Clause 7.5.2 SETTING VELOCITY OF DISCRETE PARTICLES

The following equations may be used in arriving at settling velocity of discrete spherical particles;

Law	Equation	Applicable for range of Reynolds Number, N_R	Particle size in mm for specific gravity of 2.65 and temp. of 20^0C
Stock's (Laminar)	$V_S = g/18((\rho_s - \rho)/\mu)d^2$	1	upto 0.1
Hazen's (Transition)	$V_S = [4/3*g/C_D(\rho_s - \rho)/\rho]^{0.5}$	1-1000	0.1 -1.0
Newton's (Turbulent)	$V_S = [3.3g((\rho_s - \rho)/\rho)d]^{0.5}$	10^3 - 10^4	Greater than 1

Where,

V_S = Settling velocity of particle, (L/T)

ρ_s = Mass density of the particle, (M/L^3)

ρ = Mass density of the water, (M/L^3)

g = Acceleration due to gravity, (L/T^2)

d = Diameter of the particle, (L)

C_D = Dimensionless drag coefficient defined by

$$C_D = \frac{24}{N_R} + \frac{3}{\sqrt{N_R}} + 0.34$$

N_R = Reynolds number = $V_S d.\rho / \mu$

dimensionless

μ = Absolute or dynamic visosity of water (M/LT)