

Evaluation of the performances of new generation of heated wire humidifier

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Introduction: Heated wire humidifiers performances are influenced by ambient air temperature. When ambient temperature is high, the humidification performances are significantly reduced, well below 30 mgH₂O/L of absolute humidity with risk of endotracheal tube occlusion¹. These performances are partially improved with specific settings (increased chamber temperature to 40°C or activation of compensation algorithm)². The aim of the study was to evaluate new generation heated wire humidifiers (FP950 and VHB 20) that adds parameters in their algorithm to maintain a stable humidity delivered to patients whatever ambient temperature.

Methods: We measured on bench the hygrometry of inspiratory gases delivered by (i) FP950 (Fisher&Paykel Healthcare, Auckland, New Zealand) (ii) VHB20 (Vincent medical, Hong Kong) (iii) MR850 with usual settings (37 at the chamber/40 at the Ypiece) (iv) MR 850 with no temperature gradient (40/40), and (v) MR850 with compensation algorithm activated. Hygrometry was measured with the psychrometric method² after at least one hour of stability while varying the room temperature from 20 to 30°C.

Results: We present preliminary data based on 292 hygrometric measurements performed at steady state for the different conditions tested. The main results are shown in the figure. With the new heated wire heated humidifiers (MR950 and VHB20), the mean humidity delivered remained stable above 30 mgH₂O/L of delivered absolute humidity even with ambient temperatures above 25°C. With previous generation of HH, humidity delivered was adequate when no temperature gradient was set but with high risk of circuit condensation in this situation. There is currently no clinical experience with very high humidity delivered (above 40 mgH₂O/L).

Conclusion: The new heated wire heated humidifiers FP950 and VHB20 demonstrated stable performances while varying ambient temperature from 20 to 30°C better than did previous generation of heated humidifiers when ambient temperatures were high.

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2. Lellouche L, Taillé S, Maggiore SM, Qader S, L'Her E, Deye N, et al. Influence of ambient air and ventilator output temperature on performances of heated-wire humidifiers. *Am J Respir Crit Care Med* 2004;170:1073-1079.

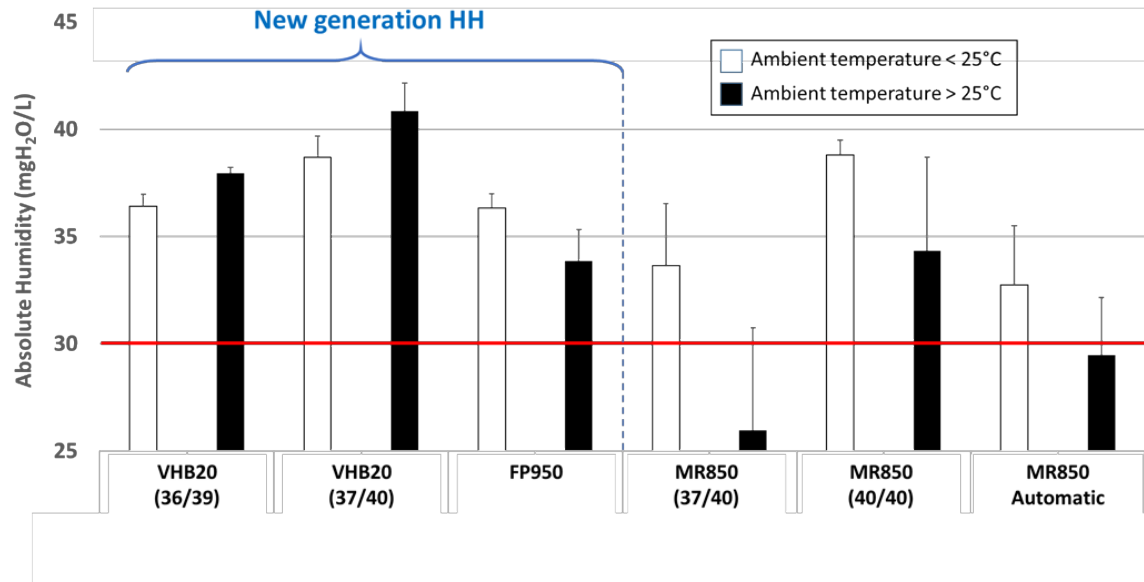


Figure: Absolute Humidity at different ambient temperatures (above and below 25°C) delivered by new generation heated humidifiers (VHB20 and FP950) and previous generation (MR 850 at different settings: 37/40, 40/40 and with compensation activated).

The minimum recommended absolute humidity (30 mgH₂O/L) is represented by a red line.