Psychrometric chart

driSteem

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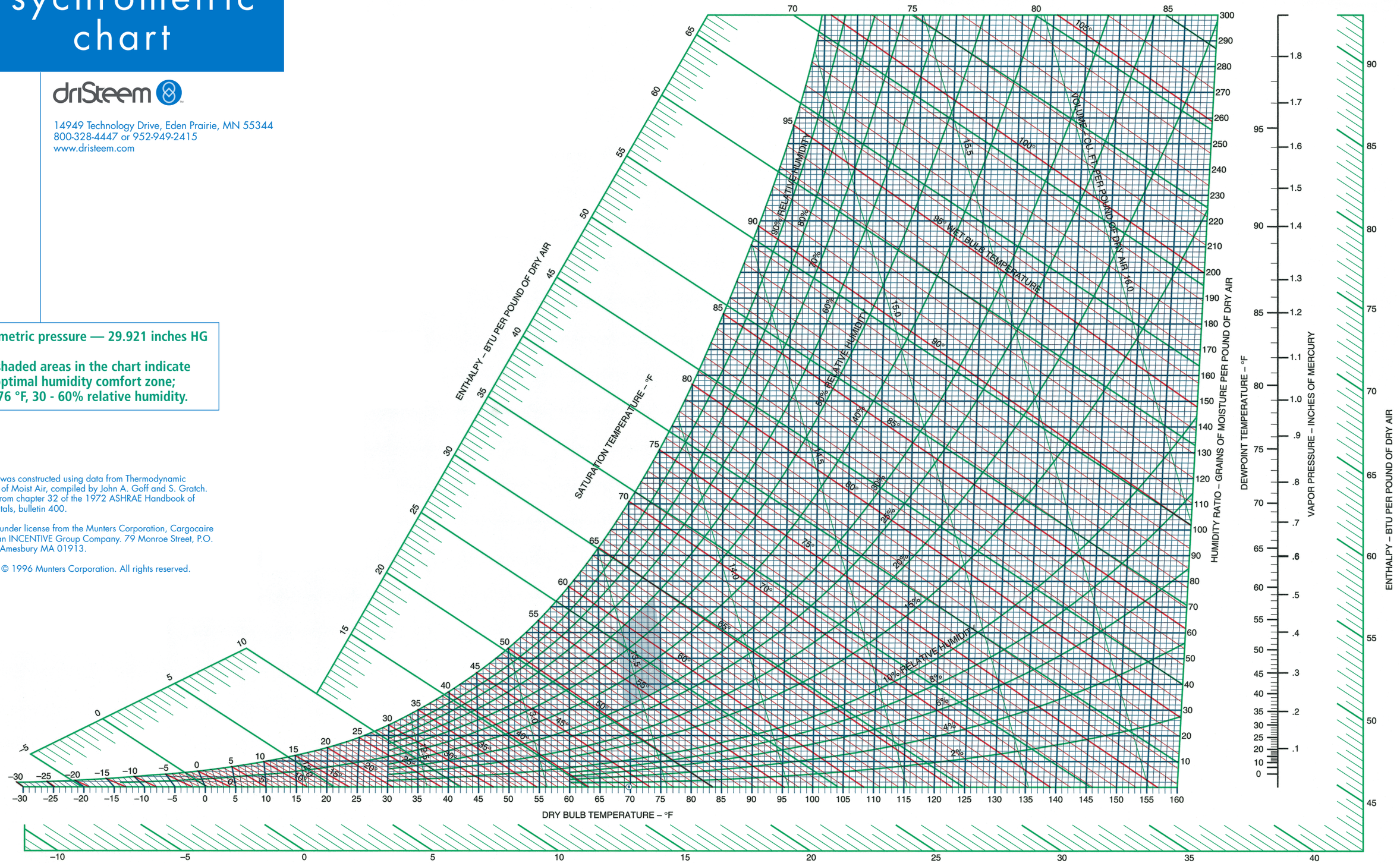
Barometric pressure — 29.921 inches HG

