

Using the following values:

D = diameter of gloved hand = 5 cm = 0.05 m

v = velocity of air = 15 miles/hr = 6.7 m/s

ρ = density of air = 1.13 kg/m³

η = 1.75×10^{-5} kg/ms (viscosity of air at $\sim 0^\circ\text{C}$)

$$Re = \frac{Dvp}{\eta} = \frac{(0.05 \text{ m})(6.7 \text{ m/s})(1.13 \text{ kg/m}^3)}{1.75 \times 10^{-5} \text{ kg/ms}} = 21631$$

$$\Rightarrow \text{Use } Nu Pr^{-0.3} = 0.26 Re^{0.60}$$

$Pr = 0.705$, $k = 0.1 \text{ W/mK}$

$$Nu = \frac{hD}{k} = \frac{0.26 (21631)^{0.60}}{(0.705)^{-0.3}} = 93.4$$

$$h = \frac{(93.4)(0.1 \text{ W/mK})}{0.05 \text{ m}} = 187 \text{ W/m}^2\text{K}$$

$$\Rightarrow h \text{ (for forced convection)} = 187 \text{ W/m}^2\text{K}$$