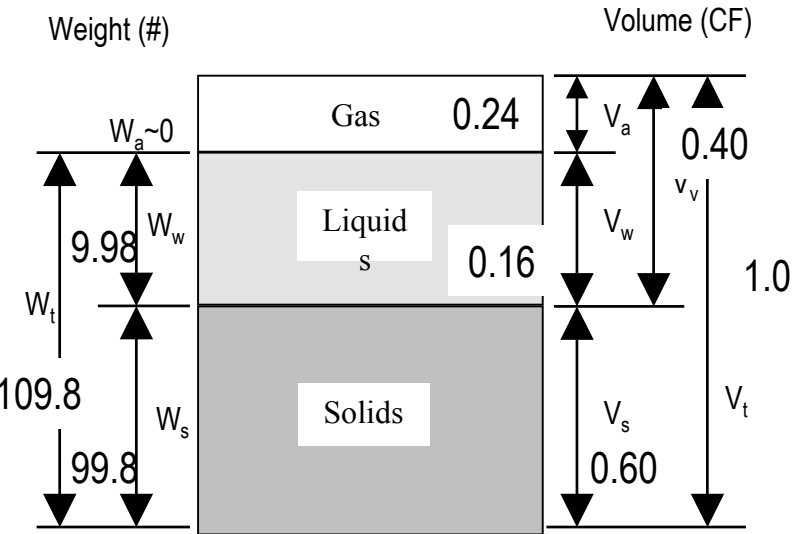


(1) Draw Phase Diagram



(2) Assume $V_t = 1 \text{ ft}^3$. Thus $W_t =$

109.8#

(3) Use ratios/unit weights to solve (may have to use 2 eqns/2 unknowns)

$$\omega = \frac{W_w}{W_s}; \quad W_t = W_s + W_w$$

$$\omega = 0.10 = \frac{W_w}{W_s} \Rightarrow W_s = 10W_w$$

$$W_t = W_w + W_s = 11W_w = 109.8\#$$

$$\therefore W_w = 9.98\#; W_s = 10W_w = 99.8\#$$

(4) Anytime we know W_w , we know V_w

$$\gamma_w = \frac{W_w}{V_w} = 62.4 \text{ pcf} \quad \therefore V_w = \frac{W_w}{62.4} = \frac{9.98}{62.4} = 0.16 \text{ ft}^3$$

(5) How do we find Volume of Solids as we're out of knowns? Assume $G_s = 2.65$

$$G_s = \frac{W_s}{V_s \gamma_w} \Rightarrow V_s = \frac{W_s}{\gamma_w G_s} = \frac{99.8}{62.4 \cdot 2.65} = 0.60$$

(6) What's Left?

$$V_v = V_t - V_s = 1.0 - 0.60 = 0.40$$

$$V_a = V_v - V_w = 0.40 - 0.16 = 0.24$$

(7) Answer Questions $e = \frac{V_v}{V_s} = \frac{0.40}{0.60} = 0.67$

$$\gamma_d = \frac{W_s}{V_t} = \frac{99.8\#}{1 \text{ ft}^3} = 99.8 \text{ pcf} \quad S = \frac{V_w}{V_v} (100\%) = \frac{0.16}{0.40} (100) = 40\%$$

$$\eta = \frac{V_v}{V_t} = 0.40$$

$$\gamma_{\text{sat}} = \frac{W_{(\text{voids 100\% filled w/ water})}}{V_t}$$

$$= \frac{W_s + (V_v) \gamma_w}{1.0} = 99.8 + (0.40) 62.4 = 124.8 \text{ pcf}$$

Soil Classification Quiz

Match the following laboratory test results to the **most correct** soil type using USCS:

(1) % Fines = 75%, LL = 30	(a) Lean Clay, CL
(2) % Fines = 55%, LL = 70	(b) Poorly-graded Sand, SP
(3) % Fines = 4%, $C_u = 2.0$	(c) Clayey Gravel, GC
(4) % Fines = 25%, LL = 25	(d) Elastic Silt, MH

5. All soil particles finer than the #200 sieve are clay minerals T / F
6. Name at least 2 differences between USDA and USCS.