

Relative Performance of Ambient Temperature Humidifiers



Test Report 48078
Revision A
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Prepared for Taga Medical Technologies
By Valley Inspired Products, LLC

Valley Inspired Products, LLC		Title: Ambient Temp. Humidifier Evaluation	Originator: PLB
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Purpose:

To evaluate the relative performance of several ambient temperature humidifiers commonly used with Constant Positive Airway Pressure (CPAP) therapy. Relative Humidity Gain and Static Pressure Drop were tested.

Units Tested:

HC325 Fisher & Paykel Healthcare
HumidAire ResMed, Inc.
Oasis Respironics, Inc.
Passover ResMed, Inc.
Velocity Taga Medical Technologies

The HC325 and HumidAire are design to also be used with heaters, for added heat and humidity. In this evaluation, all units were tested without added heat.

Procedure:

Relative Humidity Gain

A simulated patient setup was constructed as shown in Figure 1 using a Spontaneous Breathing Simulator (Hans Rudolph, Inc.), CPAP Flow Generator (Respironics REMstar Plus LX), CPAP Mask (Respironics), Exhalation Port (Respironics Whisper Swivel II), the Humidifier Under Test and associated tubing. The Breathing Simulator was set to ‘breath’ at 15 breaths per minute with a tidal volume of 600 mL, and peak inspiratory flow of 36 lpm. The CPAP Flow Generator was set to 10 cmH₂O pressure. A Relative Humidity Indicator (Omega RH82) was connected upstream of the Exhalation Port, with a restriction such that approximately 1 lpm of air passed over the sensor. The system was run for 1 hour with each humidifier to allow equilibrium to be reached before the relative humidity was read.

Static Pressure Drop

The CPAP Flow Generator was connected to the Humidifier Under Test, with a adjustable valve and Mass Flow Meter (TSI Inc. Model 4040) interposed. Pressure was measured using a U-Tube Water Manometer (Dwyer Instruments) immediately upstream of the Humidifier. The valve was adjusted to create flows of 30, 60 90 and 120 lpm. Pressure was recorded for each Humidifier Under Test at each flow setting.

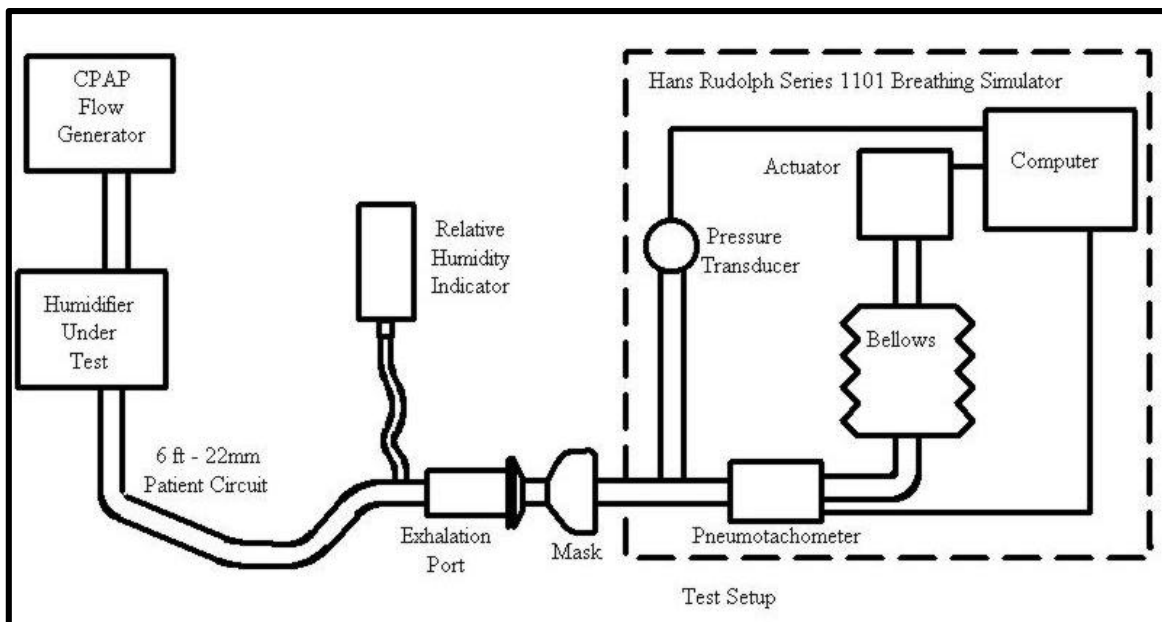


Figure 1. Relative Humidity Test Setup

Results

The results of the two test series are shown below in Figures 2 and 3. Ambient conditions for the Relative Humidity Test were; Temperature 67 °F, Relative Humidity 28%.

The accuracy of the RH82 is ± 1.8 °F and $\pm 3\%$ for humidity. There is no specification for repeatability, but we would expect it to be significantly better than the accuracy spec. So, while the absolute values of the humidity results may be off as much as 3%, we would expect the relative values between units to be appropriate.

