## An Internet Book on Fluid Dynamics

## Solution to Problem 100D:

From class notes:

$$
\begin{equation*}
T=\frac{c^{2}}{3 R} \tag{1}
\end{equation*}
$$

Therefore

$$
\begin{equation*}
c=(3 R T)^{\frac{1}{2}}=(3(280)(20+273.15))^{\frac{1}{2}}=496 \mathrm{~m} / \mathrm{s} \tag{2}
\end{equation*}
$$

Then, using the given expression,

$$
\begin{equation*}
\mu=\frac{\rho c \lambda}{3}=\frac{(1.214)(496)\left(10^{-7}\right)}{3}=2.01 \times 10^{-5} \mathrm{~kg} / \mathrm{m} \mathrm{~s} \tag{3}
\end{equation*}
$$

This compares fairly well ( $10 \%$ error) with the measured value of $\mu=1.812 \times 10^{-5} \mathrm{~kg} / \mathrm{m} \mathrm{s}$.

