1/R-value

2) Calculate Flow Rate (The Universal Hydronics Formula)

GPM = BTUH / (Delta-T x 500)

– GPM : Gallons per minute
– BTUH: Calculated heat loss of the building
– Delta-T: Design temperature drop (difference) in the system
– 500: Constant representing the weight of 1 gal of water times 60 minutes
    times the specific heat characteristic of water

3) Calculate Head Loss (For Copper or Steel Pipe)*

Longest run in feet x 1.5 x .04

– 1.5: Allowance for valves and fittings
– .04: Represents 4 ft. of head per 100 ft of correctly-sized pipe

*For Pex pipe head loss, use chart provided by the manufacturer.

4) Pipe Sizing Guidelines*

Flow	Pipe Diameter
2 – 4 GPM	3/4"
4 – 9 GPM	1"
8 – 14 GPM	1-1/4"
14 – 22 GPM	1-1/2"

*Based on minimum 2 FPS flow velocity, maximum 4 FPS. Sized to eliminate velocity noise.

5) Circulator Selection Use the Pump Selection Wizard at www.taco-hvac.com

– Go to **www.taco-hvac.com**
– Choose Support / Wizards / Pump Selection
– Enter system Flow Rate and Head requirements
– Choose a circulator from the sorted list.