

PENNSYLVANIA STATE UNIVERSITY



IE 553

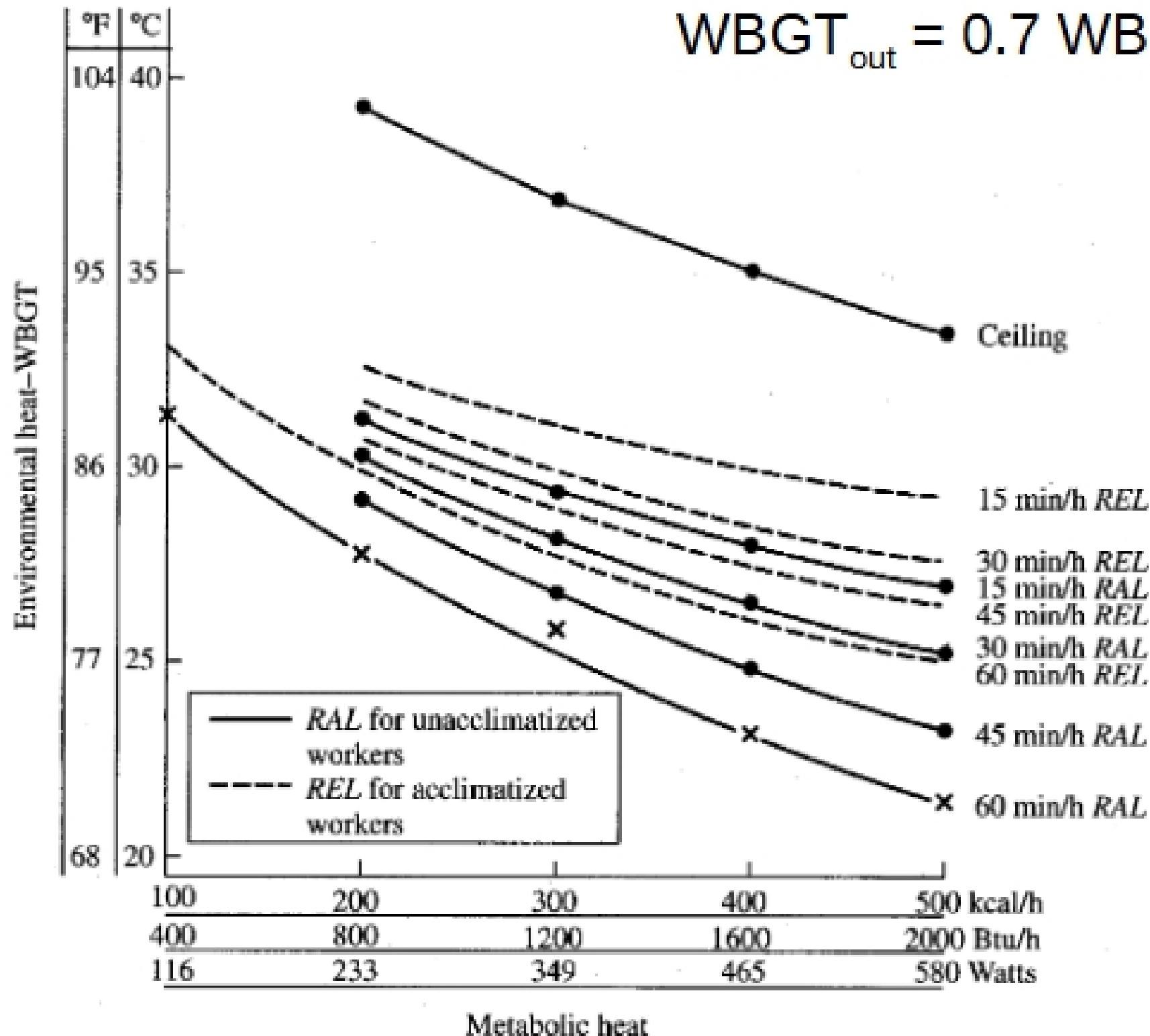
Engineering of Human Work

Dr. Andris Freivalds

Class #35

2) Wet-Bulb Globe Temperature

$$WBGT_{out} = 0.7 WB + 0.1 DB + 0.2 GT$$



HSI

- **Radiation** - heat gain/loss, absolute temperature
 $R \text{ (kcal/hr)} = 4.375 (T_w - T_{sk})$
 $T_w = [(T_G + 460)^4 + 1.03 \times 10^8 V^{0.5} (T_G - T_{DB})]^{0.25} - 460$
- **Convection** - heat gain/loss, air movement (ft/min)
 $C \text{ (kcal/hr)} = 0.189 V^{0.6} (T_{DB} - T_{sk})$
- **Evaporation** - heat loss (only), evaporation of water
(1 l = 580 kcal)
 $E_{max} \text{ (kcal/hr)} = 2.575 V^{0.6} (P_{sk} - P_A)$
 $P_{sk} = 42 \text{ mm Hg at } 37^\circ\text{C}$