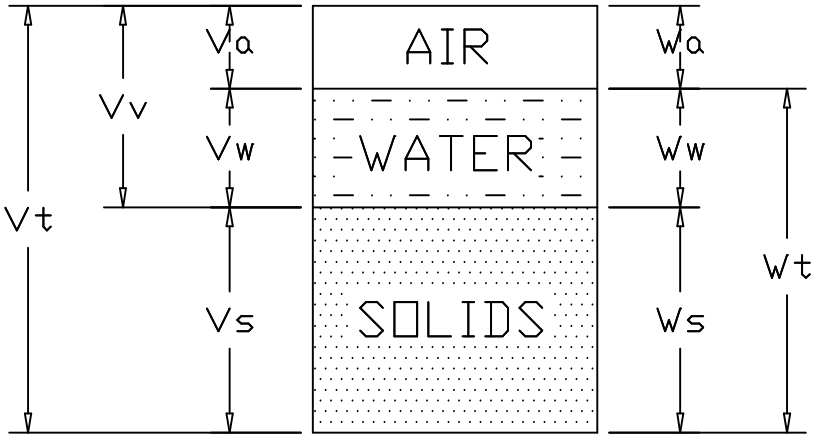
# PHASE DIAGRAM OF SOIL SAMPLE




Wa = Weight of air = 0
Ww = Weight of water
Ws = Weight of solids
Wt = Weight of soil
= Ww + Ws
(total weight)

Va = Volume of air
Vw = Volume of water
Vs = Volume of solids
Vv = Volume of voids
= Va + Vw
Vt = Volume of soil
= Va + Vw + Vs
(total volume)

$w = \frac{Ww}{Ws} 100$ = water content (moisture content), (%)

$Gs = \frac{Ws}{Vs\,\gamma w}$ = Specific Gravity, (unitless)

$Gsw = \frac{Ww}{Vw\,\gamma w} = 1$ = Specific Gravity of water, (unitless)

$e = \frac{Vv}{Vs} = \frac{n}{1-n}$ = void ratio, (decimal)

$n = \frac{Vv}{Vt} 100$ = porosity, (%)

$S = \frac{Vw}{Vv} 100$ = degree of saturation, (%)

$\gamma dry = \frac{Ws}{Vt}$ = dry unit weight, (pcf), (Kg/cubic meters)

$\gamma wet = \frac{Wt}{Vt}$ = wet unit weight, (pcf), (Kg/cubic meters)

$\gamma sat = \frac{Wt*}{Vt}$ = saturated unit weight, (pcf), (Kg/cubic meters)

Wt* = Total weight of soil after air voids are filled with water

$\gamma sub = \gamma sat - \gamma w$ = submerged unit weight, (pcf), (Kg/cubic meters)

$\gamma w = \frac{Ww}{Vw}$ = Unit weight of water = 62.4 pcf = 1 gram/cubic cm

$\gamma solids = \frac{Ws}{Vs}$ = unit weight of solids, (pcf), (Kg/cubic meters)