# Answer on Question #53007 - Physics - Mechanics - Kinematics - Dynamics

The density of a fluid is $\rho = 1257.5\,\frac{\text{kg}}{\text{m}^3}$ and its absolute viscosity is $\mu = 1.50\ \text{Pa}\cdot\text{s}$. Calculate its specific weight and kinematic viscosity.

Solution:

The connection between absolute and dynamic viscosities is given by

$$v = \frac{\mu}{\rho},$$

where $v$ – is the kinematic viscosity of the fluid. Since $\mu = 1.50\ \text{Pa}\cdot\text{s}$ and $\rho = 1257.5\,\frac{\text{kg}}{\text{m}^3}$, we obtain

$$v = \frac{\mu}{v} = \frac{1.50\ \text{Pa}\cdot\text{s}}{1257.5\,\frac{\text{kg}}{\text{m}^3}} = 1.19\times10^{-3}\ \frac{\text{m}^2}{\text{s}}$$

The specific weight is given by

$$\gamma = \rho\cdot g,$$

where $g$ – is the acceleration due to gravity. Since $g = 9.8\,\frac{\text{m}}{\text{s}^2}$, we obtain

$$\gamma = \rho\cdot g = 1257.5\,\frac{\text{kg}}{\text{m}^3}\cdot 9.8\,\frac{\text{m}}{\text{s}^2} = 12323.5\,\frac{\text{N}}{\text{m}^3}$$

Answer: $v = 1.19\times10^{-3}\ \frac{\text{m}^2}{\text{s}}$, $\gamma = 12323.5\,\frac{\text{N}}{\text{m}^3}$.