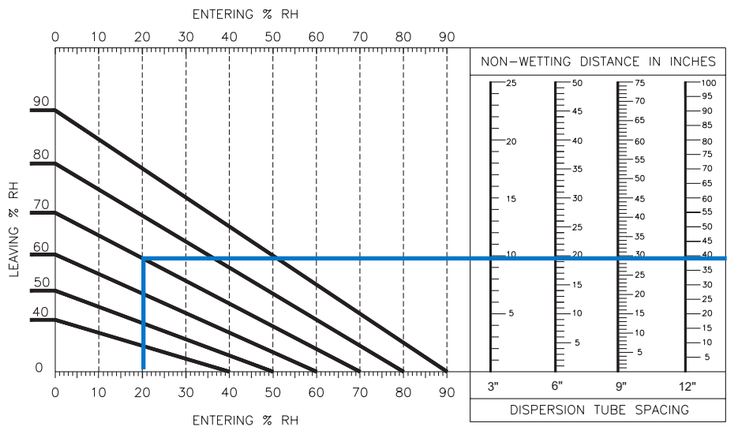
The shaded areas in the chart indicate the optimal humidity comfort zone; 68 - 76 °F, 30 - 60% relative humidity.

This chart was constructed using data from Thermodynamic Properties of Moist Air, compiled by John A. Goff and S. Gratch. As taken from chapter 32 of the 1972 ASHRAE Handbook of Fundamentals, bulletin 400.



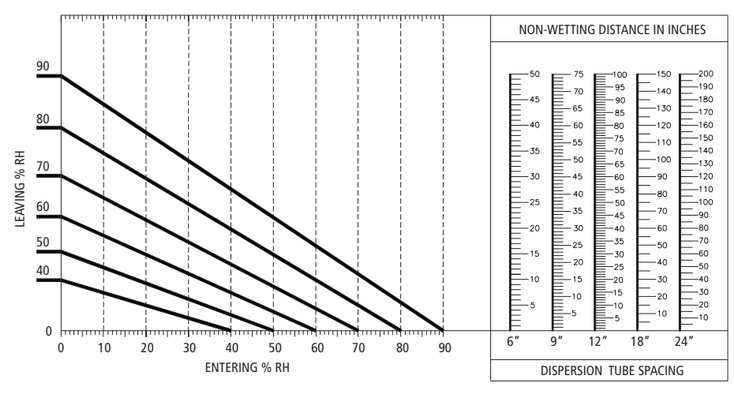
DriSteem steam absorption charts

Figure 1:
Ultra-sorb® absorption/non-wetting distances



Note:
The above absorption data applies to all air velocities up to 2,000 fpm (10.2 m/s), and is based on air leaving the zone of humidification at conditions of 55 °F (13 °C) and the stated % RH. The blue lines in this graph refer to the example described at right.

Figure 2:
Rapid-sorb® absorption/non-wetting distances



Note:
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How to determine absorption (non-wetting) distance

Assume the entering air is 20% RH, and the leaving air needs to be 70% RH. Design for a non-wetting distance of 24" (610 mm) maximum.

Solution

Refer to the Figure 1: Ultra-sorb absorption/non-wetting distances. Find 20% entering RH. Proceed vertically until you intersect the 70% leaving RH line. Draw a line horizontally from that point to the right to see that for 24" (610 mm) of non-wetting distance, 6" (152 mm) tube spacing would be the closest match.

