

2. Data :

Wt. at saturation = 200 g

Wt. at field capacity = 175 g

Air dry wt. = 135 g

Oven - dry wt. = 130 g

Volume of soil = 100 cm³

a. What is the bulk density ?

$$B.D. = \frac{(\text{Oven Dry Weight})}{\text{Volume}} = \frac{(130 \text{ g})}{(100 \text{ cm}^3)} = (1.30) \frac{\text{g}}{\text{cm}^3}$$

b. What is the percent water by weight at 0 bar ?

$$\frac{(200 - 130)}{130} = \frac{70}{130} = .538 \rightarrow 53.8 \%$$

c. What is the percent water at -1/3 bar ?

$$\frac{(175 - 130)}{130} = \frac{45}{130} = .346 \rightarrow 34.6 \%$$

d. What is the percent water by weight at -15 bar ?

$$\frac{(140 - 130)}{130} = \frac{10}{130} = .0769 \rightarrow 7.7 \%$$

e. What is the percent plant available water by weight ?

$$aw = F.C. - W.P = 34.6 - 7.7 = 26.9 \%$$

f. What is the percent plant available water by volume ?

$$26.9 \times 1.30 = 34.97 \%$$

g. How many inches of water per foot of soil are available to plants ?

$$12 \text{ in.} \times \% \text{ water by volume} = (12 \text{ in.}) \times (.3497) = 4.196 \text{ in.} = 4.2 \text{ in.}$$

h. What percent of the volume is micropores ?

$$\% \text{ water by volume at F.C.} = 34.6 \times 1.30 = 44.98 \%$$

i. What percent of the volume is macropores ?

$$\% \text{ water by Weight} \times B.D. = 53.8 \times 1.3 = 69.94 \% \text{ water by volume at saturation}$$

$$\% \text{ water by Weight at F.C} \times B.D. = 34.6 \times 1.3 = 46.98$$

$$\text{Saturation} - F.C. = 69.94 - 46.98 = 24.96 \rightarrow 25 \%$$