Venturi Tube Calibration For Airflow And Volume Measurement

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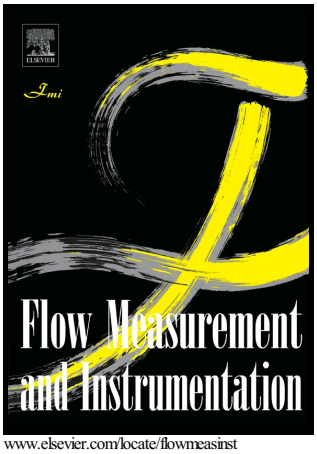

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Abstract

Ventilation measurement by Venturi meters (Vm) has not been validated for human ventilation application in basic and applied physiology. This project aimed to demonstrate the feasibility of the Vm as an inexpensive, robust method for inspiratory ventilation measurements used in Indirect Calorimetry. A differential pressure transducer sensitive from 0 to 1,000 Pa combined with Vm made from retail PVC tubing (50mm Inside Diameter (ID) at inlet, 17.5mm ID throat section) allowed for airflow measurement of 1 to 8 $L \cdot s^{-1}$. A Turbine (Ti) was used as the criterion method. Variable airflow of atmospheric, temperature, pressure saturated (ATPS) conditions, were produced through manual 3 L_{ATPS} manoeuvres of a calibration syringe and constant airflow was induced using a commercial air compressor. The Vm produced valid volumetric airflow ($\dot{V}$) estimates across non-steady state pulsatile flow conditions (±0.22 $L \cdot s^{-1}$ 95% confidence limits with zero bias for Bland-Altman). The