Exergy analysis: the effect of relative humidity, air temperature and effective clothing insulation on thermal comfort

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providing details and we will investigate your claim.
First results available on the relation between human-body exergy consumption rates and subjectively assessed thermal sensation showed that the minimum human body exergy consumption rate is associated with thermal sensation votes close to thermal neutrality, tending to slightly cool side of thermal sensation.

By applying the exergy concept to the built indoor environment, additional results are going to be explored. By using the data available so far of operative temperature (t₀), the human body exergy consumption rates increase as to increases above 24°C or decreases below 22°C at relative humidity (RH) lower than 50%. While, at 85% of RH, the human-body exergy consumption rates decrease when to is increasing above 24 °C.

**IV.6. Exergy Analysis: The Effect of Relative Humidity, Air Temperature and Effective Clothing Insulation on Thermal Comfort**

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Exergy analysis enables us to make connections among processes inside the human body and processes in a building. So far, only the effect of different combinations of air temperatures and mean radiant temperatures have been studied, with constant relative humidity in experimental conditions. The objective of this study is to determine the effects of different levels of relative humidity (RH), air temperature (Ta) and effective clothing insulation on thermal comfort conditions from the exergetic point of view. The analyses take into consideration the available data from the study by Toftum et al. (1998). The effect of different levels of RH, Ta and effective clothing insulation on human body exergy balance chain, changes in human body exergy consumption rate (hbExCr) and predicted mean vote (PMV) index were analyzed. The results show that thermal comfort conditions do not always result in lower hbExCr as it was proven in previous studies. Variations in effective clothing insulation, Ta and RH affect individual parts of human body exergy balance chain with an important effect on hbExCr. At hot and dry conditions the hbExCr is the largest while at hot and humid conditions it is the minimal. Hot and dry and cold and dry conditions have similar hbExCr. The difference appears if the whole human body exergy balance chain is taken into consideration. To maintain comfortable conditions it is important that exergy consumption and stored exergy are at optimal values with a rational combination of exergy input and output.