

COMPARISON OF SW_{req} (ISO/DIS7933) AND MEASURED SWEAT RATE IN LABORATORY EXPERIMENTS

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A new method for the evaluation of heat stress in terms of a required sweat rate has recently been proposed as an international standard (SW_{req}, ISO/DIS7933). The present study was undertaken to validate the method by comparing calculated values with data obtained during experiments in a climatic chamber at different work rates and humidity levels.

Six male, healthy subjects exercised on a bicycle for 60 min in a climatic chamber with a constant operative temperature of 36 C. On separate days the rate of work and the humidity level in the chamber were varied. Data were obtained for five different experimental conditions (three work rates and three humidity levels). Two weighing systems allowed independent measurements of sweat evaporation rate and dripping sweat rate. Average values recorded during the last 20 min of each experiment were used for the comparison.

The average response of the six subjects in terms of sweat rate, evaporation rate, skin wettedness, and sweating efficiency measured during five different experimental conditions, were very similar to the calculated values according to ISO/DIS7933. The correlation coefficient for measured sweat rate and SW_{req} was calculated at 0.98. The physiological strain associated with the experimental conditions should present no risk for an acclimatized person. Our subjects, however, being unacclimatized, experienced the two worst conditions as intolerable. This is in agreement with the limit values proposed in the standard for unacclimatized persons.

Our results suggest that for the investigated environmental conditions SW_{req} should be a reliable and useful method for the assessment of heat stress.