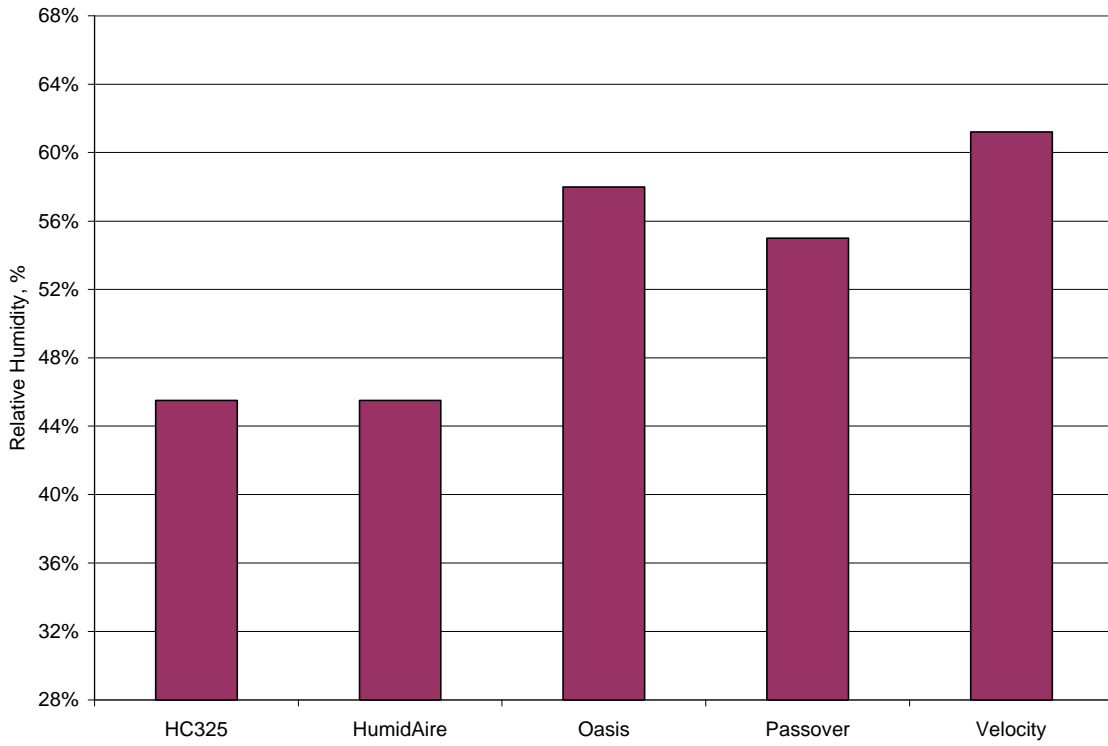


Figure 2. Relative Humidity Gain

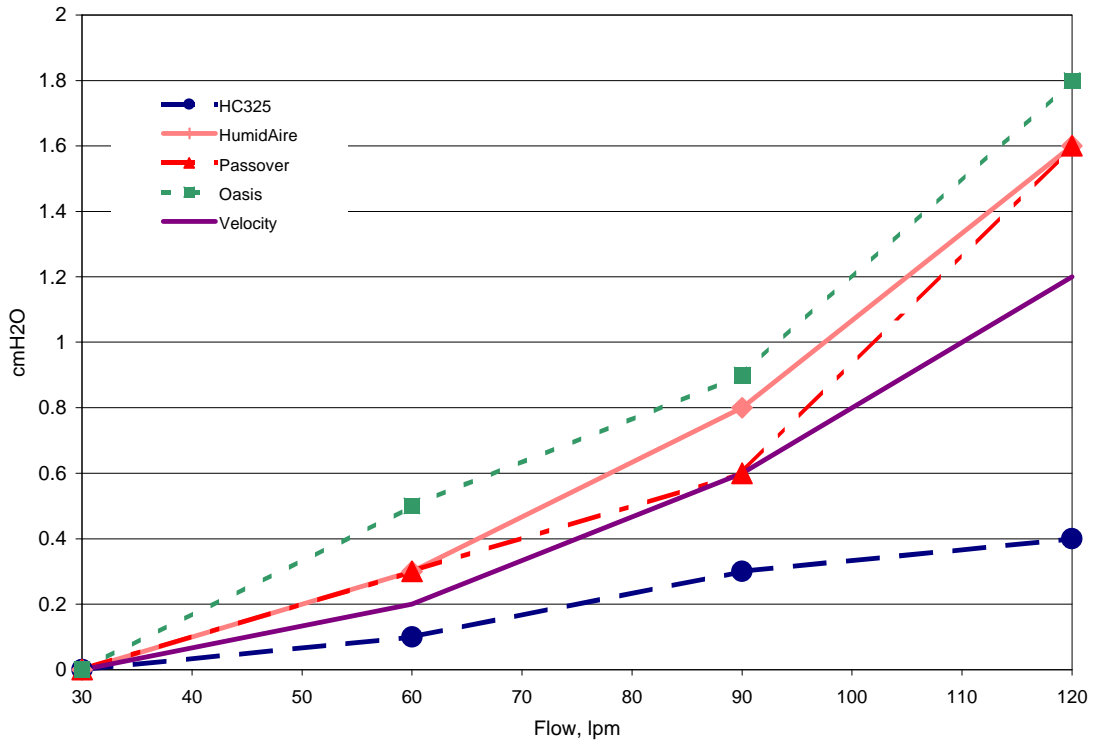


Figure 3. Static Pressure Drop

Conclusion

The Fisher Paykel HC325 had the lowest pressure drop of all units tested, however, it also added the least amount of humidity. The Taga Velocity had the highest added humidity, and its pressure drop was lowest with the exception of the HC325. The Respironics Oasis added almost as much humidity as the Velocity, but had the highest pressure drop.

Testing completed at Valley Inspired Products, LLC on October 17th and 18th, 2001.

Signed

A handwritten signature in black ink, appearing to read 'P. Bliss', is written over a horizontal line. A vertical line extends upwards from the right side of the horizontal line.

Peter Bliss
Technical Director