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Experimental Study of the Effect of Piccolo Tube Pipe on the Air-Conditioning Experimental Rig

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ABSTRACT

Air-Conditioning system plays vital role in Indoor Air Quality. Low humidity in atmosphere cost crucial consequence to human skin and nasal passages. Installing ultrasonic humidifier to air conditioning system is one of the options to make up lost humidity. An experimental HVAC rig is combined with ultrasonic humidifier to humidify the system by using a piccolo tube. This paper presents experimental study of humidity profile in an experimental rig at different air velocity and piccolo holes diameter. Experiment results show that, under fixed inlet air velocity and mist flow rate, relative humidity (RH) increased with piccolo holes diameter. RH of 12mm holes diameter piccolo tube is 7.4% higher than 5 mm holes diameter piccolo tube for $3ms^{-1}$ air velocity. Similarly, under fixed piccolo holes diameter and mist flow rate, RH is decreased with increasing air velocity. RH of $5ms^{-1}$ velocity is 13.4% lower than $1ms^{-1}$ velocity for RH change. Rate of humidity added to the HVAC system by ultrasonic humidifier also increased with respect to holes diameter size and air velocity. $3ms^{-1}$ and 12 mm piccolo holes diameter shows highest gradient humidity mixing rate.