

Chapter 2

Density, Specific Gravity, Specific Weight

1. What is the specific gravity of 38°API oil?

$$38^\circ\text{API oil sp. gr.} = \frac{141.5}{131.5 + ^\circ\text{API}} = \frac{141.5}{131.5 + 38}$$

$$\text{sp. gr.} = \frac{141.5}{169.5} = 0.835$$

2. The specific gravity of manometer gage oil is 0.826. What is its density and its °API rating?

$$\text{sp. gr.} = 0.826; \quad \rho = 1000(0.826) = 826 \text{ kg/m}^3$$

$$\rho = 62.4(0.826) = 51.54 \text{ lbfm/ft}^3$$

$$\text{sp. gr.} = \frac{141.5}{131.5 + ^\circ\text{API}} \quad 131.5 + ^\circ\text{API} = \frac{141.5}{0.826}$$

$$^\circ\text{API} = 171.3 - 131.5; \quad ^\circ\text{API} = 39.8^\circ\text{API} \approx 40^\circ\text{API}$$

3. What is the difference in density between a 50°API oil and a 40°API oil?

$$\text{sp. gr.} = \frac{141.5}{131.5 + ^\circ\text{API}} = \frac{141.5}{131.5 + 50} = 0.7796 \text{ for a } 50^\circ \text{ oil}$$

$$\text{sp. gr.} = \frac{141.5}{131.5 + ^\circ\text{API}} = \frac{141.5}{131.5 + 40} = 0.826 \text{ for a } 40^\circ \text{ oil}$$

$$0.825 - 0.7796 = 0.0455 \text{ density difference}$$

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