

Title:

Experimental and Numerical Study on the Tee Resistance Reduction in Ventilation and Air Conditioning

Abstract:

Energy consumption due to duct resistance accounts for approximately 30–50% of the total energy consumption in central air conditioning systems. Three resistance reduction methods of dividing flow tees in a ventilation and air-conditioning duct are studied. A reasonable position for installing the guide vane is proposed. The form of the guide vane and the cambered surface are optimized. The resistance characteristics of the tee are analyzed. The implementation effect of optimizing a tee is verified through a full-scale experiment. The results show that the resistance reduction rate of the proposed guide vane is 18.3% to 65.1% under different resistance reduction methods. The calculated results are verified by a full-scale experiment and by previous studies, ensuring the accuracy of the present study.