1.59

1.59 For a parallel plate arrangement of the type shown in Fig. 1.5 it is found that when the distance between plates is 2 mm, a shearing stress of 150 Pa develops at the upper plate when it is pulled at a velocity of 1 m/s. Determine the viscosity of the fluid between the plates. Express your answer in SI units.

$$\tau = \mu \frac{du}{dy}$$

$$\frac{du}{dy} = \frac{U}{b}$$

$$\mu = \frac{\tau}{\left(\frac{U}{b}\right)} = \frac{150 \frac{N}{m^2}}{\left(\frac{1 \frac{m}{s}}{0.002 m}\right)} = \underline{\underline{0.300 \frac{N \cdot s}{m^2}}}$$