EngineeringRise

Fluid pressure, Pascal law, viscosity and Bernoulli principle

Formulas and units, JEE Main. Status: Reviewed on 2026-11-20.

Result	Formula	Units or note
Pressure at depth	P = P0 + rho g h Valid when: static liquid of constant density; h below the free surface	Pa
Hydraulic lift	F1/A1 = F2/A2; A1 d1 = A2 d2 Valid when: incompressible liquid in a closed system, pistons at same level	N (m^2, m)
Viscous force	F = eta A dv/dx Valid when: laminar flow of a Newtonian fluid, linear velocity profile	N (eta in Pa s)
Stokes' drag	F = 6 pi eta r v Valid when: small sphere at low speed in laminar flow	N
Terminal velocity	v = 2 r^2 (rho - sigma) g/(9 eta) Valid when: small sphere falling at terminal speed in laminar flow	m/s
Critical velocity	v_c = K eta/(rho r) (K = Reynolds number)	m/s
Continuity	A1 v1 = A2 v2 = Q Valid when: steady flow of an incompressible fluid in a pipe	m^3/s
Bernoulli	P + (1/2) rho v^2 + rho g h = constant Valid when: steady, incompressible, non-viscous flow along a streamline	Pa
Efflux speed	v = sqrt(2 g h) (or sqrt(2 (P/rho + g h))) Valid when: small hole in a wide tank, both open to the air	m/s
Range from a hole	R = 2 sqrt(h (H - h)) Valid when: hole at depth h, tank height H, tank on level ground	m
Draining time	t = (A/a) sqrt(2 H/g) Valid when: small hole of area a in a wide open tank, ideal liquid	s

Full lesson with worked examples:
https://www.engineeringrise.in/learn/learn/jee-main/physics/properties-of-solids-and-liquids/fluid-pressure-pascal-law-viscosity-and-l

EngineeringRise is an unofficial study site. It is not affiliated with NTA, the IITs, BITS, VIT, SRM or any exam body.