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Gender Differences in Ccritical WBGT as a Function of Metabolic Rate

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2147

Heat stress depends largely on environment, work rate and clothing. Clothing adjustment factors based on critical WBGT and metabolic rate have been proposed. Because heat dissipation mechanisms may differ between males and females, gender specific clothing adjustment factors may be appropriate. **PURPOSE:** To determine gender effects on clothing adjustment factors for varying work rates based on critical WBGT. **METHODS:** Thirteen healthy adults (M = 9, F = 4) performed a total of 15 work bouts under each of three metabolic rates (80, 160 and 240 W/m2) wearing each of five ensembles (cotton work clothes, cotton coveralls, particle barrier Tyvek 1424A, waterbarrier, vapor permeable- NexGen LS417 and vapor barrier Tyvek QC). Following a critical conditions protocol, dry bulb temperature was increased in five-minute intervals at rh = 50%. Core temperature (Tre), heart rate (HR) and ambient conditions were recorded every 5 minutes. Critical WBGT (cWBGT) was recorded as the WBGT five minutes prior to the loss of thermal equilibrium as evidenced by a progressive rise in core temperature. **RESULTS:** A three way ANOVA found a significant gender by ensemble interaction for Tre and a significant gender by metabolic rate interaction for critical WBGT ($p<0.05$). There were significant differences in HR, Tre and WBGT among metabolic rates and a significant difference in cWBGT among ensembles ($p<0.05$). There was a significant gender difference in HR ($p<0.05$). **CONCLUSIONS:** There are gender differences in WBGT and associated physiological variables between males and females. The gender difference in Tre seems to be modulated by the differences in ensembles and the gender differences in WBGT are dependent on metabolic rate.