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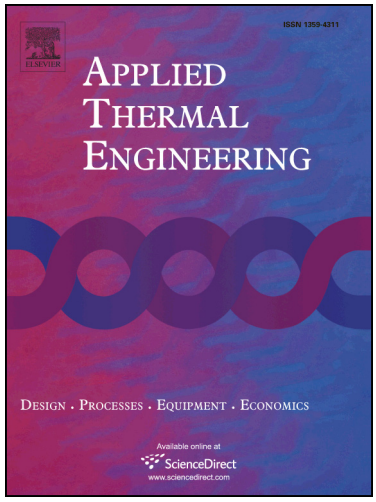

Computational fluid dynamics analysis of convective heat transfer coefficients for a sleeping human body

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PII: S1359-4311(17)30768-8
DOI: http://dx.doi.org/10.1016/j.applthermaleng.2017.02.012
Reference: ATE 9893

To appear in: *Applied Thermal Engineering*

Received Date: 5 February 2016
Revised Date: 30 January 2017
Accepted Date: 4 February 2017

Please cite this article as: M. Ning, S. Mengjie, P. Dongmei, D. Shiming, Computational fluid dynamics analysis of convective heat transfer coefficients for a sleeping human body, *Applied Thermal Engineering* (2017), doi: http://dx.doi.org/10.1016/j.applthermaleng.2017.02.012

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Computational fluid dynamics analysis of convective heat transfer coefficients for a sleeping human body

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Abstract

Task/ambient air conditioning (TAC) systems have been introduced to solve the problem of thermal comfort in bedrooms during night. The key point of this problem is the thermal environment or heat transfer between a sleeping human body and the surrounding environment. Therefore, a numerical study on the convective heat transfer between a thermal manikin and the surrounding environment was carried out in a bedroom equipped with a TAC system. Firstly, the influence of supply conditions on indoor environment was investigated. Based on this section and previous studies on the convective heat transfer coefficients (h_{conv}) between the human body and surrounding environment, equations depending on temperature difference between the thermal manikin and the environment or the air velocity in the surrounding environment were respectively established. Considering the effects of temperature difference and air velocity on the h_{conv}, the equations were modified to be a function

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