

Wet bulb temperature The adiabatic saturation temperature is the steady state temperature attained when a large amount of water is contacted with the entering gas. The wet bulb temperature is the steady-state nonequilibrium temperature reached when a small amount of water is conducted under adiabatic conditions by a continuous stream of gas. Since the amount of liquid is small, the temperature and humidity of the gas are not changed, contrary to the adiabatic saturation case, where the temperature and humidity of the gas are changed.

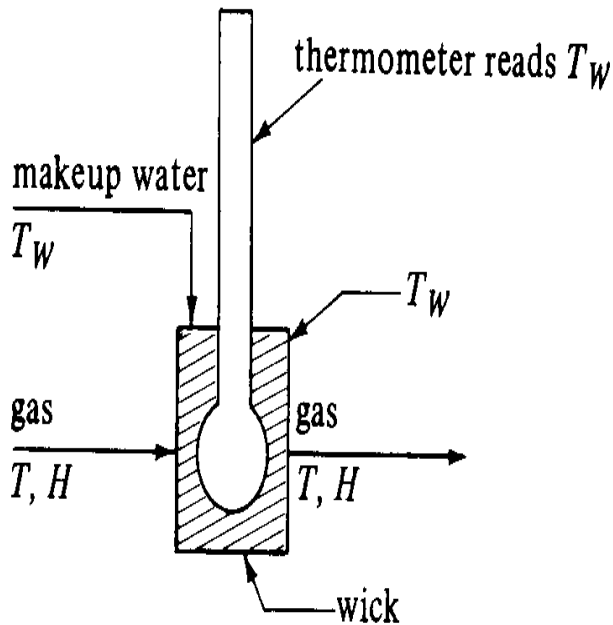


FIGURE 9.3-4. *Measurement of wet bulb temperature.*

from Transport Processes and Unit Operations by C. J. Geankoplis

From a heat balance around the wick we can obtain

$$\frac{H - H_w}{T - T_w} = - \frac{h / (M_{air} k)}{\Delta H_{vap}}$$

$h / M_{air} k$ is called the psychrometric ratio. Its value for water vapor-air mixtures is approximately 0.96 - 1.005. Because this value is close to c_s (~ 1.005), we can assume $T_s \sim T_w$.