Mixed air moisture content formula

% outside air × its moisture content in lbs/hr/100 cfm
\+ % return air × its moisture content in lbs/hr/100 cfm
= mixed air moisture content in lbs/hr/100 cfm

Steam absorption considerations

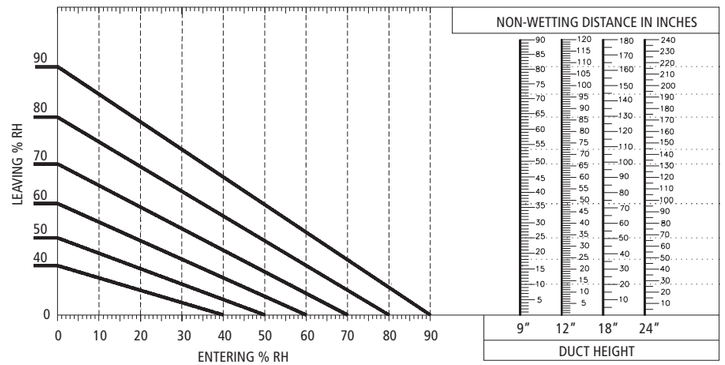
1. Absorption, or non-wetting distance, is the dimension downstream from the leaving side of the steam dispersion assembly to the point where wetting will not occur, although wisps of steam may be present. Solid objects at duct air temperature, such as coils, dampers, fans, etc., downstream of this dimension will remain dry.
2. Note that the rise (Δ) in RH (the difference between entering and leaving RH) has a direct bearing on the absorption distance. As the rise increases, more vapor needs to be dispersed into the air, and thus the absorption distance increases.
3. CAUTION: When installing upstream of high-efficiency filters, visible condensed steam wisps entering the filter bank can result in a wetted filter. If you need to install upstream of high-efficiency filters, consult your representative or DriSteem directly for special recommendations.
4. Uneven airflow over the cross-section of a dispersion assembly can result in nonuniform mixing of steam with air which, in turn, will adversely affect the absorption distance.

Notes:
- Final equipment selection should account for condensate loss. See the DriSteem Design Guide for steam loss tables.
- Dispersion assembly should accommodate maximum output capacity of humidifier.
- These charts apply only to products manufactured by DriSteem.

Calculate absorption distances the easy way — with DriCalc!

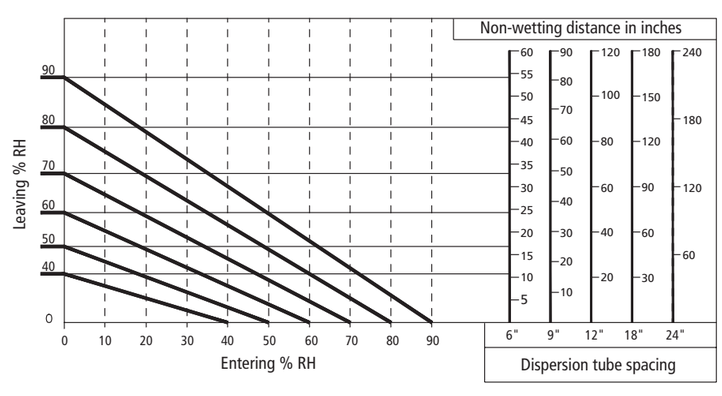
DriSteem's exclusive DriCalc® sizing and selection software helps save you time when designing humidification systems. This software allows you to easily size loads and select equipment. Plus, the program generates product-specific installation guides and specifications in CSI format. For your free copy of DriCalc sizing and selection software, visit www.dristeem.com

Figure 3:
Single tube steam injection humidifier absorption/non-wetting distances



Note:
The above absorption data applies to all air velocities up to 2,000 fpm (10.2 m/s), and is based on air leaving the zone of humidification at conditions of 55 °F (13 °C) and the stated % RH.

Figure 4:
Multiple tube or Maxi-bank™ steam injection humidifier absorption/non-wetting distances



Notes:
- Minimum dispersion tube spacing with 60-series tubes is 6".
- Minimum dispersion tube spacing with 80-series tubes is 9".

The above absorption data applies to all air velocities up to 2,000 fpm (10.2 m/s), and is based on air leaving the zone of humidification at conditions of 55 °F (13 °C) and the stated % RH.

Form No. Psychchart-EM-0615