

Exergy efficiency of ventilation heat recovery exchanger for variable reference temperature

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The purpose of this paper is to develop the application of exergy analysis for assessing the performance of building mechanical systems. When exergy analysis are applied for thermal processes in HVAC systems this method faces the conditions when variable reference temperature is placed below, above and across working fluids operating temperatures. Making use of derivative status parameter from enthalpy and entropy the methodology for HVAC equipment exergy efficiency calculation is proposed. Method capability is demonstrated via case study of exergy analysis on ventilation heat recovery exchanger. Thermodynamically justified numerical values of the universal and functional exergy efficiencies for variable reference temperatures are shown.

The proposed method is distinguished by universality and can be applied for other HVAC equipment. Results from this study could be useful for creating exergy optimised design and efficient control of HVAC systems operating at variable reference temperatures.

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