

Load Calculation using Dristeam DriCalc: Humidification Basics (Part 7)

The past couple of blogs used the [psychrometric chart and formula](#) to calculate the loads in humidification buildings and processes. This week we look at a valuable shortcut for determining these loads: the Dristeam DriCalc selection program.

Let's use an example of a humidification load requirement for a school in Flint, Michigan, on an economizer cycle. Let's assume we have a ducted system with 12,000 CFM of air flow and a requirement in the room of 40% RH at 70°F.

Next, let's allow the program to use the location data from ASHRAE. We enter the economizer calculation choice and the 55°F mixed temperature. The program tells us that Flint is at 768 feet above sea level and the design outdoor air temperature is 5.2°F. If the job site was near Flint but on a hill (not many mountains in Michigan!), we could change the elevation.

Now we choose whether use the 30-year typical numbers or the 30-year extreme numbers for our load calculation.

Systems tags > System conditions
 Define system conditions [Help](#)

Project: Monday Morning Minutes System: H-1

Dispersion installation location:
 Duct
 AHU
 Open space

Ventilation system type:
 Makeup-air system, dispersion installed in duct or AHU
 Mixed-air system, dispersion installed in duct or AHU

Total air volume (cfm):

Desired conditions in humidified state

Humidified space desired air dry bulb temperature (°F):

Desired air moisture content measured in:
 % RH
 Wet bulb (°F)
 Grains of moisture (g/lb)

Desired air moisture content (% RH):

Entering outside air conditions

I will enter outside conditions
 Use outside conditions defined by ASHRAE

Outside conditions:
 Country where project is located:
 State/province where project is located:
 City where project is located:
 Elevation at project site (ft):
 Outside dry bulb temperature (°F):
 Outside air moisture content (% RH):

Airflow conditions

Outside air intake rate: Constant
 Variable (economizer)

Mixed air dry bulb (°F):

to

If this were a museum or process application where the required RH was critical and constantly needed, we would choose the extreme. In the case of buildings, we will use the 30-year typical numbers.

The program calculates the load at a variety of outdoor temperatures and percent of outdoor air. That data is displayed in a table and the design load is the maximum shown in the table.

Our example indicates a need for 89.61 PPH when the outdoor temperature is 40°F and the makeup air is at 50%.

The chart shown above would be different if we had chosen the “30-Year Extreme” to calculate the design load rather than the 30-Year Typical. A measure of reasonableness for your clients first cost is what is applied here. It is rare that the temperatures will be in the extreme range, and it will cause a much larger load and first cost. ASHRAE and Dristeem apply this logic for you to choose or change.

SystemsTags > Load
Determine load [Help](#)

Project: Monday Morning Minutes System: H-1

Entering air RH value: [Help](#)

Use 30 year extreme
 Use 30 year typical

Selected load from the list below.

Outside air dry bulb temperature (°F)	Outside air intake (%)	Load (lbs/hr)
5.2	23.1	69.64
10	25	73.28
15	27.3	77.05
20	30	80.59
25	33.3	83.8
30	37.5	86.46
35	42.9	88.62
40	50	89.61
45	60	88.01
50	75	81.08
55	100	62.54

Calculated load (lbs/hr):

Use calculated load: Yes No

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We have a load, we have documentation for our files, and we never looked at a psych chart. Not a bad few Monday Morning Minutes. You can [download the Dristeem DriCalc program here](#).