

Answer on Question #69374 – Physics – Mechanics | Relativity

A 5.23-kg Aluminum block (density $2.70 \times 10^3 \text{ kg/m}^3$) is suspended from a spring scale and is submerged into an unknown fluid. The spring scale now reads 12.8 N. What is the density of the fluid?

Solution.

$$F_2 = F_1 - F_a = mg - \rho_f gV = mg - mg * \frac{\rho_f}{\rho} = mg \left(1 - \frac{\rho_f}{\rho}\right); \quad \rho_f = \left(1 - \frac{F_2}{mg}\right) * \rho = \left(1 - \frac{12.8}{5.23 * 9.8}\right) * 2.7 * 10^3 \approx 2 * 10^3 \text{ kg/m}^3.$$

Answer:

$$\rho_f \approx 2 * 10^3 \text{ kg/m}^3$$

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